Institute for
Interlaboratory Studies

Results of Proficiency Test
Mono Ethylene glycol
(MEG polyester grade)
October 2022

Organized 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 the analysis of Mono Ethylene glycol (MEG polyester grade) based on the latest version of ASTM E202 every year. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of Mono Ethylene glycol.

In this interlaboratory study 60 laboratories in 23 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): 1x 1 L bottle for various analyzes labelled #22195 and 1x 100 mL bottle for determination of UV only labelled #22196.
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 preparation of the sample for the regular analyzes in MEG a batch of approximately 100 liters of MEG polyester grade was obtained from a local supplier. After homogenization 85 amber glass bottles of 1 L were filled and labelled #22195.
The homogeneity of the subsamples was checked by determination of Density at 20 °C in accordance with ASTM D4052 and Water in accordance with ASTM E1064 on 8 stratified randomly selected subsamples.

	Density at 20 °C in kg/L	Water in mg/kg
sample #22195-1	1.11323	186
sample #22195-2	1.11326	183
sample #22195-3	1.11325	184
sample #22195-4	1.11325	184
sample #22195-5	1.11326	185
sample #22195-6	1.11325	189
sample #22195-7	1.11326	190
sample #22195-8	1.11324	186

Table 1: homogeneity test results of subsamples #22195

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

	Density at 20 °C in kg/L	Water in mg/kg
r (observed)	0.00003	6.9
reference test method	ISO12185:96	E1064:16
0.3 x R (reference test method)	0.0015	8.9

Table 2: evaluation of the repeatabilities of subsamples #22195

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

For the preparation of the sample for the analyzes of UV transmittance in MEG a batch of approximately 18 liters of MEG polyester grade was obtained from a local supplier. After homogenization 85 amber glass bottles of 100 mL were filled and labelled #22196.
The homogeneity of the subsamples was checked by the determination of UV transmittance at 350 nm, 275 nm, 250 nm and 220 nm in accordance with ASTM E2193 option B (not sparged with Nitrogen) using a 50 mm cuvette on 8 stratified randomly selected subsamples.

	UV at 350 nm in %T	UV at 275 nm in %T	UV at 250 nm in %T	UV at 220 nm in %T
sample #22196-1	97.6	95.4	91.1	68.1
sample #22196-2	97.7	95.4	91.1	67.5
sample #22196-3	97.7	95.4	91.1	68.4
sample #22196-4	97.8	95.7	91.3	68.5
sample #22196-5	97.7	95.6	91.3	68.7
sample #22196-6	97.7	95.5	91.2	68.7
sample #22196-7	97.8	95.7	91.4	68.9
sample #22196-8	97.8	95.7	91.4	68.9

Table 3: homogeneity test results of subsamples #22196

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 350 nm in %T	UV at 275 nm in %T	UV at 250 nm in %T	UV at 220 nm in %T
r (observed)	0.2	0.4	0.4	1.3
reference test method	E2193-B:16	E2193-B:16	E2193-B:16	E2193-B:16
0.3 x R (reference test method)	0.3	0.6	0.3	1.2

Table 4: evaluation of the repeatabilities of subsamples #22196

The calculated repeatabilities are 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 1 L bottle of MEG polyester grade labelled #22195 and one 100 mL bottle of MEG polyester grade labelled #22196 were sent on September 21, 2022. 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 #22195: Acidity as Acetic Acid (ASTM E2679 and ASTM D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Inorganic Chloride as Cl, Color Pt/Co (manual and automated), Density at 20 °C, Diethylene Glycol, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Iron as Fe, Water miscibility (Hydrocarbons), Purity by GC as received, Specific Gravity at 20/20 °C and Water. On sample #22196 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 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 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.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. 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 (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

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 (derived from e.g. ISO or ASTM test methods), 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, 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. Therefore, the usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. When considering the test results of the two samples together eight participants reported test results after the final reporting date and eight other participants did not report any test results. Not all participants were able to report all tests requested.
In total 52 participants reported 669 numerical test results. Observed were 33 outlying test results, which is 4.9%. In proficiency tests 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 original data 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). When a method has been reapproved an “R” will be added and the year of approval (e.g. D1209:05R19).

sample #22195

Acidity as Acetic Acid (ASTM E2679): This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the strict precision data of ASTM E2679:22.

Acidity as Acetic Acid (ASTM 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. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM E2313:22.

Appearance: This determination was not problematic. All reporting participants except one agreed on a test result of Pass (Clear & Bright).

Ash content: This determination was not problematic. Almost all reporting participants agreed on a value near or below the application range. Therefore, no z-scores are calculated.

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

Color Pt/Co (manual): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1209:05R19.

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

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

Diethylene Glycol: This determination was problematic. Three 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 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 D1078:11R19 automated and manual modes.

Iron as Fe: 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 E1615:22.

Water miscibility (Hydrocarbons): This determination was not problematic. All reporting participants agreed on a test result of 'Passes test' or 'Pass'.

Purity by GC as received: Regretfully, no reproducibility data for Purity is mentioned in ASTM E2409:20a. Therefore, no z-scores are calculated.
The calculated reproducibility of the 2022 PT is lower than the reproducibility of the 2021 PT (0.029 vs 0.063)

Specific Gravity 20/20 °C: This determination was not problematic. Four 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. Six 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 #22196

UV transmittance: The reported test results were evaluated separately for option A (with Nitrogen sparging) and option B (without Nitrogen sparging).

Option A: This determination was problematic. One statistical outlier was observed in transmittance at 220 nm and no statistical outliers in the other three parameters. For the transmittance at 350, 275 and 250 nm the calculated reproducibility is not in agreement. For the transmittance at 220 nm the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM E2193:16.

Option B: This determination was problematic. No statistical outliers were observed over four parameters. The calculated reproducibilities are not in agreement with the requirements of ASTM E2193:16.

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 reproducibility derived from reference methods are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R(lit)
Acidity as Acetic Acid (E2679)	mg/kg	7	1.56	1.48	0.79
Acidity as Acetic Acid (D1613)	mg/kg	38	6.89	7.0	14
Aldehydes as Acetaldehyde	mg/kg	30	24.6	7.4	21.2
Appearance		43	Pass	n.a.	n.a.
Ash content	%M/M	30	<0.01	n.e.	n.e.
Inorganic Chloride as Cl	mg/kg	14	0.018	0.020	0.015
Color Pt/Co (manual)		16	1.5	1.8	7
Color Pt/Co (automated)		33	1.5	1.8	4.8
Density at 20 °C	kg/L	42	1.1133	0.0002	0.0005
Diethylene Glycol	mg/kg	28	18.7	6.8	4.8
Initial Boiling Point	°C	32	196.9	1.0	3.1
50% recovered	°C	30	197.4	0.6	1.3
Dry Point	°C	31	197.8	0.8	2.1
Iron as Fe	mg/kg	26	0.009	0.017	0.010
Water miscibility (Hydrocarbons)		26	Pass	n.a.	n.a.
Purity by GC as received	%M/M	38	99.970	0.029	n.a.
Specific Gravity 20/20 °C		41	1.1153	0.0002	0.0005
Water	mg/kg	43	212	57	34
UV transmittance at 350 nm (A)	%T	10	98.88	1.70	0.94
UV transmittance at 275 nm (A)	%T	10	96.63	2.73	1.10
UV transmittance at 250 nm (A)	%T	9	94.44	4.19	2.06
UV transmittance at 220 nm (A)	%T	9	82.91	6.10	9.68
UV transmittance at 350 nm (B)	%T	35	98.98	2.07	1.15
UV transmittance at 275 nm (B)	%T	35	96.75	3.12	2.11
UV transmittance at 250 nm (B)	%T	34	92.41	3.31	1.10
UV transmittance at 220 nm (B)	%T	36	69.04	4.53	4.05

Table 5: reproducibilities of tests on samples #22195 and #22196

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2022 WITH PREVIOUS PTS

	October 2022	October 2021	October 2020	October 2019	October 2018
Number of reporting laboratories	52	61	60	54	61
Number of test results	669	856	852	759	855
Number of statistical outliers	33	44	45	30	33
Percentage of statistical outliers	4.9%	5.1%	5.3%	4.0%	3.9%

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 to the requirements of the reference test methods. The conclusions are given in the following table.

	October 2022	October 2021	October 2020	October 2019	October 2018
Acidity as Acetic Acid (E2679)	-	-	--	--	(--)
Acidity as Acetic Acid (D1613)	+	++	++	+	++
Aldehydes as Acetaldehyde	++	++	+	+	++
Ash content	n.e.	n.e.	n.e.	(++)	(++)
Inorganic Chloride as Cl	-	-	--	--	-
Color Pt/Co (manual)	++	++	++	+	+
Color Pt/Co (automated)	++	++	++	+/-	+
Density at 20 °C	++	++	+	++	+
Diethylene Glycol	-	--	-	-	--
Distillation	++	++	++	++	++
Iron as Fe	-	-	-	--	+/-
Specific Gravity 20/20 °C	++	+	+	++	+
Water	-	-	-	+/-	-
UV transmittance at 350 nm (A)	-	+	++	+/-	++
UV transmittance at 275 nm (A)	-	-	+/-	-	+/-
UV transmittance at 250 nm (A)	--	+	--	+/-	n.e.
UV transmittance at 220 nm (A)	+	+	++	++	n.e.
UV transmittance at 350 nm (B)	-	+	++	-	+/-
UV transmittance at 275 nm (B)	-	+	++	+	+
UV transmittance at 250 nm (B)	--	-	-	--	-
UV transmittance at 220 nm (B)	-	+	+	+	+

Table 7: comparison of determinations to the reference test methods

For results between brackets no z-scores are calculated

The following performance categories were used:

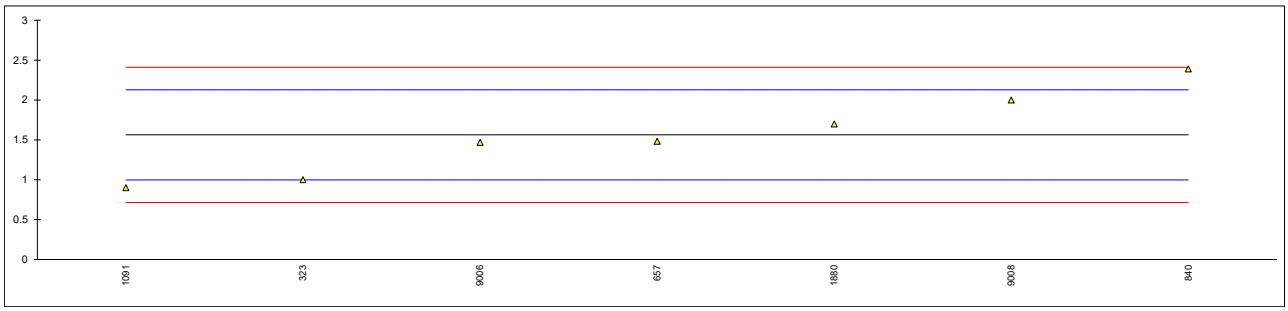
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test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

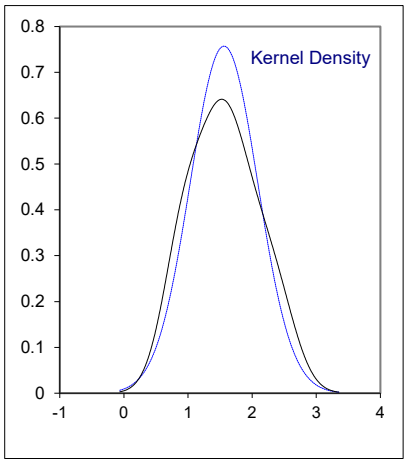
APPENDIX 1

Determination of Acidity as Acetic Acid (ASTM E2679) on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
158		-----		-----	
169		-----		-----	
171		-----		-----	
172		-----		-----	
174		-----		-----	
315		-----		-----	
323	E2679	1.0		-1.99	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621		-----		-----	
657	E2679	1.4811		-0.29	
840	E2679	2.39		2.93	
886		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2679	0.9		-2.35	
1117		-----		-----	
1135		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603	In house	< 0,3		<-4.47	possibly a false negative test result?
1656		-----		-----	
1688		-----		-----	
1701		-----		-----	
1718		-----		-----	
1742		-----		-----	
1823		-----		-----	
1880	E2679	1.7		0.48	
1954		-----		-----	
6111		-----		-----	
6189		-----		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----	W	-----	test result withdrawn, reported 13.51
6273		-----		-----	
6438		-----		-----	
7013		-----		-----	
9006	E2679	1.47		-0.33	
9008	E2679	2.0		1.55	
9009		-----		-----	
9014		-----		-----	

normality	unknown
n	7
outliers	0
mean (n)	1.563
st.dev. (n)	0.5269
R(calc.)	1.475
st.dev.(E2679:22)	0.2825
R(E2679:22)	0.791

