Results of Proficiency Test
Mono Ethylene Glycol (MEG)
October 2016

Organised by: Institute for Interlaboratory Studies (iis)
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1994, the Institute for Interlaboratory Studies organizes a proficiency test for the analyses of Mono Ethylene Glycol (MEG) every year. As part of the annual proficiency test program of 2016/2017, it was decided to continue this proficiency test on Mono Ethylene Glycol analyses. In this interlaboratory study, 64 laboratories from 28 different countries did register for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2016 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 organiser of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory.
To get maximum information from this study it was decided to send 2 different samples:

	Bottle type	Tests requested
Sample #16220	1.0 L amber glass bottle	for all regular determinations on MEG
Sample #16221	0.1 L amber glass bottle	for UV transmittance only

table 1: type of samples

As the institute decided to try to certify again a reference material, sample #16220 was added as candidate reference material. The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

The necessary bulk material, approximately 200 litre, of MEG polyester grade was obtained from a local production plant. The bulk material was transferred to a precleaned 200 litre drum. After homogenization, 90 amber glass bottles of 1 L (labelled #16220) and 288 amber glass bottles of 250 ml to be used for candidate reference material were filled. The homogeneity of the subsamples #16220 was checked by determination of Density in accordance with ASTM D4052 and water in accordance with ASTM E1064, on 8 stratified randomly selected samples.

	Density at 20°C in kg/L	*Water in mg/kg*
sample #16220-1	1.11328	530
sample #16220-2	1.11328	520
sample #16220-3	1.11328	530
sample #16220-4	1.11328	530
sample #16220-5	1.11328	530
sample #16220-6	1.11328	520
sample #16220-7	1.11328	530
sample #16220-8	1.11328	520

table 2: homogeneity test results of subsamples #16220

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 ISO 13528, Annex B2 in the next table:

	Density at 20°C in kg/L	*Water in mg/kg*
r (observed)	0.00001	14
reference test method	ISO12185:96	E1064:16
0.3 * R (ref. test method)	0.00015	27

table 3: repeatabilities on subsamples #16221

The necessary bulk material, approximately 25 litre of MEG polyester grade was obtained from a local production plant. After homogenization, 98 amber glass bottles of 100 mL (labelled #16221) were filled. The homogeneity of the subsamples #16221 was checked by determination of UV transmission at 220 and 250 nm in accordance with ASTM E2193 method B, on 8 stratified randomly selected samples.

	UV220 nm in %T	*UV250 nm in %T*
sample #16221-1	69.5	96.6
sample #16221-2	68.9	96.4
sample #16221-3	68.3	96.3
sample #16221-4	68.2	96.2
sample #16221-5	67.7	96.1
sample #16221-6	69.9	96.6
sample #16221-7	68.4	96.4
sample #16221-8	67.5	96.5

table 4: homogeneity test results of subsamples #16221

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 ISO 13528, Annex B2 in the next table:

	UV220 nm in %T	*UV250 nm in %T*
r (observed)	2.3	0.5
reference test method	E2193:16 (B)	E2193:16 (B)
0.3 * R (ref. test method)	2.9	0.6

table 5: repeatabilities on subsamples #16221

All observed repeatabilities listed in tables 3 and 5 were less than 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneities of the sub samples #16220 and #16221 were assumed

To each of the participating laboratories 2 bottles (1*1 L bottle, labelled #16220 and 1*100 mL bottle, labelled #16221), were sent on October 5, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of the Mono Ethylene Glycol, packed in amber glass bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine Acidity as Acetic Acid (E2679 and D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Chloride as Cl, Colour Pt/Co (D1209,) Colour Pt/Co (D5386), Density at 20°C, Diethylene Glycol, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Iron, Miscibility, Purity and Specific Gravity at 20/20°C and Water on sample #16220.
On sample #16221 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.

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

3 RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalysis). Additional or corrected test results are used for data analysis and 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 April 2014 (iis-protocol, version 3.3).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as ‘<…’ or ‘>…’ were not used in the statistical evaluation.

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

According to ISO 5725 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. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected 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.
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 proficiency test problems were encountered with the dispatch of the samples to laboratories in India, Malaysia and Saudi Arabia. A number of laboratories received the samples late due to custom clearance problems.

Five participants did not report any test results and two other participants did report test results after the final reporting date. Not all participants were able to report all requested parameters. Finally, 59 participants did report 808 numerical test results. Observed were 26 outlying test results, which is 5.7%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section, the results are discussed per sample and per test.
In the iis PT reports, ASTM test methods are referred to with a number (e.g. D1613) and an added designation for the year that the test method was adopted or revised (e.g. D1613:06). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1613:06(2012)). In the tables of Appendix 1 only the test method number and year of adoption or revision will be used.

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

Acidity: The determination according ASTM E2679 may be very problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the strict precision data of ASTM E2679:09e1(2016).
The determination according ASTM D1613 was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D1613:06(2012).

Aldehydes: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM E2313:15.

Appearance: A standardized method is available for Appearance since 2009, being ASTM E2680:09(2015). However, not all participants did report according this method. All participants agreed about the appearance of sample #16220 to be 'clear and bright', 'clear and free of suspended matter' or 'pass'. Participants who used ASTM E2680 should report the Appearance as 'pass' (or 'fail'). Thirty-seven participants reported the appearance correctly as 'pass'. Sixteen other laboratories reported the Appearance differently (e.g. Clear and Bright (C&B), CCFFSM, CFFSM).

Ash: The consensus value is below the application range (0.001 – 0.180 %M/M) of ASTM D482:13. Therefore no significant conclusions were drawn.

Chloride: 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.

Colour Pt/Co D1209: The determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D1209:05(2011).

Colour Pt/Co D5386: The determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D5386:10.

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

Diethylene Glycol: This determination was very problematic at this low concentration of 15 mg/kg. Five statistical outliers were observed and two other results were excluded. The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ASTM E2409:13. A number of participants reported the presence of impurities near the DEG peak in the chromatogram. The integration of the DEG peak may be influenced. This may partly explain the large spread

Distillation: This determination was problematic for a number of laboratories. In total eight statistical outliers were observed. However, all three calculated reproducibilities after rejection of the statistical outliers are in good agreement with the requirements of ASTM D1078:11.
From the reported test results of the 50% recovered, it appears that twenty-one participants obviously did not correct the results for barometric pressure and thermometer inaccuracy as described in ASTM D1078:11 (paragraph 11.1.3 and 11.1.4).

Iron: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM E1615:16.

Miscibility with water: A standardized method is available for Miscibility with water, being ASTM D1722:09. However, not all participants did report according this method. All participants agreed about the miscibility of sample #16220 to be 'passes test'. Eighteen participants reported the miscibility correctly as 'passes test'.

Purity: This determination seems problematic as the group of reported test results is bimodally divided. A number of participants reported the presence of other impurities. This may partly explain the large spread.
Regretfully, no reproducibility data for purity is mentioned in ASTM E2409:13. Therefore no significant conclusions were drawn.
The calculated reproducibility of the 2016 PT is larger than the reproducibility of the 2015 PT (0.085 vs 0.031).

Specific Gravity: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of E202:12.

Water: This determination was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM E1064:16.

UV: The reported test results were split up into method A (sparged with nitrogen) and method B (not sparged with nitrogen). Both sets of test results were evaluated separately.
For method A; regretfully only four participants reported tests results. Therefore no significant conclusions were drawn.
For method B, this determination was problematic for a number of laboratories. In total ten statistical outliers were observed. However, all calculated reproducibilities after rejection of the statistical outliers, are in agreement with the requirements of ASTM E2193:08_method B.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 *sd	R (lit.)
Acidity as Acetic Acid (E2679)	mg/kg	11	1.60	2.27	0.81
Acidity as Acetic Acid (D1613)	mg/kg	42	6.00	3.62	14.00
Aldehydes as Acetaldehyde	mg/kg	29	11.81	5.80	10.16
Appearance		53	pass	n.a.	n.a.
Ash	%M/M	27	0.0003	0.0007	(0.0050)
Chloride as Cl	mg/kg	18	0.106	0.136	0.087
Colour D1209 manual	---	32	1.9	2.2	7.0
Colour D5386 automated	---	32	1.9	2.4	4.9
Density at 20°C	kg/L	51	1.1133	0.0002	0.0005
Diethylene Glycol	mg/kg	31	15.0	15.2	3.8
Initial Boiling Point	°C	43	196.7	1.2	3.1
50% recovered	°C	42	197.6	0.6	1.3
Dry Point	°C	43	198.0	1.2	2.1
Iron as Fe	mg/kg	38	0.026	0.027	0.029
Miscibility with water		20	Passes test	n.a.	n.a.
Purity	%M/M	44	99.919	0.085	n.a.
Specific Gravity 20/20°C	---	45	1.1153	0.0003	0.0005
Water	mg/kg	51	549	97	94
UV Transmittance at 350 nm (N_2)	%T	4	100.26	2.06	(0.94)
UV Transmittance at 275 nm (N_2)	%T	4	98.71	2.31	(1.10)
UV Transmittance at 250 nm (N_2)	%T	2	97.82	n.a.	(2.06)
UV Transmittance at 220 nm (N_2)	%T	4	78.65	7.57	(9.68)
UV Transmittance at 350 nm	%T	39	100.08	0.49	1.15
UV Transmittance at 275 nm	%T	43	99.20	0.96	2.11
UV Transmittance at 250 nm	%T	41	96.44	1.26	1.10
UV Transmittance at 220 nm	%T	44	67.54	3.55	4.05

table 6: reproducibilities of samples #16220 and #16221

Results between brackets were below the application range of the method, therefore results should be evaluated with care

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

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

	October 2016	*October 2015*	*October 2014*	*October 2013*
Number of reporting labs	59	53	52	54
Number of results reported	808	751	766	785
Statistical outliers	46	14	31	40
Percentage outliers	5.7%	1.9%	4.0%	5.1%

table 7: comparison of statistical summary parameters with previous proficiency tests

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

	October 2016	*October 2015*	*October 2014*	*October 2013*
Acidity as Acetic Acid (E2679)	--	--	--	--
Acidity as Acetic Acid (D1613)	++	++	++	n.a.
Aldehydes as Acetaldehyde	++	++	+	++
Ash	(++)	(++)	(++)	(+/-)
Chloride as Cl	--	--	--	+/-
Colour D1209 manual	++	++	++	++
Colour D5368 automated	++	+	++	++
Density at 20°C	++	+	+	++
Diethylene Glycol	--	--	-	--
Initial Boiling Point	++	++	++	++
50% recovered	++	++	++	++
Dry Point	++	++	++	++
Iron as Fe	+	+	-	+/-
Purity	n.e.	n.e.	n.a.	--
Specific Gravity 20/20°C	++	++	+	++
Water	+/-	--	--	--
UV Transmittance at 350 nm	++	+	+	++
UV Transmittance at 275 nm	+	-	-	++
UV Transmittance at 250 nm	-	-	-	+/-
UV Transmittance at 220 nm	+	--	++	+

table 8: comparison determinations against the standard

Results between brackets were below the application range of the method, therefore results should be evaluated with care

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

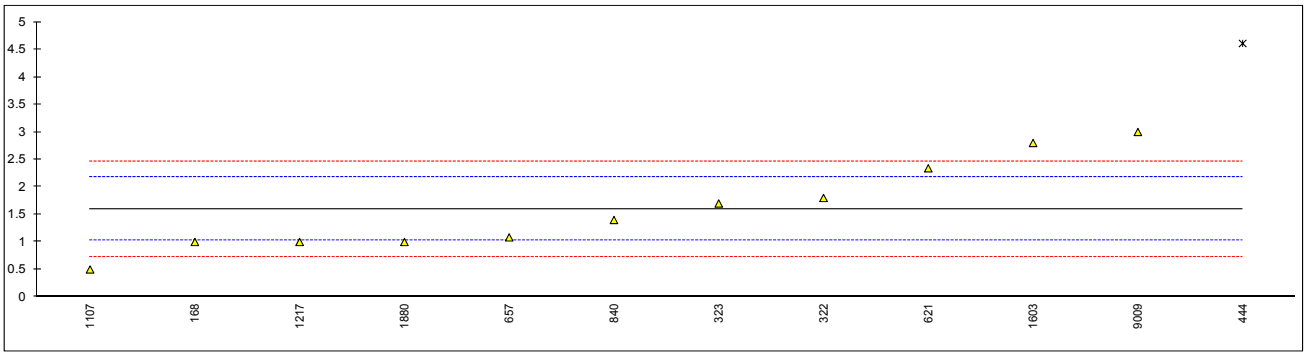
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- - : group performed worse than the standard
- -- : group performed much worse than the standard

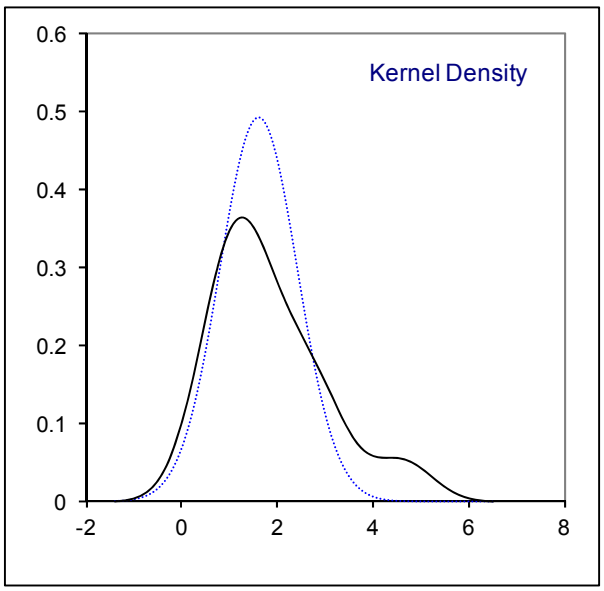
APPENDIX 1

Determination of Acidity as Acetic Acid (E2679) on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168	E2679	1.0		-2.08	
169		-----		-----	
171		-----		-----	
174		-----		-----	
311		-----		-----	
322	E2679	1.8		0.68	
323	E2679	1.7		0.34	
343		-----		-----	
347		-----		-----	
360		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2679	4.61	G(0.05)	10.39	
528		-----		-----	
529		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	E2679	2.34		2.55	
657	E2679	1.0831		-1.79	
663		-----		-----	
786		-----		-----	
825		-----		-----	
840	E2679	1.4		-0.70	
848		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865		-----		-----	
869		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107	E2679	0.5		-3.81	
1117		-----		-----	
1151		-----		-----	
1217	E2679	1	C	-2.08	Reported 0.0001 mg/kg (probably unit error?)
1261		-----		-----	
1460		-----		-----	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603	In house	2.8		4.14	
1623		-----		-----	
1718		-----		-----	
1814		-----		-----	
1823		-----		-----	
1866		-----		-----	
1868		-----		-----	
1880	E2679	1.0		-2.08	
2124		-----		-----	
7006		-----		-----	
9008		-----		-----	
9009	E2679	3.0		4.83	
9014		-----		-----	

normality	OK
n	11
outliers	1
mean (n)	1.602
st.dev. (n)	0.8121
R(calc.)	2.274
R(E2679:09e1)	0.811

