Results of Proficiency Test
Mono Ethylene Glycol (MEG)
October 2018

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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

Report: iis18C09

January 2019

CONTENTS

1 INTRODUCTION 3

2 SET UP 3

2.1 ACCREDITATION 3

2.2 PROTOCOL 3

2.3 CONFIDENTIALITY STATEMENT 4

2.4 SAMPLES 4

2.5 STABILITY OF THE SAMPLES 6

2.6 ANALYSES 6

3 RESULTS 7

3.1 STATISTICS 7

3.2 GRAPHICS 8

3.3 Z-SCORES 8

4 EVALUATION 9

4.1 EVALUATION PER SAMPLE AND PER TEST 9

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES 11

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2018 WITH PREVIOUS PTS 12

Appendices:

1. Data and statistical results 14
2. Number of participants per country 54
3. Abbreviations and literature 55

1 INTRODUCTION

Since 1994, the Institute for Interlaboratory Studies organizes a proficiency scheme for Mono Ethylene Glycol (MEG) every year. During the annual proficiency test program of 2018/2019, it was decided to continue this proficiency test on Mono Ethylene Glycol analyses according to the latest applicable version of ASTM E202 (Standard test methods for analysis of Ethylene and Propylene Glycols).
In this interlaboratory study, 66 laboratories from 24 different countries did register for participation. See appendix 2 for the number of participants per country.
In this report, the results of the 2018 MEG proficiency test are presented and discussed. This report is also available as PDF file from 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 three different samples of Mono Ethylene Glycol: a 1L bottle labelled #18205 for the tests according to latest version of specification ASTM E202, a 100mL bottle labelled #18206 for determination of UV only and a 100mL bottle labelled #18207 for determination of Iron (Fe) only.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of 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

The necessary bulk material of approximately 100 litre MEG polyester grade was obtained from a local production plant and used for the main and UV round. The bulk material was transferred to a precleaned drum. After homogenization, 88 amber glass bottles of 1L were filled and labelled #18205. The homogeneity of the subsamples #18205 was checked by determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples.

	Density at 20°C in kg/L
sample #18205-1	1.11332
sample #18205-2	1.11332
sample #18205-3	1.11332
sample #18205-4	1.11332
sample #18205-5	1.11332
sample #18205-6	1.11332
sample #18205-7	1.11332
sample #18205-8	1.11332

table 1: homogeneity test results of subsamples #18205

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

	Density at 20°C in kg/L
r (observed)	0.00000
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.0015

table 2: evaluation of the repeatability of subsamples #18205

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples #18205 was assumed.

Approximately 8 litre MEG polyester grade was used for the UV sample. After homogenization, 90 amber glass bottles of 100mL were filled with approx. 75mL of MEG and labelled #18206. The homogeneity of the subsamples #18206 was checked by determination of UV transmission at 275 and 350nm in accordance with ASTM E2193 method B (not sparged with N_2), on 7 stratified randomly selected samples.

	UV 275nm in %T	UV 350nm in %T
sample #18206-1	89.27	98.98
sample #18206-2	89.40	99.03
sample #18206-3	89.30	98.99
sample #18206-4	89.38	99.04
sample #18206-5	89.27	99.01
sample #18206-6	89.16	99.00
sample #18206-7	88.68	98.89

table 3: homogeneity test results of subsamples #18206

From the above test results, the repeatabilities (r) were calculated and compared with 0.3 times the corresponding reproducibility of the reference test method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	UV 275nm in %T	UV 350nm in %T
r (observed)	0.689	0.139
reference test method	E2193-B:16	E2193-B:16
0.3 * R (ref. test method)	0.632	0.346

table 4: evaluation of the repeatability of subsamples #18206

The calculated repeatabilities are in agreement with 0.3 times the corresponding reproducibilities of the reference test method. Therefore, homogeneity of the subsamples #18206 was assumed.

For the Iron sample, the necessary bulk material of approximately 9 litre MEG polyester grade was obtained from a local production plant. After homogenization, 90 amber glass bottles of 100mL were filled and labelled #18207. The homogeneity of the subsamples #18207 was checked by determination of Iron in accordance with ASTM E1615, on 7 stratified randomly selected samples.

	Fe in mg/kg
sample #18207-1	0.018
sample #18207-2	0.017
sample #18207-3	0.015
sample #18207-4	0.015
sample #18207-5	0.019
sample #18207-6	0.017
sample #18207-7	0.015

table 5: homogeneity test results of subsamples #18207

From the above test results, the repeatability (r) was calculated and compared with 0.3 times the corresponding reproducibility of the reference test method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Fe in mg/kg
r (observed)	0.0045
reference test method	E1615:16
0.3 * R (ref. test method)	0.0054

table 6: evaluation of the repeatability of subsamples #18207

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples #18207 was assumed.

To each of the participating laboratories a set of 3 bottles had been sent on October 3, 2018: 1*1L bottle labelled #18205, 1*100mL bottle labelled #18206 and 1*100mL bottle labelled #18207. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYSES

The participants were requested to determine on sample #18205: Acidity as Acetic Acid (E2679 and D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Inorganic Chloride as Cl, Color Pt/Co (D1209 and D5386), Density at 20°C, Diethylene Glycol content, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Miscibility with water, Purity by GC as received, Specific Gravity at 20/20°C and Water.
On sample #18206 was requested to determine UV Transmittance at 350, 275, 250 and 220nm and on sample #18207 was requested to determine Iron as Fe.

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

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

3 RESULTS

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

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 reanalyses). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the test result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

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

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

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

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis, the reported analysis results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. The Kernel Density Graph is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

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

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

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the result tables of appendix 1.

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

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

4 EVALUATION

In this proficiency test, no major problems were encountered with the dispatch of the samples. Five participants did not report any test results and eight other participants did report test results after the final reporting date. Not all participants were able to report all requested parameters. Finally, 61 participants did report 855 numerical test results. Observed were 33 outlying test results, which is 3.9%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

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

In the iis PT reports, ASTM test methods are referred to with a number (e.g. D1209) and an added designation for the year that the test method was adopted or revised (e.g. D1209:05). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1209:05(2011)). In the tables of appendix 1 only the test method number and year of adoption or revision will be used.

Sample #18205

Acidity E2679: This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the strict precision data of ASTM E2679:09(2016)e1. Therefore, it was decided to calculate no z-scores.

Acidity D1613: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1613:17.

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

Appearance: No problems have been observed with this determination. The majority of the participants agreed that the appearance was a ‘Pass’. One participant reported a fail. Two participants reported (slight) pale yellow.

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

Inorganic Chloride: This determination was problematic at the low concentration of 0.02 mg/kg. Three 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 D1209: This determination was problematic for some laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1209:05(2011).

Color Pt/Co D5386: 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. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO12185:96.

Diethylene Glycol content: This determination was very problematic. Two statistical outliers were observed and one other test result was excluded. The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ASTM E2409:13.

Distillation: This determination was not problematic. One statistical outlier was observed. All three calculated reproducibilities are in agreement with the requirements of ASTM D1078:11.
From the reported test results of the 50% recovered, it appeared that twelve 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). One participant observed a distillation range larger than 2°C.

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

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

Specific Gravity: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of E202:18.

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

Sample #18206

UV: The reported test results were evaluated separately for method A; sparged with Nitrogen and method B; not sparged.
Method A: For the transmittance at 350 and 275nm this determination was not problematic. In total one statistical outlier was observed and two other test results were excluded. The calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of E2193:16 method A.
For the transmittance at 250nm only three test results were reported of which one was excluded. For the transmittance at 220nm were four test results reported of which one was excluded. Therefore no z-scores were calculated.
Method B: This determination was not problematic. In total over 4 parameters, seven statistical outliers were observed and four other test results were excluded. However, for the transmittance at 350, 275 and 220nm the calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of E2193:16 method B. For the transmittance at 250nm the calculated reproducibility after rejection of the suspect data is not in agreement with these requirements.

Sample #18207

Iron: 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 E1615:16.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

parameter	unit	n	average	2.8 * sd	R (lit.)
Acidity as Acetic Acid (E2679)	mg/kg	7	4.55	6.69	(2.30)
Acidity as Acetic Acid (D1613)	mg/kg	46	10.6	5.3	14
Aldehydes as Acetaldehyde	mg/kg	37	51.9	16.3	44.7
Appearance		53	Pass	n.a.	n.a.
Ash content	%M/M	28	0.0006	0.0011	(0.005)
Inorganic Chloride as Cl	mg/kg	15	0.024	0.032	0.020
Color D1209 manual	---	25	30.1	8.0	12.0
Color D5386 automated	---	36	29.5	5.6	9.2
Density at 20°C	kg/L	51	1.1133	0.0004	0.0005
Diethylene Glycol content	mg/kg	49	46.7	23.8	11.9
Initial Boiling Point	°C	43	196.9	1.0	3.1

parameter	unit	n	average	2.8 * sd	R (lit.)
50% recovered	°C	41	197.5	0.5	1.4
Dry Point	°C	43	198.0	1.0	2.1
Miscibility with water	---	32	passes test	n.a.	n.a.
Purity by GC as received	%M/M	49	99.954	0.055	n.a.
Specific Gravity 20/20°C	---	49	1.1154	0.0004	0.0005
Water	mg/kg	51	170	47	29
UV Transmittance at 350nm (N_2)	%T	4	99.23	0.32	0.94
UV Transmittance at 275nm (N_2)	%T	3	90.38	1.10	1.10
UV Transmittance at 250nm (N_2)	%T	2	81.48	n.a.	(2.06)
UV Transmittance at 220nm (N_2)	%T	3	77.70	n.a.	(9.68)
UV Transmittance at 350nm	%T	49	99.40	1.12	1.15
UV Transmittance at 275nm	%T	47	90.02	1.48	2.11
UV Transmittance at 250nm	%T	46	78.89	1.39	1.10
UV Transmittance at 220nm	%T	47	66.46	3.26	4.05
Iron as Fe	mg/kg	43	0.029	0.034	0.032

table 7: reproducibilities of samples #18205, #18206 and #18207

Results between brackets should be used with due 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 reference test methods. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2018 WITH PREVIOUS PTS

	October 2018	*October 2017*	*October 2016*	*October 2015*	*October 2014*
Number of reporting labs	61	62	59	53	52
Number of results reported	855	880	808	751	766
Statistical outliers	33	37	46	14	31
Percentage outliers	3.9%	4.2%	5.7%	1.9%	4.0%

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

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

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

	October 2018	*October 2017*	*October 2016*	*October 2015*	*October 2014*
Acidity as Acetic Acid (E2679)	(--)	--	--	--	--
Acidity as Acetic Acid (D1613)	++	++	++	++	++
Aldehydes as Acetaldehyde	++	++	++	++	+
Ash content	(++)	(++)	(++)	(++)	(++)
Inorganic Chloride as Cl	-	--	--	--	--
Color D1209 manual	+	++	++	++	++
Color D5368 automated	+	++	++	+	++
Density at 20°C	+	+	++	+	+
Diethylene Glycol content	--	-	--	--	-
Initial Boiling Point	++	++	++	++	++
50% recovered	++	+	++	++	++
Dry Point	++	+	++	++	++
Purity by GC as received	n.e.	n.e.	n.e.	n.e.	n.a.
Specific Gravity 20/20°C	+	+	++	++	+
Water	-	--	+/-	--	--
UV Transmittance at 350nm	+/-	+/-	++	+	+
UV Transmittance at 275nm	+	-	+	-	-
UV Transmittance at 250nm	-	-	-	-	-
UV Transmittance at 220nm	+	+	+	--	++
Iron as Fe	+/-	+	+	+	-

table 9: comparison determinations against the reference test method

Results between brackets should be used with due care

The following performance categories in above table were used:

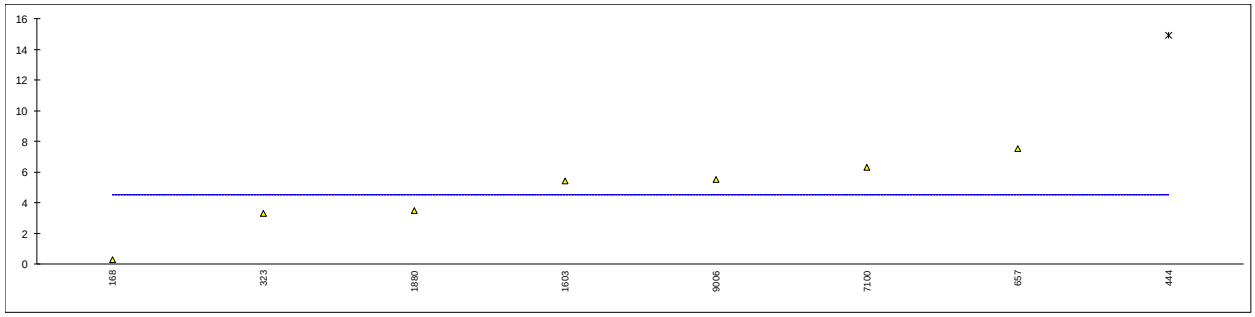
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test method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

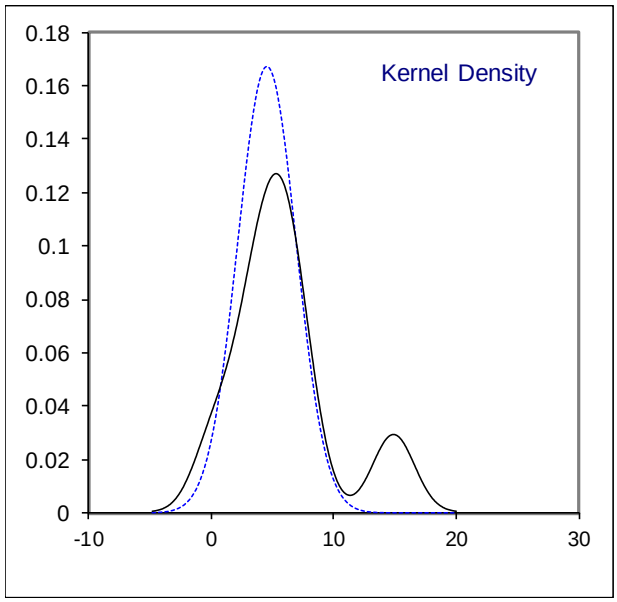
APPENDIX 1

Determination of Acidity as Acetic Acid (E2679) on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168	E2679	0.3		-----	
169		-----		-----	
171		-----		-----	
174		-----		-----	
311		-----		-----	
323	E2679	3.3		-----	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2679	14.9	D(0.05)	-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
657	E2679	7.5163		-----	
663		-----		-----	
786		-----		-----	
840		-----		-----	
848		-----		-----	
852		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865		-----		-----	
869		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1107		-----		-----	
1117		-----		-----	
1135		-----		-----	
1151		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603	In house	5.4		-----	
1608		-----		-----	
1656		-----		-----	
1718		-----		-----	
1823		-----		-----	
1868		-----		-----	
1880	E2679	3.5		-----	
1954		-----		-----	
6198		-----		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100	GOST 19710	6.3		-----	
9006	E2679	5.512		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	unknown
n	7
outliers	1
mean (n)	4.547
st.dev. (n)	2.3888
R(calc.)	6.689
st.dev.(E2679:09(16)e1)	(0.8217)
R(E2679:09(16)e1)	(2.301)