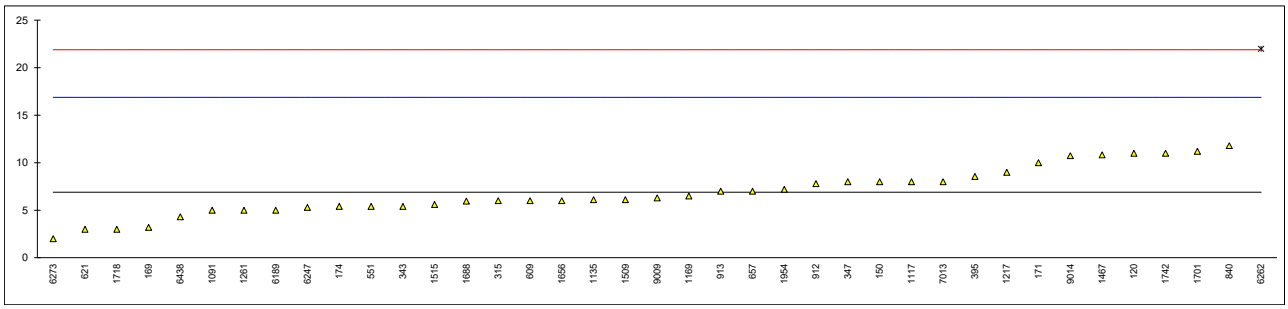

3
2.5
2
1.5
1
0.5
0
1091
323
9006
657
1880
9008
840

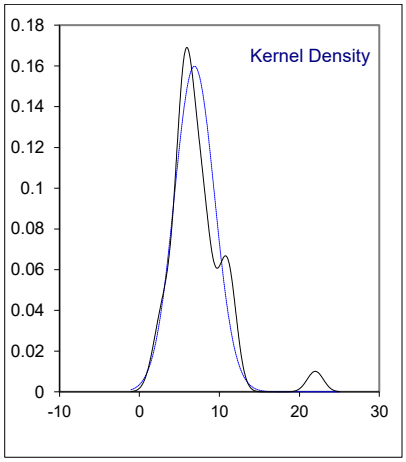

Kernel Density
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-1
0
1
2
3
4

Determination of Acidity as Acetic Acid (ASTM D1613) on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	11	C	0.82	reported 0.011 mg/kg
150	D1613	8		0.22	
158		-----		-----	
169	D1613	3.2		-0.74	
171	D1613	10		0.62	
172		-----		-----	
174	D1613	5.4		-0.30	
315	D1613	6		-0.18	
323		-----		-----	
343	D1613	5.4		-0.30	
347	D1613	8		0.22	
370		-----		-----	
395	D1613	8.55		0.33	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D1613	5.4		-0.30	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609	D1613	6		-0.18	
621	D1613	3		-0.78	
657	D1613	7		0.02	
840	D1613	11.8		0.98	
886		-----		-----	
912	D1613	7.8		0.18	
913	D1613	7		0.02	
962		-----		-----	
963		-----		-----	
1091	D1613	5		-0.38	
1117	D1613	8		0.22	
1135	D1613	6.1		-0.16	
1169	D1613	6.5		-0.08	
1217		9		0.42	
1261	D1613	5	C	-0.38	first reported 49.2
1467	D1613	10.83		0.79	
1509	D1613	6.1		-0.16	
1515	D1613	5.6		-0.26	
1603		-----		-----	
1656	D1613	6		-0.18	
1688	D1613	5.96		-0.19	
1701	D1613	11.2		0.86	
1718	D1613	3.0		-0.78	
1742	D1613	11.0		0.82	
1823		-----		-----	
1880		-----		-----	
1954	D1613	7.2		0.06	
6111		-----		-----	
6189	D1613	5		-0.38	
6198		-----		-----	
6247	D1613	5.3		-0.32	
6262	D1613	22	C,R(0.01)	3.02	first reported 19
6273	D1613	2		-0.98	
6438	D1613	4.31	C	-0.52	reported 0.000431 mg/kg
7013	D1613	8		0.22	
9006		-----		-----	
9008		-----		-----	
9009	D1613	6.3		-0.12	
9014	D1613	10.74		0.77	

normality	OK
n	38
outliers	1
mean (n)	6.887
st.dev. (n)	2.4964
R(calc.)	6.990
st.dev.(D1613:17)	5.0000
R(D1613:17)	14

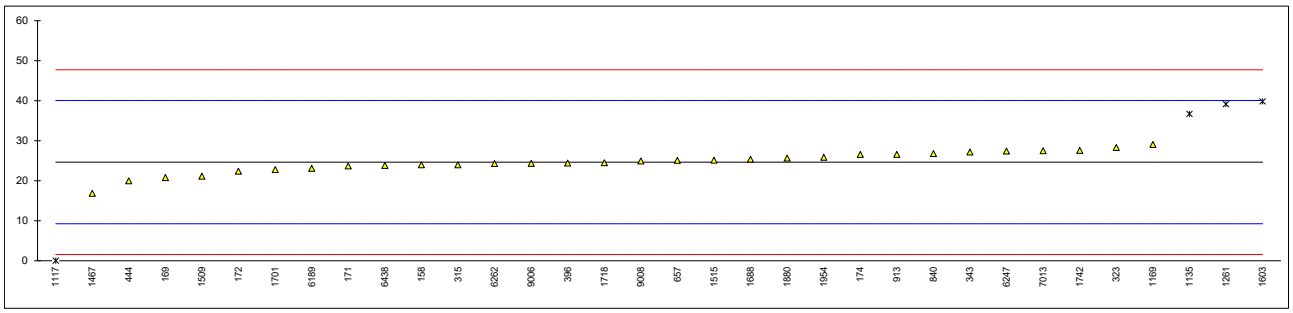

25
20
15
10
5
0
6273
621
1718
169
6438
1091
1261
6189
6247
174
551
343
1515
1688
315
609
1656
1135
1509
9009
1169
913
657
1954
912
347
150
1117
7013
395
1217
171
9014
1467
120
1742
1701
840
6262

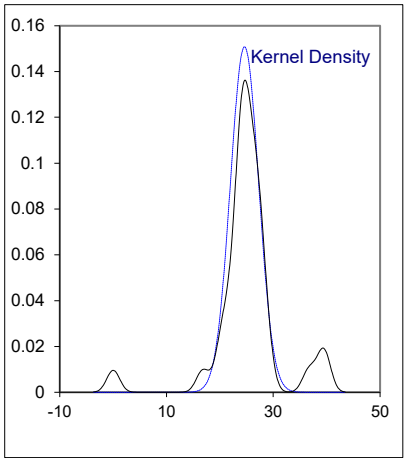

Kernel Density
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-10
0
10
20
30

Determination of Aldehydes as Acetaldehyde on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
158	E2313	24.0		-0.09	
169	E2313	20.8		-0.51	
171	E2313	23.7		-0.12	
172	E2313	22.4		-0.30	
174	E2313	26.6		0.26	
315	E2313	24.0		-0.09	
323	E2313	28.3		0.48	
343	E2313	27.2		0.34	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396	E2313	24.4		-0.03	
444	E2313	20.0		-0.61	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621		-----		-----	
657	E2313	25.1113		0.06	
840	E2313	26.79		0.28	
886		-----		-----	
912		-----		-----	
913	E2313	26.6		0.26	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	In house	0.05	G(0.01)	-3.25	
1135	E2313	36.7	C,G(0.01)	1.59	first reported 35.1
1169	E2313	29.06		0.58	
1217		-----		-----	
1261	E2313	39.15	C,DG(0.01)	1.92	first reported 40.41
1467		16.84		-1.03	
1509	E2313	21.15		-0.46	
1515	E2313	25.17		0.07	
1603	In house	39.8	C,DG(0.01)	2.00	first reported 53.4
1656		-----		-----	
1688	E2313	25.39		0.10	
1701	E2313	22.8		-0.24	
1718	E2313	24.51		-0.02	
1742	E2313	27.6		0.39	
1823		-----		-----	
1880	E2313	25.68		0.14	
1954	E2313	25.85		0.16	
6111		-----		-----	
6189	E2313	23.1		-0.20	
6198		-----		-----	
6247	E2313	27.4		0.36	
6262	E2313	24.3		-0.05	
6273		-----		-----	
6438	E2313	23.8		-0.11	
7013	E2313	27.52		0.38	
9006	E2313	24.34		-0.04	
9008	E2313	24.95		0.04	
9009		-----		-----	
9014		-----		-----	

normality	suspect
n	30
outliers	4
mean (n)	24.645
st.dev. (n)	2.6453
R(calc.)	7.407
st.dev.(E2313:22)	7.5713
R(E2313:22)	21.200


60
50
40
30
20
10
0
1117
1467
444
169
1509
172
1701
6189
171
6438
158
315
6262
9006
396
1718
9008
657
1515
1688
1880
1954
174
913
840
343
6247
7013
1742
323
1169
1135
1261
1603


Kernel Density
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-10
10
30
50

Determination of Appearance on sample #22195;

lab	method	value	mark	z(targ)	remarks
120	Visual	C & B		-----	
150	E2680	Fail		-----	
158	E2680	C&B		-----	
169	Visual	Pass		-----	
171	E2680	Pass		-----	
172	Visual	Pass		-----	
174	Visual	Clear & Free		-----	
315	E2680	clear and free		-----	
323	E2680	C&B		-----	
343	E2680	PASS		-----	
347	E2680	Pass		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	PASS		-----	
444	E2680	Pass		-----	
522		-----		-----	
528		-----		-----	
551	E2680	Pass		-----	
557		-----		-----	
558		-----		-----	
600	Visual	Colourless		-----	
609	E2680	Pass		-----	
621	Visual	Pass		-----	
657	E2680	Clear and Bright		-----	
840	E2680	Pass		-----	
886		-----		-----	
912	E2680	Pass		-----	
913	E2680	Clear and Bright		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	E2680	Pass		-----	
1135	Visual	Clear & Bright		-----	
1169	D4176	Pass		-----	
1217		pass		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2680	CFFSM		-----	
1515	E2680	Pass		-----	
1603	Visual	CFP		-----	
1656	Visual	Clear & Bright		-----	
1688		-----		-----	
1701		-----		-----	
1718	E2680	CFFSM		-----	
1742	E2680	Pass		-----	
1823		-----		-----	
1880	E2680	Pass		-----	
1954	Visual	Clear and colourless		-----	
6111		-----		-----	
6189	D4176	pass		-----	
6198		-----		-----	
6247		Clear colourless liquid		-----	
6262	Visual	Pass		-----	
6273	E2680	PASS		-----	
6438	E2680	Pass-Clear and Bright		-----	
7013		Clear		-----	
9006		-----		-----	
9008	E2680	pass		-----	
9009	E2680	PASS		-----	
9014	E2680	PASS		-----	
	n	43			
	mean (n)	Pass (Clear & Bright)			

CFFSM = Clear and free from suspended matter
CFP = Clear and free from particles

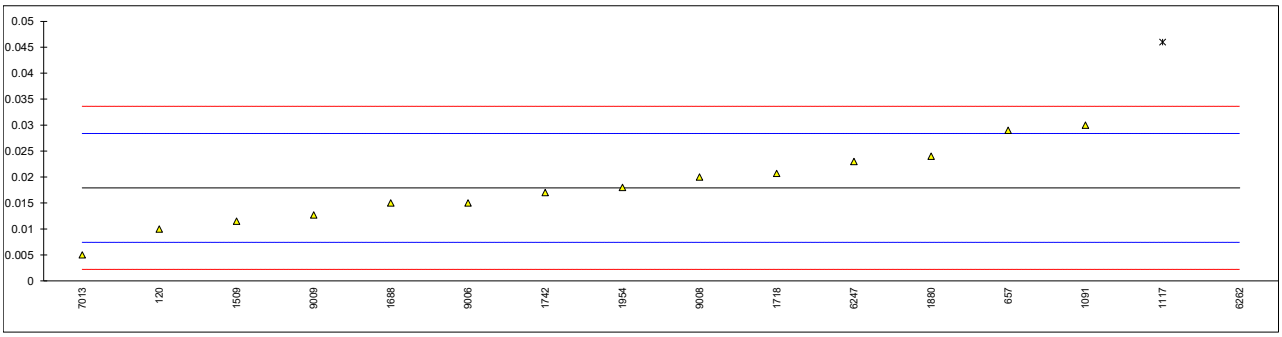
Determination of Ash content on sample #22195; results in %M/M

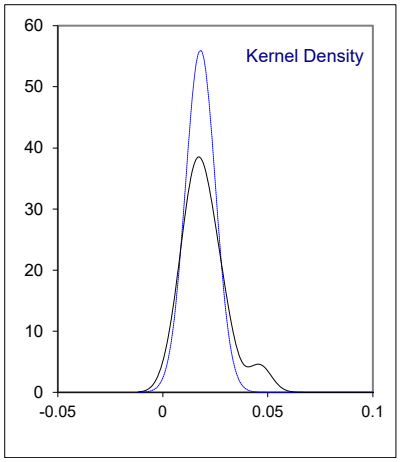
lab	method	value	mark	z(targ)	remarks
120	D482	0.00		-----	
150	D482	<0.010		-----	
158	D482	<0.001		-----	
169	D482	0.0		-----	
171	D482	<0.010		-----	
172	D482	<0.01		-----	
174	D482	<0.001		-----	
315	D482	<0.001		-----	
323	D482	< 0.001		-----	
343		-----		-----	
347		-----		-----	
370	D482	< 0.001		-----	
395		-----		-----	
396	D482	<0.0100		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D482	<0.001		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621	D482	<0.01		-----	
657	D482	0.0005		-----	
840	D482	<0.001		-----	
886		-----		-----	
912	D482	<0.01		-----	
913	D482	<0.01		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D482	< 10		-----	
1135	D482	<0.001		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		0.00047		-----	
1509	D482	0.0009		-----	
1515		-----		-----	
1603	In house	< 0,0010		-----	
1656	D482	<0.001		-----	
1688		-----		-----	
1701		-----		-----	
1718	D482	<0.001		-----	
1742		-----		-----	
1823		-----		-----	
1880		-----		-----	
1954	D482	0.00028		-----	
6111		-----		-----	
6189	D482	<0.010		-----	
6198		-----		-----	
6247		-----		-----	
6262	D482	0		-----	
6273	D482	<0.001		-----	
6438	D482	<0.01		-----	
7013	D482	0.0002		-----	
9006		-----		-----	
9008		-----		-----	
9009	D482	<0.01		-----	
9014		-----		-----	
	n	30			
	mean (n)	<0.01			