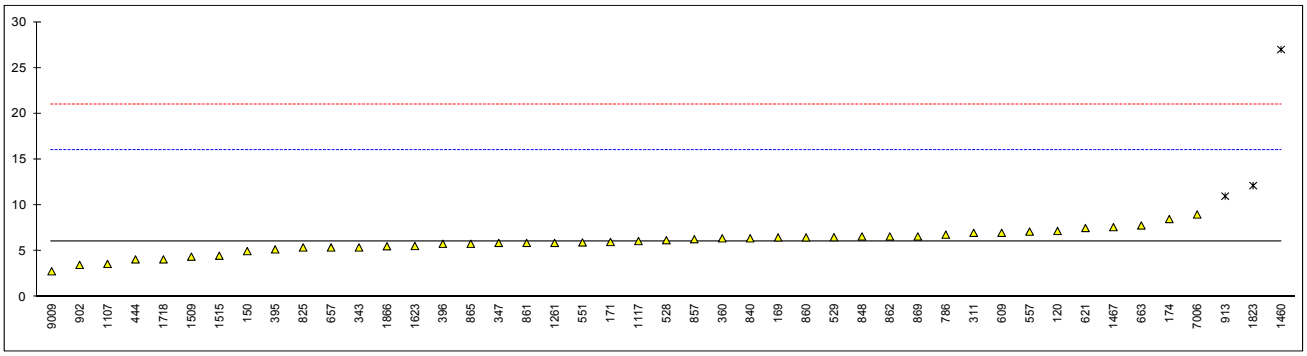

5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1107
168
1217
1880
657
840
323
322
621
1603
9009
444

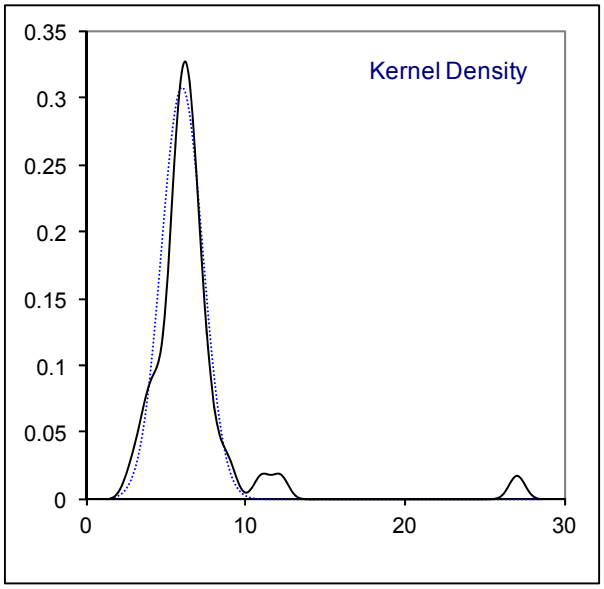

Kernel Density
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
0
2
4
6
8

Determination of Acidity as Acetic Acid (D1613) on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	7.2		0.24	
150	D1613	5		-0.20	
168		-----		-----	
169	D1613	6.5		0.10	
171	D1613	6		0.00	
174	D1613	8.5	C	0.50	First reported 0.79
311	D1613	7		0.20	
322		-----		-----	
323		-----		-----	
343	D1613	5.4		-0.12	
347	D1613	5.9		-0.02	
360	D1613	6.4		0.08	
370		-----		-----	
395	D1613	5.19		-0.16	
396	D1613	5.8		-0.04	
444	D1613	4.1		-0.38	
528	D1613	6.197		0.04	
529	D1613	6.521		0.10	
551	D1613	5.95		-0.01	
557	D1613	7.13516		0.23	
558		-----		-----	
609	D1613	7		0.20	
610		-----		-----	
621	D1613	7.52		0.30	
657	D1613	5.4		-0.12	
663	D1613	7.8		0.36	
786	D1613	6.8	C	0.16	First reported 0.00068 mg/kg
825	D1613	5.4		-0.12	
840	D1613	6.4		0.08	
848	D1613	6.6		0.12	
857	D1613	6.3		0.06	
860	D1613	6.5		0.10	
861	D1613	5.9		-0.02	
862	D1613	6.6		0.12	
865	D1613	5.8		-0.04	
869	D1613	6.6		0.12	
886		-----		-----	
902	D1613	3.5		-0.50	
912		-----		-----	
913	D1613	11	R(0.05)	1.00	
962		-----		-----	
963		-----		-----	
1107	D1613	3.6		-0.48	
1117	D1613	6.1	C	0.02	First reported 0.00061 mg/kg
1151		-----		-----	
1217		-----		-----	
1261	D1613	5.9		-0.02	
1460	D1613	27	R(0.01)	4.20	
1467	D1613	7.62		0.32	
1509	D1613	4.4		-0.32	
1515	D1613	4.5		-0.30	
1603		-----		-----	
1623	D1613	5.56		-0.09	
1718	D1613	4.1		-0.38	
1814		-----		-----	
1823	D1613	12.15	R(0.05)	1.23	
1866	D1613	5.53		-0.09	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006	D1613	9.0	C	0.60	First reported 30
9008		-----		-----	
9009	D1613	2.8		-0.64	
9014		-----		-----	

normality	OK
n	42
outliers	3
mean (n)	6.001
st.dev. (n)	1.2940
R(calc.)	3.623
R(D1613:06)	14.000

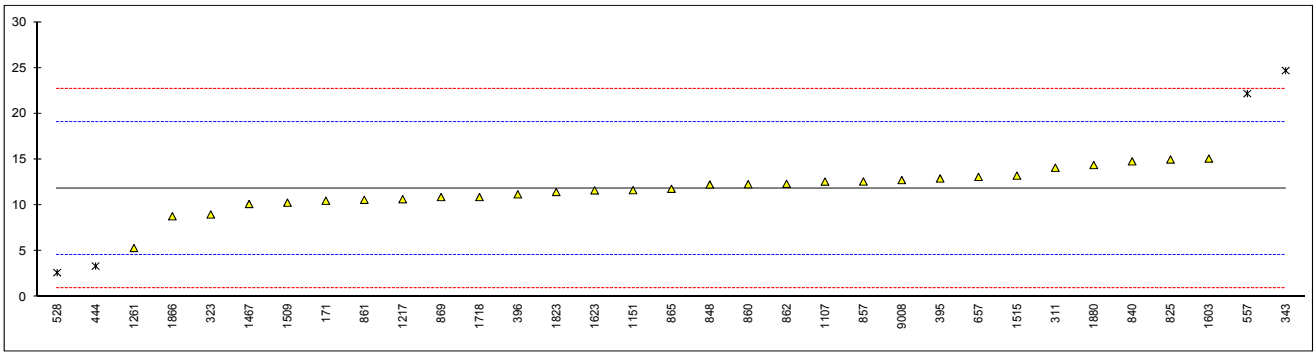

30
25
20
15
10
5
0
9009
902
1107
444
1718
1509
1515
150
395
825
657
343
1866
1623
396
865
347
861
1261
551
171
1117
528
857
360
840
169
860
529
848
862
869
786
311
609
557
120
621
1467
663
174
7006
913
1823
1460

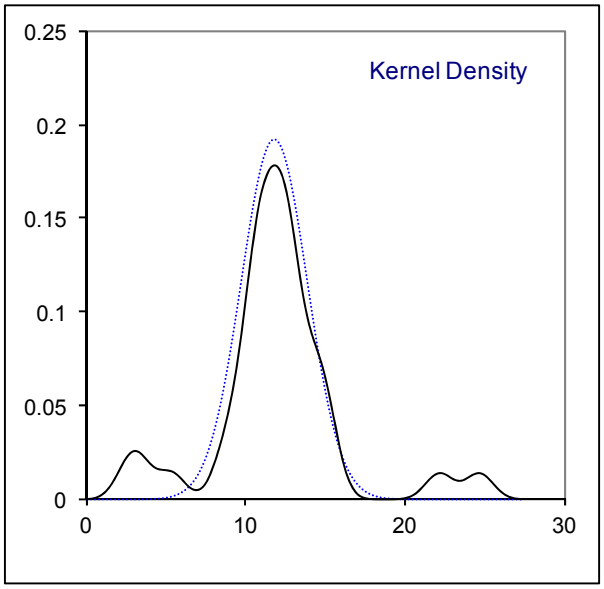

Kernel Density
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
10
20
30

Determination of Aldehydes as Acetaldehyde on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169		-----		-----	
171	E2313	10.5		-0.36	
174		-----		-----	
311	E2313	14.1		0.63	
322		-----		-----	
323	E2313	9.0		-0.77	
343	E2313	24.7	R(0.05)	3.55	
347		-----		-----	
360		-----		-----	
370		-----		-----	
395	E2313	12.93		0.31	
396	E2313	11.2		-0.17	
444	E2313	3.37	R(0.05)	-2.33	
528	E2313	2.6563	R(0.05)	-2.52	
529		-----		-----	
551		-----		-----	
557	NBR 7343	22.193	R(0.05)	2.86	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2313	13.1		0.36	
663		-----		-----	
786		-----		-----	
825	E2313	15.0		0.88	
840	E2313	14.80		0.83	
848	E2313	12.27		0.13	
857	E2313	12.6		0.22	
860	E2313	12.3		0.14	
861	E2313	10.6		-0.33	
862	E2313	12.34		0.15	
865	E2313	11.8		0.00	
869	E2313	10.9		-0.25	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107	E2313	12.59		0.22	
1117		-----		-----	
1151	E2313	11.65		-0.04	
1217	E2313	10.67		-0.31	
1261	E2313	5.34		-1.78	
1460		-----		-----	
1467	E2313	10.14		-0.46	
1509	E2313	10.29		-0.42	
1515	E2313	13.24		0.40	
1603	In house	15.1		0.91	
1623	INH-63	11.63		-0.05	
1718	E2313	10.90		-0.25	
1814		-----		-----	
1823	E2313	11.452		-0.10	
1866	E2313	8.805		-0.83	
1868		-----		-----	
1880	E2313	14.4		0.71	
2124		-----		-----	
7006		-----		-----	
9008	E2313	12.75		0.26	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	29
outliers	4
mean (n)	11.807
st.dev. (n)	2.0727
R(calc.)	5.803
R(E2313:15)	10.156


30
25
20
15
10
5
0
528
444
1261
1866
323
1467
1509
171
861
1217
869
1718
396
1823
1623
1151
865
848
860
862
1107
857
9008
395
657
1515
311
1880
840
825
1603
557
343


Kernel Density
0.25
0.2
0.15
0.1
0.05
0
0
10
20
30

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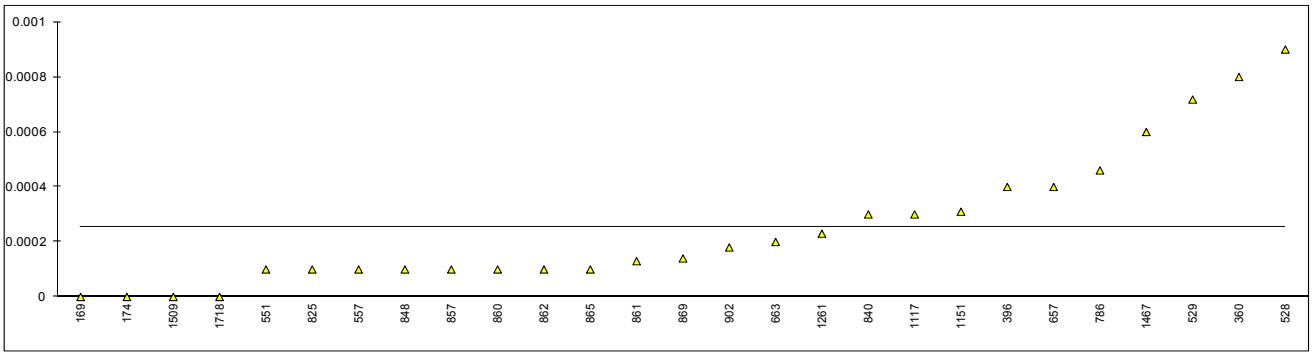
Determination of Appearance on sample #16220;

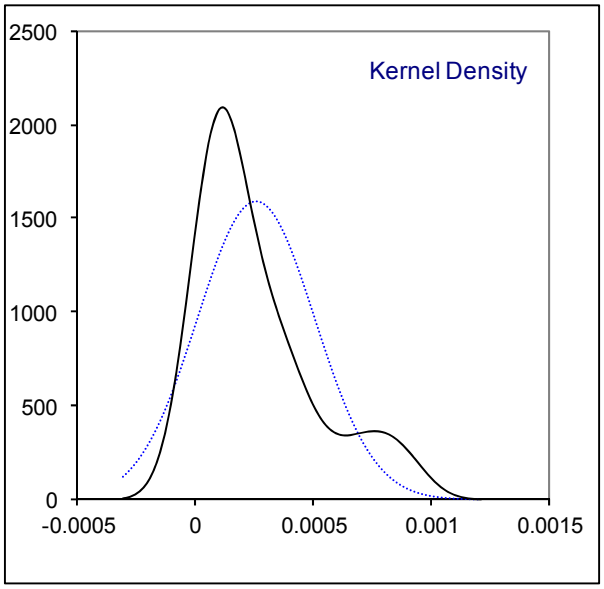
lab	method	value	mark	z(targ)	remarks
120	Visual	Pass		-----	
150	E2680	Pass		-----	
168	Visual	Clear & Bright		-----	
169	Visual	BC&FSM		-----	
171	E2680	Clear and Free		-----	
174	E2680	CFSM		-----	
311	E2680	pass		-----	
322	E2680	PASS		-----	
323	E2680	clear & bright		-----	
343	E2680	PASS		-----	
347	E2680	PASS		-----	
360	E2680	Clear and Bright		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	Pass		-----	
444	E2680	Pass		-----	
528	E2680	CFSM		-----	
529	E2680	pass		-----	
551	E2680	Pass		-----	
557	E2680	Pass		-----	
558	E2680	Pass		-----	
609	E2680	Pass		-----	
610		-----		-----	
621	E2680	Pass		-----	
657	E2680	PASS		-----	
663	E2680	Pass		-----	
786	D4176	Pass		-----	
825	Visual	Clear & Free		-----	
840	E2680	Pass		-----	
848	E2680	B & C		-----	
857	E2680	Pass		-----	
860	E2680	Pass		-----	
861	E2680	Bright&Clear		-----	
862	E2680	pass		-----	
865	E2680	pass		-----	
869	Visual	Clear and bright		-----	
886		-----		-----	
902	E2680	PASS		-----	
912		-----		-----	
913	E2680	CFSM		-----	
962		-----		-----	
963		-----		-----	
1107		-----		-----	
1117	D4176	pass		-----	
1151	Visual	Clear		-----	
1217		Pass		-----	
1261	Visual	Clear		-----	
1460	D4176	Clear ,Pass		-----	
1467	E2680	pass		-----	
1509	E2680	Pass		-----	
1515	E2680	PASS		-----	
1603	In house	PASS		-----	
1623	INH-63	Clear		-----	
1718	D4176	Pass		-----	
1814		-----		-----	
1823	D4176	Pass		-----	
1866		-----		-----	
1868		-----		-----	
1880	E2680	Pass		-----	
2124		-----		-----	
7006		-----		-----	
9008	Visual	pass		-----	
9009	Visual	pass		-----	
9014	E2680	Clear & bright		-----	
	normality	n.a.			
	n	53			
	mean (n)	Pass			