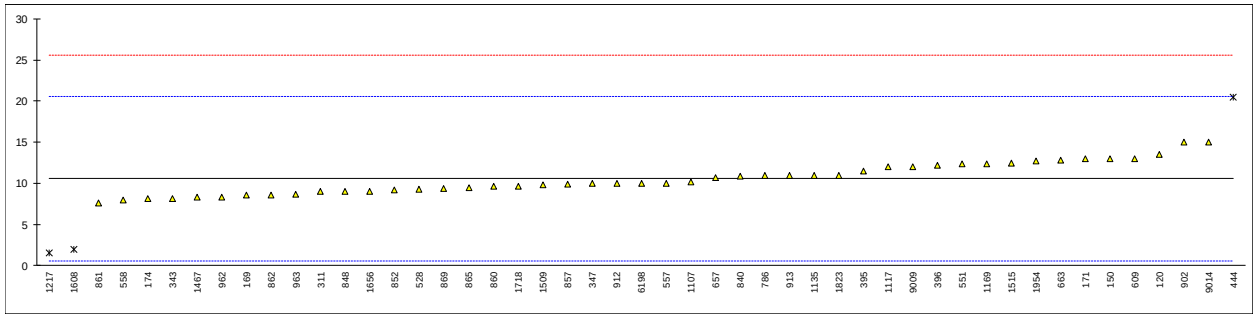


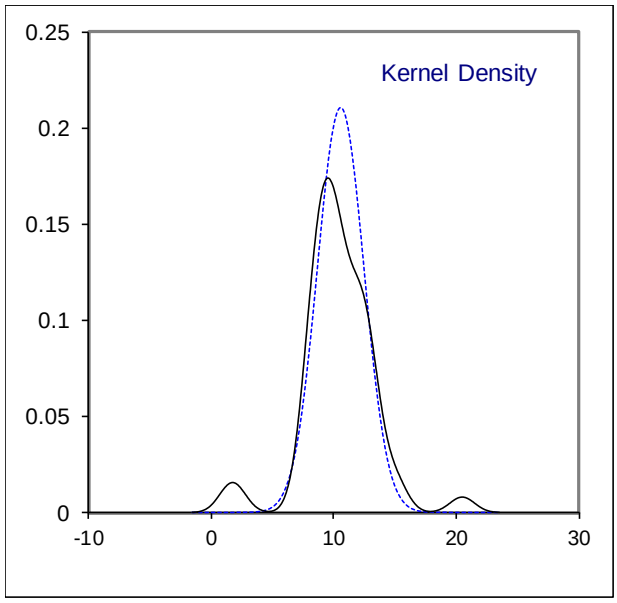


Determination of Acidity as Acetic Acid (D1613) on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	13.5		0.59	
150	D1613	13	C	0.49	first reported 32
168		-----		-----	
169	D1613	8.6		-0.39	
171	D1613	13		0.49	
174	D1613	8.1		-0.49	
311	D1613	9		-0.31	
323		-----		-----	
343	D1613	8.1		-0.49	
347	D1613	10	C	-0.11	first reported 0.0010 mg/kg
370		-----		-----	
395	D1613	11.53		0.19	
396	D1613	12.2		0.33	
444	D1613	20.5	R(0.01)	1.99	
522		-----		-----	
528	D1613	9.24		-0.27	
551	D1613	12.38		0.36	
557	D1613	10.0271227		-0.11	
558	D1613	7.96		-0.52	
609	D1613	13		0.49	
610		-----		-----	
657	D1613	10.7348		0.03	
663	D1613	12.8		0.45	
786	D1613	11		0.09	
840	D1613	10.9		0.07	
848	D1613	9		-0.31	
852	D1613	9.2		-0.27	
857	D1613	9.9		-0.13	
860	D1613	9.6		-0.19	
861	D1613	7.6		-0.59	
862	D1613	8.6		-0.39	
865	D1613	9.5		-0.21	
869	D1613	9.4		-0.23	
886		-----		-----	
902	D1613	15		0.89	
912	D1613	10		-0.11	
913	D1613	11		0.09	
962	D1613	8.3		-0.45	
963	D1613	8.7		-0.37	
1107	D1613	10.2		-0.07	
1117	D1613	12		0.29	
1135	D1613	11		0.09	
1151		-----		-----	
1169	D1613	12.4		0.37	
1217	D1613	1.5	C,R(0.01)	-1.81	first reported 0.00015 mg/kg
1261		-----		-----	
1467	D1613	8.29		-0.46	
1509	D1613	9.8		-0.15	
1515	D1613	12.45		0.38	
1603		-----		-----	
1608	D1613	2	C,R(0.01)	-1.71	first reported 0.0002 mg/kg
1656	D1613	9	C	-0.31	first reported 0.0009 mg/kg
1718	D1613	9.6		-0.19	
1823	D1613	11.0		0.09	
1868		-----		-----	
1880		-----		-----	
1954	D1613	12.74		0.43	
6198	D1613	10		-0.11	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D1613	12.0		0.29	
9014	D1613	15.0222		0.89	

normality	OK
n	46
outliers	3
mean (n)	10.573
st.dev. (n)	1.8942
R(calc.)	5.304
st.dev.(D1613:17)	5.0000
R(D1613:17)	14

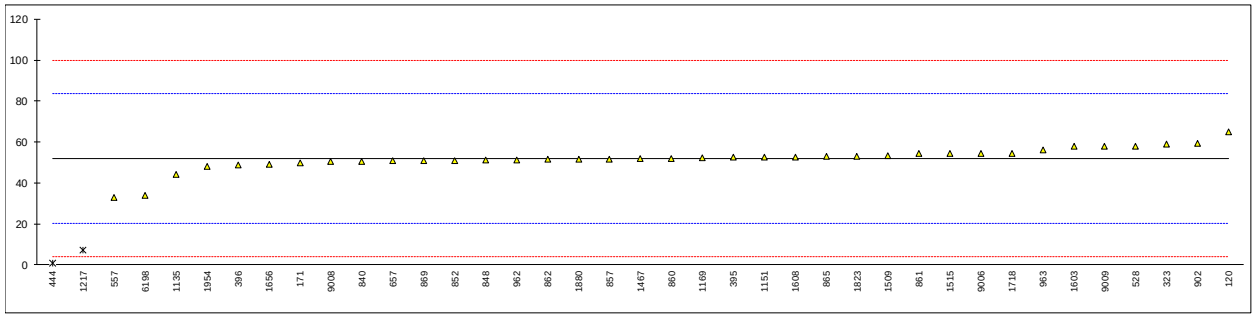


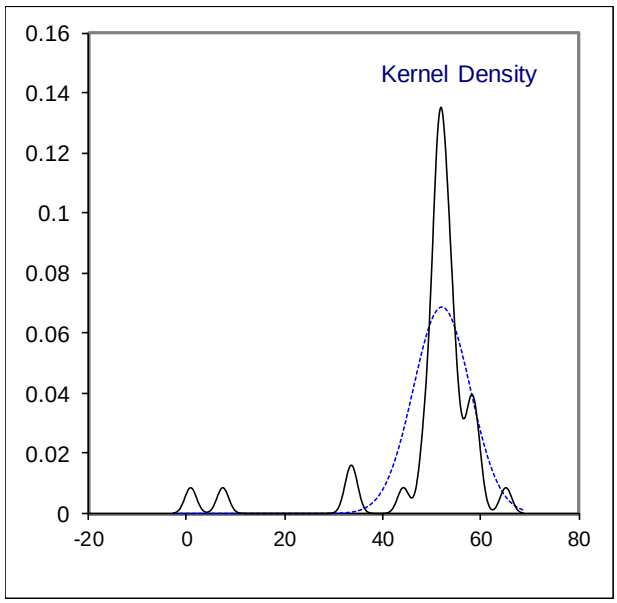


Determination of Aldehydes as Acetaldehyde on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2313	65.0		0.82	
150		-----		-----	
168		-----		-----	
169		-----		-----	
171	E2313	49.8		-0.13	
174	E2313	>50		-----	
311	E2313	>50		-----	
323	E2313	58.9		0.44	
343	E2313	>50		-----	
347		-----		-----	
370		-----		-----	
395	E2313	52.58		0.04	
396	E2313	48.6		-0.21	
444	E2313	0.75	R(0.01)	-3.21	
522		-----		-----	
528	E2313	57.922		0.37	
551		-----		-----	
557	NBR6309	33.0631276	R(0.01)	-1.18	
558		-----		-----	
609		-----		-----	
610		-----		-----	
657	E2313	50.8831		-0.07	
663		-----		-----	
786		-----		-----	
840	E2313	50.69		-0.08	
848	E2313	51.1		-0.05	
852	E2313	51.0		-0.06	
857	E2313	51.7		-0.02	
860	E2313	52		0.00	
861	E2313	54.3		0.15	
862	E2313	51.46		-0.03	
865	E2313	52.9		0.06	
869	E2313	50.9		-0.07	
886		-----		-----	
902	E2313	59.3		0.46	
912		-----		-----	
913		-----		-----	
962	E2313	51.2		-0.05	
963	E2313	56.15		0.26	
1107		-----		-----	
1117		-----		-----	
1135	E2313	44.1	C	-0.49	first reported 1455.7
1151	E2313	52.71		0.05	
1169	E2313	52.3		0.02	
1217	E2313	7.3	R(0.01)	-2.80	
1261		-----		-----	
1467	E2313	51.93		0.00	
1509	E2313	53.53		0.10	
1515	E2313	54.31		0.15	
1603	In house	57.8	C	0.37	first reported 143.7
1608	E2313	52.81		0.05	
1656	E2313	49.2		-0.17	
1718	E2313	54.49		0.16	
1823	E2313	52.9		0.06	
1868		-----		-----	
1880	E2313	51.49		-0.03	
1954	E2313	48.13		-0.24	
6198	E2313	33.92	R(0.01)	-1.13	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006	E2313	54.4		0.15	
9008	E2313	50.6		-0.08	
9009	E2313	57.80		0.37	
9014		-----		-----	

normality	not OK
n	37
outliers	2
mean (n)	51.942
st.dev. (n)	5.8067
R(calc.)	16.259
st.dev.(E2313:15)	15.9573
R(E2313:15)	44.680





Determination of Appearance on sample #18205;

lab	method	value	mark	z(targ)	remarks
120	Visual	clear and free form suspended matter		-----	
150	E2680	Pass		-----	
168	E2680	Pass		-----	
169	Visual	CBFSM		-----	
171	E2680	Clear		-----	
174	Visual	Clear & Free of suspended matter		-----	
311	E2680	pass		-----	
323	D4176	fail [lots of white particles]		-----	
343	E2680	PASS		-----	
347	E2680	pass		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	Pass		-----	
444	E2680	Pass		-----	
522		-----		-----	
528	E2680	PASS		-----	
551	E2680	Pass		-----	
557	E2680	PASS		-----	
558	E2680	PASS		-----	
609	E2680	PASS		-----	
610		-----		-----	
657	E2680	Pass		-----	
663	Visual	Pass		-----	
786	E2680	pass		-----	
840	E2680	Pass		-----	
848	Visual	pass		-----	
852	Visual	pass		-----	
857	E2680	Pass		-----	
860	E2680	pass		-----	
861	E2680	Bright &Clear		-----	
862	E2680	pass		-----	
865	E2680	pass		-----	
869	E2680	Pass		-----	
886		-----		-----	
902	E2680	Pass		-----	
912	Visual	Clear & Bright		-----	
913	E2680	Pass		-----	
962	D4176	Pass		-----	
963	E2680	Pass		-----	
1107		-----		-----	
1117	D4176	PASS		-----	
1135	Visual	Pass		-----	
1151	Visual	clear		-----	
1169	D4176	Pass		-----	
1217	Visual	Pass		-----	
1261		-----		-----	
1467	E2680	pass		-----	
1509	E2680	Pale Yellow coloured Clear Liquid		-----	
1515	E2680	PASS		-----	
1603	Visual	CFP		-----	
1608	D4176	Pass		-----	
1656	E2680	Pass		-----	
1718	E2680	Slight pale yellow clear liquid		-----	
1823	E2680	Pass		-----	
1868		-----		-----	
1880	E2680	Pass		-----	
1954	Visual	clear liquid		-----	
6198	D4176	Pass		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006	E2680	pass		-----	
9008	E2680	PASS		-----	
9009	E2680	PASS		-----	
9014	E2680	Clear and Bright		-----	
	n	53 for Pass (Clear and Bright)			
	n	1 for Fail			
	n	2 for Slight pale yellow			