Determination of Inorganic Chloride as Cl on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2469	0.01		-1.51	
150		-----		-----	
158		-----		-----	
169	E2469	<0.1	C	-----	first reported 0.1
171		-----		-----	
172	E2469	<0.01		-----	
174	E2469	<0.01		-----	
315	E2469	<0.01		-----	
323	E2469	< 0.03		-----	
343	E2469	<0,01		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621		-----		-----	
657	E2469	0.029		2.11	
840	IMPCA002	<0.2		-----	
886		-----		-----	
912		-----		-----	
913	INH-001	<1		-----	
962		-----		-----	
963		-----		-----	
1091	E2469	0.03		2.31	
1117	E2469	0.046	G(0.05)	5.36	
1135	E2469	<0.01		-----	
1169	E2469	<0.1		-----	
1217		-----		-----	
1261		-----		-----	
1467		<0.1		-----	
1509	E2469	0.0115		-1.23	
1515		-----		-----	
1603	In house	< 0,006		-----	
1656		-----		-----	
1688	E2469	0.015		-0.56	
1701		-----		-----	
1718	E2469	0.0207		0.53	
1742	In house	0.017		-0.18	
1823		-----		-----	
1880	E2469	0.024		1.16	
1954	E2469	0.018		0.01	
6111		-----		-----	
6189		-----		-----	
6198		-----		-----	
6247	E2469	0.023		0.97	
6262	E2469	0.3373	C,G(0.01)	60.96	first reported 0.3208
6273		-----		-----	
6438		-----		-----	
7013	E2469	0.005		-2.47	
9006	E2469	0.015		-0.56	
9008	E2469	0.02		0.40	
9009	E2469	0.0127		-1.00	
9014		-----		-----	

normality	OK
n	14
outliers	2
mean (n)	0.0179
st.dev. (n)	0.00712
R(calc.)	0.0199
st.dev.(E2469:16)	0.00524
R(E2469:16)	0.0147

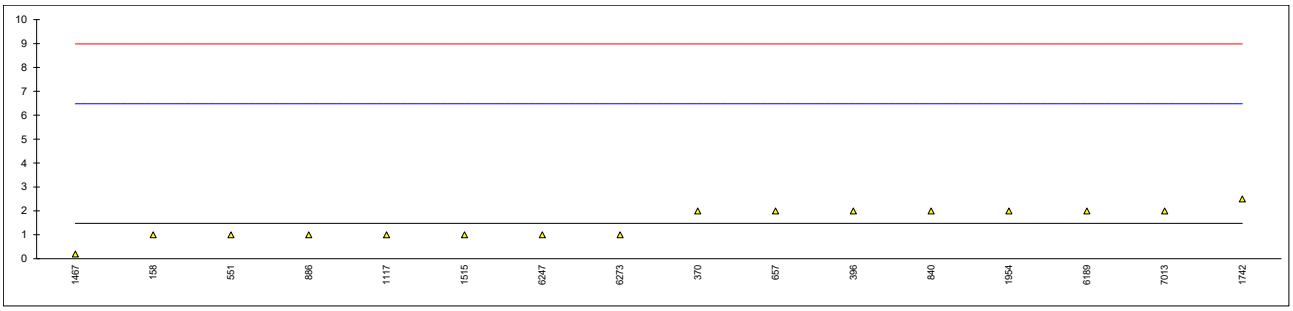

0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
7013
120
1509
9009
1688
9006
1742
1954
9008
1718
6247
1880
657
1091
1117
6262

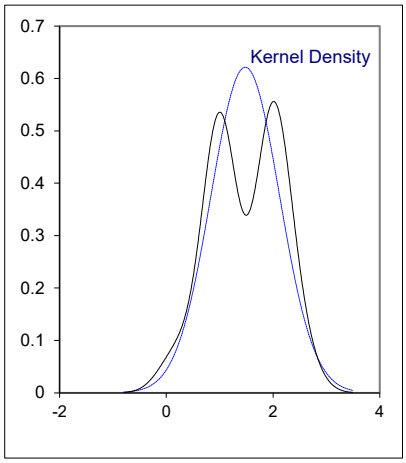

Kernel Density
60
50
40
30
20
10
0
-0.05
0
0.05
0.1

Determination of Color Pt/Co (manual) on sample #22195

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D1209	<5		-----	
158	D1209	1		-0.19	
169	D1209	<5		-----	
171	D1209	<5		-----	
172		-----		-----	
174		-----		-----	
315	D1209	<5		-----	
323	D1209	< 5		-----	
343		-----		-----	
347		-----		-----	
370	D1209	2		0.21	
395		-----		-----	
396	D1209	2		0.21	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D1209	1		-0.19	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621	D1209	<5		-----	
657	D1209	2		0.21	
840	D1209	2		0.21	
886	D1209	1		-0.19	
912		-----		-----	
913	D1209	<5		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D1209	1		-0.19	
1135		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		0.2		-0.51	
1509	D1209	<5		-----	
1515	D1209	1		-0.19	
1603		-----		-----	
1656		-----		-----	
1688		-----		-----	
1701		-----		-----	
1718	D1209	<5		-----	
1742	D1209	2.5		0.41	
1823		-----		-----	
1880		-----		-----	
1954	D1209	2		0.21	
6111		-----		-----	
6189	D1209	2		0.21	
6198		-----		-----	
6247	D1209	1		-0.19	
6262		-----		-----	
6273	D1209	1		-0.19	
6438		-----		-----	
7013	D1209	2		0.21	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	16
outliers	0
mean (n)	1.48
st.dev. (n)	0.642
R(calc.)	1.80
st.dev.(D1209:05R19)	2.500
R(D1209:05R19)	7

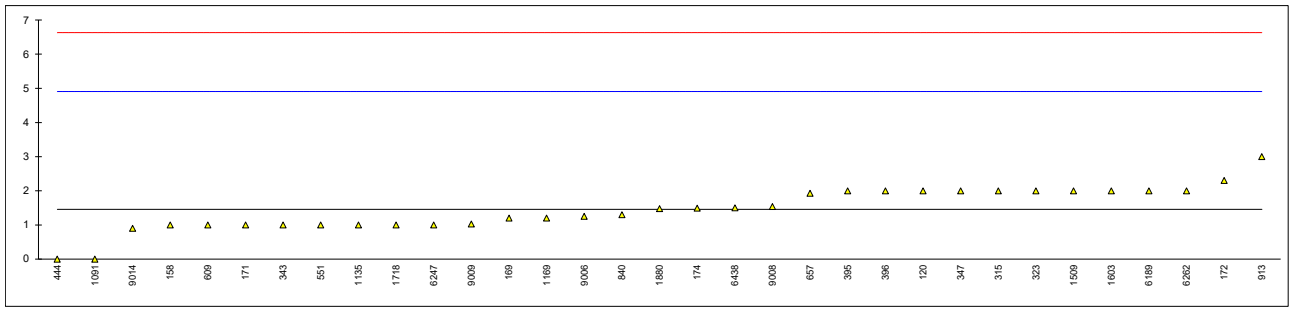

10
9
8
7
6
5
4
3
2
1
0
1467
158
551
886
1117
1515
6247
6273
370
657
396
840
1954
6189
7013
1742

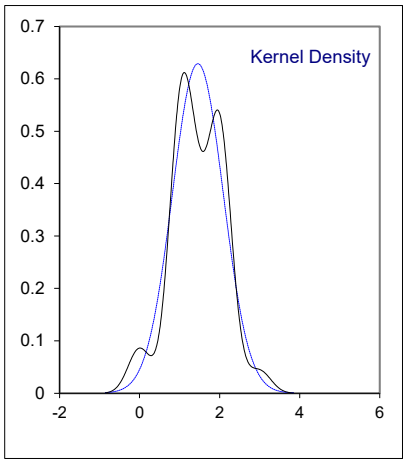

Kernel Density
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
0
2
4

Determination of Color Pt/Co (automated) on sample #22195

lab	method	value	mark	z(targ)	remarks
120	D1209	2		0.31	
150		-----		-----	
158	D5386	1		-0.27	
169	D5386	1.2		-0.15	
171	D5386	1		-0.27	
172	D5386	2.3		0.49	
174	D5386	1.49		0.02	
315	D5386	2		0.31	
323	D5386	2		0.31	
343	D5386	1		-0.27	
347	D5386	2		0.31	
370		-----		-----	
395	D5386	2		0.31	
396	D5386	2		0.31	
444	D5386	0		-0.85	
522		-----		-----	
528		-----		-----	
551	D5386	1		-0.27	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609	D5386	1.0		-0.27	
621		-----		-----	
657	D5386	1.93		0.27	
840	D5386	1.3		-0.09	
886		-----		-----	
912		-----		-----	
913	D5386	3		0.89	
962		-----		-----	
963		-----		-----	
1091	D5386	0		-0.85	
1117		-----		-----	
1135	D5386	1		-0.27	
1169	D5386	1.2		-0.15	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D5386	2		0.31	
1515		-----		-----	
1603	In house	2	C	0.31	first reported 3
1656	D5386	<5		-----	
1688		-----		-----	
1701		-----		-----	
1718	D5386	1		-0.27	
1742		-----		-----	
1823		-----		-----	
1880	D5386	1.48		0.01	
1954		-----		-----	
6111		-----		-----	
6189	D5386	2		0.31	
6198		-----		-----	
6247	D5386	1		-0.27	
6262	D5386	2	C	0.31	first reported 0
6273		-----		-----	
6438	D1209	1.5	C	0.02	first reported 0
7013		-----		-----	
9006	D5386	1.25		-0.12	
9008	D5386	1.54		0.05	
9009	D5386	1.03		-0.25	
9014	D5386	0.9		-0.32	

normality	OK
n	33
outliers	0
mean (n)	1.46
st.dev. (n)	0.634
R(calc.)	1.78
st.dev.(D5386:16)	1.723
R(D5386:16)	4.83

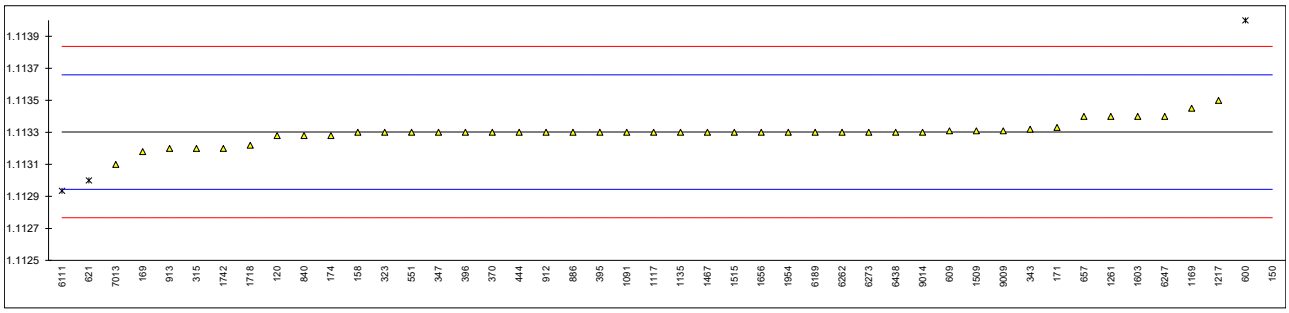

7
6
5
4
3
2
1
0
444
1091
9014
158
609
171
343
551
1135
1718
6247
9009
169
1169
9006
840
1880
174
6438
9008
657
395
396
120
347
315
323
1509
1603
6189
6262
172
913