Determination of Ash on sample #16220; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D482	<0.001		-----	
150	D482	<0.001		-----	
168		-----		-----	
169	D482	0.0000		-----	
171	D482	<0.001		-----	
174	D482	0.0000		-----	
311	D482	<0.001		-----	
322		-----		-----	
323		-----		-----	
343	D482	<0.001		-----	
347	D482	<0.001		-----	
360	D482	0.0008		-----	
370	D482	< 0.001		-----	
395		-----		-----	
396	D482	0.0004		-----	
444	D482	<0.0010		-----	
528	D482	0.0009		-----	
529	D482	0.000718		-----	
551	D482	0.0001		-----	
557	NBR 0984	0.0001		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D482	< 0.001		-----	
657	D482	0.0004		-----	
663	D482	0.0002		-----	
786	D482	0.00046		-----	
825	D482	0.0001		-----	
840	D482	0.0003		-----	
848	D482	0.0001		-----	
857	D482	0.0001		-----	
860	D482	0.0001		-----	
861	D482	0.00013		-----	
862	D482	0.0001		-----	
865	D482	0.0001		-----	
869	D482	0.00014		-----	
886		-----		-----	
902	D482	0.00018		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107		-----		-----	
1117	D482	0.0003		-----	
1151	D482	0.00031		-----	
1217		-----		-----	
1261	D482	0.00023		-----	
1460	D482	< 0.001		-----	
1467	D482	0.0006		-----	
1509	D482	0.0000		-----	
1515		-----		-----	
1603	In house	< 0.0010		-----	
1623	D482	<0.001		-----	
1718	D482	0.0000		-----	
1814		-----		-----	
1823	D482	N.D		-----	
1866		-----		-----	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

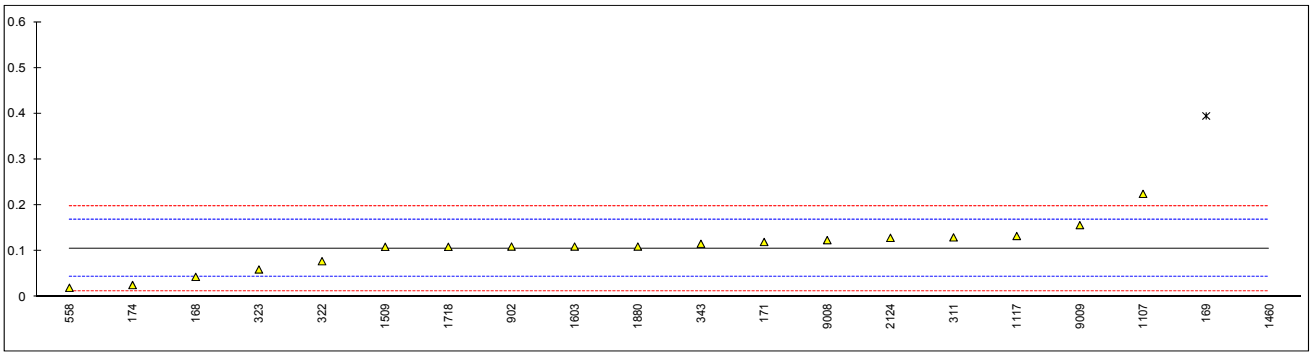
	normality	suspect	
	n	27	
	outliers	0	
	mean (n)	0.00025	
	st.dev. (n)	0.000250	
	R(calc.)	0.00070	
	R(D482:13)	(0.00500)	Application range: 0.001 – 0.180%M/M

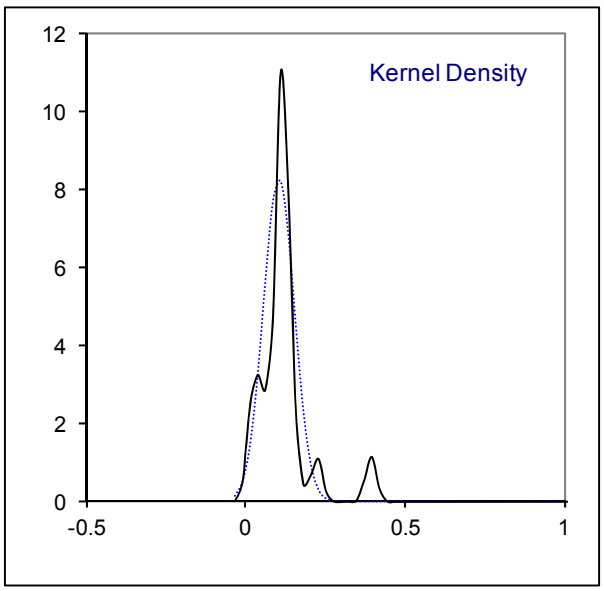

0.001
0.0008
0.0006
0.0004
0.0002
0
169
174
1509
1718
551
825
557
848
857
860
862
865
861
869
902
663
1261
840
1117
1151
396
657
786
1467
529
360
528


Kernel Density
2500
2000
1500
1000
500
0
-0.0005
0
0.0005
0.001
0.0015

Determination of Chloride as Cl on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168	E2469	0.0438		-2.01	
169		0.395	G(0.01)	9.31	
171	E2469	0.12		0.45	
174	E2469	0.026		-2.58	
311	E2469	0.13		0.77	
322	E2469	0.078		-0.91	
323	E2469	0.06		-1.49	
343	E2469	0.116		0.32	
347		-----		-----	
360		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
528		-----		-----	
529		-----		-----	
551		-----		-----	
557		-----		-----	
558	NBR 7342	0.02		-2.78	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657		-----		-----	
663		-----		-----	
786		-----		-----	
825		-----		-----	
840	IMPCA002	<0.25		-----	
848		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865	INH-001	<0.2		-----	
869		-----		-----	
886		-----		-----	
902	E2469	0.11		0.12	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107	E2469	0.225		3.83	
1117	E2469	0.133		0.87	
1151		-----		-----	
1217		-----		-----	
1261		-----		-----	
1460	E2469	6	G(0.01)	189.98	
1467		-----		-----	
1509	E2469	0.1094		0.11	
1515		-----		-----	
1603	In house	0.11		0.12	
1623		-----		-----	
1718	E2469	0.1094		0.11	
1814		-----		-----	
1823		-----		-----	
1866	E2469	<0.5		-----	
1868		-----		-----	
1880	E2469	0.11		0.12	
2124	E2469	0.129		0.74	
7006		-----		-----	
9008	E2469	0.124		0.58	
9009	E2469	0.1567		1.63	
9014		-----		-----	
					Only ASTM E2469 data:
	normality	suspect			suspect
	n	18			16
	outliers	2			1
	mean (n)	0.1061			0.1113
	st.dev. (n)	0.04840			0.04616
	R(calc.)	0.1355			0.1293
	R(E2469:16)	0.0869			0.0911

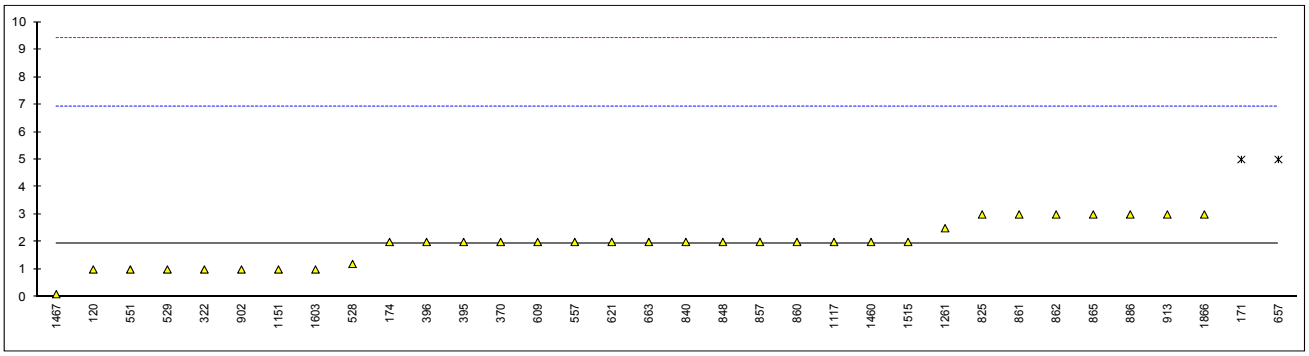

0.6
0.5
0.4
0.3
0.2
0.1
0
558
174
168
323
322
1509
1718
902
1603
1880
343
171
9008
2124
311
1117
9009
1107
169
1460

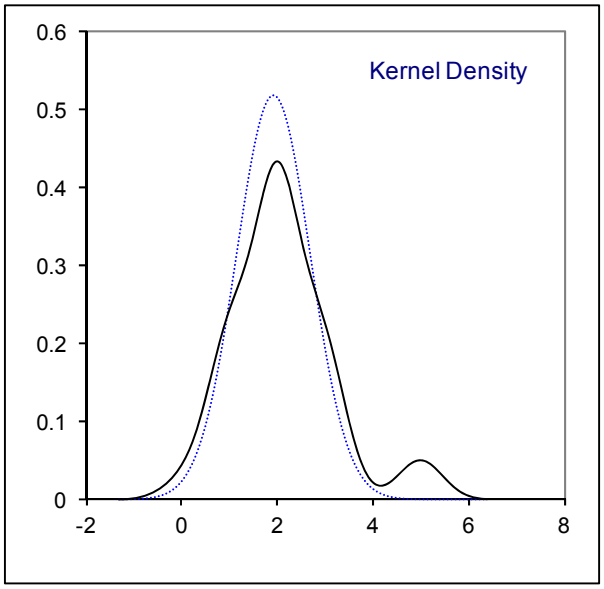

Kernel Density
12
10
8
6
4
2
0
-0.5
0
0.5
1

Determination of Colour Pt/Co manual (D1209) on sample #16220;

lab	method	value	mark	z(targ)	remarks
120	D1209	1		-0.37	
150		-----		-----	
168		-----		-----	
169	D1209	<5		-----	
171	D1209	5	R(0.05)	1.23	
174	D1209	2		0.03	
311	D1209	<5		-----	
322	D1209	1		-0.37	
323	D1209	<5		-----	
343		-----		-----	
347		-----		-----	
360		-----		-----	
370	D1209	2		0.03	
395	D1209	2		0.03	
396	D1209	2		0.03	
444		-----		-----	
528	D5386	1.2		-0.29	
529	D1209	1		-0.37	
551	D1209	1		-0.37	
557	D1209	2		0.03	
558	NBR 7342	<5		-----	
609	D1209	2		0.03	
610		-----		-----	
621	D1209	2		0.03	
657	D1209	5	R(0.05)	1.23	
663	D1209	2		0.03	
786	D1209	<5		-----	
825	D1209	3		0.43	
840	D1209	2		0.03	
848	D1209	2		0.03	
857	D1209	2		0.03	
860	D1209	2		0.03	
861	D1209	3		0.43	
862	D1209	3		0.43	
865	D1209	3		0.43	
869		-----		-----	
886	D1209	3		0.43	
902	D1209	1		-0.37	
912		-----		-----	
913	D1209	3		0.43	
962		-----		-----	
963		-----		-----	
1107	D1209	<5		-----	
1117	D1209	2		0.03	
1151	D1209	1		-0.37	
1217	D1209	<5		-----	
1261	D1209	2.5		0.23	
1460	D1209	2		0.03	
1467	D1209	0.10		-0.73	
1509	D1209	<5		-----	
1515	D1209	2		0.03	
1603	In house	1		-0.37	
1623		-----		-----	
1718	D1209	< 5		-----	
1814		-----		-----	
1823		-----		-----	
1866	D1209	3		0.43	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	32
outliers	2
mean (n)	1.93
st.dev. (n)	0.769
R(calc.)	2.15
R(D1209:05)	7.00

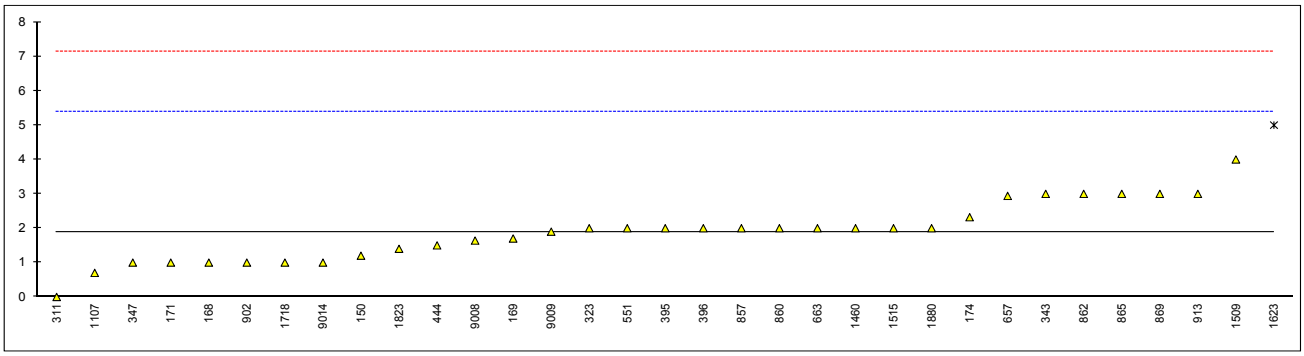

10
9
8
7
6
5
4
3
2
1
0
1467
120
551
529
322
902
1151
1603
528
174
396
395
370
609
557
621
663
840
848
857
860
1117
1460
1515
1261
825
861
862
865
886
913
1866
171
657

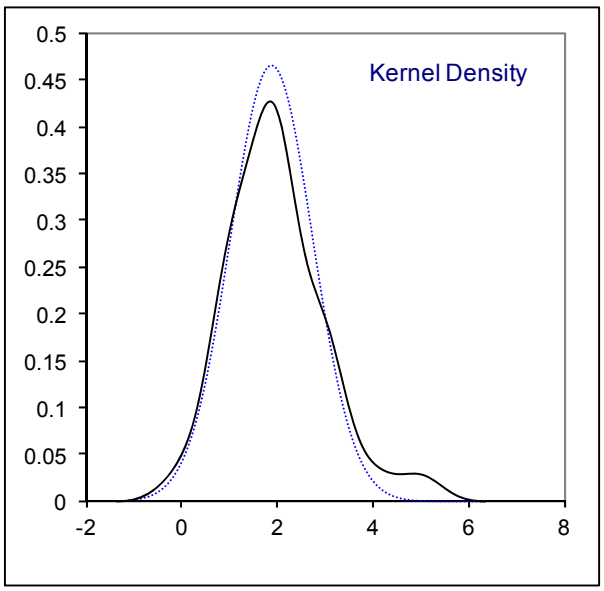

Kernel Density
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
0
2
4
6
8

Determination of Colour Pt/Co automated (D5386) on sample #16220;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D5386	1.2		-0.39	
168	D5386	1		-0.51	
169	D5386	1.7		-0.11	
171	D5386	1		-0.51	
174	D5386	2.32		0.25	
311	D5386	0		-1.08	
322		-----		-----	
323	D5386	2		0.07	
343	D5386	3		0.64	
347	D5386	1		-0.51	
360		-----		-----	
370		-----		-----	
395	D5386	2		0.07	
396	D5386	2		0.07	
444	D5386	1.5		-0.22	
528		-----		-----	
529		-----		-----	
551	D5386	2		0.07	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	D5386	2.94		0.60	
663	D5386	2		0.07	
786		-----		-----	
825		-----		-----	
840		-----		-----	
848		-----		-----	
857	D5386	2		0.07	
860	D5386	2		0.07	
861		-----		-----	
862	D5386	3		0.64	
865	D5386	3		0.64	
869	D5386	3		0.64	
886		-----		-----	
902	D5386	1		-0.51	
912		-----		-----	
913	D5386	3		0.64	
962		-----		-----	
963		-----		-----	
1107	D5386	0.7		-0.68	
1117		-----		-----	
1151		-----		-----	
1217		-----		-----	
1261		-----		-----	
1460	D5386	2		0.07	
1467		-----		-----	
1509	D5386	4		1.21	
1515	D5386	2		0.07	
1603		-----		-----	
1623	D1209	5	R(0.05)	1.78	
1718	D5386	1		-0.51	
1814		-----		-----	
1823	D5386	1.4		-0.28	
1866		-----		-----	
1868		-----		-----	
1880	D5386	2.0		0.07	
2124		-----		-----	
7006		-----		-----	
9008	D5386	1.64		-0.14	
9009	D5386	1.9		0.01	
9014	D5386	1.0		-0.51	