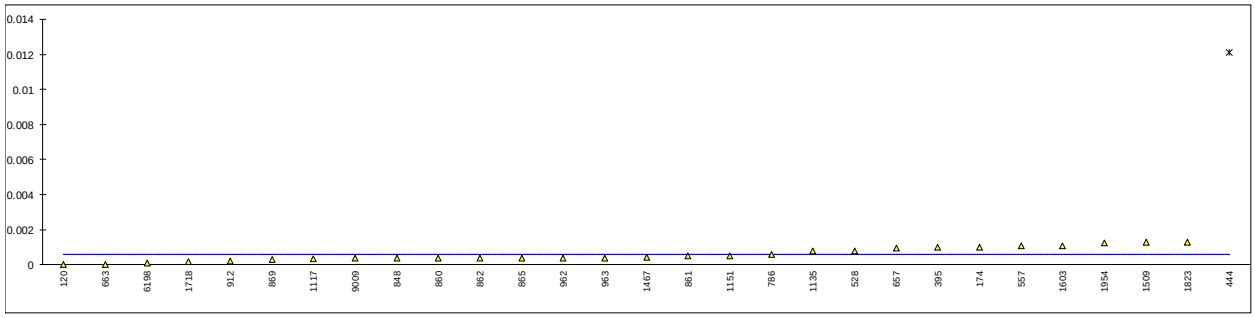
--- Empty Page ---

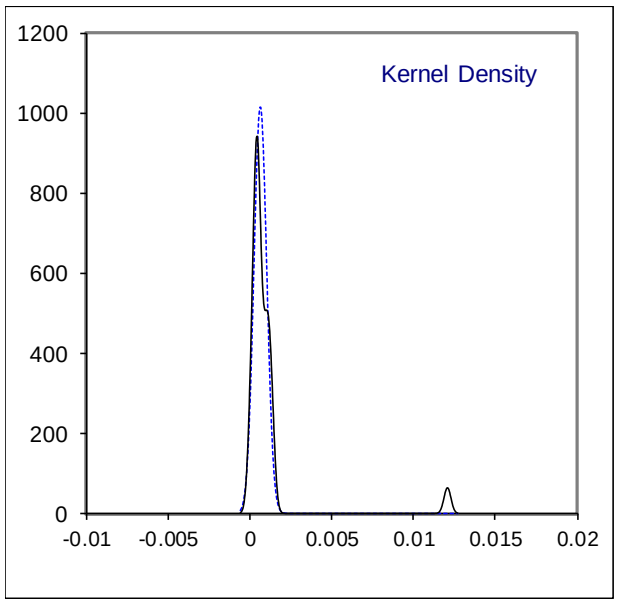
Determination of Ash content on sample #18205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D482	0		-----	
150	D482	<0.001		-----	
168		-----		-----	
169	D482	<0.001		-----	
171	D482	<0.001		-----	
174	D482	0.001		-----	
311	D482	<0.001		-----	
323	D482	<0.001		-----	
343	D482	<0,001		-----	
347	D482	<0.001		-----	
370		-----		-----	
395	D482	0.001	C	-----	first reported 0.01194
396		-----		-----	
444	D482	0.0121	R(0.01)	-----	possibly a false positive test result?
522		-----		-----	
528	D482	0.00081		-----	
551	D482	<0,001		-----	
557	D482	0.0010849		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
657	D482	0.00095		-----	
663	D482	0.000		-----	
786	D482	0.0006		-----	
840	D482	<0.001		-----	
848	D482	0.0004		-----	
852	D482	<0.001		-----	
857	D482	<0.001		-----	
860	D482	0.0004		-----	
861	D482	0.0005		-----	
862	D482	0.0004		-----	
865	D482	0.0004		-----	
869	D482	0.0003		-----	
886		-----		-----	
902	D482	<0,001		-----	
912	D482	0.0002		-----	
913		-----		-----	
962	D482	0.0004		-----	
963	D482	0.0004		-----	
1107		-----		-----	
1117	D482	0.00035		-----	
1135	D482	0.00080		-----	
1151	D482	0.0005		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467	D482	0.00043		-----	
1509	D482	0.0013		-----	
1515		-----		-----	
1603	In house	0.0011		-----	
1608	D482	<0.001		-----	
1656	D482	<0.001		-----	
1718	D482	0.00019		-----	
1823	D482	0.0013		-----	
1868		-----		-----	
1880		-----		-----	
1954	D482	0.001232		-----	
6198	D482	0.0001		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D482	0.000399		-----	
9014		-----		-----	

normality	OK
n	28
outliers	1
mean (n)	0.00059
st.dev. (n)	0.000393
R(calc.)	0.00110
st.dev.(D482:13)	(0.001786)
R(D482:13)	(0.005)

Application range: 0.001 – 0.180%M/M

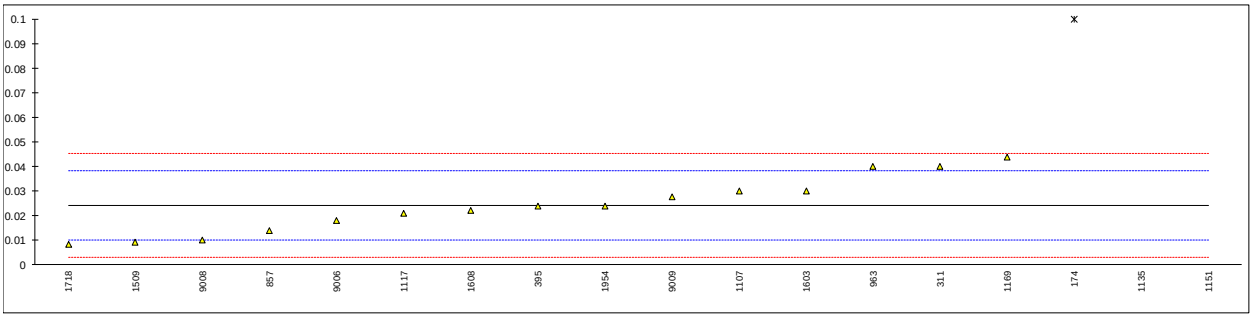


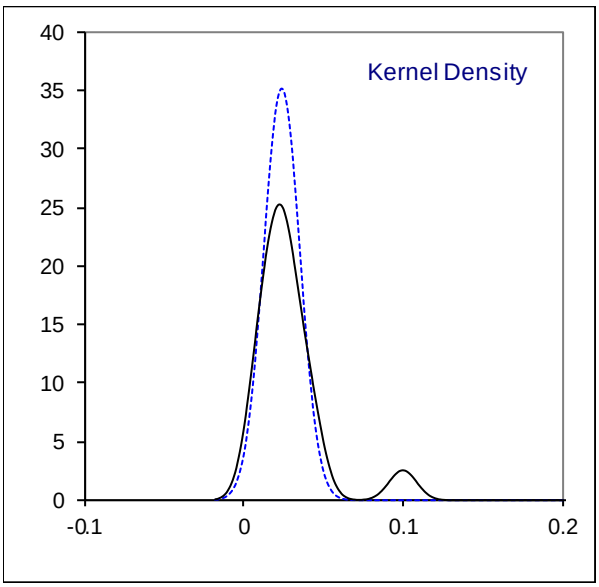


Determination of Inorganic Chloride as Cl on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	E2469	<0.1		-----	
168		-----		-----	
169		-----		-----	
171		-----		-----	
174	E2469	0.1	G(0.01)	10.73	
311	E2469	0.04		2.24	
323	E2469	<0.03		-----	
343	E2469	<0,01		-----	
347		-----		-----	
370		-----		-----	
395	INH-1677	0.024		-0.02	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E2469	<0.01		-----	
610		-----		-----	
657		-----		-----	
663		-----		-----	
786	IMPCA002	<0.25		-----	
840	IMPCA002	<0.2		-----	
848		-----		-----	
852		-----		-----	
857	E2469	0.014		-1.44	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865	INH-001	<0.3		-----	
869		-----		-----	
886		-----		-----	
902	E2469	<0,05		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963	E2469	0.040		2.24	
1107	E2469	0.03		0.83	
1117	E2469	0.021		-0.45	
1135	INH-2901	0.33346	G(0.01)	43.78	
1151	In house	10.68	G(0.01)	1508.37	possibly an unit error?
1169	E2469	0.044		2.81	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2469	0.0093		-2.10	
1515		-----		-----	
1603	In house	0.03		0.83	
1608	E2469	0.022		-0.31	
1656	E2469	<0.1		-----	
1718	E2469	0.0084		-2.23	
1823		-----		-----	
1868		-----		-----	
1880	E2469	<0.01		-----	
1954	E2469	0.024		-0.02	
6198	E2469	<0.01		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006	E2469	0.018		-0.87	
9008	E2469	0.01		-2.01	
9009	E2469	0.0278		0.51	
9014		-----		-----	

normality	OK
n	15
outliers	3
mean (n)	0.0242
st.dev. (n)	0.01135
R(calc.)	0.0318
st.dev.(E2469:16)	0.00706
R(E2469:16)	0.0198

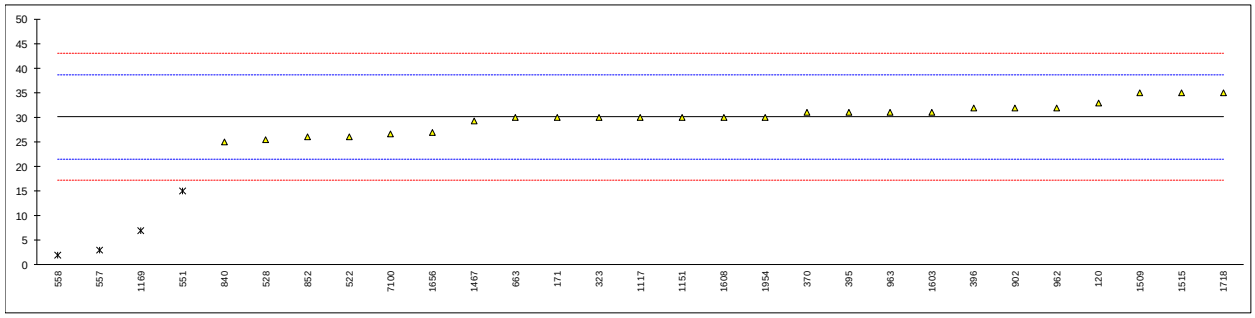


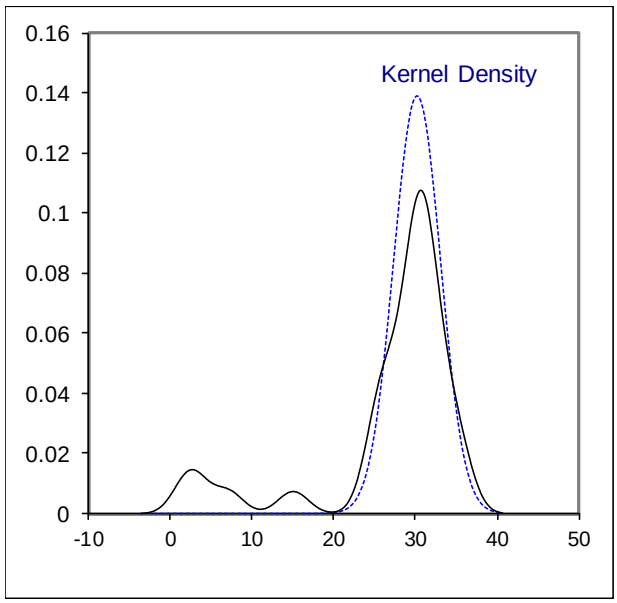


Determination of Color Pt/Co manual (D1209) on sample #18205

lab	method	value	mark	z(targ)	remarks
120	D1209	33		0.66	
150		-----		-----	
168		-----		-----	
169	D1209	>20		-----	
171	D1209	30		-0.03	
174		-----		-----	
311	D1209	OH 25-30		-----	
323	D1209	30		-0.03	
343		-----		-----	
347		-----		-----	
370	D1209	31		0.20	
395	D1209	31		0.20	
396	D1209	32		0.43	
444		-----		-----	
522	D1209	26.1		-0.94	
528	D1209	25.5		-1.08	
551	D1209	15	R(0.01)	-3.52	
557	D1209	3	R(0.01)	-6.30	
558	NBR 5769	2	R(0.01)	-6.54	
609		-----		-----	
610		-----		-----	
657	D1209	25-30 Off-hue		-----	
663	D1209	30		-0.03	
786		-----		-----	
840	D1209	25		-1.19	
848	D1209	25~30 off- hue		-----	
852	D1209	26		-0.96	
857	D1209	30-35 off hue		-----	
860	D1209	25~30 offhue		-----	
861	D1209	20-30 off hue		-----	
862	D1209	25-30 offhue		-----	
865	D1209	30[off hue]		-----	
869	D1209	25-30 off hue		-----	
886		-----		-----	
902	D1209	32		0.43	
912		-----		-----	
913		-----		-----	
962	D1209	32		0.43	
963	D1209	31		0.20	
1107		-----		-----	
1117	D1209	30		-0.03	
1135		-----		-----	
1151	D1209	30		-0.03	
1169	D1209	7	C,R(0.01)	-5.37	first reported 17
1217		-----		-----	
1261		-----		-----	
1467	D1209	29.23		-0.21	
1509	D1209	35		1.13	
1515	D1209	35		1.13	
1603	D1209	31		0.20	
1608	D1209	30		-0.03	
1656	D1209	27		-0.73	
1718	D1209	35		1.13	
1823		-----		-----	
1868		-----		-----	
1880		-----		-----	
1954	D1209	30		-0.03	
6198		-----		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100	GOST 29131	26.6		-0.82	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	25
outliers	4
mean (n)	30.14
st.dev. (n)	2.866
R(calc.)	8.02
st.dev.(D1209:05)	4.305
R(D1209:05)	12.05

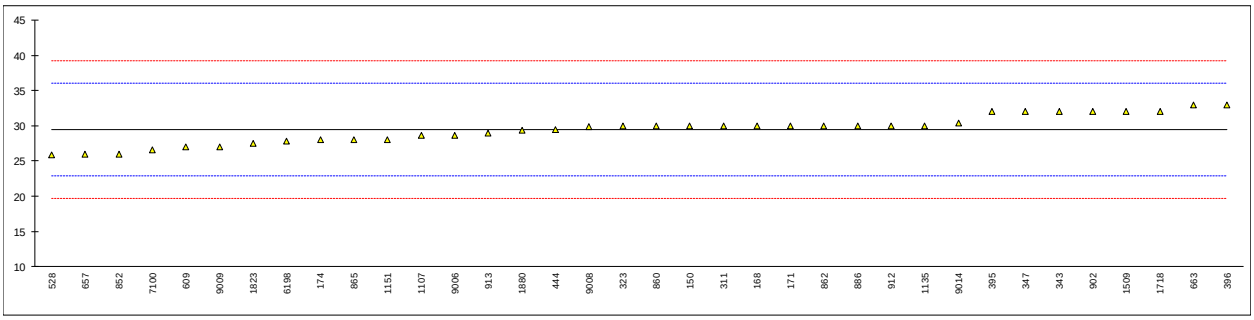


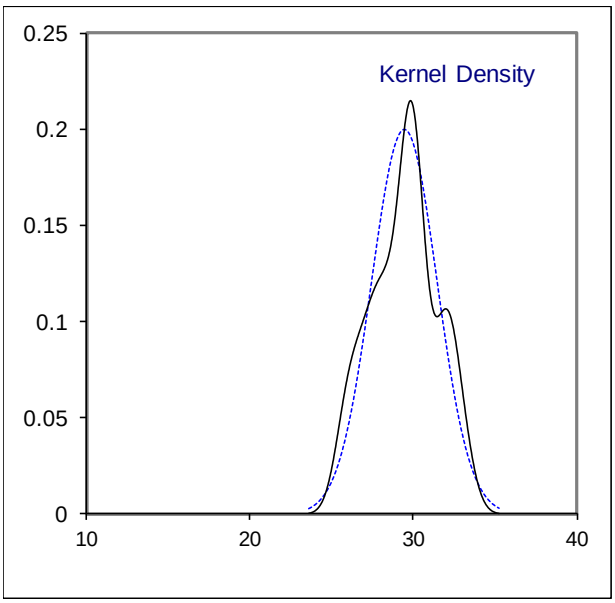


Determination of Color Pt/Co automated (D5386) on sample #18205

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D5386	30		0.16	
168	D5386	30		0.16	
169		-----		-----	
171	D5386	30		0.16	
174	D5386	28		-0.45	
311	D5386	30		0.16	
323	D5386	30		0.16	
343	D5386	32		0.77	
347	D5386	32		0.77	
370		-----		-----	
395	D5386	32		0.77	
396	D5386	33		1.08	
444	D5386	29.5		0.01	
522		-----		-----	
528	D5386	25.9		-1.09	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	D5386	27		-0.76	
610		-----		-----	
657	D5386	25.99		-1.07	
663	D5386	33		1.08	
786		-----		-----	
840		-----		-----	
848		-----		-----	
852	D5386	26		-1.06	
857		-----		-----	
860	D5386	30		0.16	
861		-----		-----	
862	D5386	30		0.16	
865	D5386	28		-0.45	
869	D5386	25-30 off hue		-----	
886	D5386	30	C	0.16	first reported 1
902	D5386	32		0.77	
912	D5386	30		0.16	
913	D5386	29		-0.15	
962		-----		-----	
963		-----		-----	
1107	D5386	28.6		-0.27	
1117		-----		-----	
1135	D5386	30		0.16	
1151	D5386	28		-0.45	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D5386	32		0.77	
1515		-----		-----	
1603		-----		-----	
1608		-----		-----	
1656		-----		-----	
1718	D5386	32		0.77	
1823	D5386	27.5		-0.60	
1868		-----		-----	
1880	D5386	29.4		-0.02	
1954		-----		-----	
6198	D5386	27.8		-0.51	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100	GOST 29131	26.6		-0.88	
9006	D5386	28.6		-0.27	
9008	D5386	29.9		0.13	
9009	D5386	27.0		-0.76	
9014	D5386	30.4		0.28	

normality	OK
n	36
outliers	0
mean (n)	29.48
st.dev. (n)	1.996
R(calc.)	5.59
st.dev.(D5386:16)	3.270
R(D5386:16)	9.16