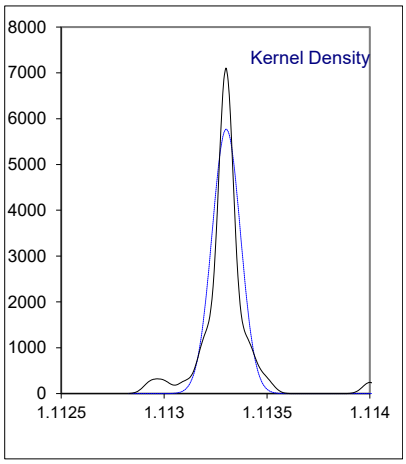

Kernel Density
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
0
2
4
6

Determination of Density at 20 °C on sample #22195; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11328		-0.12	
150	D4052	1.1154	C,R(0.01)	11.75	first reported 1.113
158	D4052	1.1133	C	-0.01	first reported 1.1143
169	D4052	1.11318		-0.68	
171	D4052	1.11333		0.16	
172		-----		-----	
174	D4052	1.11328		-0.12	
315	D4052	1.1132		-0.57	
323	D4052	1.1133		-0.01	
343	D4052	1.11332	C	0.10	first reported 1.113
347	D4052	1.1133		-0.01	
370	D4052	1.1133		-0.01	
395	D4052	1.1133		-0.01	
396	D4052	1.1133		-0.01	
444	D4052	1.1133		-0.01	
522		-----		-----	
528		-----		-----	
551	D4052	1.1133		-0.01	
557		-----		-----	
558		-----		-----	
600	D4052	1.114	R(0.01)	3.91	
609	D4052	1.11331		0.05	
621	D4052	1.113	R(0.01)	-1.69	
657	D4052	1.1134		0.55	
840	ISO12185	1.11328		-0.12	
886	D4052	1.1133		-0.01	
912	D4052	1.1133		-0.01	
913	D4052	1.1132		-0.57	
962		-----		-----	
963		-----		-----	
1091	D4052	1.1133		-0.01	
1117	D4052	1.1133		-0.01	
1135	ISO12185	1.1133		-0.01	
1169	D4052	1.11345		0.83	
1217		1.11350		1.11	
1261	D4052	1.1134		0.55	
1467		1.1133		-0.01	
1509	D4052	1.11331		0.05	
1515	D4052	1.1133		-0.01	
1603	In house	1.11340		0.55	
1656	ISO12185	1.1133		-0.01	
1688		-----		-----	
1701		-----		-----	
1718	D4052	1.11322		-0.46	
1742	ISO12185	1.1132	C	-0.57	first reported 1.1167
1823		-----		-----	
1880		-----		-----	
1954	D4052	1.1133		-0.01	
6111	D4052	1.112935	R(0.01)	-2.05	
6189	ISO12185	1.1133		-0.01	
6198		-----		-----	
6247	D4052	1.1134		0.55	
6262	D4052	1.1133		-0.01	
6273	D4052	1.1133	C	-0.01	first reported 1.11279
6438	D4052	1.1133		-0.01	
7013	D4052	1.1131		-1.13	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11331		0.05	
9014	D4052	1.11330		-0.01	

normality	not OK
n	42
outliers	4
mean (n)	1.11330
st.dev. (n)	0.000069
R(calc.)	0.00019
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005

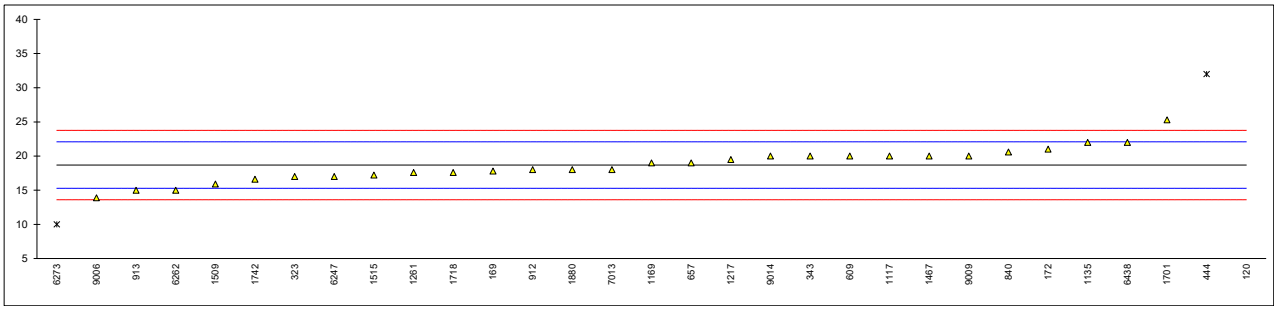

1.1139
1.1137
1.1135
1.1133
1.1131
1.1129
1.1127
1.1125
6111 621 7013 169 913 315 1742 1718 120 840 174 158 323 551 347 396 370 444 912 886 395 1091 1117 1135 1467 1515 1656 1954 6189 6282 6273 6438 9014 609 1509 9009 343 171 657 1261 1603 6247 1169 1217 600 150

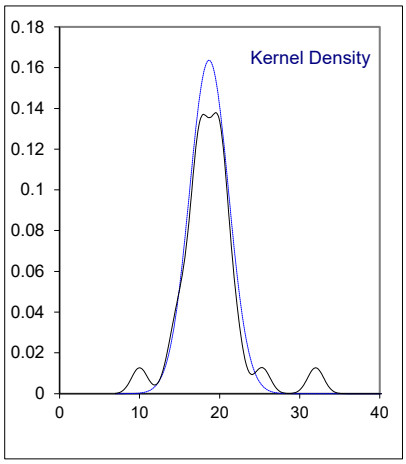

Kernel Density
8000
7000
6000
5000
4000
3000
2000
1000
0
1.1125
1.113
1.1135
1.114

Determination of Diethylene Glycol on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	91	C,R(0.01)	42.61	first reported 0
150		-----		-----	
158	E2409	<22	C	-----	first reported 215.5
169	E2409	17.8		-0.52	
171	E2409	<22	C	-----	first reported 11
172	E2409	21		1.37	
174	E2409	<22		-----	
315	E2409	<10		-----	
323	E2409	17	C	-0.99	first reported 0.0017
343	E2409	20		0.78	
347	E2409	<20		-----	
370		-----		-----	
395		-----		-----	
396	D2409	<50		-----	
444	D2409	32	R(0.01)	7.85	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609	E2409	20		0.78	
621	E2409	<22		-----	
657	E2409	19		0.19	
840	E2409	20.6		1.13	
886		-----		-----	
912	E2409	18		-0.40	
913	E2409	15		-2.17	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	E2409	20		0.78	
1135	E2409	22		1.96	
1169	E2409	19		0.19	
1217		19.5		0.48	
1261	E2409	17.6		-0.64	
1467		20		0.78	
1509	E2409	15.9		-1.64	
1515	E2409	17.2		-0.87	
1603	In house	<50	C	-----	first reported <0.0050
1656		-----		-----	
1688		-----		-----	
1701	E2409	25.3		3.90	
1718	E2409	17.6		-0.64	
1742	E2409	16.6		-1.22	
1823		-----		-----	
1880	E2409	18		-0.40	
1954	E2409	<22		-----	
6111		-----		-----	
6189	E2409	<0.22		-----	
6198		-----		-----	
6247	E2409	17		-0.99	
6262	E2409	15		-2.17	
6273	E2409	10	C,R(0.01)	-5.11	first reported 57
6438	E2409	22	C	1.96	first reported 28
7013	E2409	18		-0.40	
9006	E2409	13.9		-2.82	
9008		-----		-----	
9009	E2409	20		0.78	
9014	E2409	19.99		0.77	

normality	OK
n	28
outliers	3
mean (n)	18.68
st.dev. (n)	2.439
R(calc.)	6.83
st.dev.(E2409:20a)	1.697
R(E2409:20a)	4.75


40
35
30
25
20
15
10
5
6273
9006
913
6262
1509
1742
323
6247
1515
1261
1718
169
912
1880
7013
1169
657
1217
9014
343
609
1117
1467
9009
840
172
1135
6438
1701
444
120

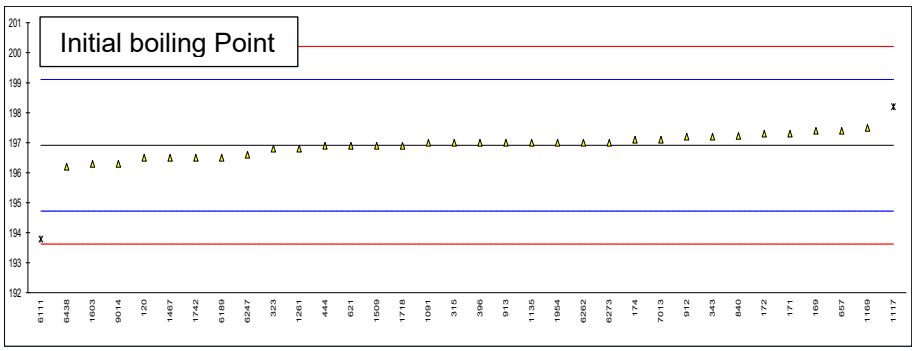

Kernel Density
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
10
20
30
40

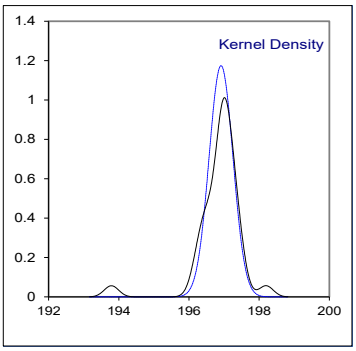
Determination of Distillation: IBP, 50% recovered, Dry Point on sample #22195; results in °C

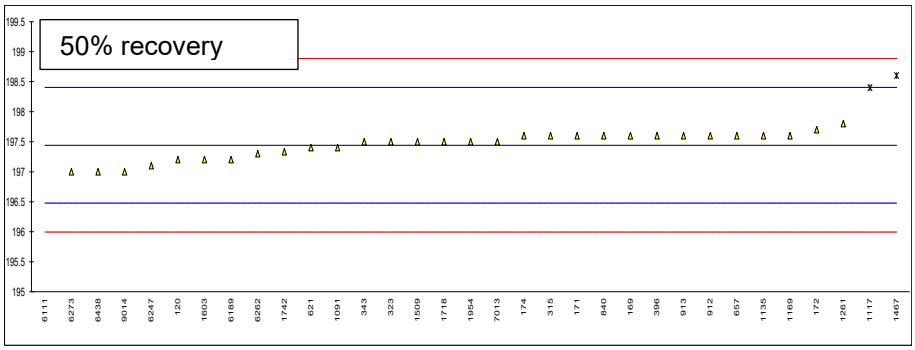
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
120	D1078-automated	196.5		-0.38	197.2		-0.50	197.6	C	-0.30
150		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
169	D1078-automated	197.4		0.44	197.6		0.33	197.7		-0.17
171	D1078-automated	197.3		0.35	197.6		0.33	197.9		0.10
172	D1078-automated	197.3		0.35	197.7		0.54	198.4		0.76
174	D1078-automated	197.1		0.17	197.6		0.33	197.7		-0.17
315	D1078-automated	197.0		0.08	197.6		0.33	197.8		-0.04
323	D1078-automated	196.8		-0.11	197.5		0.12	197.8		-0.04
343	D1078-automated	197.2		0.26	197.5		0.12	197.9		0.10
347		-----		-----	-----		-----	-----		-----
370		-----		-----	-----		-----	-----		-----
395		-----		-----	-----		-----	-----		-----
396	D1078	197.0		0.08	197.6		0.33	198.0		0.23
444	D1078	196.9		-0.02	-----		-----	197.8		-0.04
522		-----		-----	-----		-----	-----		-----
528		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
557		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
600		-----		-----	-----		-----	-----		-----
609		-----		-----	-----		-----	-----		-----
621	D1078-manual	196.9		-0.02	197.4		-0.09	197.9		0.10
657	D1078-automated	197.4		0.44	197.6		0.33	197.8		-0.04
840	D1078-automated	197.23		0.29	197.60		0.33	197.78		-0.06
886		-----		-----	-----		-----	-----		-----
912	D1078-manual	197.2		0.26	197.6		0.33	198		0.23
913	D1078-manual	197.0		0.08	197.6		0.33	198.0		0.23
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
1091		197.0		0.08	197.4		-0.09	197.6		-0.30
1117	D1078-automated	198.2	R(0.05)	1.17	198.4	R(0.01)	1.99	198.6	ex	1.02
1135	D1078-automated	197.0		0.08	197.6		0.33	198.0		0.23
1169	D1078-manual	197.5		0.53	197.6		0.33	197.7		-0.17
1217		-----		-----	-----		-----	-----		-----
1261		196.8		-0.11	197.8		0.75	198.1		0.36
1467		196.5		-0.38	198.6	R(0.01)	2.41	198.2		0.49
1509	D1078-automated	196.9		-0.02	197.5		0.12	197.7		-0.17
1515		-----		-----	-----		-----	-----		-----
1603	D1078-automated	196.3		-0.56	197.2		-0.50	197.5		-0.43
1656		-----		-----	-----		-----	-----		-----
1688		-----		-----	-----		-----	-----		-----
1701		-----		-----	-----		-----	-----		-----
1718	D1078-automated	196.9		-0.02	197.5		0.12	197.7		-0.17
1742	D1078-automated	196.50		-0.38	197.33		-0.23	197.48		-0.46
1823		-----		-----	-----		-----	-----		-----
1880		-----		-----	-----		-----	-----		-----
1954	D1078-automated	197		0.08	197.5		0.12	198		0.23
6111	D86	193.79	R(0.01)	-2.85	194.27	R(0.01)	-6.58	194.54	R(0.01)	-4.35
6189		196.5		-0.38	197.2		-0.50	198.4	C	0.76
6198		-----		-----	-----		-----	-----		-----
6247	D1078	196.6		-0.29	197.1		-0.71	-----		-----
6262	D1078-automated	197.0		0.08	197.3		-0.29	197.8		-0.04
6273	D1078-manual	197	C	0.08	197	C	-0.92	198	C	0.23
6438	D1078-automated	196.2	C	-0.65	197.0	C	-0.92	197.2		-0.83
7013	D1078	197.1		0.17	197.5		0.12	197.9		0.10
9006		-----		-----	-----		-----	-----		-----
9008		-----		-----	-----		-----	-----		-----
9009		-----		-----	-----		-----	-----		-----
9014	D1078-automated	196.3	C	-0.56	197.0	C	-0.92	197.3	C	-0.70