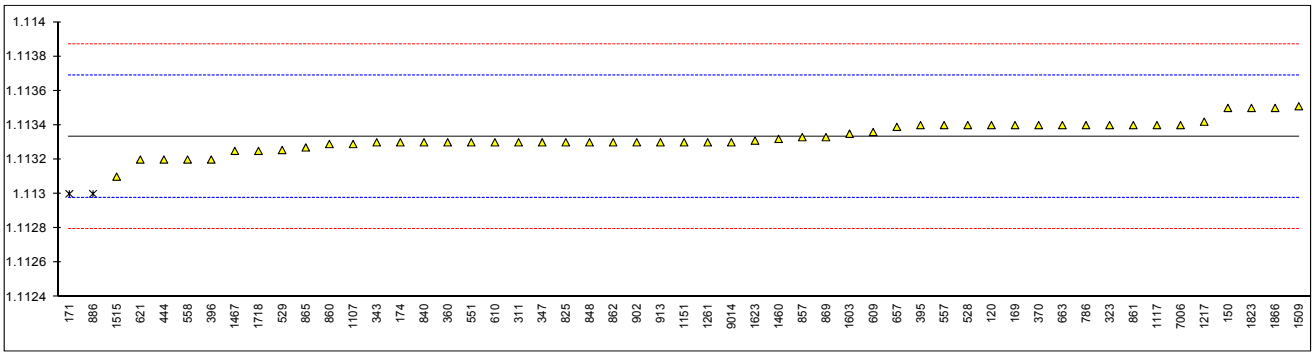
normality	OK
n	32
outliers	1
mean (n)	1.88
st.dev. (n)	0.856
R(calc.)	2.40
R(D5386:10)	4.89

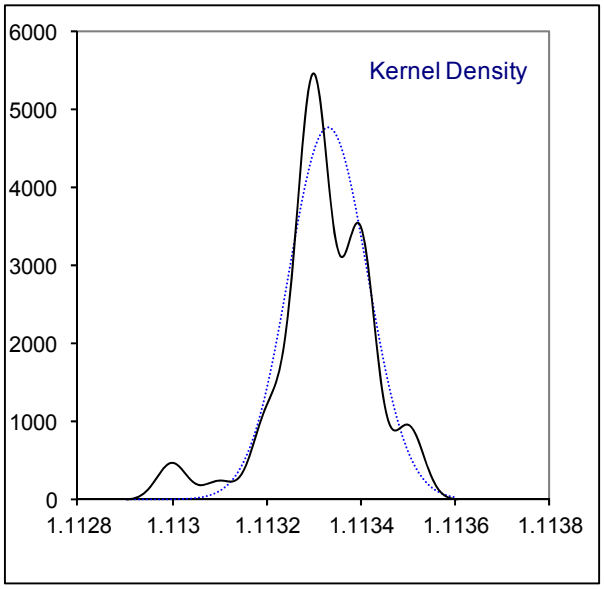

8
7
6
5
4
3
2
1
0
311
1107
347
171
168
902
1718
9014
150
1823
444
9008
169
9009
323
551
395
396
857
860
663
1460
1515
1880
174
657
343
862
865
869
913
1509
1623


Kernel Density
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-2
0
2
4
6
8

Determination of Density at 20 °C on sample #16220; results in kg/L

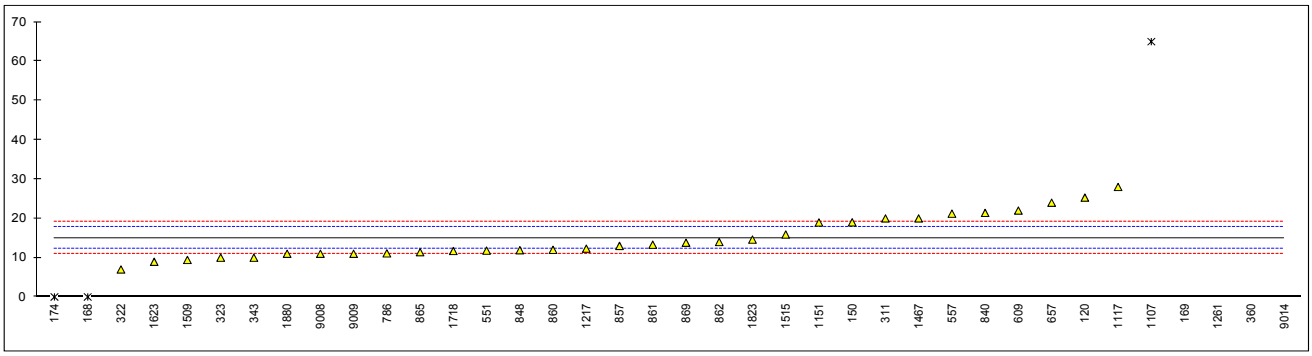
lab	method	value	mark	z(targ)	remarks
120	ISO12185	1.1134		0.38	
150	D4052	1.1135		0.94	
168		-----		-----	
169	D4052	1.1134		0.38	
171	D4052	1.113	R(0.05)	-1.86	
174	D4052	1.1133		-0.18	
311	ISO12185	1.1133		-0.18	
322		-----		-----	
323	D4052	1.1134		0.38	
343	D4052	1.1133		-0.18	
347	D4052	1.1133		-0.18	
360	ISO12185	1.1133		-0.18	
370	D4052	1.1134		0.38	
395	D4052	1.1134		0.38	
396	D4052	1.1132		-0.74	
444	D4052	1.1132		-0.74	
528	D4052	1.1134		0.38	
529	D4052	1.113255		-0.43	
551	D4052	1.1133		-0.18	
557	D4052	1.1134		0.38	
558	D4052	1.1132		-0.74	
609	D4052	1.11336		0.16	
610	D4052	1.1133		-0.18	
621	D4052	1.1132		-0.74	
657	D4052	1.11339		0.33	
663	D4052	1.11340		0.38	
786	D4052	1.1134		0.38	
825	D4052	1.1133		-0.18	
840	D4052	1.1133		-0.18	
848	D4052	1.1133		-0.18	
857	D4052	1.11333		-0.01	
860	D4052	1.11329		-0.23	
861	D4052	1.1134		0.38	
862	D4052	1.1133		-0.18	
865	D4052	1.11327		-0.35	
869	D4052	1.11333		-0.01	
886	D4052	1.113	C,R(0.05)	-1.86	First reported 1113
902	D4052	1.1133		-0.18	
912		-----		-----	
913	D4052	1.1133		-0.18	
962		-----		-----	
963		-----		-----	
1107	D4052	1.11329		-0.23	
1117	D4052	1.1134		0.38	
1151	D4052	1.11330		-0.18	
1217	ISO12185	1.11342		0.49	
1261	ISO12185	1.11330		-0.18	
1460	D4052	1.11332		-0.07	
1467	D4052	1.11325		-0.46	
1509	D4052	1.11351		1.00	
1515	D4052	1.1131		-1.30	
1603	In house	1.11335		0.10	
1623	D4052	1.11331		-0.12	
1718	D4052	1.11325		-0.46	
1814		-----		-----	
1823	D4052	1.1135		0.94	
1866	ISO12185	1.1135		0.94	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006	D4052	1.1134		0.38	
9008		-----		-----	
9009		-----		-----	
9014	D4052	1.1133		-0.18	
	normality	OK			
	n	51			
	outliers	2			
	mean (n)	1.11333			
	st.dev. (n)	0.000084			
	R(calc.)	0.00023			
	R(ISO12185:96)	0.00050			

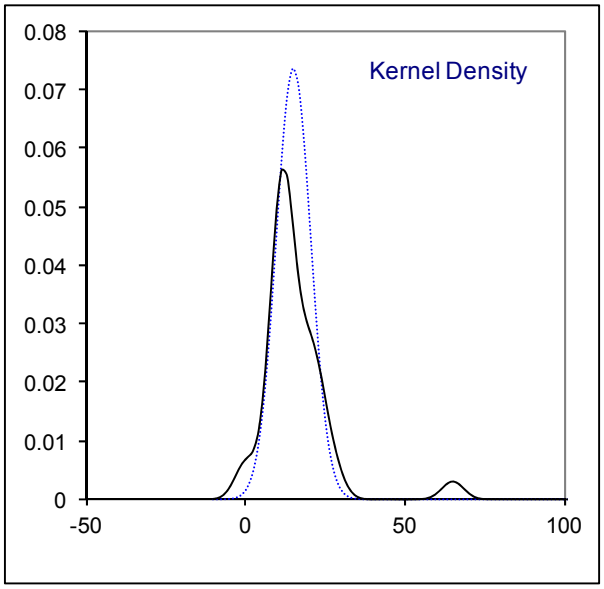

1.114
1.1138
1.1136
1.1134
1.1132
1.113
1.1128
1.1126
1.1124
171 886 1515 621 444 558 396 1467 1718 529 865 860 1107 343 174 840 360 551 610 311 347 825 848 862 902 913 1151 1261 9014 1623 1460 857 869 1603 609 657 395 557 528 120 169 370 663 786 323 861 1117 7006 1217 150 1823 1866 1509


Kernel Density
6000
5000
4000
3000
2000
1000
0
1.1128
1.113
1.1132
1.1134
1.1136
1.1138

Determination of Diethylene Glycol on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	25.3		7.56	
150	E2409	19		2.93	
168	E2409	0	ex	-11.01	Result excluded, zero is not a real result
169	E2409	292	R(0.01)	203.23	
171	E2409	<5	C	<-7.33	False negative test result? First reported 78
174	E2409	0	ex	-11.01	Result excluded, zero is not a real result
311	INH-100	20		3.67	
322	E2409	7		-5.87	
323	E2409	10		-3.67	
343	E2409	10		-3.67	
347	E2409	<100		-----	
360	E2409	422	R(0.01)	298.60	
370		-----		-----	
395		-----		-----	
396	E2409	<50	C	-----	First reported 111
444		-----		-----	
528		-----		-----	
529		-----		-----	
551	E2409	11.8		-2.35	
557	E2409	21.2017		4.55	
558		-----		-----	
609	E2409	22	C	5.13	First reported 129
610		-----		-----	
621		-----		-----	
657	E2409	24		6.60	
663		-----		-----	
786	E2409	11.1		-2.86	
825		-----		-----	
840	E2409	21.4		4.69	
848	E2409	11.9		-2.28	
857	E2409	13		-1.47	
860	E2409	12		-2.20	
861	E2409	13.3		-1.25	
862	E2409	14		-0.73	
865	E2409	11.4		-2.64	
869	E2409	13.8		-0.88	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107	E2409	65	R(0.01)	36.68	
1117	E2409	28		9.54	
1151	E2409	18.96		2.90	
1217	E2409	12.3	C	-1.98	Reported 0.00123 mg/kg
1261	E2409	378	R(0.01)	266.32	
1460		-----		-----	
1467	E2409	20		3.67	
1509	E2409	9.42		-4.09	
1515	E2409	15.90		0.66	
1603	In house	< 50		-----	
1623	E2409	8.95		-4.44	
1718	E2409	11.7		-2.42	
1814		-----		-----	
1823	E2409	14.6		-0.29	
1866		-----		-----	
1868		-----		-----	
1880	E2409	11		-2.94	
2124	INH-180	<100		-----	
7006	E2409	<50		-----	
9008	E2409	11		-2.94	
9009	E2409	11		-2.94	
9014	E2409	436	R(0.01)	308.87	
	normality	OK			
	n	31			
	outliers	5 (+2 excl)			
	mean (n)	15.00			
	st.dev. (n)	5.420			
	R(calc.)	15.18			
	R(E2409:13)	3.82			Compare R(Horwitz) = 4.471

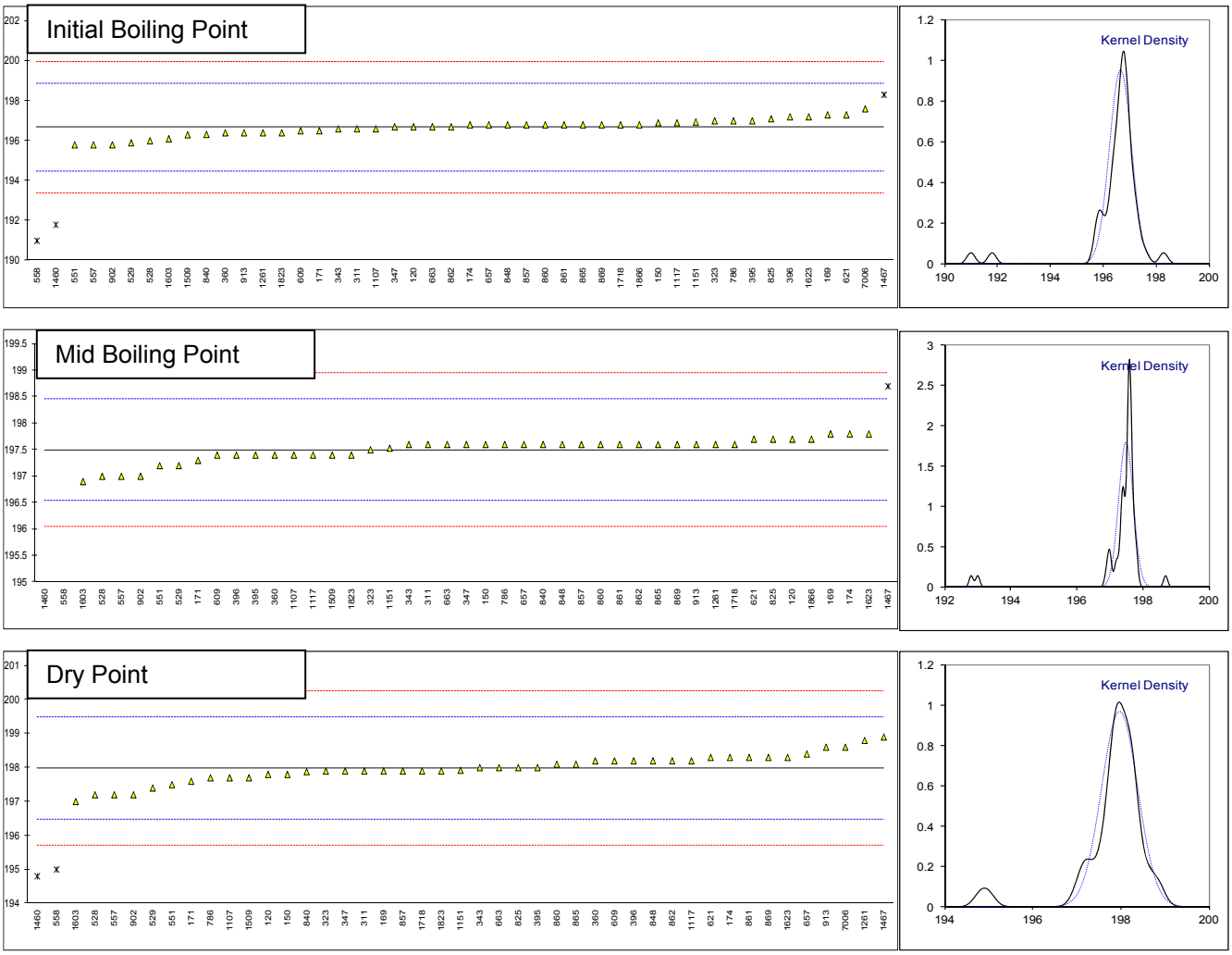

70
60
50
40
30
20
10
0
174
168
322
1623
1509
323
343
1880
9008
9009
786
865
1718
551
848
860
1217
857
861
869
862
1823
1515
1151
150
311
1467
557
840
609
657
120
1117
1107
169
1261
360
9014