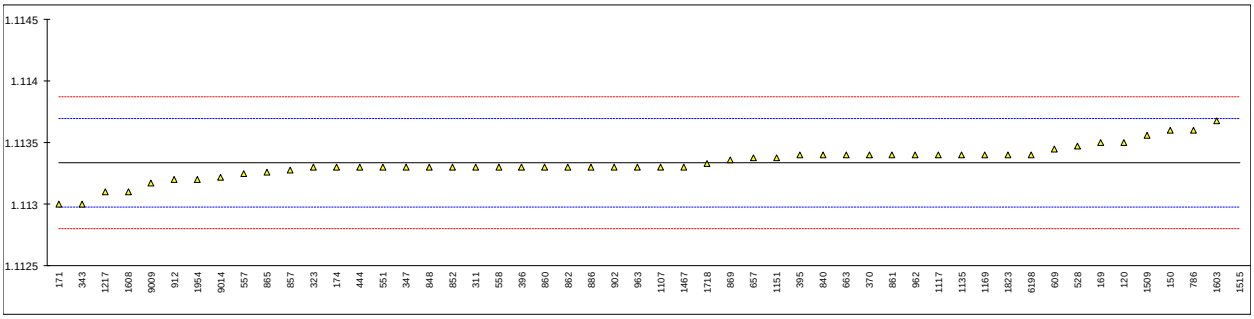


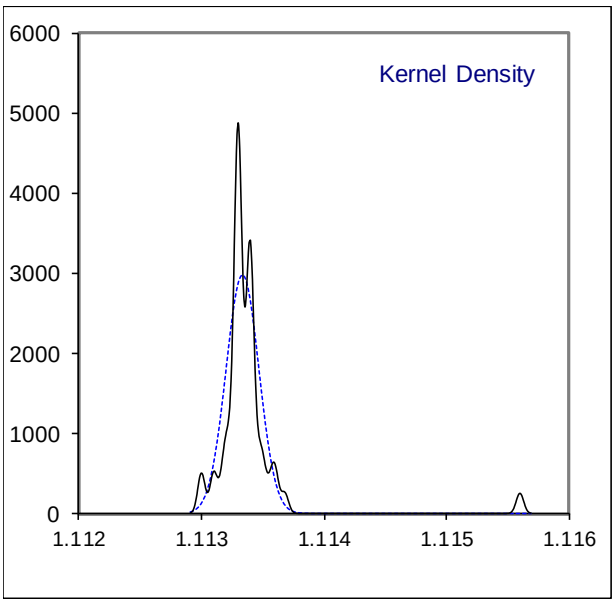


Determination of Density at 20°C on sample #18205; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	ISO12185	1.1135		0.92	
150	D4052	1.1136		1.48	
168		-----		-----	
169	D4052	1.1135		0.92	
171	D4052	1.113		-1.88	
174	D4052	1.1133		-0.20	
311	D4052	1.1133		-0.20	
323	D4052	1.1133		-0.20	
343	D4052	1.113		-1.88	
347	D4052	1.1133		-0.20	
370	D4052	1.1134		0.36	
395	D4052	1.1134		0.36	
396	D4052	1.1133		-0.20	
444	D4052	1.1133		-0.20	
522		-----		-----	
528	D4052	1.11347		0.76	
551	D4052	1.1133		-0.20	
557	D4052	1.11325		-0.48	
558	D4052	1.1133		-0.20	
609	D4052	1.11345		0.64	
610		-----		-----	
657	D4052	1.11338		0.25	
663	D4052	1.1134	C	0.36	first reported 1.1100
786	D4052	1.1136		1.48	
840	D4052	1.1134		0.36	
848	D4052	1.1133		-0.20	
852	D4052	1.1133		-0.20	
857	D4052	1.11328		-0.31	
860	D4052	1.11330		-0.20	
861	D4052	1.1134		0.36	
862	D4052	1.1133		-0.20	
865	D4052	1.11326		-0.42	
869	D4052	1.11336		0.14	
886	D4052	1.1133		-0.20	
902	ISO12185	1.1133		-0.20	
912	D4052	1.1132		-0.76	
913		-----		-----	
962	D4052	1.1134		0.36	
963	ISO12185	1.1133		-0.20	
1107	D4052	1.1133		-0.20	
1117	D4052	1.1134		0.36	
1135	ISO12185	1.1134		0.36	
1151	D4052	1.11338		0.25	
1169	D4052	1.1134		0.36	
1217	ISO12185	1.1131	C	-1.32	first reported 1.11591
1261		-----		-----	
1467	D4052	1.1133		-0.20	
1509	D4052	1.11356		1.26	
1515	D4052	1.1156	C,R(0.01)	12.68	first reported 0.8697
1603	In house	1.11368	C	1.93	first reported 1.1232
1608	D4052	1.1131		-1.32	
1656		-----		-----	
1718	D4052	1.11333		-0.03	
1823	D4052	1.1134		0.36	
1868		-----		-----	
1880		-----		-----	
1954	D4052	1.1132		-0.76	
6198	D4052	1.1134		0.36	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11317		-0.92	
9014	D4052	1.11322		-0.64	

normality	suspect
n	51
outliers	1
mean (n)	1.11334
st.dev. (n)	0.000134
R(calc.)	0.00037
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.00050

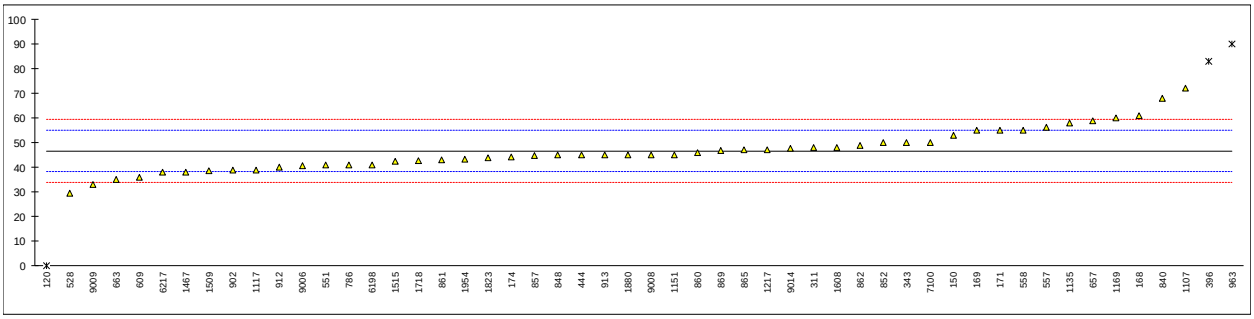


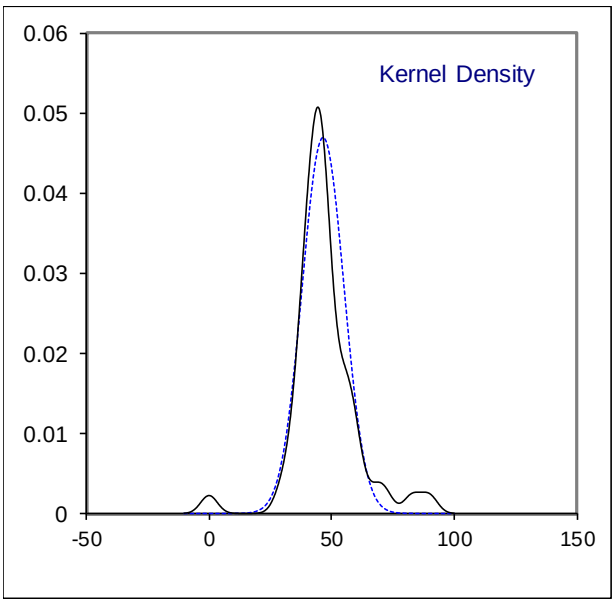


Determination of Diethylene Glycol content on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	0.02	ex,U	-11.00	test result possibly reported in a different unit?
150	E2409	53		1.50	
168	E2409	61		3.39	
169	E2409	54.9		1.95	
171	E2409	55		1.97	
174	E2409	44.2		-0.58	
311	INH-100	48		0.32	
323		-----		-----	
343	E2409	50	C	0.79	reported 0.005 mg/kg
347	E2409	<100		-----	
370		-----		-----	
395		-----		-----	
396	E2409	83	R(0.01)	8.58	
444	E2409	45		-0.39	
522		-----		-----	
528	E2409	29.6030		-4.02	
551	E2409	41		-1.33	
557	E2409	56.3		2.28	
558	E2409	55		1.97	
609	E2409	36		-2.51	
610		-----		-----	
657	E2409	59		2.91	
663	E2409	35.0		-2.75	
786	GOST19710	41		-1.33	
840	E2409	67.9		5.01	
848	E2409	45		-0.39	
852	E2409	50		0.79	
857	E2409	44.9		-0.41	
860	E2409	46		-0.15	
861	E2409	43		-0.86	
862	E2409	49		0.55	
865	E2409	47		0.08	
869	E2409	46.8		0.04	
886		-----		-----	
902	E2409	39		-1.80	
912	E2409	40		-1.57	
913	E2409	45		-0.39	
962		-----		-----	
963	E2409	90	R(0.01)	10.23	
1107	E2409	72		5.98	
1117	E2409	39		-1.80	
1135	E2409	58	C	2.68	first reported 78
1151	E2409	45.2		-0.34	
1169	E2409	60		3.15	
1217	E2409	47	C	0.08	first reported 0.0047 mg/kg
1261		-----		-----	
1467	E2409	38		-2.04	
1509	E2409	38.5		-1.92	
1515	E2409	42.3		-1.03	
1603	In house	<50		-----	
1608	E2409	48	C	0.32	first reported 0.0048 mg/kg
1656		-----		-----	
1718	E2409	42.6		-0.96	
1823	E2409	44		-0.63	
1868		-----		-----	
1880	E2409	45		-0.39	
1954	E2409	43.32		-0.79	
6198	E2409	41		-1.33	
6217	In house	37.98		-2.05	
7006		-----		-----	
7013		-----		-----	
7100	GOST 19710	50		0.79	
9006	E2409	40.56		-1.44	
9008	E2409	45		-0.39	
9009	E2409	33.0		-3.22	
9014	E2409	47.8		0.27	

normality	suspect
n	49
outliers	2 +1ex
mean (n)	46.65
st.dev. (n)	8.507
R(calc.)	23.82
st.dev.(E2409:13)	4.239
R(E2409:13)	11.87



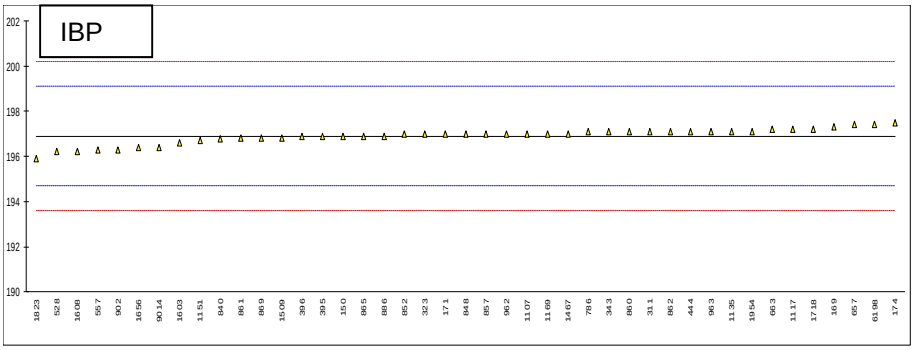


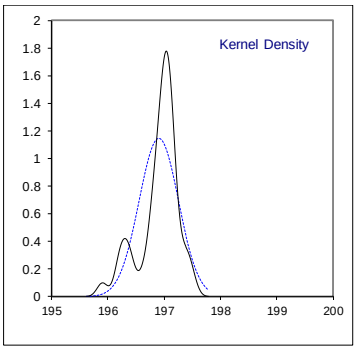
Determination of Distillation: IBP, 50% recovered, Dry Point on sample #18205; results in °C