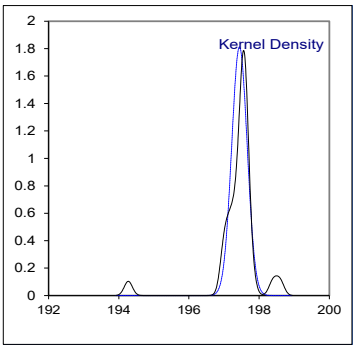
	normality	OK	OK	OK
	n	32	30	31
	outliers	2	3	1 +1ex
	mean (n)	196.92	197.44	197.83
	st.dev. (n)	0.340	0.220	0.268
	R(calc.)	0.95	0.62	0.75
	st.dev.(D1078-A:11R19)	1.097	0.482	0.756
	R(D1078-A:11R19)	3.07	1.35	2.12
Compare				
	R(D1078-M:11R19)	2.11	1.28	2.57

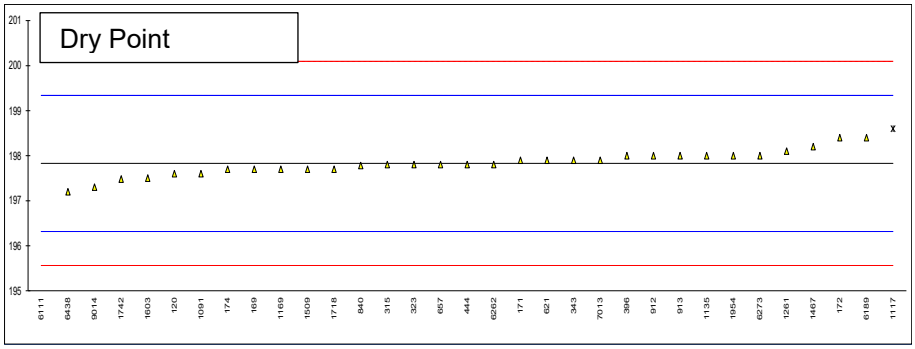
Lab 120 first reported 199.4
Lab 1117 test result excluded because of statistical outliers in related parameters
Lab 6189 first reported 199.6
Lab 6273 first reported 190 for IBP, 191 for 50% recovered and 191 for DP
Lab 6438 first reported 195.7 for IBP and 196.9 for 50% recovered
Lab 9014 first reported 195.4 for IBP, 196.2 for 50% recovery and 196.4 for DP

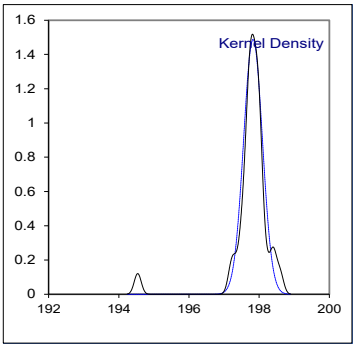








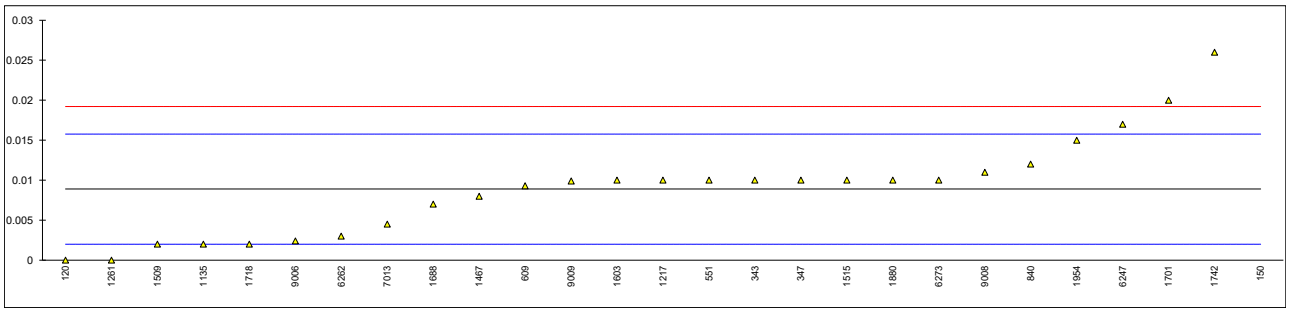


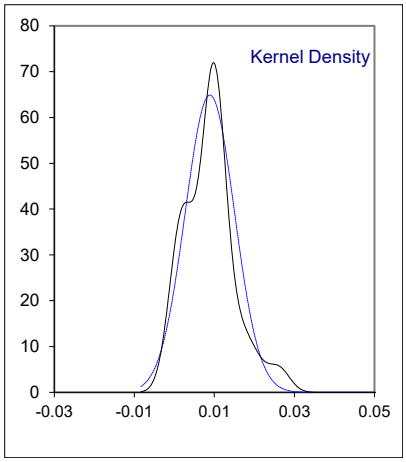


Determination of Iron as Fe on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E394	0		-2.58	
150	E1615	0.081	C,R(0.01)	20.95	first reported 0.018
158		-----		-----	
169	E1615	<0.01		-----	
171	E1615	<0.01		-----	
172	E1615	<0.10		-----	
174	E1615	<0.010		-----	
315	E1615	<0.01		-----	
323	E1615	< 0.010		-----	
343	E1615	0.01		0.32	
347	E394	0.01		0.32	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	E394	0.010		0.32	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609	E1615	0.0093		0.12	
621		-----		-----	
657	E1615	<0.01		-----	
840	E394	0.012		0.90	
886		-----		-----	
912		-----		-----	
913	E394	<0.01		-----	
962		-----		-----	
963		-----		-----	
1091	E1615	<0.001		-----	
1117		-----		-----	
1135	E1615	0.002		-2.00	
1169	E394	<0.02		-----	
1217		0.01		0.32	
1261	E394	0	C	-2.58	first reported
1467		0.008		-0.26	
1509	E394	0.002		-2.00	
1515	E394	0.01		0.32	
1603	In house	0.01		0.32	
1656		-----		-----	
1688	E394	0.007		-0.55	
1701	E394	0.02		3.23	
1718	E394	0.002		-2.00	
1742		0.026		4.97	
1823		-----		-----	
1880	E1615	0.01		0.32	
1954	E394	0.015		1.78	
6111		-----		-----	
6189	E1615	<0.01		-----	
6198		-----		-----	
6247	E394	0.017		2.36	
6262	E1615	0.003		-1.71	
6273	E1615	0.01		0.32	
6438	E202	<0.05		-----	
7013	E1615	0.0045		-1.28	
9006	E1615	0.0024		-1.89	
9008	E1615	0.011		0.61	
9009	E1615	0.0099		0.29	
9014		-----		-----	

normality	suspect
n	26
outliers	1
mean (n)	0.0089
st.dev. (n)	0.00615
R(calc.)	0.0172
st.dev.(E1615:22)	0.00344
R(E1615:22)	0.0096


0.03
0.025
0.02
0.015
0.01
0.005
0
120
1261
1509
1135
1718
9006
6262
7013
1688
1467
609
9009
1603
1217
551
343
347
1515
1880
6273
9008
840
1954
6247
1701
1742
150


Kernel Density
80
70
60
50
40
30
20
10
0
-0.03
-0.01
0.01
0.03
0.05

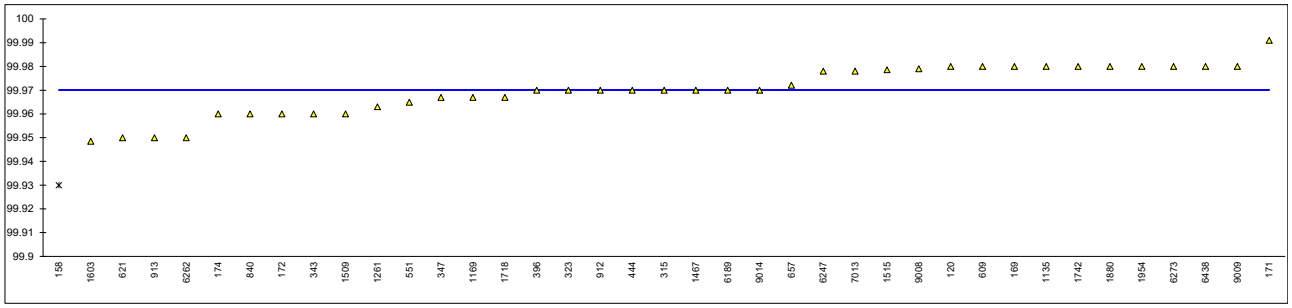
Determination of Water miscibility (Hydrocarbons) on sample #22195;

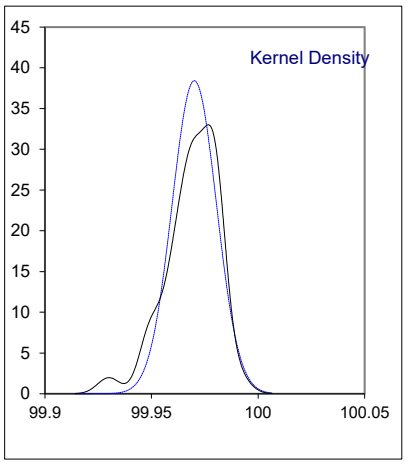
lab	method	value	mark	z(targ)	remarks
120	D1722	Pass		-----	
150	D1722	Pass		-----	
158	D1722	pass		-----	
169	D1722	Pass		-----	
171		-----		-----	
172		-----		-----	
174	D1722	Pass		-----	
315		-----		-----	
323	D1722	pass		-----	
343	D1722	PASS		-----	
347		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Passes test		-----	
444	D1722	Passes test		-----	
522		-----		-----	
528		-----		-----	
551	D1722	Pass		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609		-----		-----	
621		-----		-----	
657		-----		-----	
840	D1722	Passes test		-----	
886		-----		-----	
912	D1722	Pass		-----	
913	D1722	Pass		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D1722	pass		-----	
1135	D1722	Pass		-----	
1169	D1722	Pass		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D1722	Pass		-----	
1515	D1722	Pass		-----	
1603		-----		-----	
1656		-----		-----	
1688		-----		-----	
1701		-----		-----	
1718	D1722	Pass		-----	
1742	D1722	Pass		-----	
1823		-----		-----	
1880		-----		-----	
1954		-----		-----	
6111		-----		-----	
6189	D1722	pass		-----	
6198		-----		-----	
6247		-----		-----	
6262	D1722	pass		-----	
6273	D1722	Pass		-----	
6438	D1722	Pass		-----	
7013		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014	D1722	PASS		-----	
	n	26			
	mean (n)	Pass			

Determination of Purity by GC as received on sample #22195; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E2409	99.98		-----	
150		-----		-----	
158	E2409	99.93	R(0.05)	-----	
169	E2409	99.98		-----	
171	E2409	99.9910		-----	
172	E2409	99.96		-----	
174	E2409	99.96		-----	
315	E2409	99.97		-----	
323	E2409	99.97		-----	
343	E2409	99.96		-----	
347	E2409	99.967		-----	
370		-----		-----	
395		-----		-----	
396	E2409	99.97		-----	
444	E2409	99.97		-----	
522		-----		-----	
528		-----		-----	
551	E2409	99.965		-----	
557		-----		-----	
558		-----		-----	
600		-----		-----	
609	E2409	99.98		-----	
621	E2409	99.95		-----	
657	E2409	99.9721		-----	
840	E2409	99.960		-----	
886		-----		-----	
912	E2409	99.97		-----	
913	E2409	99.95		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	E2409	>99,9		-----	
1135	E2409	99.98		-----	
1169	E2409	99.967		-----	
1217		-----		-----	
1261	E2409	99.963		-----	
1467		99.97		-----	
1509	E2409	99.960		-----	
1515	E2409	99.9786		-----	
1603	In house	99.9485		-----	
1656		-----		-----	
1688		-----		-----	
1701		-----		-----	
1718	E2409	99.967		-----	
1742	In house	99.98		-----	
1823		-----		-----	
1880	E2409	99.980		-----	
1954	E2409	99.98		-----	
6111		-----		-----	
6189	E2409	99.97		-----	
6198		-----		-----	
6247	E2409	99.978		-----	
6262	E2409	99.95		-----	
6273	E2409	99.98		-----	
6438	E2409	99.98		-----	
7013		99.978		-----	
9006		-----		-----	
9008	E2409	99.979		-----	
9009	E2409	99.98		-----	
9014	E202	99.97		-----	

	normality	OK
	n	38
	outliers	1
	mean (n)	99.9701
	st.dev. (n)	0.01039
	R(calc.)	0.0291
	st.dev.(lit.)	unknown
	R(lit.)	unknown
Compare		
	R(iis21C14)	0.0626