Kernel Density
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-50
0
50
100

Determination of Distillation: IBP, 50% recovered, Dry Point on sample #16220; results in °C

lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
120	D1078	196.7		0.03	197.7		0.42	197.8		-0.24
150	D1078	196.9		0.21	197.6		0.22	197.8		-0.24
168		-----		-----	-----		-----	-----		-----
169	D1078	197.3		0.58	197.8		0.63	197.9		-0.10
171	D1078	196.5		-0.15	197.3		-0.41	197.6		-0.50
174	D1078	196.8		0.12	197.8		0.63	198.3		0.42
311	D1078	196.6		-0.06	197.6		0.22	197.9		-0.10
322		-----		-----	-----		-----	-----		-----
323	D1078	197.0		0.30	197.5		0.01	197.9		-0.10
343	D1078	196.6		-0.06	197.6		0.22	198.0		0.03
347	D1078	196.7		0.03	197.6		0.22	197.9		-0.10
360	D1078	196.4		-0.24	197.4		-0.20	198.2		0.29
370		-----		-----	-----		-----	-----		-----
395	D1078	197.0		0.30	197.4		-0.20	198.0		0.03
396	D1078	197.2		0.49	197.4		-0.20	198.2		0.29
444		-----		-----	-----		-----	-----		-----
528	D1078	196.0		-0.61	197.0		-1.03	197.2		-1.03
529	D1078	195.9		-0.70	197.2		-0.61	197.4		-0.77
551	D1078	195.8		-0.79	197.2		-0.61	197.5		-0.63
557	D1078	195.8		-0.79	197.0		-1.03	197.2		-1.03
558	NBR 7125	191	R(0.01)	-5.17	193	R(0.01)	-9.33	195	R(0.01)	-3.94
609	D86	197	C	-0.15	197.4	C	-0.20	198.2	C	0.29
610		-----		-----	-----		-----	-----		-----
621	D1078	197.3		0.58	197.7		0.42	198.3		0.42
657	D1078	196.8		0.12	197.6		0.22	198.4		0.56
663	D1078	196.7		0.03	197.6		0.22	198.0		0.03
786	D1078	197.0		0.30	197.6		0.22	197.7		-0.37
825	D1078	197.1		0.40	197.7		0.42	198.0		0.03
840	D1078	196.32		-0.32	197.6		0.22	197.88		-0.13
848	D1078	196.8		0.12	197.6		0.22	198.2		0.29
857	D1078	196.8		0.12	197.6		0.22	197.9		-0.10
860	D1078	196.8		0.12	197.6		0.22	198.1		0.16
861	D1078	196.8		0.12	197.6		0.22	198.3		0.42
862	D1078	196.7		0.03	197.6		0.22	198.2		0.29
865	D1078	196.8		0.12	197.6		0.22	198.1		0.16
869	D1078	196.8		0.12	197.6		0.22	198.3		0.42
886		-----		-----	-----		-----	-----		-----
902	D1078	195.8		-0.79	197.0		-1.03	197.2		-1.03
912		-----		-----	-----		-----	-----		-----
913	D1078	196.4		-0.24	197.6		0.22	198.6		0.82
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
1107	D1078	196.6		-0.06	197.4		-0.20	197.7		-0.37
1117	D1078	196.9		0.21	197.4		-0.20	198.2		0.29
1151	D1078	196.94		0.25	197.53		0.07	197.92		-0.08
1217		-----		-----	-----		-----	-----		-----
1261	D1078	196.4		-0.24	197.6		0.22	198.8		1.09
1460	D1078	191.8	R(0.01)	-4.44	192.8	R(0.01)	-9.75	194.8	R(0.01)	-4.20
1467	D1078	198.3	R(0.05)	1.49	198.7	R(0.01)	2.50	198.9		1.22
1509	D1078	196.3		-0.33	197.4		-0.20	197.7		-0.37
1515		-----		-----	-----		-----	-----		-----
1603	In house	196.1		-0.52	196.9		-1.24	197.0		-1.29
1623	D1078	197.2		0.49	197.8		0.63	198.3		0.42
1718	D1078	196.8		0.12	197.6		0.22	197.9		-0.10
1814		-----		-----	-----		-----	-----		-----
1823	D1078	196.4		-0.24	197.4		-0.20	197.9		-0.10
1866	D1078	196.8		0.12	197.7		0.42	-----		-----
1868		-----		-----	-----		-----	-----		-----
1880		-----		-----	-----		-----	-----		-----
2124		-----		-----	-----		-----	-----		-----
7006	D1078	197.6		0.85	-----		-----	198.6		0.82
9008		-----		-----	-----		-----	-----		-----
9009		-----		-----	-----		-----	-----		-----
9014		-----		-----	-----		-----	-----		-----
	normality	OK			OK			OK		
	n	43			42			43		
	outliers	3			3			2		
	mean (n)	196.67			197.55			197.98		
	st.dev. (n)	0.418			0.222			0.413		
	R(calc.)	1.17			0.62			1.16		
	R(D1078:11)	3.07			1.35			2.12		

Lab 609 : first reported 192, 193.5, 197



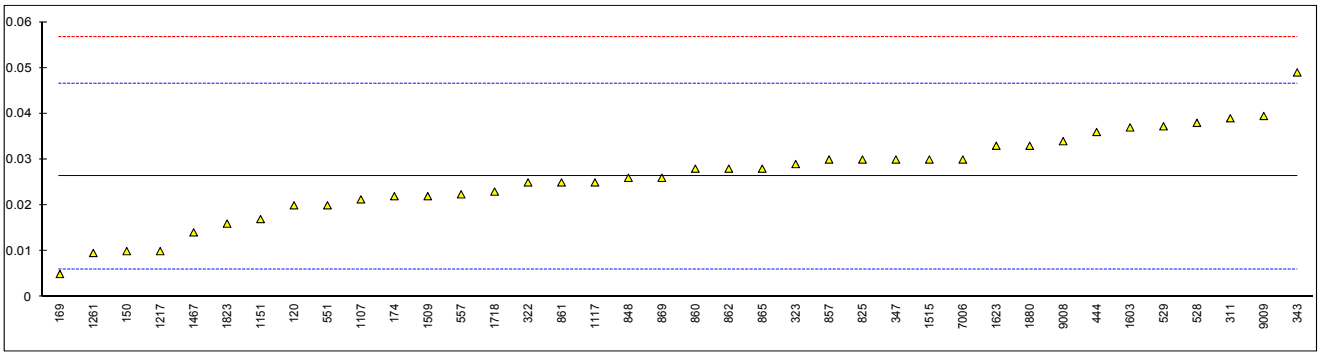
Several laboratories did not correct for theoretical mid boiling point (197.6°C). Results after correction by iis:

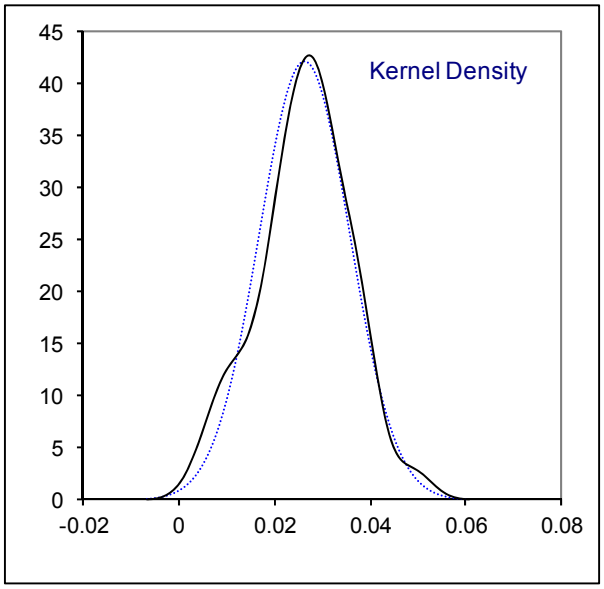
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
169	D1078	197.1		0.29	197.6		-0.01	197.7		-0.48
171	D1078	196.8		0.02	197.6		-0.01	197.9		-0.21
174	D1078	196.6		-0.16	197.6		-0.01	198.1		0.05
360	D1078	196.6		-0.16	197.6		-0.01	198.4		0.45
395	D1078	197.2		0.40	197.6		-0.01	198.2		0.18
396	D1078	197.4		0.57	197.6		-0.01	198.4		0.45
528	D1078	196.6		-0.16	197.6		-0.01	197.8		-0.34
529	D1078	196.3		-0.44	197.6		-0.01	197.8		-0.34
551	D1078	196.2		-0.53	197.6		-0.01	197.9		-0.21
557	D1078	196.4		-0.35	197.6		-0.01	197.8		-0.34
558	NBR7125	195.6		-1.07	197.6		-0.01	199.6		2.03
609	D86	196.7		-0.07	197.6		-0.01	198.4		0.45
902	D1078	196.4		-0.35	197.6		-0.01	197.8		-0.34
1107	D1078	196.8		0.02	197.6		-0.01	197.9		-0.21
1117	D1078	197.1		0.29	197.6		-0.01	198.4		0.45
1460	D1078	196.6		-0.16	197.6		-0.01	199.6		2.03
1467	D1078	197.2		0.40	197.6		-0.01	197.8		-0.34
1509	D1078	196.5		-0.25	197.6		-0.01	197.9		-0.21
1603	In house	196.8		0.02	197.6		-0.01	197.7		-0.48
1623	D1078	197.0		0.20	197.6		-0.01	198.1		0.05
1823	D1078	196.6		-0.16	197.6		-0.01	198.1		0.05
	normality	OK			not OK			OK		
	n	45			45			43		
	outliers	1			0			2		
	mean (n)	196.78			197.61			198.06		
	st.dev. (n)	0.297			0.035			0.272		
	R(calc.)	0.83			0.10			0.76		
	R(D1078:11)	3.07			1.35			2.12		

Determination of Iron as Fe on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1615	0.020		-0.62	
150	E394	0.01		-1.60	
168		-----		-----	
169	E202	0.005	C	-2.09	First reported 0.14
171	E1615	<0.010		<-1.60	
174	E1615	0.022		-0.42	
311	E1615	0.039		1.25	
322	E1615	0.025		-0.12	
323	E1615	0.029		0.27	
343	E1615	0.049		2.24	
347	E394	0.03		0.37	
360		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E1615	0.036		0.96	
528	E1615	0.038		1.15	
529	E1615	0.03725		1.08	
551	E394	0.02		-0.62	
557	E394	0.0224		-0.38	
558	NBR 7448	<0.01		<-1.60	
609		-----		-----	
610		-----		-----	
621	E1615	< 0.01		<-1.60	
657	E1615	<0.001		<-2.48	False negative test result?
663		-----		-----	
786		-----		-----	
825	E394	0.030		0.37	
840		-----		-----	
848	E1615	0.026		-0.03	
857	E1615	0.030		0.37	
860	E394	0.028		0.17	
861	E394	0.025		-0.12	
862	E1615	0.028		0.17	
865	E394	0.028		0.17	
869	E394	0.026		-0.03	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913	E1615	<0.01		<-1.60	
962		-----		-----	
963		-----		-----	
1107	E1615	0.0213		-0.49	
1117	E394	0.025		-0.12	
1151	E394	0.017		-0.91	
1217	E1615	0.01		-1.60	
1261	E1615	0.0096		-1.64	
1460		-----		-----	
1467	E394	0.0141		-1.20	
1509	E394	0.022		-0.42	
1515	E394	0.03		0.37	
1603	In house	0.037	C	1.06	First reported 0.145
1623	E202	0.033		0.66	
1718	E394	0.023		-0.32	
1814		-----		-----	
1823	E394	0.016		-1.01	
1866		-----		-----	
1868		-----		-----	
1880	E1615	0.033		0.66	
2124	ISO11885	<1		-----	
7006	E394	0.03		0.37	
9008	E1615	0.034		0.76	
9009	E1615	0.0395		1.30	
9014		-----		-----	

normality	OK
n	38
outliers	0
mean (n)	0.0263
st.dev. (n)	0.00948
R(calc.)	0.0266
R(E1615:16)	0.0285


0.06
0.05
0.04
0.03
0.02
0.01
0
169
1261
150
1217
1467
1823
1151
120
551
1107
174
1509
557
1718
322
861
1117
848
869
860
862
865
323
857
825
347
1515
7006
1623
1880
9008
444
1603
529
528
311
9009
343