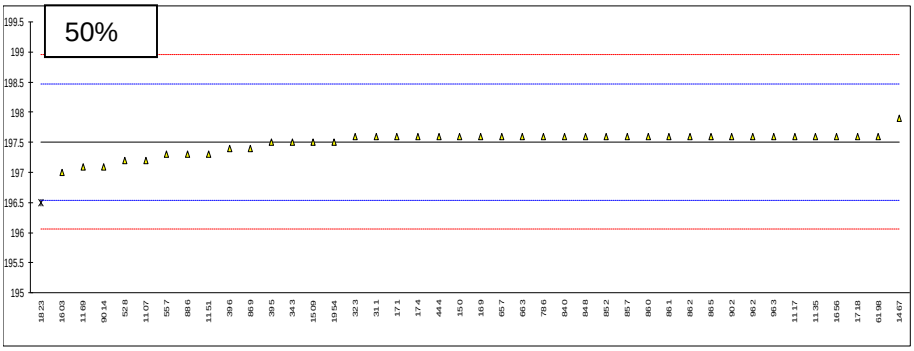
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)	DP-IBP
120		-----		-----	-----		-----	-----		-----	-----
150	D1078-automated	196.9		0.00	197.6		0.19	197.8		-0.20	0.9
168		-----		-----	-----		-----	-----		-----	-----
169	D1078-automated	197.3		0.36	197.6		0.19	197.8		-0.20	0.5
171	D1078-automated	197.0		0.09	197.6		0.19	198.3		0.46	1.3
174	D1078-automated	197.5		0.55	197.6		0.19	198.3		0.46	0.8
311	D1078-automated	197.1		0.18	197.6		0.19	198.0		0.06	0.9
323	D1078-manual	197.0		0.09	197.6		0.19	198.1		0.20	1.1
343	D1078-automated	197.1		0.18	197.5		-0.02	197.8		-0.20	0.7
347		-----		-----	-----		-----	-----		-----	-----
370		-----		-----	-----		-----	-----		-----	-----
395	D1078-manual	196.9		0.00	197.5		-0.02	198.3		0.46	1.4
396	D1078-manual	196.9		0.00	197.4	*)	-0.22	198.2		0.33	1.3
444	D1078-automated	197.1		0.18	197.6		0.19	197.9		-0.07	0.8
522		-----		-----	-----		-----	-----		-----	-----
528		196.2		-0.64	197.2	*)	-0.64	198.0		0.06	1.8
551		-----		-----	-----		-----	-----		-----	-----
557	D1078A	196.3		-0.55	197.3	*)	-0.43	197.6		-0.46	1.3
558		-----		-----	-----		-----	-----		-----	-----
609		-----		-----	-----		-----	-----		-----	-----
610		-----		-----	-----		-----	-----		-----	-----
657	D1078-manual	197.4		0.45	197.6		0.19	198.4		0.59	1.0
663	D1078-automated	197.20		0.27	197.60		0.19	197.95		0.00	0.8
786	D1078-manual	197.1		0.18	197.6		0.19	198.1		0.20	1.0
840	D1078-automated	196.79		-0.10	197.60		0.19	198.06		0.14	1.3
848	D1078-manual	197.0		0.09	197.6		0.19	198.1		0.20	1.1
852	D1078-manual	197.0		0.09	197.6		0.19	198.0		0.06	1.0
857	D1078-manual	197.0		0.09	197.6		0.19	198.1		0.20	1.1
860	D1078-manual	197.1		0.18	197.6		0.19	198.2		0.33	1.1
861	D1078	196.8		-0.09	197.6		0.19	198.4		0.59	1.6
862	D1078-manual	197.1		0.18	197.6		0.19	198.1		0.20	1.0
865	D1078-manual	196.9		0.00	197.6		0.19	198.0		0.06	1.1
869	D1078-automated	196.8		-0.09	197.4	*)	-0.22	197.7		-0.33	0.9
886		196.9		0.00	197.3	*)	-0.43	198.0		0.06	1.1
902	D1078-automated	196.3		-0.55	197.6		0.19	197.8		-0.20	1.5
912		-----		-----	-----		-----	-----		-----	-----
913		-----		-----	-----		-----	-----		-----	-----
962	D1078-automated	197.0		0.09	197.6		0.19	197.9		-0.07	0.9
963	D1078-automated	197.1		0.18	197.6		0.19	197.9		-0.07	0.8
1107	D1078-automated	197.0		0.09	197.2	*)	-0.64	197.7		-0.33	0.7
1117	D1078-automated	197.2		0.27	197.6		0.19	197.9		-0.07	0.7
1135	D1078-automated	197.1		0.18	197.6		0.19	198.9		1.25	1.8
1151	D1078-automated	196.7		-0.18	197.3	*)	-0.43	197.8		-0.20	1.1
1169	D1078-manual	197.0		0.09	197.1	*)	-0.85	197.8		-0.20	0.8
1217		-----		-----	-----		-----	-----		-----	-----
1261		-----		-----	-----		-----	-----		-----	-----
1467	D1078-automated	197.0		0.09	197.9	*)	0.81	197.7		-0.33	0.7
1509	D1078-automated	196.8		-0.09	197.5		-0.02	197.8		-0.20	1.0
1515		-----		-----	-----		-----	-----		-----	-----
1603	D1078-automated	196.6		-0.28	197	*)	-1.05	197.1		-1.13	0.5
1608	D1078-automated	196.2		-0.64	-----		-----	197.3		-0.86	1.1
1656	D1078-manual	196.4		-0.46	197.6		0.19	198.6		0.86	2.2
1718	D1078-automated	197.2		0.27	197.6		0.19	198.0		0.06	0.8
1823	D1078-automated	195.9		-0.91	196.5	*),R(0.01)	-2.09	196.9		-1.39	1.0
1868		-----		-----	-----		-----	-----		-----	-----
1880		-----		-----	-----		-----	-----		-----	-----
1954	D1078-automated	197.1		0.18	197.5		-0.02	197.8		-0.20	0.7
6198	D1078-automated	197.4		0.45	197.6		0.19	198.4		0.59	1.0
6217		-----		-----	-----		-----	-----		-----	-----
7006		-----		-----	-----		-----	-----		-----	-----
7013		-----		-----	-----		-----	-----		-----	-----
7100		-----		-----	-----		-----	-----		-----	-----
9006		-----		-----	-----		-----	-----		-----	-----
9008		-----		-----	-----		-----	-----		-----	-----
9009		-----		-----	-----		-----	-----		-----	-----
9014	D1078-automated	196.4		-0.46	197.1	*)	-0.85	197.4		-0.73	1.0

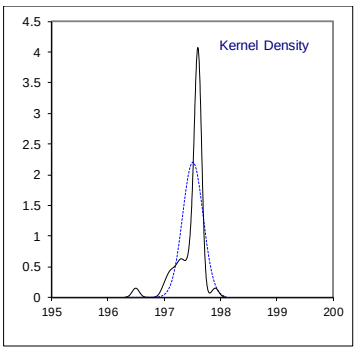
normality	OK	suspect	suspect
n	43	41	43
outliers	0	1	0
mean (n)	196.90	197.51	197.95
st.dev. (n)	0.349	0.181	0.366
R(calc.)	0.98	0.51	1.02
st.dev.(D1078:11)	1.097	0.482	0.756
R(D1078:11)	3.07	1.35	2.12

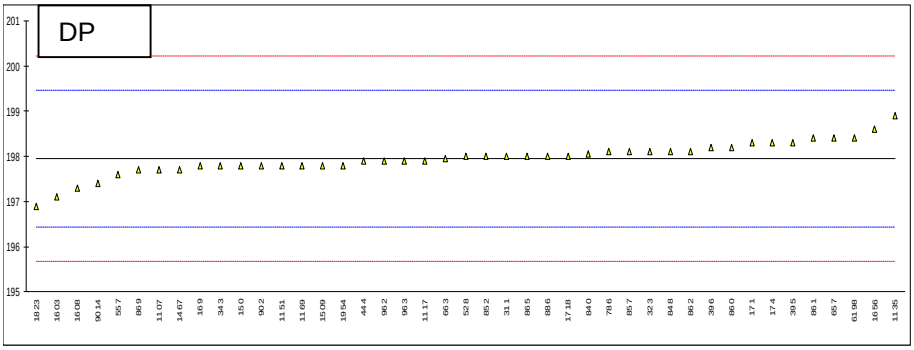
*) laboratories did not correct for theoretical mid boiling point: 197.6°C

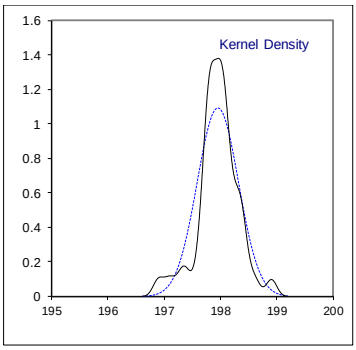












Determination of Miscibility with water on sample #18205;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D1722	Pass		-----	
168		-----		-----	
169	D1722	Pass		-----	
171		-----		-----	
174	D1722	Pass		-----	
311		-----		-----	
323	D1722	pass		-----	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Pass		-----	
444	D1722	Pass		-----	
522		-----		-----	
528		-----		-----	
551	D1722	Pass test		-----	
557	D1722	PASS TEST		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
657		-----		-----	
663	D1722	passes test		-----	
786	D1722	pass		-----	
840	D1722	Passes Test		-----	
848	D1722	pass		-----	
852	D1722	pass		-----	
857	D1722	Pass		-----	
860	D1722	pass		-----	
861	D1722	PASS		-----	
862	D1722	pass		-----	
865	D1722	passes test		-----	
869		-----		-----	
886		-----		-----	
902	D1722	Pass		-----	
912	D1722	Pass		-----	
913	D1722	Pass		-----	
962	D1722	Pass		-----	
963	D1722	Pass		-----	
1107		-----		-----	
1117	D1722	PASS		-----	
1135	D1722	Pass		-----	
1151		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D1722	Pass		-----	
1515	D1722	PASS		-----	
1603		-----		-----	
1608	D1722	Pass		-----	
1656		-----		-----	
1718	D1722	Pass		-----	
1823		-----		-----	
1868		-----		-----	
1880		-----		-----	
1954		-----		-----	
6198		-----		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D1722	PASS		-----	
9014	D1722	Passes Test		-----	
	n	32			
	mean (n)	passes test			

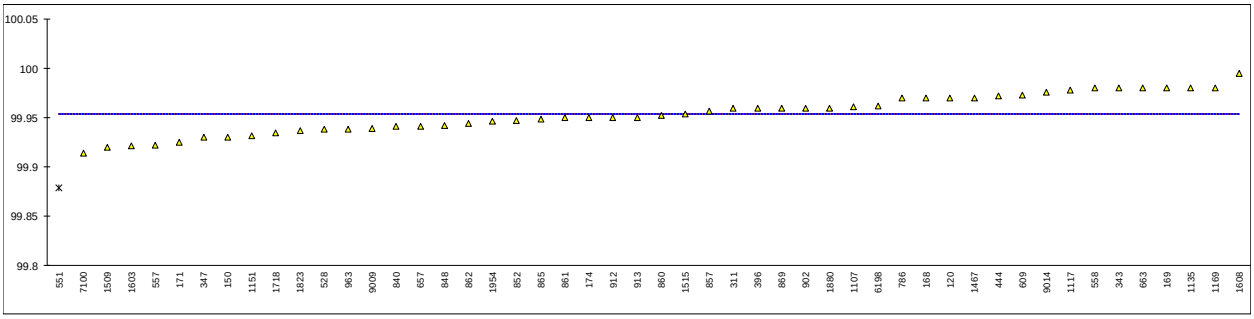
--- Empty Page ---

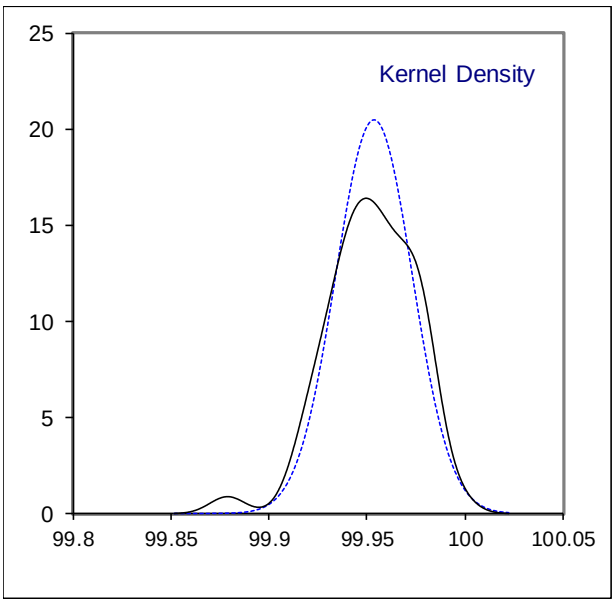
Determination of Purity by GC as received on sample #18205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D3362	99.97		-----	
150	E2409	99.93		-----	
168	E2409	99.97		-----	
169	E2409	99.98		-----	
171	E2409	99.9253		-----	
174	E2409	99.95		-----	
311	INH-100	99.96		-----	
323		-----		-----	
343	E2409	99.98		-----	
347	E2409	99.93		-----	
370		-----		-----	
395		-----		-----	
396	E2409	99.96		-----	
444	E2409	99.972		-----	
522		-----		-----	
528	E2409	99.938		-----	
551	E2409	99.879	R(0.05)	-----	
557	E2409	99.9223944		-----	
558	E2409	99.98		-----	
609	E2409	99.973		-----	
610		-----		-----	
657	E2409	99.9412		-----	
663	E2409	99.980		-----	
786	GOST19710	99.97		-----	
840	E2409	99.941		-----	
848	E2409	99.942		-----	
852	E2409	99.947		-----	
857	E2409	99.957		-----	
860	E2409	99.952		-----	
861	E2409	99.950		-----	
862	E202	99.944		-----	
865	E2409	99.949		-----	
869	E2409	99.96		-----	
886		-----		-----	
902	E2409	99.96		-----	
912	E2409	99.95		-----	
913	E2409	99.95		-----	
962		-----		-----	
963	E2409	99.938		-----	
1107	E2409	99.961		-----	
1117	E2409	99.978		-----	
1135	E2409	99.98		-----	
1151	E202	99.9315		-----	
1169	E2409	99.98		-----	
1217		-----		-----	
1261		-----		-----	
1467	E2409	99.97		-----	
1509	E2409	99.920		-----	
1515	E2409	99.95364		-----	
1603	In house	99.9214		-----	
1608	E2409	99.9952		-----	
1656		-----		-----	
1718	E2409	99.935		-----	
1823	E2409	99.937		-----	
1868		-----		-----	
1880	E2409	99.96		-----	
1954	E2409	99.94616		-----	
6198	E2409	99.962		-----	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100	GOST 19710	99.914		-----	
9006		-----		-----	
9008		-----		-----	
9009	E2409	99.9393		-----	
9014	E2409	99.976		-----	

normality	OK
n	49
outliers	1
mean (n)	99.9537
st.dev. (n)	0.01951
R(calc.)	0.0546
st.dev.(lit.)	unknown
R(lit.)	unknown