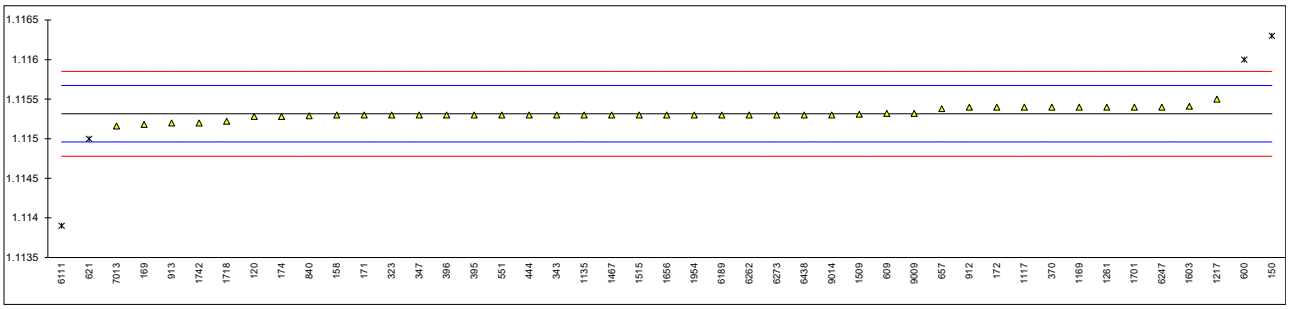

100
99.99
99.98
99.97
99.96
99.95
99.94
99.93
99.92
99.91
99.9
158 1603 621 913 6262 174 840 172 343 1509 1261 551 347 1169 1718 396 323 912 444 315 1467 6189 9014 657 6247 7013 1515 9008 120 609 169 1135 1742 1880 1954 6273 6438 9009 171

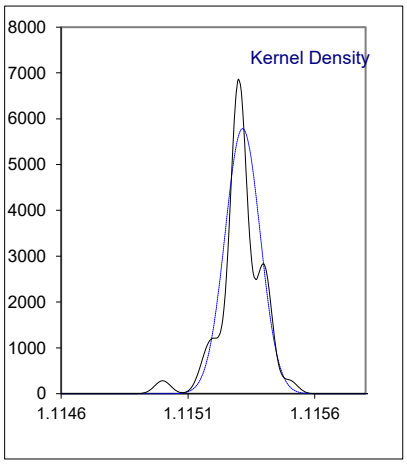

Kernel Density
45
40
35
30
25
20
15
10
5
0
99.9
99.95
100
100.05

Determination of Specific Gravity 20/20 °C on sample #22195;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11528		-0.20	
150	D4052	1.1163	C,R(0.01)	5.51	first reported 1.115
158	D4052	1.1153		-0.09	
169	D4052	1.11518		-0.76	
171	D4052	1.1153		-0.09	
172	D4052	1.1154		0.47	
174	D4052	1.11528		-0.20	
315		-----		-----	
323	D4052	1.1153		-0.09	
343	D4052	1.1153		-0.09	
347	D4052	1.1153		-0.09	
370	E202	1.1154		0.47	
395	D4052	1.1153		-0.09	
396	D4052	1.1153		-0.09	
444	D4052	1.1153		-0.09	
522		-----		-----	
528		-----		-----	
551	D4052	1.1153		-0.09	
557		-----		-----	
558		-----		-----	
600	D4052	1.116	R(0.01)	3.83	
609	D4052	1.11532		0.03	
621	D4052	1.115	R(0.01)	-1.77	
657	D4052	1.11538		0.36	
840	D4052	1.11529		-0.14	
886		-----		-----	
912	D4052	1.1154		0.47	
913	D4052	1.1152		-0.65	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D4052	1.1154		0.47	
1135	D4052	1.1153		-0.09	
1169	D4052	1.1154		0.47	
1217		1.11550		1.03	
1261	D4052	1.1154		0.47	
1467		1.1153		-0.09	
1509	D4052	1.11531		-0.03	
1515	D4052	1.1153		-0.09	
1603	In house	1.11541		0.53	
1656	E202	1.1153		-0.09	
1688		-----		-----	
1701	D4052	1.1154		0.47	
1718	D4052	1.11522		-0.53	
1742	D4052	1.1152	C	-0.65	first reported 1.1145
1823		-----		-----	
1880		-----		-----	
1954	D4052	1.1153		-0.09	
6111	D5355	1.1139	R(0.01)	-7.93	
6189	D4052	1.1153	C	-0.09	first reported 1.115
6198		-----		-----	
6247	D4052	1.1154		0.47	
6262	D4052	1.1153		-0.09	
6273	D4052	1.1153	C	-0.09	first reported 1.1139
6438	D4052	1.1153		-0.09	
7013	D4052	1.11516		-0.87	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11532		0.03	
9014	D4052	1.11530		-0.09	

normality	OK
n	41
outliers	4
mean (n)	1.11532
st.dev. (n)	0.000069
R(calc.)	0.00019
st.dev.(E202:18)	0.000179
R(E202:18)	0.0005

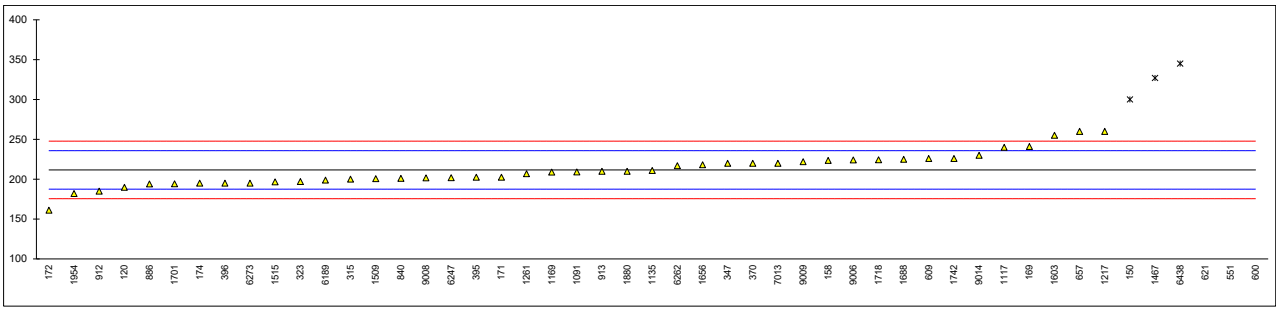

1.1165
1.116
1.1155
1.115
1.1145
1.114
1.1135
6111 621 7013 169 913 1742 1718 120 174 840 158 171 323 347 396 395 551 444 343 1135 1467 1515 1656 1954 6189 6262 6273 6438 9014 1509 609 9009 657 912 172 1117 370 1169 1261 1701 6247 1603 1217 600 150

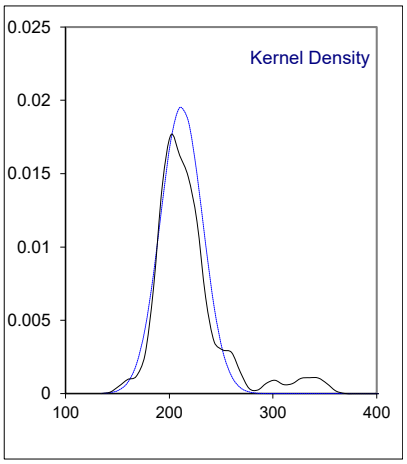

Kernel Density
8000
7000
6000
5000
4000
3000
2000
1000
0
1.1146
1.1151
1.1156

Determination of Water on sample #22195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1064	189.9		-1.81	
150	E1064	300	C,R(0.01)	7.35	first reported 0.028 mg/kg
158		223.5		0.98	
169	E1064	241.1	C	2.45	first reported 299.148
171	E203	202.5		-0.76	
172	E203	161.0		-4.22	
174	E1064	195		-1.39	
315	E1064	200		-0.97	
323	E1064	197		-1.22	
343		-----		-----	
347	E1064	220		0.69	
370	E1064	220		0.69	
395	E1064	202.4		-0.77	
396	E1064	195		-1.39	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	E1064	635	R(0.01)	35.22	
557		-----		-----	
558		-----		-----	
600	D6304	2240	R(0.01)	168.74	
609	E1064	226		1.19	
621	E1064	480	R(0.01)	22.32	
657	E1064	260		4.02	
840	E1064	201		-0.89	
886	E1064	194		-1.47	
912	D6304-C	185		-2.22	
913	E1064	210		-0.14	
962		-----		-----	
963		-----		-----	
1091	E1064	209		-0.22	
1117	E1064	240		2.36	
1135	E1064	211		-0.06	
1169	E1064	208.8		-0.24	
1217		260	C	4.02	first reported 309
1261	E1064	207		-0.39	
1467		327	R(0.01)	9.59	
1509	E1064	200.8		-0.91	
1515	E1064	196.7		-1.25	
1603	In house	255	C	3.60	first reported 0.0255 mg/kg
1656	E1064	218		0.53	
1688	E1064	224.92		1.10	
1701	E203	194.4		-1.44	
1718	E1064	224.4		1.06	
1742	E1064	226		1.19	
1823		-----		-----	
1880	E1064	210		-0.14	
1954	E1064	182		-2.47	
6111		-----		-----	
6189	E1064	199		-1.05	
6198		-----		-----	
6247	E1064	202		-0.81	
6262	E1064	217		0.44	
6273	E1064	195		-1.39	
6438	E1064	345	R(0.01)	11.09	
7013	E1064	220	C	0.69	reported 0.022 mg/kg
9006	E1064	224		1.03	
9008	E1064	201.76		-0.83	
9009	E1064	222		0.86	
9014	E203	230		1.52	

normality	OK
n	43
outliers	6
mean (n)	211.68
st.dev. (n)	20.370
R(calc.)	57.04
st.dev.(E1064:16)	12.020
R(E1064:16)	33.66

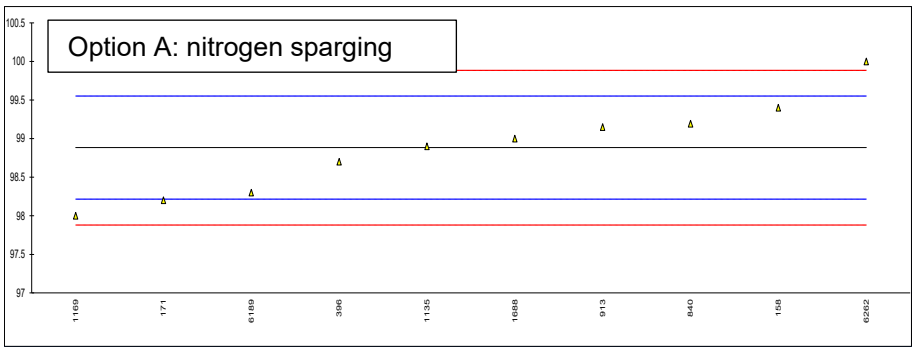

400
350
300
250
200
150
100
172 1954 912 120 886 1701 174 396 6273 1515 323 6189 315 1509 840 9008 6247 395 171 1261 1169 1091 913 1880 1135 6262 1656 347 370 7013 9009 158 9006 1718 1688 609 1742 9014 1117 169 1603 657 1217 150 1467 6438 621 551 600

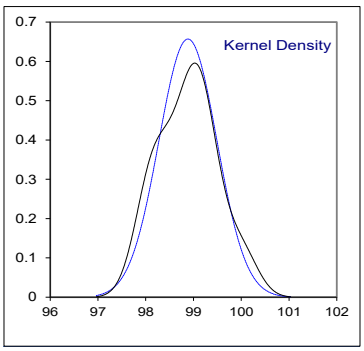

Kernel Density
0.025
0.02
0.015
0.01
0.005
0
100
200
300
400

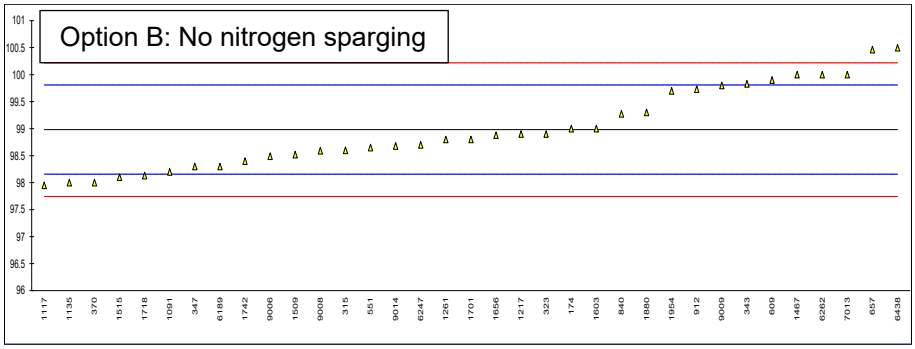
Determination of UV transmittance at 350 nm on sample #22196; results in %Transmittance