Kernel Density
45
40
35
30
25
20
15
10
5
0
-0.02
0
0.02
0.04
0.06
0.08

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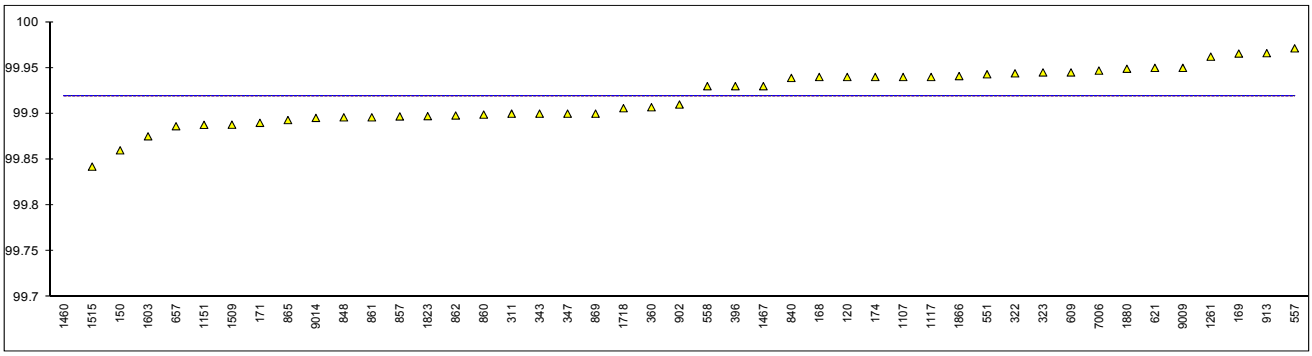
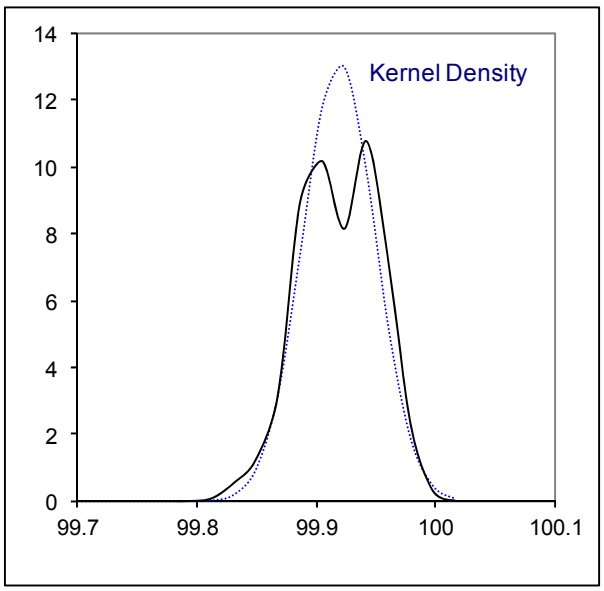
Determination of Miscibility with water on sample #16220;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D1722	Pass		-----	
168		-----		-----	
169		-----		-----	
171	D1722	Passes Test		-----	
174	D1722	PASS		-----	
311		-----		-----	
322		-----		-----	
323	D1722	pass		-----	
343		-----		-----	
347		-----		-----	
360		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Complete		-----	
444	D1722	Pass		-----	
528		-----		-----	
529		-----		-----	
551	D1722	Passes test		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D1722	Pass		-----	
657		-----		-----	
663		-----		-----	
786	D1722	Passes test		-----	
825		-----		-----	
840	D1722	Pass test		-----	
848		-----		-----	
857		-----		-----	
860		-----		-----	
861	D1722	pass		-----	
862		-----		-----	
865	D1722	passes test		-----	
869		-----		-----	
886		-----		-----	
902	D1722	PASS		-----	
912		-----		-----	
913	D1722	passes		-----	
962		-----		-----	
963		-----		-----	
1107	D1722	pass		-----	
1117		-----		-----	
1151		-----		-----	
1217		-----		-----	
1261		-----		-----	
1460	D1722	Miscible		-----	
1467		-----		-----	
1509		-----		-----	
1515	D1722	PASS		-----	
1603		-----		-----	
1623		-----		-----	
1718	D1722	Pass		-----	
1814		-----		-----	
1823		-----		-----	
1866		-----		-----	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014	D1722	Passes test		-----	
	normality	n.a.			
	n	20			
	mean (n)	Passes test			

Determination of Purity by GC as received on sample #16220; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E2409	99.94		-----	
150	E2409	99.86		-----	
168	E2409	99.94		-----	
169	E2409	99.9656		-----	
171	E2409	99.89		-----	
174	E2409	99.940		-----	
311	INH-100	99.90		-----	
322	E2409	99.944		-----	
323	E2409	99.945		-----	
343	E2409	99.90		-----	
347	E2409	99.90		-----	
360	E2409	99.907		-----	
370		-----		-----	
395		-----		-----	
396	E2409	99.93		-----	
444		-----		-----	
528		-----		-----	
529		-----		-----	
551	E2409	99.943		-----	
557	E2409	99.9713		-----	
558	E2409	99.93		-----	
609	E2409	99.945		-----	
610		-----		-----	
621	E2409	99.95		-----	
657	E2409	99.8863		-----	
663		-----		-----	
786		-----		-----	
825		-----		-----	
840	E2409	99.939		-----	
848	E2409	99.896		-----	
857	E2409	99.897		-----	
860	E2409	99.899		-----	
861	E2409	99.896		-----	
862	E202	99.898		-----	
865	E2409	99.893		-----	
869	E2409	99.900		-----	
886		-----		-----	
902	E2409	99.91		-----	
912		-----		-----	
913	E202	99.966		-----	
962		-----		-----	
963		-----		-----	
1107	E2409	99.94		-----	
1117	E2409	99.94		-----	
1151	E2409	99.8878		-----	
1217		-----		-----	
1261		99.9622		-----	
1460	E202	95.34	G(0.01)	-----	
1467	E2409	99.93		-----	
1509	E2409	99.888		-----	
1515	E2409	99.8422		-----	
1603	In house	99.8753		-----	
1623		-----	W	-----	Result withdrawn, first reported 99.75
1718	E2409	99.906		-----	
1814		-----		-----	
1823	E2409	99.8973		-----	
1866	D2409	99.941		-----	
1868		-----		-----	
1880	E2409	99.949		-----	
2124		-----		-----	
7006		99.947		-----	
9008		-----		-----	
9009	E2409	99.95		-----	
9014	E2409	99.8954		-----	
	normality	OK			
	n	44			
	outliers	1			
	mean (n)	99.9189			
	st.dev. (n)	0.03037			
	R(calc.)	0.0850			
	R(lit)	unknown			Compare R(iis15C12) = 0.0313

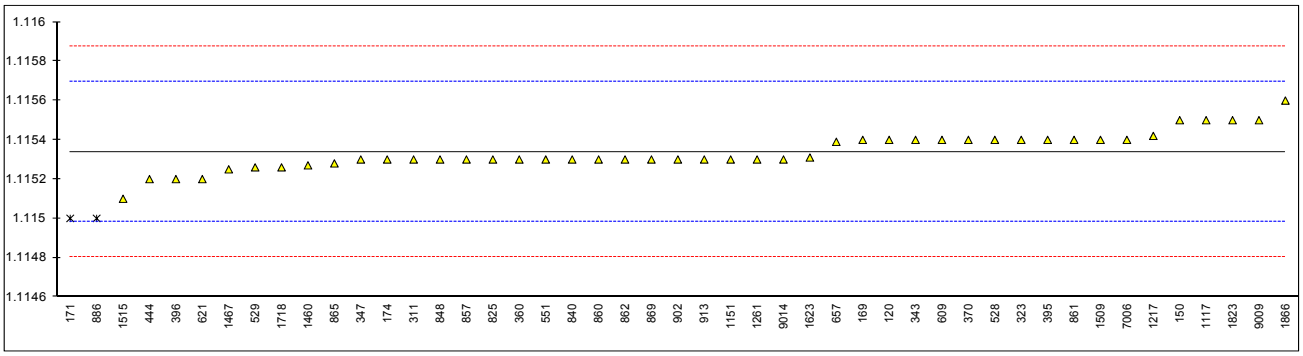

100
99.95
99.9
99.85
99.8
99.75
99.7
1460 1515 150 1603 657 1151 1509 171 865 9014 848 861 857 1823 862 860 311 343 347 869 1718 360 902 558 396 1467 840 168 120 174 1107 1117 1866 551 322 323 609 7006 1880 621 9009 1261 169 913 557

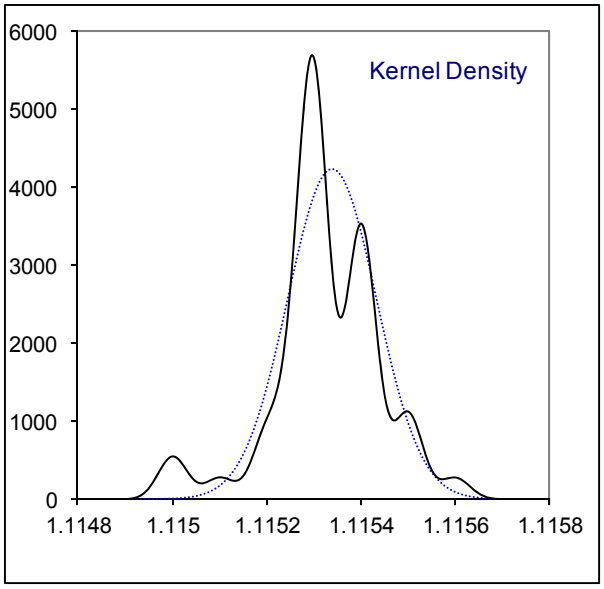

Kernel Density
14
12
10
8
6
4
2
0
99.7
99.8
99.9
100
100.1

Determination of Specific Gravity 20/20°C on sample #16220;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.1154		0.35	
150	D4052	1.1155		0.91	
168		-----		-----	
169	D4052	1.1154		0.35	
171	D4052	1.115	R(0.05)	-1.89	
174	D4052	1.1153		-0.21	
311	E202	1.1153		-0.21	
322		-----		-----	
323	D4052	1.1154		0.35	
343	D4052	1.1154		0.35	
347	D4052	1.1153		-0.21	
360	D4052	1.1153		-0.21	
370	E202	1.1154		0.35	
395	D4052	1.1154		0.35	
396	D4052	1.1152		-0.77	
444	D4052	1.1152		-0.77	
528	D4052	1.1154		0.35	
529	D4052	1.11526		-0.44	
551	D4052	1.1153		-0.21	
557		-----		-----	
558		-----		-----	
609	D4052	1.1154		0.35	
610		-----		-----	
621	D4052	1.1152		-0.77	
657	D4052	1.11539		0.29	
663		-----		-----	
786		-----		-----	
825	D4052	1.1153		-0.21	
840	D4052	1.1153		-0.21	
848	D4052	1.1153		-0.21	
857	D4052	1.1153		-0.21	
860	D4052	1.1153		-0.21	
861	D4052	1.1154		0.35	
862	D4052	1.1153		-0.21	
865	D4052	1.11528		-0.33	
869	D4052	1.1153		-0.21	
886	D4052	1.115	R(0.05)	-1.89	
902	D4052	1.1153		-0.21	
912		-----		-----	
913	D4052	1.1153		-0.21	
962		-----		-----	
963		-----		-----	
1107		-----		-----	
1117	D4052	1.1155		0.91	
1151	D4052	1.1153		-0.21	
1217	E202	1.11542		0.46	
1261	E202	1.1153		-0.21	
1460	D4052	1.11527		-0.38	
1467	D4052	1.11525		-0.49	
1509	D4052	1.11540		0.35	
1515	D4052	1.1151		-1.33	
1603		-----		-----	
1623	D891	1.11531		-0.16	
1718	D4052	1.11526		-0.44	
1814		-----		-----	
1823	D4052	1.1155		0.91	
1866	E202	1.1156		1.47	
1868		-----		-----	
1880		-----		-----	
2124		-----		-----	
7006	D4052	1.1154		0.35	
9008		-----		-----	
9009	D4052	1.1155		0.91	
9014	D4052	1.1153		-0.21	

normality	OK
n	45
outliers	2
mean (n)	1.11534
st.dev. (n)	0.000094
R(calc.)	0.00026
R(E202:12)	0.00050

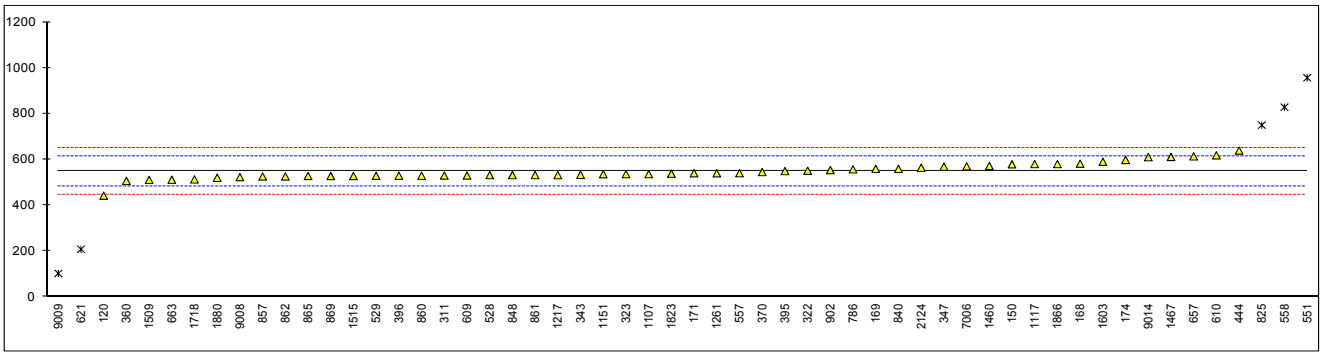

1.116
1.1158
1.1156
1.1154
1.1152
1.115
1.1148
1.1146
171 886 1515 444 396 621 1467 529 1718 1460 865 347 174 311 848 857 825 360 551 840 860 862 869 902 913 1151 1261 9014 1623 657 169 120 343 609 370 528 323 395 861 1509 7006 1217 150 1117 1823 9009 1866

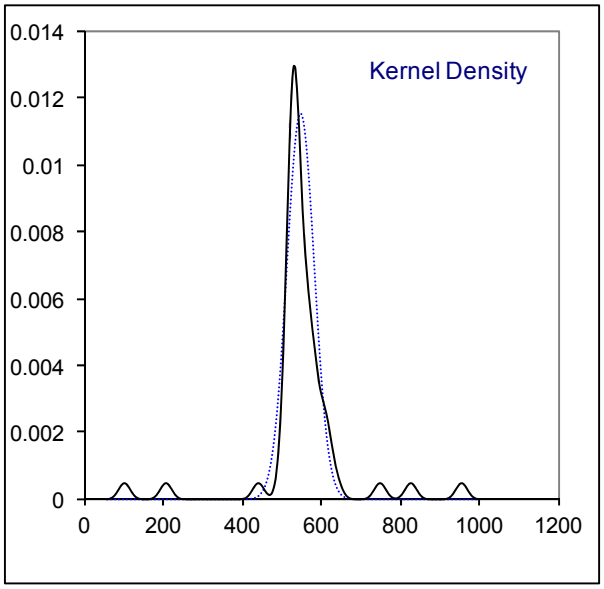

Kernel Density
6000
5000
4000
3000
2000
1000
0
1.1148
1.115
1.1152
1.1154
1.1156
1.1158