Compare: R(iis17C13) = 0.0902

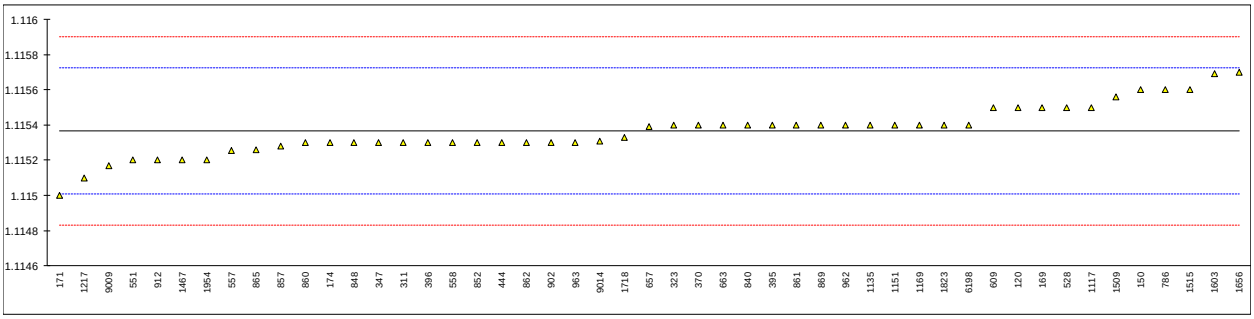


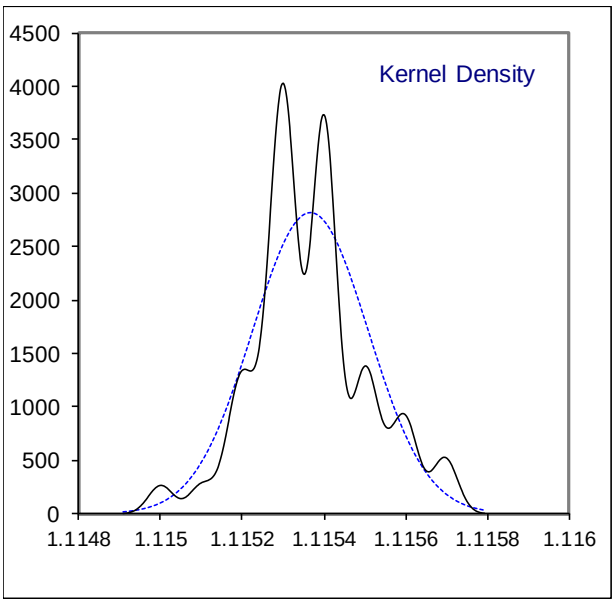


Determination of Specific Gravity 20/20°C on sample #18205;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.1155		0.75	
150	D4052	1.1156		1.31	
168		-----		-----	
169	D4052	1.1155		0.75	
171	D4052	1.115		-2.05	
174	D4052	1.1153		-0.37	
311	D4052	1.1153		-0.37	
323	D4052	1.1154		0.19	
343		-----		-----	
347	D4052	1.1153		-0.37	
370	E202	1.1154		0.19	
395	D4052	1.1154		0.19	
396	D4052	1.1153		-0.37	
444	D4052	1.1153		-0.37	
522		-----		-----	
528	D4052	1.1155		0.75	
551	D4052	1.1152		-0.93	
557	D4052	1.11525411		-0.63	
558	D4052	1.1153		-0.37	
609	D4052	1.1155		0.75	
610		-----		-----	
657	D4052	1.11539		0.13	
663	D4052	1.1154	C	0.19	first reported 1.1132
786	D4052	1.1156		1.31	
840	D4052	1.1154		0.19	
848	D4052	1.1153		-0.37	
852	D4052	1.1153		-0.37	
857	D4052	1.11528		-0.48	
860	D4052	1.1153		-0.37	
861	D4052	1.1154		0.19	
862	D4052	1.1153		-0.37	
865	D4052	1.11526		-0.59	
869	D4052	1.1154		0.19	
886		-----		-----	
902	D4052	1.1153		-0.37	
912	D4052	1.1152		-0.93	
913		-----		-----	
962	E202	1.1154		0.19	
963	E202	1.1153		-0.37	
1107		-----		-----	
1117	D4052	1.1155		0.75	
1135	D4052	1.1154		0.19	
1151	D4052	1.1154		0.19	
1169	D4052	1.1154		0.19	
1217	E202	1.1151	C	-1.49	first reported 1.11792
1261		-----		-----	
1467	D4052	1.1152		-0.93	
1509	D4052	1.11556		1.09	
1515	D4052	1.1156		1.31	
1603	In house	1.11569	C	1.81	first reported 1.12523
1608		-----		-----	
1656	D4052	1.1157		1.87	
1718	D4052	1.11533		-0.20	
1823	D4052	1.1154		0.19	
1868		-----		-----	
1880		-----		-----	
1954	D4052	1.1152		-0.93	
6198	D4052	1.1154		0.19	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11517		-1.10	
9014	D4052	1.11531		-0.31	

normality	OK
n	49
outliers	0
mean (n)	1.11537
st.dev. (n)	0.000142
R(calc.)	0.00040
st.dev.(E202:18)	0.000179
R(E202:18)	0.0005

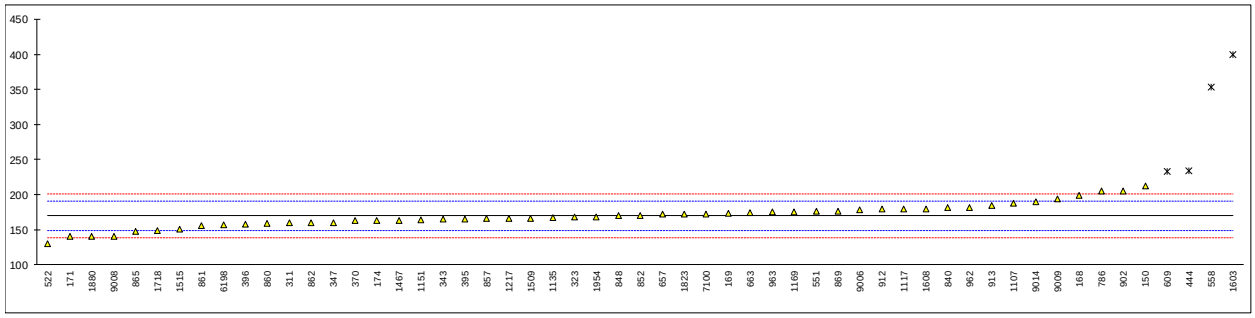


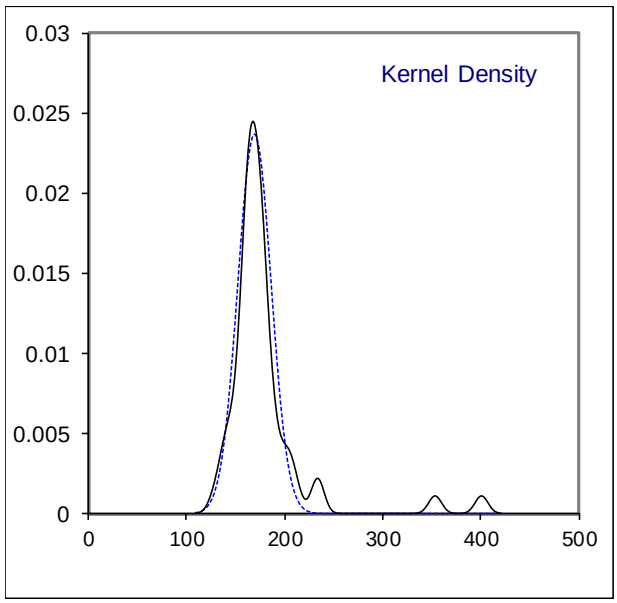


Determination of Water, Coulometric KF titration on sample #18205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	E1064	212		4.07	
168	E1064	199		2.82	
169	E1064	173		0.31	
171	E1064	140		-2.87	
174	E1064	163		-0.65	
311	E1064	160		-0.94	
323	E1064	168		-0.17	
343	E1064	165		-0.46	
347	E1064	160	C	-0.94	first reported 220
370	E1064	163		-0.65	
395	E1064	165.5		-0.41	
396	E1064	158		-1.14	
444	E1064	234	R(0.05)	6.19	
522	E203	129.8		-3.86	
528		-----		-----	
551	E1064	176		0.60	
557		-----		-----	
558	E1064	352.9	R(0.01)	17.66	
609	E1064	233.5	R(0.05)	6.14	
610		-----		-----	
657	E1064	172.6		0.27	
663	E1064	174.3		0.44	
786	E1064	205		3.40	
840	E1064	182		1.18	
848	E1064	170		0.02	
852	E1064	170		0.02	
857	E1064	166		-0.36	
860	E1064	159		-1.04	
861	E1064	156		-1.33	
862	E1064	160		-0.94	
865	E1064	148		-2.10	
869	E1064	176		0.60	
886		-----		-----	
902	E1064	205		3.40	
912	E1064	180		0.99	
913	E1064	185		1.47	
962	E1064	182		1.18	
963	E1064	175		0.50	
1107	E1064	188		1.76	
1117	E1064	180		0.99	
1135	E1064	167		-0.27	
1151	E1064	164	C	-0.56	first reported 229
1169	E1064	175		0.50	
1217	E1064	166	C	-0.36	first reported 0.0166 mg/kg
1261		-----		-----	
1467	E1064	163	C	-0.65	first reported 270
1509	E1064	166		-0.36	
1515	E1064	150.5		-1.86	
1603	In house	400	C,R(0.01)	22.20	first reported 300
1608	E1064	180	C	0.99	first reported 0.018 mg/kg
1656		-----		-----	
1718	E1064	149	C	-2.00	first reported 349
1823	E1064	172.6		0.27	
1868		-----		-----	
1880	E1064	140		-2.87	
1954	E1064	168		-0.17	
6198	E1064	157	C	-1.23	first reported 0.0157 mg/kg
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100	GOST 14870	172.7		0.28	
9006	E1064	178		0.79	
9008	E1064	140		-2.87	
9009	E1064	194	C	2.34	first reported 309
9014	E203	190		1.95	

normality	OK
n	51
outliers	4
mean (n)	169.78
st.dev. (n)	16.879
R(calc.)	47.26
st.dev.(E1064:16)	10.369
R(E1064:16)	29.03



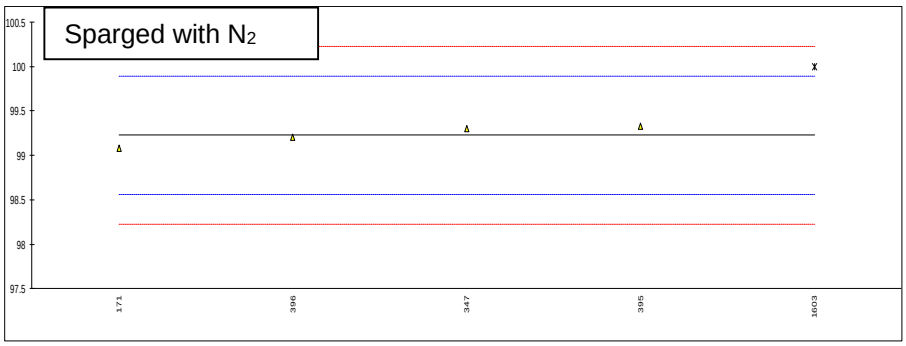


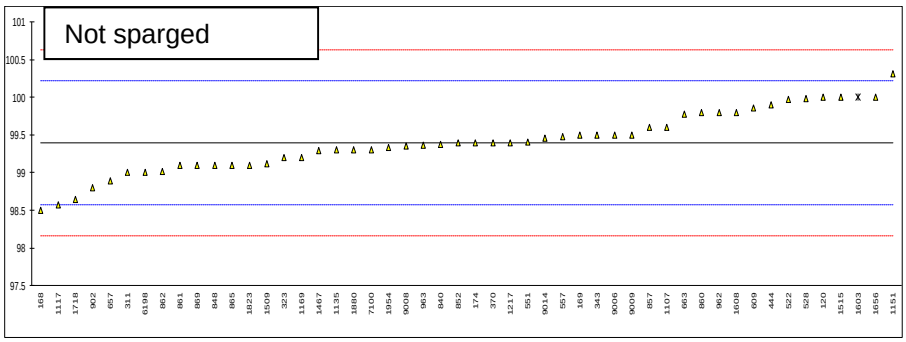
Determination of UV Transmittance at 350nm on sample #18206; results in %Transmittance