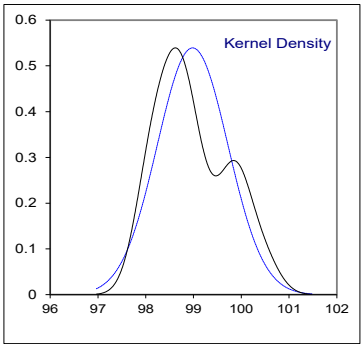
lab	Option A method	cuvette size	ASTM E2193	mark	z(targ)	Option B method	cuvette size	ASTM E2193	mark	z(targ)
120			-----		-----			-----		-----
150			-----		-----			-----		-----
158	E2193 - A	10 mm	99.4	C	1.54			-----		-----
169			-----		-----			-----		-----
171	E2193 - A	10 mm	98.2		-2.05			-----		-----
172			-----		-----	E2193 - B	10 mm	>100		-----
174			-----		-----	E2193 - B	10 mm	99.0		0.04
315			-----		-----	E2193 - B	10 mm	98.6		-0.93
323			-----		-----	E2193 - B	10 mm	98.9		-0.20
343			-----		-----	E2193 - B	10 mm	99.83		2.06
347			-----		-----		50 mm	98.3		-1.66
370			-----		-----	E2193 - B	10 mm	98		-2.38
395			-----		-----			-----		-----
396	E2193 - A	10 mm	98.7		-0.55			-----		-----
444			-----		-----			-----		-----
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193 - B	10 mm	98.6485		-0.81
557			-----		-----			-----		-----
558			-----		-----			-----		-----
600			-----		-----			-----		-----
609			-----		-----		10 mm	99.9	C	2.23
621			-----		-----			-----		-----
657			-----		-----	E2193 - B	10 mm	100.462		3.59
840	E2193 - A	10 mm	99.194		0.93	E2193 - B	10 mm	99.273		0.71
886			-----		-----			-----		-----
912			-----		-----	E2193 - B	10 mm	99.73		1.81
913	E2193 - A	10	99.15		0.79			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193 - B	10 mm	98.2		-1.90
1117			-----		-----	E2193 - B	50 mm	97.95		-2.50
1135	E2193 - A	50 mm	98.9		0.05	E2193 - B	50 mm	98.0		-2.38
1169	E2193 - A	50 mm	98.0		-2.65			-----		-----
1217			-----		-----	E2193 - B	50 mm	98.9		-0.20
1261			-----		-----			98.8		-0.44
1467			-----		-----	E2193 - B		100		2.47
1509			-----		-----	E2193 - B	50 mm	98.52		-1.12
1515			-----		-----	E2193 - B	50 mm	98.1		-2.14
1603			-----		-----	In house	10 mm	99		0.04
1656			-----		-----	E2193 - B	10 mm	98.88		-0.25
1688	E2193 - A	50 mm	99.0		0.35			-----		-----
1701			-----		-----	E2193 - B	10 mm	98.8		-0.44
1718			-----		-----	E2193 - B	50 mm	98.13		-2.07
1742			-----		-----	E2193 - B	10 mm	98.4		-1.41
1823			-----		-----			-----		-----
1880			-----		-----	E2193 - B	10 mm	99.3		0.77
1954			-----		-----	E2193 - B	10 mm	99.7		1.74
6111			-----		-----			-----		-----
6189	E2193 - A	10 mm	98.3		-1.75	E2193 - B	10 mm	98.3		-1.66
6198			-----		-----			-----		-----
6247			-----		-----	E2193 - B	10 mm	98.7		-0.68
6262	E2193 - A	10 mm	100.00		3.34	E2193 - B	10 mm	100.00		2.47
6273			-----		-----			-----		-----
6438			-----		-----		10 mm	100.4973		3.68
7013			-----		-----	E2193 - B	10 mm	100.0		2.47
9006			-----		-----			98.49		-1.19
9008			-----		-----	E2193 - B	10 mm	98.59		-0.95
9009			-----		-----	E2193 - B	10 mm	99.8	C	1.98
9014			-----		-----	E2193 - B	10 mm	98.68		-0.73
	normality		OK					OK		
	n		10					35		
	outliers		0					0		
	mean (n)		98.884					98.982		
	st.dev. (n)		0.6070					0.7395		
	R(calc.)		1.700					2.071		
	st.dev.(E2193:16)		0.3343					0.4121		
	R(E2193:16)		0.936					1.154		

Lab 158 first reported 66.4
Lab 609 first reported 97.4
Lab 9009 first reported 97.478


Option A: nitrogen sparging
100.5
100
99.5
99
98.5
98
97.5
97
1169
171
6189
396
1135
1688
913
840
158
6262


Kernel Density
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
96
97
98
99
100
101
102

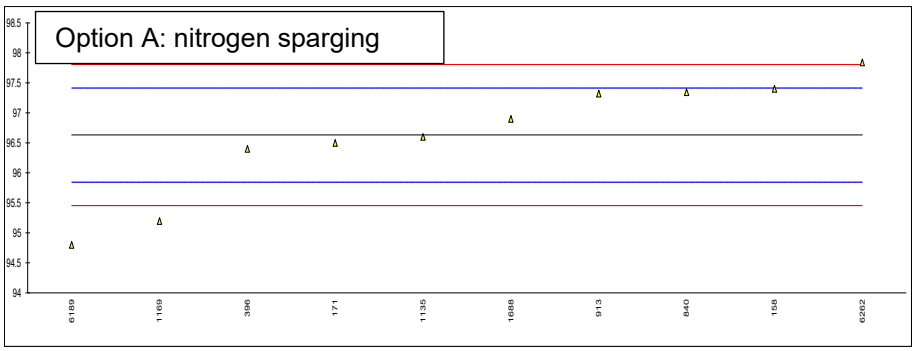

Option B: No nitrogen sparging
101
100.5
100
99.5
99
98.5
98
97.5
97
96.5
96
1117
1135
370
1515
1718
1091
347
6189
1742
9006
1609
9008
315
551
9014
6247
1261
1701
1656
1217
323
174
1603
840
1880
1954
912
9009
343
609
1467
6262
7013
657
6438

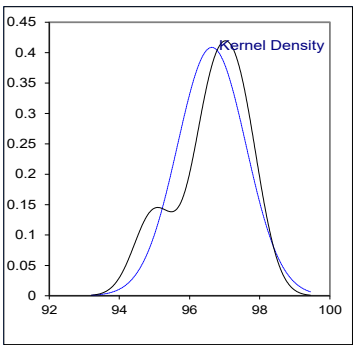

Kernel Density
0.6
0.5
0.4
0.3
0.2
0.1
0
96
97
98
99
100
101
102

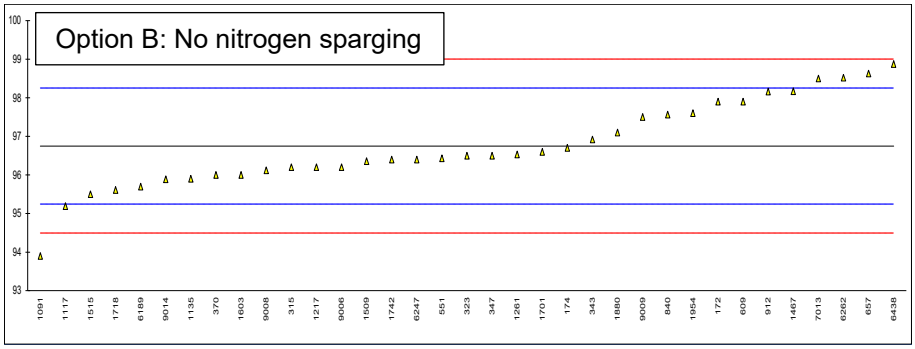
Determination of UV transmittance at 275 nm on sample #22196; results in %Transmittance

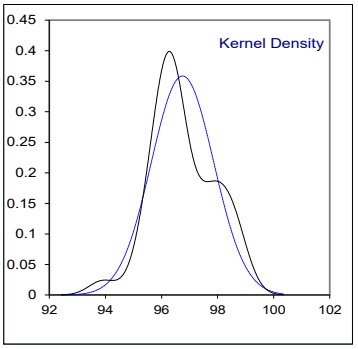
lab	method	cuvette size	Option A ASTM E2193	mark	z(targ)	method	cuvette size	Option B ASTM E2193	mark	z(targ)
120			-----		-----			-----		-----
150			-----		-----			-----		-----
158	E2193 - A	10 mm	97.4	C	1.96			-----		-----
169			-----		-----			-----		-----
171	E2193 - A	10 mm	96.5		-0.33			-----		-----
172			-----		-----	E2193 - B	10 mm	97.9		1.53
174			-----		-----	E2193 - B	10 mm	96.7		-0.06
315			-----		-----	E2193 - B	10 mm	96.2		-0.73
323			-----		-----	E2193 - B	10 mm	96.5		-0.33
343			-----		-----	E2193 - B	10 mm	96.92		0.23
347			-----		-----		50 mm	96.5		-0.33
370			-----		-----	E2193 - B	10 mm	96		-0.99
395			-----		-----			-----		-----
396	E2193 - A	10 mm	96.4		-0.59			-----		-----
444			-----		-----			-----		-----
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193 - B	10 mm	96.4345		-0.42
557			-----		-----			-----		-----
558			-----		-----			-----		-----
600			-----		-----			-----		-----
609			-----		-----		10 mm	97.9	C	1.53
621			-----		-----			-----		-----
657			-----		-----	E2193 - B	10 mm	98.63		2.50
840	E2193 - A	10 mm	97.346		1.82	E2193 - B	10 mm	97.565		1.09
886			-----		-----			-----		-----
912			-----		-----	E2193 - B	10 mm	98.16		1.88
913	E2193 - A	10	97.32		1.76			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193 - B	10 mm	93.9		-3.79
1117			-----		-----	E2193 - B	50 mm	95.19		-2.07
1135	E2193 - A	50 mm	96.6		-0.08	E2193 - B	50 mm	95.9		-1.13
1169	E2193 - A	50 mm	95.2		-3.65			-----		-----
1217			-----		-----	E2193 - B	50 mm	96.2		-0.73
1261			-----		-----			96.53		-0.29
1467			-----		-----	E2193 - B		98.17		1.89
1509			-----		-----	E2193 - B	50 mm	96.36		-0.52
1515			-----		-----	E2193 - B	50 mm	95.5		-1.66
1603			-----		-----	In house	10 mm	96		-0.99
1656			-----		-----	E2193 - B	10 mm	-----		-----
1688	E2193 - A	50 mm	96.9		0.69			-----		-----
1701			-----		-----	E2193 - B	10 mm	96.6		-0.20
1718			-----		-----	E2193 - B	50 mm	95.61		-1.51
1742			-----		-----	E2193 - B	10 mm	96.4		-0.46
1823			-----		-----			-----		-----
1880			-----		-----	E2193 - B	10 mm	97.1		0.47
1954			-----		-----	E2193 - B	10 mm	97.6		1.13
6111			-----		-----			-----		-----
6189	E2193 - A	10 mm	94.8		-4.67	E2193 - B	10 mm	95.7		-1.39
6198			-----		-----			-----		-----
6247			-----		-----	E2193 - B	10 mm	96.4		-0.46
6262	E2193 - A	10 mm	97.84		3.08	E2193 - B	10 mm	98.52		2.36
6273			-----		-----			-----		-----
6438			-----		-----		10 mm	98.8742		2.83
7013			-----		-----	E2193 - B	10 mm	98.5		2.33
9006			-----		-----			96.2		-0.73
9008			-----		-----	E2193 - B	10 mm	96.12		-0.84
9009			-----		-----	E2193 - B	10 mm	97.5	C	1.00
9014			-----		-----	E2193 - B	10 mm	95.89		-1.14
	normality		OK					OK		
	n		10					35		
	outliers		0					0		
	mean (n)		96.631					96.748		
	st.dev. (n)		0.9766					1.1127		
	R(calc.)		2.734					3.116		
	st.dev.(E2193:16)		0.3921					0.7518		
	R(E2193:16)		1.098					2.105		

Lab 158 first reported 92.2
Lab 609 first reported 93.4
Lab 9009 first reported 93.626


Option A: nitrogen sparging
98.5
98
97.5
97
96.5
96
95.5
95
94.5
94
6189
1169
396
171
1135
1688
913
840
158
6262


Kernel Density
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
92
94
96
98
100

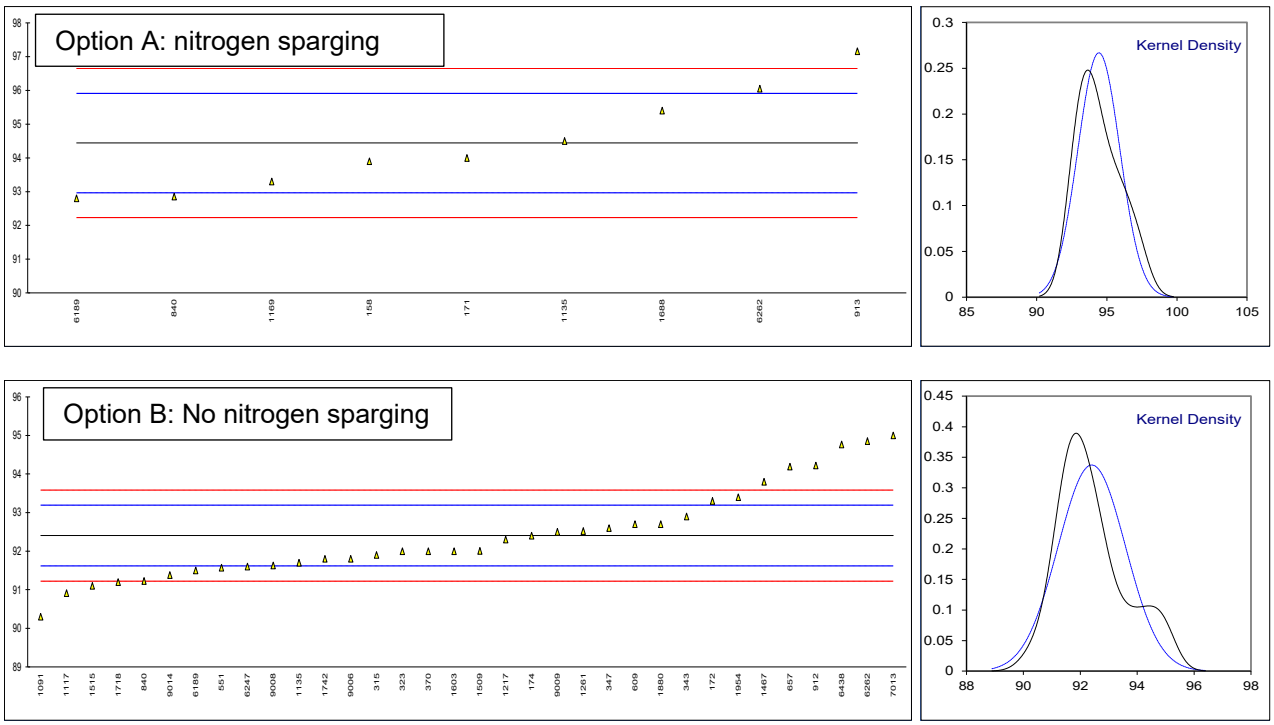

Option B: No nitrogen sparging
100
99
98
97
96
95
94
93
1091
1117
1515
1718
6189
9014
1135
370
1603
9008
315
1217
9006
1509
1742
6247
551
323
347
1261
1701
174
343
1880
9009
840
1954
172
609
912
1467
7013
6262
657
6438