Determination of Water, coulometric KF titration on sample #16220; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1064	442	C	-3.19	First reported 205
150	E1064	579		0.90	
168	E1064	581.65		0.98	
169	E1064	559		0.31	
171	E1064	540		-0.26	
174	E1064	598		1.47	
311	E1064	530		-0.56	
322	E1064	551		0.07	
323	E1064	536		-0.38	
343	E1064	533		-0.47	
347	E1064	569		0.60	
360	E1064	506.8		-1.25	
370	E1064	545		-0.11	
395	E1064	549.36		0.02	
396	E1064	529		-0.59	
444	E1064	639		2.69	
528	E1064	531.7		-0.51	
529	E1064	528.7		-0.60	
551	E1064	956.5	R(0.01)	12.17	
557	E1064	540.0824		-0.26	
558	E1064	828	R(0.01)	8.33	
609	E1064	530		-0.56	
610	E1064	618.2		2.07	
621	D6304	208	R(0.01)	-10.17	
657	E1064	613.6		1.93	
663	E1064	511.6		-1.11	
786	E1064	557		0.25	
825	E1064	750	C,R(0.01)	6.00	First reported 180
840	E1064	559		0.31	
848	E1064	532		-0.50	
857	E1064	526		-0.68	
860	E1064	529		-0.59	
861	E1064	532		-0.50	
862	E1064	526		-0.68	
865	E1064	528		-0.62	
869	E1064	528		-0.62	
886		-----		-----	
902	E1064	554		0.16	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107	E1064	536.0		-0.38	
1117	E1064	580	C	0.93	First reported 0.0580 mg/kg
1151	E1064	535.83		-0.39	
1217	E1064	532		-0.50	
1261	E1064	540		-0.26	
1460	D6304	572		0.69	
1467	E1064	611		1.86	
1509	E1064	511		-1.13	
1515	E1064	528		-0.62	
1603	In house	590		1.23	
1623		-----		-----	
1718	E1064	513		-1.07	
1814		-----		-----	
1823	E1064	538		-0.32	
1866	E1064	580		0.93	
1868		-----		-----	
1880	E1064	520		-0.86	
2124	D6304	564.1	C	0.46	First reported 1012.7
7006		570	C	0.63	First reported 640
9008	E1064	523		-0.77	
9009	E1064	102.7	R(0.01)	-13.31	
9014	E203	610		1.83	

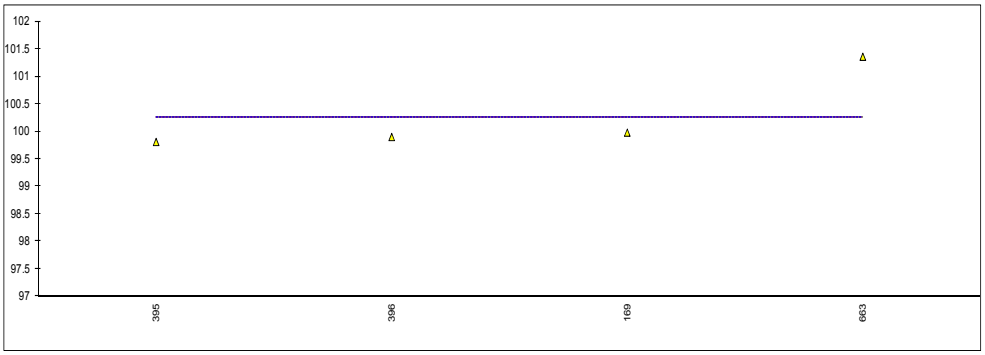
normality	suspect
n	51
outliers	5
mean (n)	548.76
st.dev. (n)	34.640
R(calc.)	96.99
R(E1064:16)	93.84

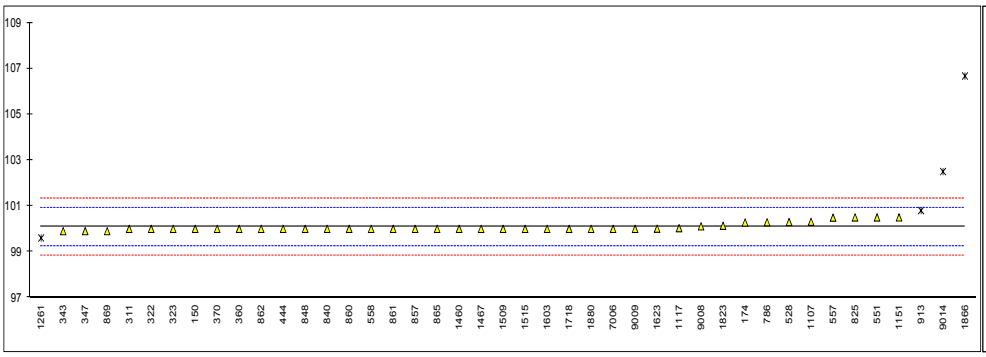

1200
1000
800
600
400
200
0
9009 621 120 360 1509 663 1718 1880 9008 857 862 865 869 1515 529 396 860 311 609 528 848 861 1217 343 1151 323 1107 1823 171 1261 557 370 395 322 902 786 169 840 2124 347 7006 1460 150 1117 1866 168 1603 174 9014 1467 657 610 444 825 558 551

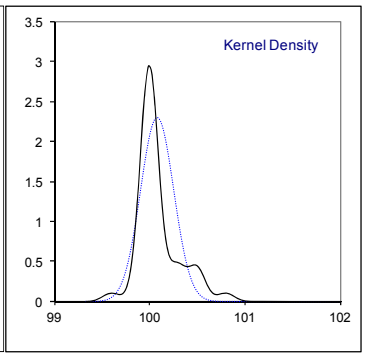

Kernel Density
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
0 200 400 600 800 1000 1200

Determination of UV Transmittance at 350 nm on sample #16221; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120			-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	100.0		-0.20	
168			-----		-----	-----		-----	
169	E2193	10 mm	99.98		-----	-----		-----	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	100.28		0.48	
311	E2193	10 mm	-----		-----	100.0		-0.20	
322	E2193	10 mm	-----		-----	100		-0.20	
323	E2193	10 mm	-----		-----	100.0		-0.20	
343	E2193	10 mm	-----		-----	99.9		-0.44	
347	E2193	50 mm	-----		-----	99.9		-0.44	
360	E2193	50 mm	-----		-----	100.00		-0.20	
370	E2193	10 mm	-----		-----	100		-0.20	
395	E2193	10 mm	99.81		-----	-----		-----	
396	E2193	10 mm	99.9		-----	-----		-----	
444	E2193	10 mm	-----		-----	100.0		-0.20	
528	E2193	10 mm	-----		-----	100.300		0.53	
529			-----		-----	-----		-----	
551	E2193	10 mm	-----		-----	100.5		1.02	
557	NBR 7140	10 mm	-----		-----	100.491		0.99	
558	NBR 7140	10 mm	-----		-----	100		-0.20	
609			-----		-----	-----		-----	
610			-----		-----	-----		-----	
621		10 mm	-----		-----	-----		-----	
657			-----		-----	-----		-----	
663	E2193	10 mm	101.36		-----	-----		-----	
786	E2193	10 mm	-----		-----	100.29		0.51	
825	E2193	10 mm	-----		-----	100.5		1.02	
840	E2193	50 mm	-----		-----	100.00		-0.20	
848	E2193	50 mm	-----		-----	100.00		-0.20	
857	E2193	10 mm	-----		-----	100.0		-0.20	
860	E2193	10 mm	-----		-----	100.0		-0.20	
861	E2193	10 mm	-----		-----	100		-0.20	
862	E2193	50 mm	-----		-----	100.0		-0.20	
865	E2193	10 mm	-----		-----	100.0		-0.20	
869	E2193	10 mm	-----		-----	99.9		-0.44	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	>100,0		-----	
912			-----		-----	-----		-----	
913	E2193	10 mm	-----		-----	100.8	R(0.01)	1.74	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1107	E2193	10 mm	-----		-----	100.31		0.56	
1117	E2193	50 mm	-----		-----	100.03		-0.12	
1151	E2193	10 mm	-----		-----	100.501		1.02	
1217	E2193		-----		-----	>99.9		-----	
1261	INH-577A	10 mm	-----		-----	99.6	R(0.01)	-1.17	
1460	E2193	10 mm	-----		-----	100		-0.20	
1467	E2193	10 mm	-----		-----	100.0		-0.20	
1509	E2193	50 mm	-----		-----	100.00		-0.20	
1515	E2193	50 mm	-----		-----	100.00		-0.20	
1603	In house	10 mm	-----		-----	100		-0.20	
1623	E2193	10 mm	-----		-----	100.01		-0.17	
1718	E2193	50 mm	-----		-----	100.00		-0.20	
1814			-----		-----	-----		-----	
1823	E2193	50 mm	-----		-----	100.136		0.13	
1866	E2193	10 mm	-----		-----	106.67	R(0.01)	15.99	
1868			-----		-----	-----		-----	
1880	E2193	10 mm	-----		-----	100.0		-0.20	
2124			-----		-----	-----		-----	
7006	E2193	10 mm	-----		-----	100		-0.20	
9008	E2193	10 mm	-----		-----	100.11		0.07	
9009	E2193	10 mm	-----		-----	100		-0.20	
9014	E2193	10 mm	-----		-----	102.5	R(0.01)	5.87	
	normality		unknown			not OK			
	n		4			39			
	outliers		0			4			
	mean (n)		100.262			100.081			
	st.dev. (n)		0.7350			0.1737			
	R(calc.)		2.058			0.486			
	R(E2193:08)		(0.936)			1.154			

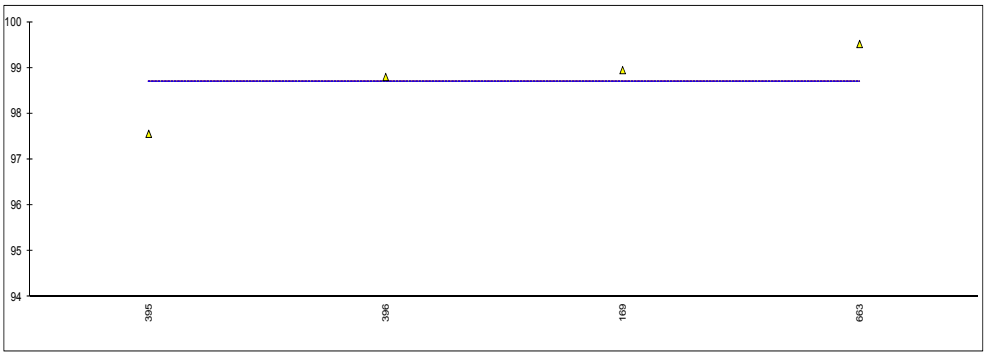

102
101.5
101
100.5
100
99.5
99
98.5
98
97.5
97
395
396
169
663

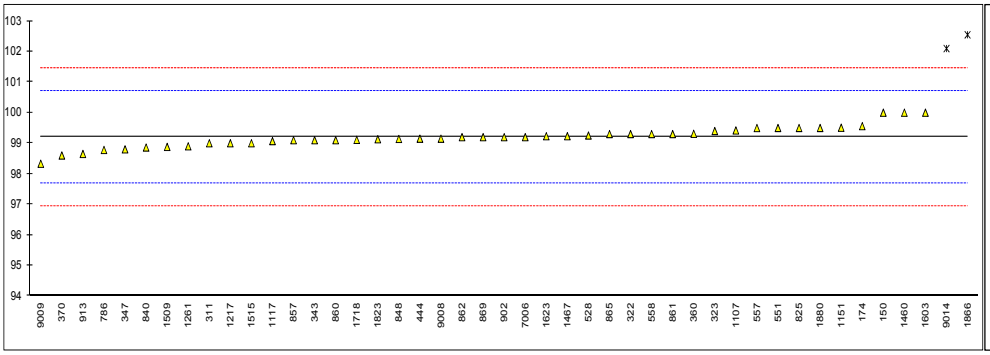

109
107
105
103
101
99
97
1261 343 347 869 311 322 323 150 370 360 862 444 848 840 860 558 861 857 865 1460 1467 1509 1515 1603 1718 1880 7006 9009 1623 1117 9008 1823 174 786 528 1107 557 825 551 1151 913 9014 1866

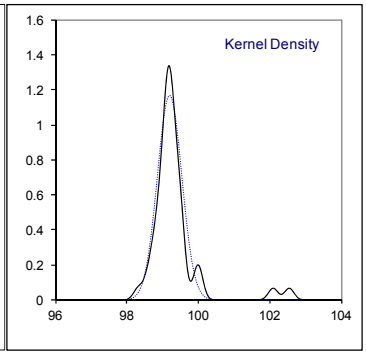

Kernel Density
3.5
3
2.5
2
1.5
1
0.5
0
99
100
101
102

Determination of UV Transmittance at 275 nm on sample #16221; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120			-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	100.0		1.06	
168			-----		-----	-----		-----	
169	E2193	10 mm	98.95		-----	-----		-----	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	99.56		0.47	
311	E2193	10 mm	-----		-----	99.0		-0.27	
322	E2193	10 mm	-----		-----	99.3		0.13	
323	E2193	10 mm	-----		-----	99.4		0.26	
343	E2193	10 mm	-----		-----	99.1		-0.14	
347	E2193	50 mm	-----		-----	98.8		-0.54	
360	E2193	50 mm	-----		-----	99.31		0.14	
370	E2193	10 mm	-----		-----	98.6	C	-0.80	f.r. 97.6
395	E2193	10 mm	97.56		-----	-----		-----	
396	E2193	10 mm	98.8		-----	-----		-----	
444	E2193	10 mm	-----		-----	99.15		-0.07	
528	E2193	10 mm	-----		-----	99.253		0.07	
529			-----		-----	-----		-----	
551	E2193	10 mm	-----		-----	99.5		0.39	
557	NBR 7140	10 mm	-----		-----	99.498		0.39	
558	NBR 7140	10 mm	-----		-----	99.3		0.13	
609			-----		-----	-----		-----	
610			-----		-----	-----		-----	
621		10 mm	-----		-----	-----		-----	
657			-----		-----	-----		-----	
663	E2193	10 mm	99.52		-----	-----		-----	
786	E2193	10 mm	-----		-----	98.78		-0.56	
825	E2193	10 mm	-----		-----	99.5		0.39	
840	E2193	50 mm	-----		-----	98.86		-0.46	
848	E2193	50 mm	-----		-----	99.14		-0.08	
857	E2193	10 mm	-----		-----	99.1		-0.14	
860	E2193	10 mm	-----		-----	99.1		-0.14	
861	E2193	10 mm	-----		-----	99.3		0.13	
862	E2193	50 mm	-----		-----	99.2		0.00	
865	E2193	10 mm	-----		-----	99.3		0.13	
869	E2193	10 mm	-----		-----	99.2		0.00	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	99.2		0.00	
912			-----		-----	-----		-----	
913	E2193	10 mm	-----		-----	98.65		-0.74	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1107	E2193	10 mm	-----		-----	99.42		0.29	
1117	E2193	50 mm	-----		-----	99.07		-0.18	
1151	E2193	10 mm	-----		-----	99.509		0.41	
1217	E2193		-----		-----	99.0		-0.27	
1261	INH-577A	10 mm	-----		-----	98.9		-0.40	
1460	E2193	10 mm	-----		-----	100		1.06	
1467	E2193	10 mm	-----		-----	99.231		0.04	
1509	E2193	50 mm	-----		-----	98.88		-0.43	
1515	E2193	50 mm	-----		-----	99.00		-0.27	
1603	In house	10 mm	-----		-----	100		1.06	
1623	E2193	10 mm	-----		-----	99.23		0.03	
1718	E2193	50 mm	-----		-----	99.11		-0.12	
1814			-----		-----	-----		-----	
1823	E2193	50 mm	-----		-----	99.131		-0.10	
1866	E2193	10 mm	-----		-----	102.55	R(0.01)	4.45	
1868			-----		-----	-----		-----	
1880	E2193	10 mm	-----		-----	99.5		0.39	
2124			-----		-----	-----		-----	
7006	E2193	10 mm	-----		-----	99.2		0.00	
9008	E2193	10 mm	-----		-----	99.15		-0.07	
9009	E2193	10 mm	-----		-----	98.330	C	-1.16	f.r. 98.293
9014	E2193	10 mm	-----		-----	102.1	R(0.01)	3.85	
	normality		unknown			suspect			
	n		4			43			
	outliers		0			2			
	mean (n)		98.707			99.204			
	st.dev. (n)		0.8255			0.3416			
	R(calc.)		2.311			0.956			
	R(E2193:08)		(1.098)			2.105			