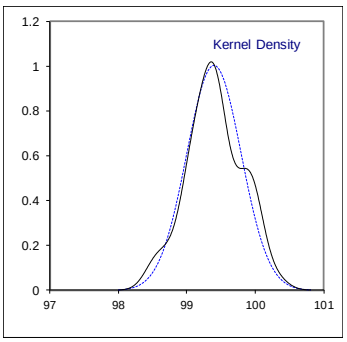
lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120	E2193- not sparged	10 mm	-----		-----	100.0		1.47	
150	E2193- not sparged	10 mm	-----		-----	>100.0		-----	
168	E2193- not sparged	10 mm	-----		-----	98.5		-2.17	
169	E2193- not sparged	10 mm	-----		-----	99.5		0.25	
171	E2193- sparged with N2	10 mm	99.0802		-0.44	-----		-----	
174	E2193- not sparged	10 mm	-----		-----	99.4		0.01	
311	E2193- not sparged	10 mm	-----		-----	99.0		-0.96	
323	E2193- not sparged	10 mm	-----		-----	99.2		-0.48	
343	E2193- not sparged	10 mm	-----		-----	99.50		0.25	
347	E2193- sparged with N2	50 mm	99.3		0.22	-----		-----	
370	E2193- not sparged	10 mm	-----		-----	99.4		0.01	
395	E2193- sparged with N2	10 mm	99.33		0.31	-----		-----	
396	E2193- sparged with N2	10 mm	99.2		-0.08	-----		-----	
444	E2193- not sparged	10 mm	-----		-----	99.9		1.22	
522	E2193- not sparged	10 mm	-----		-----	99.97		1.39	
528	E2193- not sparged	10 mm	-----		-----	99.986		1.43	
551	E2193- not sparged	10 mm	-----		-----	99.4025		0.02	
557	NBR7140	10 mm	-----		-----	99.4815		0.21	
558			-----		-----	-----		-----	
609	E2193- not sparged	10 mm	-----		-----	99.854		1.11	
610			-----		-----	-----		-----	
657	E2193- not sparged	10 mm	-----		-----	98.892		-1.22	
663	E2193- not sparged	10 mm	-----		-----	99.78		0.93	
786			-----		-----	-----		-----	
840	E2193- sparged with N2	10 mm	-----		-----	99.38		-0.04	
848	E2193- not sparged	50 mm	-----		-----	99.1		-0.72	
852	E2193- not sparged	10 mm	-----		-----	99.4		0.01	
857	E2193- not sparged	10 mm	-----		-----	99.6		0.50	
860	E2193- not sparged	10 mm	-----		-----	99.8		0.98	
861	E2193- not sparged	50 mm	-----		-----	99.1		-0.72	
862	E2193- not sparged	50 mm	-----		-----	99.02		-0.91	
865	E2193- not sparged	10 mm	-----		-----	99.1		-0.72	
869	E2193- not sparged	10 mm	-----		-----	99.1		-0.72	
886			-----		-----	-----		-----	
902	E2193- not sparged	10 mm	-----		-----	98.8		-1.45	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962	E2193- not sparged	50 mm	-----		-----	99.8		0.98	
963	E2193- not sparged	10 mm	-----		-----	99.362		-0.08	
1107	E2193- not sparged	10 mm	-----		-----	99.6	C	0.50	fr. 66.6
1117	E2193- not sparged	50 mm	-----		-----	98.57		-2.00	
1135	E2193- not sparged	10 mm	-----		-----	99.3		-0.23	
1151	E2193- not sparged	10 mm	-----		-----	100.31		2.22	
1169	E2193- not sparged	50 mm	-----		-----	99.2		-0.48	
1217	E2193- not sparged	50 mm	-----		-----	99.4		0.01	
1261			-----		-----	-----		-----	
1467	E2193- not sparged	10 mm	-----		-----	99.29		-0.26	
1509	E2193- not sparged	50 mm	-----		-----	99.12		-0.67	
1515	E2193- not sparged	50 mm	-----		-----	100.0		1.47	
1603	In house	10 mm	100	ex	2.31	100	ex	1.47	
1608	E2193- sparged with N2	50 mm	-----		-----	99.8		0.98	
1656	E2193- not sparged	10 mm	-----		-----	100		1.47	
1718	E2193- not sparged	50 mm	-----		-----	98.64		-1.83	
1823	E2193- not sparged	50 mm	-----		-----	99.1		-0.72	
1868			-----		-----	-----		-----	
1880	E2193- not sparged	10 mm	-----		-----	99.3		-0.23	
1954	E2193- not sparged	10 mm	-----		-----	99.33		-0.16	
6198	E2193- not sparged	10 mm	-----		-----	99.00		-0.96	
6217			-----		-----	-----		-----	
7006			-----		-----	-----		-----	
7013			-----		-----	-----		-----	
7100			-----		-----	99.3		-0.23	
9006	E2193- not sparged	10 mm	-----		-----	99.5		0.25	
9008	E2193- not sparged	10 mm	-----		-----	99.35		-0.11	
9009	E2193- not sparged	10 mm	-----		-----	99.500		0.25	
9014	E2193- not sparged	10 mm	-----		-----	99.46		0.16	

normality	unknown	OK
n	4	49
outliers	0 +1ex	0 +1ex
mean (n)	99.228	99.396
st.dev. (n)	0.1129	0.3980
R(calc.)	0.316	1.115
st.dev.(E2193:16)	0.3343	0.4121
R(E2193:16)	0.936	1.154

Lab 1603 excluded it was not clear whether there was sparged with N_2





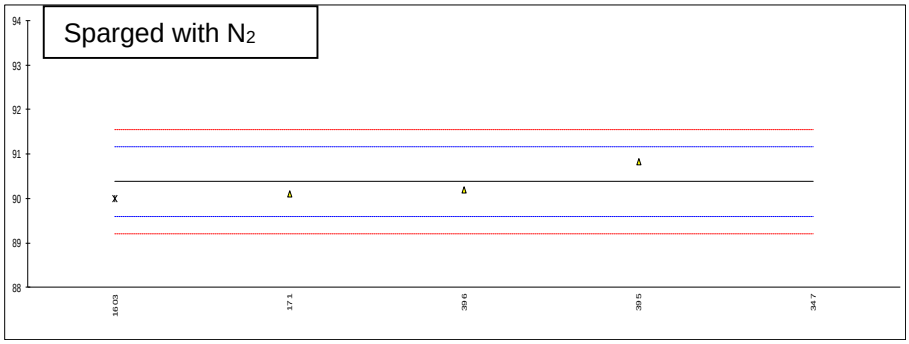


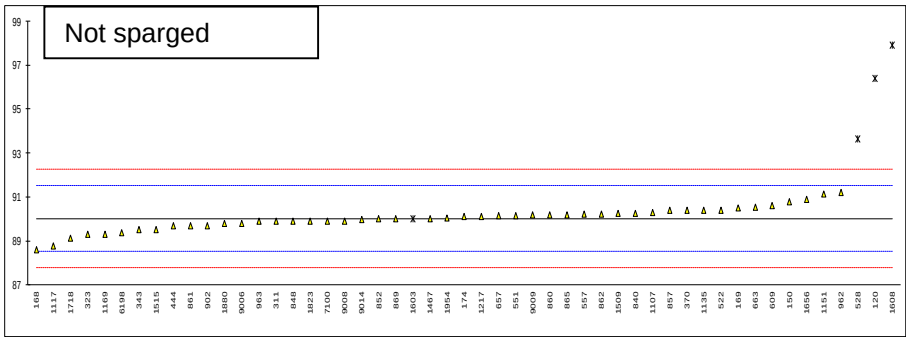
Determination of UV Transmittance at 275nm on sample #18206; results in %Transmittance

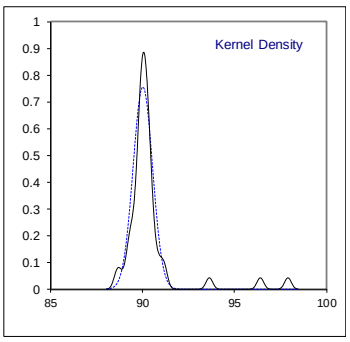
lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120	E2193- not sparged	10 mm	-----		-----	96.4	R(0.01)	8.48	
150	E2193- not sparged	10 mm	-----		-----	90.8		1.03	
168	E2193- not sparged	10 mm	-----		-----	88.6		-1.89	
169	E2193- not sparged	10 mm	-----		-----	90.5		0.63	
171	E2193- sparged with N2	10 mm	90.1112		-0.69	-----		-----	
174	E2193- not sparged	10 mm	-----		-----	90.1		0.10	
311	E2193- not sparged	10 mm	-----		-----	89.9		-0.17	
323	E2193- not sparged	10 mm	-----		-----	89.3		-0.96	
343	E2193- not sparged	10 mm	-----		-----	89.50		-0.70	
347	E2193- sparged with N2	50 mm	99.0	D(0.01)	21.98	-----		-----	
370	E2193- not sparged	10 mm	-----		-----	90.4		0.50	
395	E2193- sparged with N2	10 mm	90.83		1.15	-----		-----	
396	E2193- sparged with N2	10 mm	90.2		-0.46	-----		-----	
444	E2193- not sparged	10 mm	-----		-----	89.7		-0.43	
522	E2193- not sparged	10 mm	-----		-----	90.41		0.51	
528	E2193- not sparged	10 mm	-----		-----	93.633	R(0.01)	4.80	
551	E2193- not sparged	10 mm	-----		-----	90.164		0.19	
557	NBR7140	10 mm	-----		-----	90.207		0.24	
558			-----		-----	-----		-----	
609	E2193- not sparged	10 mm	-----		-----	90.595		0.76	
610			-----		-----	-----		-----	
657	E2193- not sparged	10 mm	-----		-----	90.147		0.16	
663	E2193- not sparged	10 mm	-----		-----	90.52		0.66	
786			-----		-----	-----		-----	
840	E2193- sparged with N2	10 mm	-----		-----	90.26		0.31	
848	E2193- not sparged	50 mm	-----		-----	89.9		-0.17	
852	E2193- not sparged	10 mm	-----		-----	90.0		-0.03	
857	E2193- not sparged	10 mm	-----		-----	90.4		0.50	
860	E2193- not sparged	10 mm	-----		-----	90.2		0.23	
861	E2193- not sparged	50 mm	-----		-----	89.7		-0.43	
862	E2193- not sparged	50 mm	-----		-----	90.22		0.26	
865	E2193- not sparged	10 mm	-----		-----	90.2		0.23	
869	E2193- not sparged	10 mm	-----		-----	90.0		-0.03	
886			-----		-----	-----		-----	
902	E2193- not sparged	10 mm	-----		-----	89.7		-0.43	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962	E2193- not sparged	50 mm	-----		-----	91.2		1.56	
963	E2193- not sparged	10 mm	-----		-----	89.889		-0.18	
1107	E2193- not sparged	10 mm	-----		-----	90.3	C	0.37	fr. 79.1
1117	E2193- not sparged	50 mm	-----		-----	88.76		-1.68	
1135	E2193- not sparged	10 mm	-----		-----	90.4		0.50	
1151	E2193- not sparged	10 mm	-----		-----	91.15		1.50	
1169	E2193- not sparged	50 mm	-----		-----	89.3		-0.96	
1217	E2193- not sparged	50 mm	-----		-----	90.1		0.10	
1261			-----		-----	-----		-----	
1467	E2193- not sparged	10 mm	-----		-----	90.02		-0.01	
1509	E2193- not sparged	50 mm	-----		-----	90.24		0.29	
1515	E2193- not sparged	50 mm	-----		-----	89.5		-0.70	
1603	In house	10 mm	90	ex	-0.97	90	ex	-0.03	
1608	E2193- sparged with N2	50 mm	-----		-----	97.9	R(0.01)	10.48	
1656	E2193- not sparged	10 mm	-----		-----	90.9		1.16	
1718	E2193- not sparged	50 mm	-----		-----	89.11		-1.22	
1823	E2193- not sparged	50 mm	-----		-----	89.9		-0.17	
1868			-----		-----	-----		-----	
1880	E2193- not sparged	10 mm	-----		-----	89.8		-0.30	
1954	E2193- not sparged	10 mm	-----		-----	90.03		0.01	
6198	E2193- not sparged	10 mm	-----		-----	89.37		-0.87	
6217			-----		-----	-----		-----	
7006			-----		-----	-----		-----	
7013			-----		-----	-----		-----	
7100			-----		-----	89.9		-0.17	
9006	E2193- not sparged	10 mm	-----		-----	89.8		-0.30	
9008	E2193- not sparged	10 mm	-----		-----	89.9		-0.17	
9009	E2193- not sparged	10 mm	-----		-----	90.187		0.22	
9014	E2193- not sparged	10 mm	-----		-----	89.97		-0.07	

normality	unknown	suspect
n	3	47
outliers	1 +1ex	3 +1ex
mean (n)	90.380	90.024
st.dev. (n)	0.3919	0.5271
R(calc.)	1.097	1.476
st.dev.(E2193:16)	0.3921	0.7518
R(E2193:16)	1.098	2.105

Lab 1603 excluded it was not clear whether there was sparged with N_2





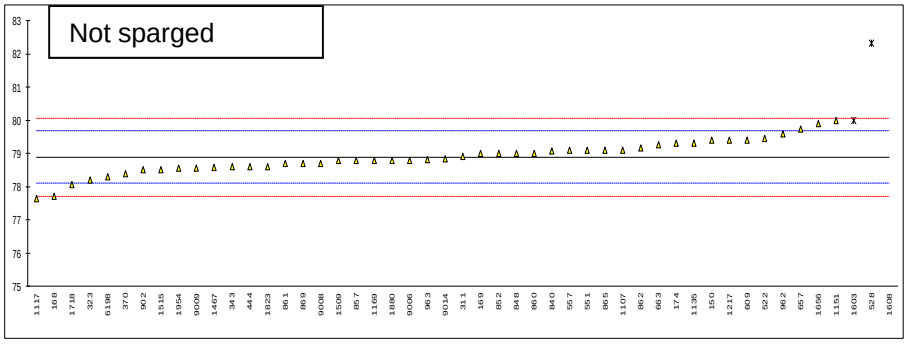


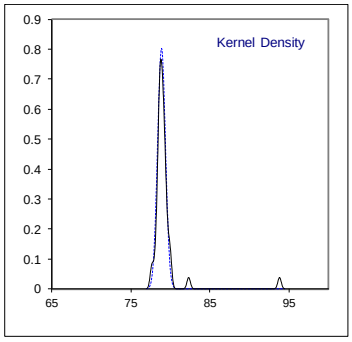
Determination of UV Transmittance at 250nm on sample #18206; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120	E2193- not sparged	10 mm	-----		-----	-----		-----	
150	E2193- not sparged	10 mm	-----		-----	79.4		1.30	
168	E2193- not sparged	10 mm	-----		-----	77.7		-3.02	
169	E2193- not sparged	10 mm	-----		-----	79.0		0.29	
171	E2193- sparged with N2	10 mm	81.6615		-----	-----		-----	
174	E2193- not sparged	10 mm	-----		-----	79.3		1.05	
311	E2193- not sparged	10 mm	-----		-----	78.9		0.03	
323	E2193- not sparged	10 mm	-----		-----	78.2		-1.75	
343	E2193- not sparged	10 mm	-----		-----	78.60		-0.73	
347	E2193- sparged with N2	50 mm	81.3		-----	-----		-----	
370	E2193- not sparged	10 mm	-----		-----	78.4		-1.24	
395	E2193- sparged with N2	10 mm	-----		-----	-----		-----	
396	E2193- sparged with N2	10 mm	-----		-----	-----		-----	
444	E2193- not sparged	10 mm	-----		-----	78.6		-0.73	
522	E2193- not sparged	10 mm	-----		-----	79.44		1.40	
528	E2193- not sparged	10 mm	-----		-----	82.318	R(0.01)	8.72	
551	E2193- not sparged	10 mm	-----		-----	79.099		0.54	
557	NBR7140	10 mm	-----		-----	79.0985		0.54	
558			-----		-----	-----		-----	
609	E2193- not sparged	10 mm	-----		-----	79.401		1.31	
610			-----		-----	-----		-----	
657	E2193- not sparged	10 mm	-----		-----	79.726		2.13	
663	E2193- not sparged	10 mm	-----		-----	79.27		0.97	
786			-----		-----	-----		-----	
840	E2193- sparged with N2	10 mm	-----		-----	79.07		0.46	
848	E2193- not sparged	50 mm	-----		-----	79.0		0.29	
852	E2193- not sparged	10 mm	-----		-----	79.0		0.29	
857	E2193- not sparged	10 mm	-----		-----	78.8		-0.22	
860	E2193- not sparged	10 mm	-----		-----	79.0		0.29	
861	E2193- not sparged	50 mm	-----		-----	78.7		-0.48	
862	E2193- not sparged	50 mm	-----		-----	79.18		0.74	
865	E2193- not sparged	10 mm	-----		-----	79.1		0.54	
869	E2193- not sparged	10 mm	-----		-----	78.7		-0.48	
886			-----		-----	-----		-----	
902	E2193- not sparged	10 mm	-----		-----	78.5		-0.98	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962	E2193- not sparged	50 mm	-----		-----	79.6		1.81	
963	E2193- not sparged	10 mm	-----		-----	78.815		-0.18	
1107	E2193- not sparged	10 mm	-----		-----	79.1	C	0.54	fr. 90.3
1117	E2193- not sparged	50 mm	-----		-----	77.63		-3.19	
1135	E2193- not sparged	10 mm	-----		-----	79.3		1.05	
1151	E2193- not sparged	10 mm	-----		-----	79.99		2.80	
1169	E2193- not sparged	50 mm	-----		-----	78.8		-0.22	
1217	E2193- not sparged	50 mm	-----		-----	79.4		1.30	
1261			-----		-----	-----		-----	
1467	E2193- not sparged	10 mm	-----		-----	78.57		-0.81	
1509	E2193- not sparged	50 mm	-----		-----	78.79		-0.25	
1515	E2193- not sparged	50 mm	-----		-----	78.5		-0.98	
1603	In house	10 mm	80	ex	-----	80	ex	2.83	
1608	E2193- sparged with N2	50 mm	-----		-----	93.8	R(0.01)	37.89	
1656	E2193- not sparged	10 mm	-----		-----	79.9		2.57	
1718	E2193- not sparged	50 mm	-----		-----	78.07		-2.08	
1823	E2193- not sparged	50 mm	-----		-----	78.6		-0.73	
1868			-----		-----	-----		-----	
1880	E2193- not sparged	10 mm	-----		-----	78.8		-0.22	
1954	E2193- not sparged	10 mm	-----		-----	78.55		-0.86	
6198	E2193- not sparged	10 mm	-----		-----	78.31		-1.47	
6217			-----		-----	-----		-----	
7006			-----		-----	-----		-----	
7013			-----		-----	-----		-----	
7100			-----		-----	-----		-----	
9006	E2193- not sparged	10 mm	-----		-----	78.8		-0.22	
9008	E2193- not sparged	10 mm	-----		-----	78.7		-0.48	
9009	E2193- not sparged	10 mm	-----		-----	78.560		-0.83	
9014	E2193- not sparged	10 mm	-----		-----	78.84		-0.12	