Kernel Density
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
92
94
96
98
100
102

Determination of UV transmittance at 250 nm on sample #22196; results in %Transmittance

lab	method	cuvette size	Option A ASTM E2193	mark	z(targ)	method	cuvette size	Option B ASTM E2193	mark	z(targ)
120			-----		-----			-----		-----
150			-----		-----			-----		-----
158	E2193 - A	10 mm	93.9		-0.73			-----		-----
169			-----		-----			-----		-----
171	E2193 - A	10 mm	94.0		-0.60			-----		-----
172			-----		-----	E2193 - B	10 mm	93.3		2.27
174			-----		-----	E2193 - B	10 mm	92.4		-0.01
315			-----		-----	E2193 - B	10 mm	91.9		-1.28
323			-----		-----	E2193 - B	10 mm	92.0		-1.03
343			-----		-----	E2193 - B	10 mm	92.9		1.26
347			-----		-----		50 mm	92.6		0.50
370			-----		-----	E2193 - B	10 mm	92		-1.03
395			-----		-----			-----		-----
396	E2193 - A	10 mm	-----		-----			-----		-----
444			-----		-----			-----		-----
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193 - B	10 mm	91.5715		-2.12
557			-----		-----			-----		-----
558			-----		-----			-----		-----
600			-----		-----			-----		-----
609			-----		-----		10 mm	92.7	C	0.75
621			-----		-----			-----		-----
657			-----		-----	E2193 - B	10 mm	94.19		4.54
840	E2193 - A	10 mm	92.855		-2.15	E2193 - B	10 mm	91.227	C	-2.99
886			-----		-----			-----		-----
912			-----		-----	E2193 - B	10 mm	94.22		4.61
913	E2193 - A	10	97.16		3.69			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193 - B	10 mm	90.3		-5.35
1117			-----		-----	E2193 - B	50 mm	90.91		-3.80
1135	E2193 - A	50 mm	94.5		0.08	E2193 - B	50 mm	91.7		-1.79
1169	E2193 - A	50 mm	93.3		-1.55			-----		-----
1217			-----		-----	E2193 - B	50 mm	92.3		-0.27
1261			-----		-----			92.52		0.29
1467			-----		-----	E2193 - B		93.80		3.54
1509			-----		-----	E2193 - B	50 mm	92.01		-1.00
1515			-----		-----	E2193 - B	50 mm	91.1		-3.32
1603			-----		-----	In house	10 mm	92		-1.03
1656			-----		-----	E2193 - B	10 mm	-----		-----
1688	E2193 - A	50 mm	95.4		1.30			-----		-----
1701			-----		-----	E2193 - B	10 mm	-----		-----
1718			-----		-----	E2193 - B	50 mm	91.20		-3.06
1742			-----		-----	E2193 - B	10 mm	91.8		-1.54
1823			-----		-----			-----		-----
1880			-----		-----	E2193 - B	10 mm	92.7		0.75
1954			-----		-----	E2193 - B	10 mm	93.4		2.53
6111			-----		-----			-----		-----
6189	E2193 - A	10 mm	92.8		-2.23	E2193 - B	10 mm	91.5		-2.30
6198			-----		-----			-----		-----
6247			-----		-----	E2193 - B	10 mm	91.6		-2.05
6262	E2193 - A	10 mm	96.05		2.18	E2193 - B	10 mm	94.85		6.21
6273			-----		-----			-----		-----
6438			-----		-----		10 mm	94.7653		6.00
7013			-----		-----	E2193 - B	10 mm	95.0		6.59
9006			-----		-----			91.8		-1.54
9008			-----		-----	E2193 - B	10 mm	91.63		-1.97
9009			-----		-----	E2193 - B	10 mm	92.5	C	0.24
9014			-----		-----	E2193 - B	10 mm	91.38		-2.60
	normality		OK					OK		
	n		9					34		
	outliers		0					0		
	mean (n)		94.441					92.405		
	st.dev. (n)		1.4959					1.1825		
	R(calc.)		4.189					3.311		
	st.dev.(E2193:16)		0.7368					0.3936		
	R(E2193:16)		2.063					1.102		

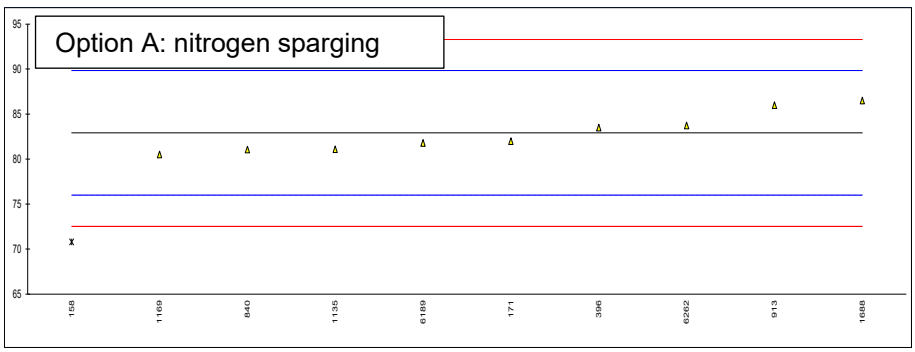
Lab 609 first reported 89.1
Lab 840 first reported 94.912
Lab 9009 first reported 89.060

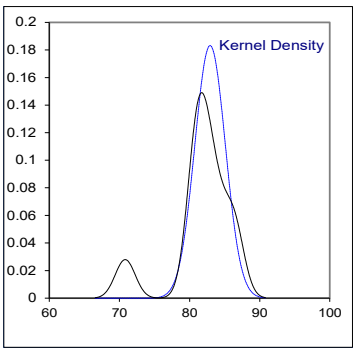

Option A: nitrogen sparging
Kernel Density
Option B: No nitrogen sparging
Kernel Density

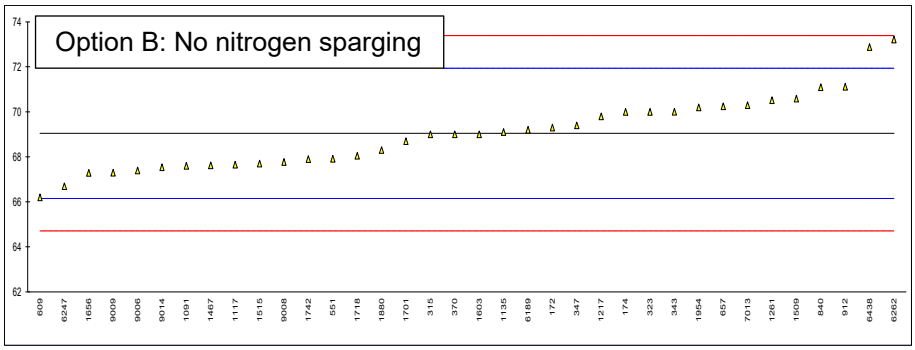
Determination of UV transmittance at 220 nm on sample #22196; results in %Transmittance

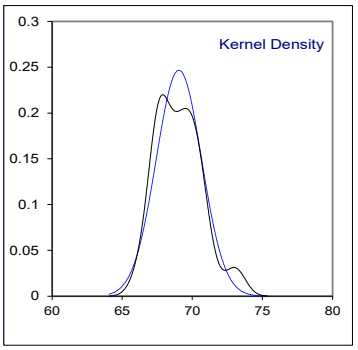
lab	method	cuvette size	Option A ASTM E2193	mark	z(targ)	method	cuvette size	Option B ASTM E2193	mark	z(targ)
120			-----		-----			-----		-----
150			-----		-----			-----		-----
158	E2193 - A	10 mm	70.8	C,G(1)	-3.50			-----		-----
169			-----		-----			-----		-----
171	E2193 - A	10 mm	82.0		-0.26			-----		-----
172			-----		-----	E2193 - B	10 mm	69.3		0.18
174			-----		-----	E2193 - B	10 mm	70.0		0.66
315			-----		-----	E2193 - B	10 mm	69.0		-0.03
323			-----		-----	E2193 - B	10 mm	70.0		0.66
343			-----		-----	E2193 - B	10 mm	70.01		0.67
347			-----		-----		50 mm	69.4		0.25
370			-----		-----	E2193 - B	10 mm	69		-0.03
395			-----		-----			-----		-----
396	E2193 - A	10 mm	83.5		0.17			-----		-----
444			-----		-----			-----		-----
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193 - B	10 mm	67.9150		-0.78
557			-----		-----			-----		-----
558			-----		-----			-----		-----
600			-----		-----			-----		-----
609			-----		-----		10 mm	66.2	C	-1.97
621			-----		-----			-----		-----
657			-----		-----	E2193 - B	10 mm	70.25		0.83
840	E2193 - A	10 mm	81.059	C	-0.53	E2193 - B	10 mm	71.095	C	1.42
886			-----		-----			-----		-----
912			-----		-----	E2193 - B	10 mm	71.12		1.44
913	E2193 - A	10	85.99		0.89			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193 - B	10 mm	67.6		-1.00
1117			-----		-----	E2193 - B	50 mm	67.65		-0.96
1135	E2193 - A	50 mm	81.1		-0.52	E2193 - B	50 mm	69.1		0.04
1169	E2193 - A	50 mm	80.5		-0.70			-----		-----
1217			-----		-----	E2193 - B	50 mm	69.8		0.52
1261			-----		-----			70.52		1.02
1467			-----		-----	E2193 - B		67.62		-0.99
1509			-----		-----	E2193 - B	50 mm	70.59		1.07
1515			-----		-----	E2193 - B	50 mm	67.7		-0.93
1603			-----		-----	In house	10 mm	69		-0.03
1656			-----		-----	E2193 - B	10 mm	67.29		-1.21
1688	E2193 - A	50 mm	86.5		1.04			-----		-----
1701			-----		-----	E2193 - B	10 mm	68.7		-0.24
1718			-----		-----	E2193 - B	50 mm	68.05		-0.69
1742			-----		-----	E2193 - B	10 mm	67.9		-0.79
1823			-----		-----			-----		-----
1880			-----		-----	E2193 - B	10 mm	68.3		-0.52
1954			-----		-----	E2193 - B	10 mm	70.2		0.80
6111			-----		-----			-----		-----
6189	E2193 - A	10 mm	81.8		-0.32	E2193 - B	10 mm	69.2		0.11
6198			-----		-----			-----		-----
6247			-----		-----	E2193 - B	10 mm	66.7		-1.62
6262	E2193 - A	10 mm	83.72		0.23	E2193 - B	10 mm	73.21		2.88
6273			-----		-----			-----		-----
6438			-----		-----		10 mm	72.8804		2.65
7013			-----		-----	E2193 - B	10 mm	70.3		0.87
9006			-----		-----			67.4		-1.14
9008			-----		-----	E2193 - B	10 mm	67.77		-0.88
9009			-----		-----	E2193 - B	10 mm	67.3	C	-1.21
9014			-----		-----	E2193 - B	10 mm	67.54		-1.04
	normality		OK					OK		
	n		9					36		
	outliers		1					0		
	mean (n)		82.908					69.045		
	st.dev. (n)		2.1780					1.6167		
	R(calc.)		6.098					4.527		
	st.dev.(E2193:16)		3.4579					1.4454		
	R(E2193:16)		9.682					4.047		

Lab 158 first reported 98.2
Lab 609 first reported 65.5
Lab 840 first reported 71.095 for option A and 81.059 for option B
Lab 9009 first reported 66.414


Option A: nitrogen sparging


Kernel Density


Option B: No nitrogen sparging


Kernel Density

APPENDIX 2

Number of participants per country

4 labs in BELGIUM
3 labs in BRAZIL
2 labs in CANADA
2 labs in CHINA, People's Republic
1 lab in FINLAND
1 lab in GERMANY
5 labs in INDIA
1 lab in INDONESIA
1 lab in IRAN, Islamic Republic of
2 labs in ITALY
3 labs in KUWAIT
1 lab in LITHUANIA
4 labs in MALAYSIA
2 labs in MEXICO
2 labs in NETHERLANDS
7 labs in SAUDI ARABIA
4 labs in SINGAPORE
2 labs in SPAIN
1 lab in TAIWAN
1 lab 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)/G(1)	= outlier in Grubbs' outlier test
G(0.05)/G(5)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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6 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
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10 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
11 W. Horwitz and R. Albert, J. AOAC Int, 79.3, 589-621, (1996)
12 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)