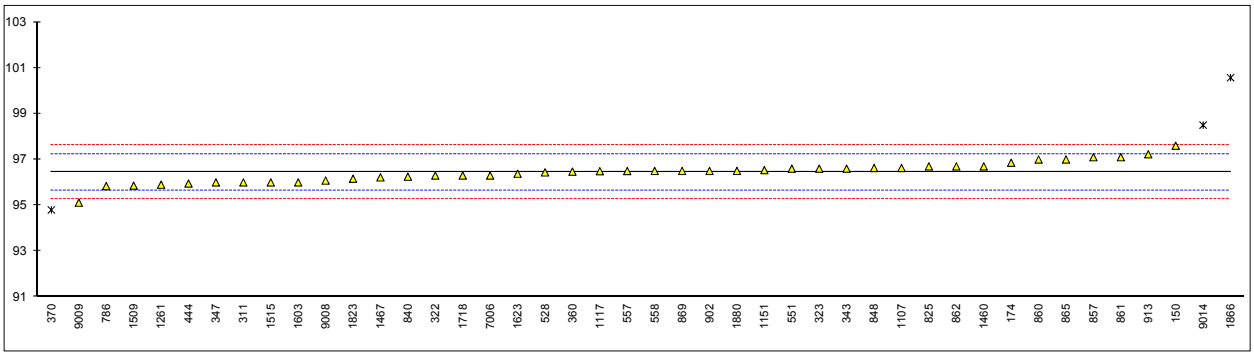

100
99
98
97
96
95
94
395
396
169
663


103
102
101
100
99
98
97
96
95
94
9009 370 913 786 347 840 1509 1261 311 1217 1515 1117 857 343 860 1718 1823 848 444 9008 862 869 902 7006 1623 1467 528 865 322 558 861 360 323 1107 557 551 825 1880 1151 174 150 1460 1603 9014 1866


Kernel Density
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
96
98
100
102
104

Determination of UV Transmittance at 250 nm on sample #16221; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120			-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	97.6		2.94	
168			-----		-----	-----		-----	
169	E2193	10 mm	97.27		-----	-----		-----	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	96.86		1.06	
311	E2193	10 mm	-----		-----	96.0		-1.12	
322	E2193	10 mm	-----		-----	96.3		-0.36	
323	E2193	10 mm	-----		-----	96.6		0.40	
343	E2193	10 mm	-----		-----	96.6		0.40	
347	E2193	50 mm	-----		-----	96.0		-1.12	
360	E2193	50 mm	-----		-----	96.47		0.07	
370	E2193	10 mm	-----		-----	94.8	C,R(0.05)	-4.17	f.r. 92.8
395	E2193	10 mm	-----		-----	-----		-----	
396	E2193	10 mm	-----		-----	-----		-----	
444	E2193	10 mm	-----		-----	95.95		-1.25	
528	E2193	10 mm	-----		-----	96.438		-0.01	
529			-----		-----	-----		-----	
551	E2193	10 mm	-----		-----	96.6		0.40	
557	NBR 7140	10 mm	-----		-----	96.497		0.14	
558	NBR 7140	10 mm	-----		-----	96.5		0.15	
609			-----		-----	-----		-----	
610			-----		-----	-----		-----	
621		10 mm	-----		-----	-----		-----	
657			-----		-----	-----		-----	
663	E2193	10 mm	98.36		-----	-----		-----	
786	E2193	10 mm	-----		-----	95.84		-1.53	
825	E2193	10 mm	-----		-----	96.7		0.65	
840	E2193	50 mm	-----		-----	96.25		-0.49	
848	E2193	50 mm	-----		-----	96.63		0.48	
857	E2193	10 mm	-----		-----	97.1		1.67	
860	E2193	10 mm	-----		-----	97.0		1.42	
861	E2193	10 mm	-----		-----	97.1		1.67	
862	E2193	50 mm	-----		-----	96.7		0.65	
865	E2193	10 mm	-----		-----	97.0		1.42	
869	E2193	10 mm	-----		-----	96.5		0.15	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	96.5		0.15	
912			-----		-----	-----		-----	
913	E2193	10 mm	-----		-----	97.23		2.00	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1107	E2193	10 mm	-----		-----	96.63		0.48	
1117	E2193	50 mm	-----		-----	96.49		0.12	
1151	E2193	10 mm	-----		-----	96.538		0.24	
1217	E2193		-----		-----	-----		-----	
1261	INH-577A	10 mm	-----		-----	95.9		-1.38	
1460	E2193	10 mm	-----		-----	96.7		0.65	
1467	E2193	10 mm	-----		-----	96.22		-0.57	
1509	E2193	50 mm	-----		-----	95.86		-1.48	
1515	E2193	50 mm	-----		-----	96.00		-1.12	
1603	In house	10 mm	-----		-----	96	C	-1.12	f.r. 98
1623	E2193	10 mm	-----		-----	96.38		-0.16	
1718	E2193	50 mm	-----		-----	96.30		-0.36	
1814			-----		-----	-----		-----	
1823	E2193	50 mm	-----		-----	96.161		-0.72	
1866	E2193	10 mm	-----		-----	100.57	R(0.01)	10.49	
1868			-----		-----	-----		-----	
1880	E2193	10 mm	-----		-----	96.5		0.15	
2124			-----		-----	-----		-----	
7006	E2193	10 mm	-----		-----	96.3		-0.36	
9008	E2193	10 mm	-----		-----	96.08		-0.92	
9009	E2193	10 mm	-----		-----	95.115	C	-3.37	f.r. 94.499
9014	E2193	10 mm	-----		-----	98.5	R(0.01)	5.23	
	normality		unknown			suspect			
	n		2			41			
	outliers		n.a.			3			
	mean (n)		97.815			96.442			
	st.dev. (n)		n.a.			0.4511			
	R(calc.)		n.a.			1.263			
	R(E2193:08)		(2.063)			1.102			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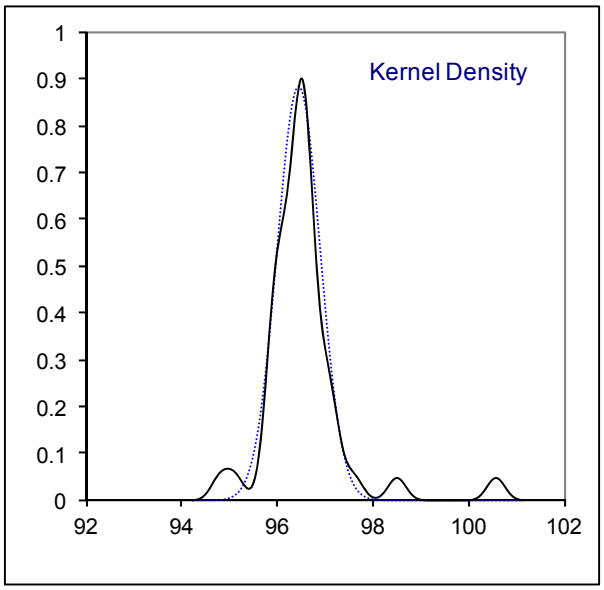
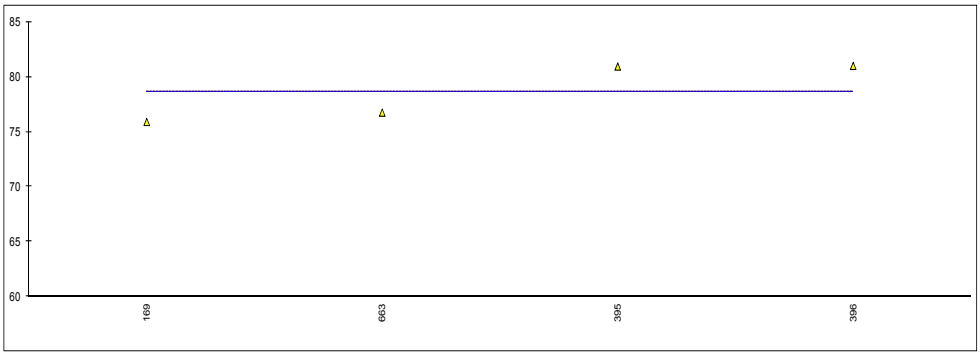
101
99
97
95
93
91
370
9009
786
1509
1261
444
347
311
1515
1603
9008
1823
1467
840
322
1718
7006
1623
528
360
1117
557
558
869
902
1880
1151
551
323
343
848
1107
825
862
1460
174
860
865
857
861
913
150
9014
1866


Kernel Density
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
92
94
96
98
100
102

Determination of UV Transmittance at 220 nm on sample #16221; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120			-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	68.1		0.39	
168			-----		-----	-----		-----	
169	E2193	10 mm	75.90		-----	-----		-----	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	68.42		0.61	
311	E2193	10 mm	-----		-----	66.4		-0.79	
322	E2193	10 mm	-----		-----	66.7		-0.58	
323	E2193	10 mm	-----		-----	66.8		-0.51	
343	E2193	10 mm	-----		-----	67.3		-0.17	
347	E2193	50 mm	-----		-----	67.3		-0.17	
360	E2193	50 mm	-----		-----	67.95		0.28	
370	E2193	10 mm	-----		-----	66.5		-0.72	
395	E2193	10 mm	80.94		-----	-----		-----	
396	E2193	10 mm	81.0		-----	-----		-----	
444	E2193	10 mm	-----		-----	67.8		0.18	
528	E2193	10 mm	-----		-----	68.091		0.38	
529			-----		-----	-----		-----	
551	E2193	10 mm	-----		-----	67.6		0.04	
557	NBR 7140	10 mm	-----		-----	66.323		-0.84	
558	NBR 7140	10 mm	-----		-----	64.2	C	-2.31	f.r. 80.8
609			-----		-----	-----		-----	
610			-----		-----	-----		-----	
621		10 mm	-----		-----	-----		-----	
657			-----		-----	-----		-----	
663	E2193	10 mm	76.75		-----	-----		-----	
786	E2193	10 mm	-----		-----	67.15		-0.27	
825	E2193	10 mm	-----		-----	67.8		0.18	
840	E2193	50 mm	-----		-----	70.31		1.92	
848	E2193	50 mm	-----		-----	68.32		0.54	
857	E2193	10 mm	-----		-----	68.6		0.73	
860	E2193	10 mm	-----		-----	69.0		1.01	
861	E2193	10 mm	-----		-----	70.2		1.84	
862	E2193	50 mm	-----		-----	69.9		1.63	
865	E2193	10 mm	-----		-----	68.7		0.80	
869	E2193	10 mm	-----		-----	70.0		1.70	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	68.0		0.32	
912			-----		-----	-----		-----	
913	E2193	10 mm	-----		-----	67.85		0.21	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1107	E2193	10 mm	-----		-----	67.32		-0.15	
1117	E2193	50 mm	-----		-----	67.25		-0.20	
1151	E2193	10 mm	-----		-----	67.166		-0.26	
1217	E2193		-----		-----	69.1		1.08	
1261	INH-577A	10 mm	-----		-----	65.5		-1.41	
1460	E2193	10 mm	-----		-----	68.5		0.66	
1467	E2193	10 mm	-----		-----	67.11		-0.30	
1509	E2193	50 mm	-----		-----	67.19		-0.24	
1515	E2193	50 mm	-----		-----	66.6		-0.65	
1603	In house	10 mm	-----		-----	66	C	-1.07	f.r.70
1623	E2193	10 mm	-----		-----	67.50		-0.03	
1718	E2193	50 mm	-----		-----	67.14		-0.28	
1814			-----		-----	-----		-----	
1823	E2193	50 mm	-----		-----	66.735		-0.56	
1866	E2193	10 mm	-----		-----	72.53	R(0.05)	3.45	
1868			-----		-----	-----		-----	
1880	E2193	10 mm	-----		-----	66.5		-0.72	
2124			-----		-----	-----		-----	
7006	E2193	10 mm	-----		-----	68.2		0.46	
9008	E2193	10 mm	-----		-----	66.57		-0.67	
9009	E2193	10 mm	-----		-----	65.755	C	-1.24	f.r. 74.49
9014	E2193	10 mm	-----		-----	66.4		-0.79	
	normality		unknown			OK			
	n		4			44			
	outliers		0			1			
	mean (n)		78.647			67.542			
	st.dev. (n)		2.7043			1.2688			
	R(calc.)		7.572			3.553			
	R(E2193:08)		(9.682)			4.047			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65
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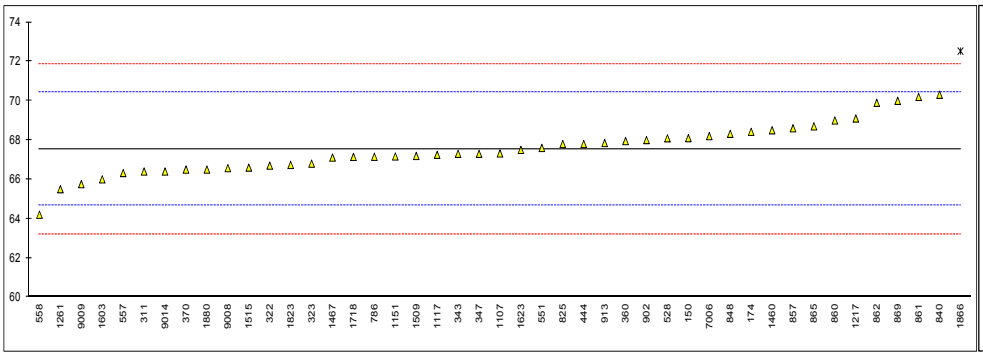
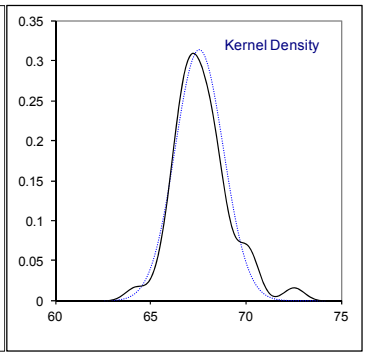
169
663
395
396


74
72
70
68
66
64
62
60
558 1261 9009 1603 557 311 9014 370 1880 9008 1515 322 1823 323 1467 1718 786 1151 1509 1117 343 347 1107 1623 551 825 444 913 360 902 528 150 7006 848 174 1460 857 865 860 1217 862 869 861 840 1866


Kernel Density
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
60
65
70
75

APPENDIX 2

Number of participants per country

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

APPENDIX 3

Abbreviations:

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

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014
2 ASTM E178:02
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