normality	unknown	OK
n	2	46
outliers	0 +1ex	2 +1ex
mean (n)	81.481	78.887
st.dev. (n)	n.a.	0.4968
R(calc.)	n.a.	1.391
st.dev.(E2193:16)	(0.7368)	0.3936
R(E2193:16)	(2.063)	1.102

Lab 1603 excluded it was not clear whether there was sparged with N_2



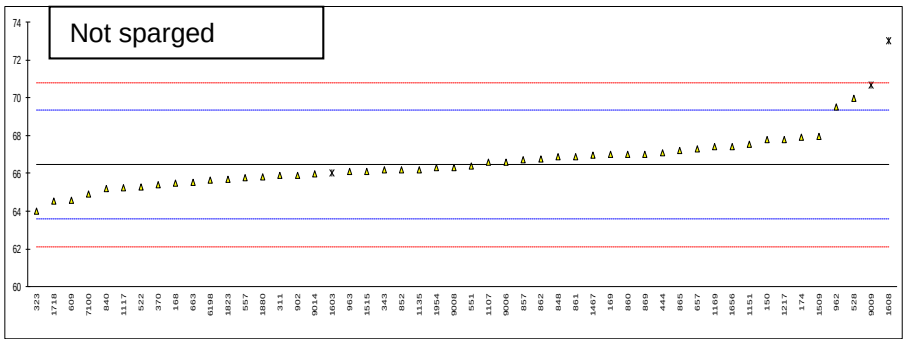


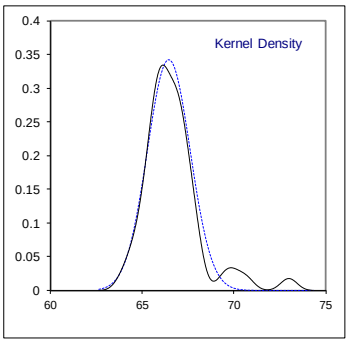
Determination of UV Transmittance at 220nm on sample #18206; results in %Transmittance

lab	Method	cuvet	Method A	mark	z(targ)	Method B	mark	z(targ)	remarks
120	E2193- not sparged	10 mm	-----		-----	-----		-----	
150	E2193- not sparged	10 mm	-----		-----	67.8		0.92	
168	E2193- not sparged	10 mm	-----		-----	65.5		-0.67	
169	E2193- not sparged	10 mm	-----		-----	67.0		0.37	
171	E2193- sparged with N2	10 mm	75.2895		-----	-----		-----	
174	E2193- not sparged	10 mm	-----		-----	67.9		0.99	
311	E2193- not sparged	10 mm	-----		-----	65.9		-0.39	
323	E2193- not sparged	10 mm	-----		-----	64.0		-1.71	
343	E2193- not sparged	10 mm	-----		-----	66.20		-0.18	
347	E2193- sparged with N2	50 mm	78.4		-----	-----		-----	
370	E2193- not sparged	10 mm	-----		-----	65.4		-0.74	
395	E2193- sparged with N2	10 mm	-----		-----	-----		-----	
396	E2193- sparged with N2	10 mm	79.4		-----	-----		-----	
444	E2193- not sparged	10 mm	-----		-----	67.1		0.44	
522	E2193- not sparged	10 mm	-----		-----	65.27		-0.83	
528	E2193- not sparged	10 mm	-----		-----	69.959		2.42	
551	E2193- not sparged	10 mm	-----		-----	66.375		-0.06	
557	NBR7140	10 mm	-----		-----	65.7905		-0.47	
558			-----		-----	-----		-----	
609	E2193- not sparged	10 mm	-----		-----	64.579		-1.30	
610			-----		-----	-----		-----	
657	E2193- not sparged	10 mm	-----		-----	67.288		0.57	
663	E2193- not sparged	10 mm	-----		-----	65.51		-0.66	
786			-----		-----	-----		-----	
840	E2193- sparged with N2	10 mm	-----		-----	65.19		-0.88	
848	E2193- not sparged	50 mm	-----		-----	66.9		0.30	
852	E2193- not sparged	10 mm	-----		-----	66.2		-0.18	
857	E2193- not sparged	10 mm	-----		-----	66.7		0.16	
860	E2193- not sparged	10 mm	-----		-----	67.0		0.37	
861	E2193- not sparged	50 mm	-----		-----	66.9		0.30	
862	E2193- not sparged	50 mm	-----		-----	66.75		0.20	
865	E2193- not sparged	10 mm	-----		-----	67.2		0.51	
869	E2193- not sparged	10 mm	-----		-----	67.0		0.37	
886			-----		-----	-----		-----	
902	E2193- not sparged	10 mm	-----		-----	65.9		-0.39	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962	E2193- not sparged	50 mm	-----		-----	69.5		2.10	
963	E2193- not sparged	10 mm	-----		-----	66.098		-0.25	
1107	E2193- not sparged	10 mm	-----		-----	66.6	C	0.09	fr. 99.6
1117	E2193- not sparged	50 mm	-----		-----	65.23		-0.85	
1135	E2193- not sparged	10 mm	-----		-----	66.2		-0.18	
1151	E2193- not sparged	10 mm	-----		-----	67.55		0.75	
1169	E2193- not sparged	50 mm	-----		-----	67.4		0.65	
1217	E2193- not sparged	50 mm	-----		-----	67.8		0.92	
1261			-----		-----	-----		-----	
1467	E2193- not sparged	10 mm	-----		-----	66.95		0.34	
1509	E2193- not sparged	50 mm	-----		-----	67.97		1.04	
1515	E2193- not sparged	50 mm	-----		-----	66.1		-0.25	
1603	In house	10 mm	66	ex	-----	66	ex	-0.32	
1608	E2193- sparged with N2	50 mm	-----		-----	73.0	R(0.01)	4.52	
1656	E2193- not sparged	10 mm	-----		-----	67.4		0.65	
1718	E2193- not sparged	50 mm	-----		-----	64.54		-1.33	
1823	E2193- not sparged	50 mm	-----		-----	65.7		-0.53	
1868			-----		-----	-----		-----	
1880	E2193- not sparged	10 mm	-----		-----	65.8		-0.46	
1954	E2193- not sparged	10 mm	-----		-----	66.29		-0.12	
6198	E2193- not sparged	10 mm	-----		-----	65.63		-0.58	
6217			-----		-----	-----		-----	
7006			-----		-----	-----		-----	
7013			-----		-----	-----		-----	
7100			-----		-----	64.9		-1.08	
9006	E2193- not sparged	10 mm	-----		-----	66.6		0.09	
9008	E2193- not sparged	10 mm	-----		-----	66.3		-0.11	
9009	E2193- not sparged	10 mm	-----		-----	70.666	R(0.05)	2.91	
9014	E2193- not sparged	10 mm	-----		-----	65.96		-0.35	

normality	unknown	suspect
n	3	47
outliers	0 +1ex	2 +1ex
mean (n)	77.697	66.464
st.dev. (n)	n.a.	1.1653
R(calc.)	n.a.	3.263
st.dev.(E2193:16)	(3.4579)	1.4454
R(E2193:16)	(9.682)	4.047

Lab 1603 excluded it was not clear whether there was sparged with N_2

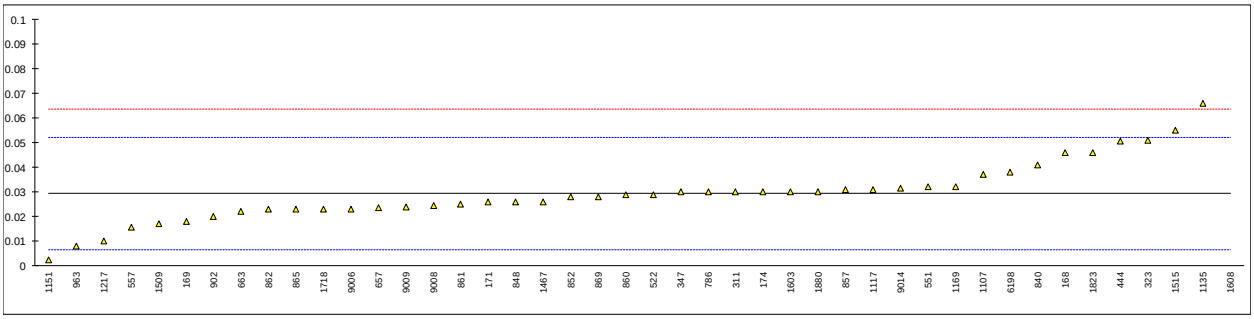


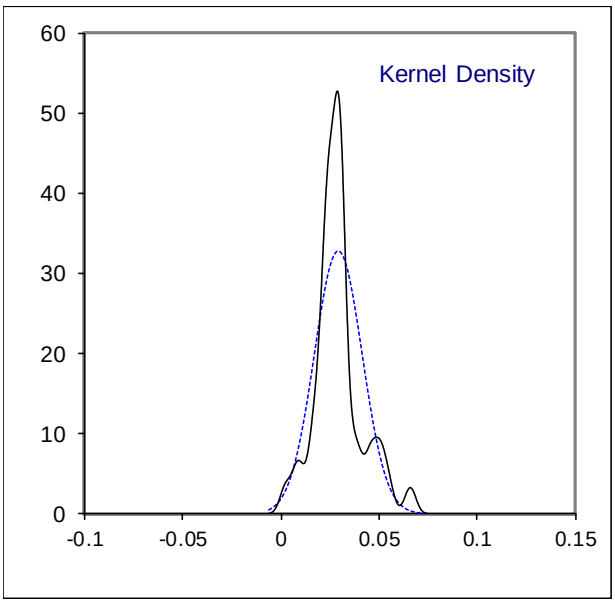


Determination of Iron as Fe on sample #18207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168	E1615	0.046		1.46	
169	E1615	0.018		-1.00	
171	E1615	0.026		-0.30	
174	E1615	0.030		0.06	
311	E1615	0.030		0.06	
323	E1615	0.051		1.90	
343	E1615	<0,010		-----	
347	E394	0.03		0.06	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E1615	0.0505		1.86	
522	E1615	0.029		-0.03	
528		-----		-----	
551	E394	0.032		0.23	
557	MA1042	0.01572185		-1.20	
558		-----		-----	
609	E1615	<0.1		-----	
610		-----		-----	
657	E1615	0.0236		-0.51	
663	E394	0.022		-0.65	
786	E394	0.03		0.06	
840	E394	0.041		1.02	
848	E394	0.026		-0.30	
852	E394	0.028		-0.12	
857	E1615	0.031		0.14	
860	E394	0.029		-0.03	
861	E394	0.025		-0.38	
862	E1615	0.023		-0.56	
865	E394	0.023		-0.56	
869	E394	0.028		-0.12	
886		-----		-----	
902	E1615	0.02		-0.82	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963	E394	0.008		-1.88	
1107	E1615	0.037		0.67	
1117	E394	0.031		0.14	
1135	E394	0.066		3.22	
1151	E394	0.0025		-2.36	
1169	E394	0.032		0.23	
1217	E202	0.01		-1.70	
1261		-----		-----	
1467	E394	0.026		-0.30	
1509	E394	0.017		-1.09	
1515	E394	0.055		2.26	
1603	In house	0.03		0.06	
1608	E394	4.41	R(0.01)	385.46	
1656	E1615	<0.01		-----	
1718	E394	0.023		-0.56	
1823	E394	0.046		1.46	
1868		-----		-----	
1880	E1615	0.03		0.06	
1954	E394	<1		-----	
6198	E394	0.038		0.76	
6217		-----		-----	
7006		-----		-----	
7013		-----		-----	
7100		-----		-----	
9006	E1615	0.023		-0.56	
9008	E1615	0.0246		-0.42	
9009	E1615	0.0238		-0.49	
9014	E1615	0.03146		0.19	

normality	suspect
n	43
outliers	1
mean (n)	0.0294
st.dev. (n)	0.01218
R(calc.)	0.0341
st.dev.(E1615:16)	0.01136
R(E1615:16)	0.0318





APPENDIX 2

Number of participants per country

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

APPENDIX 3

Abbreviations:

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

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ASTM E178:02
3 ASTM E1301:03
4 ISO 5725:86
5 ISO 5725, parts 1-6, 1994
6 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
7 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
8 IP 367:84
9 DIN 38402 T41/42
10 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
11 J.N. Miller, Analyst, 118, 455, (1993)
12 Analytical Methods Committee Technical brief, No 4 January 2001.
13 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364 (2002)
14 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), 165-172, (1983)
15 Horwitz, R. Albert, J. AOAC Int. 79-3, 589 (1996)