Results of Proficiency Test
Mono Ethylene glycol
(MEG polyester grade)
October 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. M. Meijer
Correctors: ing. R.J. Starink & ing. A.S. Noordman-de Neef
Report: iis21C14

January 2022

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1 INTRODUCTION

Since 1994 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Mono Ethylene glycol (MEG polyester grade) in accordance with the latest version of ASTM E202 every year. During the annual proficiency test program of 2021/2022 it was decided to continue the round robin for the analysis of Mono Ethylene glycol.

In this interlaboratory study 69 laboratories in 24 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of the Mono Ethylene glycol proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
It was decided to send two different samples of Mono Ethylene glycol (MEG polyester grade): a 1L bottle labelled #21190 for various analyzes and a 100mL bottle labelled #21191 for determination of UV only.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

For the preparation of the sample for the regular analyzes in MEG a batch of approximately 100 liters of MEG polyester grade was obtained from a local producer. After homogenization 100 amber glass bottles of 1L were filled and labelled #21190.
The homogeneity of the subsamples was checked by determination of Density at 20°C in accordance with ASTM D4052 and Water in accordance with ASTM E1064 on 8 stratified randomly selected subsamples.

	Density at 20°C in kg/L	Water in mg/kg
sample #21190-1	1.11330	152
sample #21190-2	1.11329	153
sample #21190-3	1.11330	153
sample #21190-4	1.11330	152
sample #21190-5	1.11331	158
sample #21190-6	1.11329	188 / D(0.01)
sample #21190-7	1.11330	153
sample #21190-8	1.11330	152

Table 1: homogeneity test results of subsamples #21190

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

	Density at 20°C in kg/L	Water in mg/kg
r (observed)	0.00002	6.0
reference test method	ISO12185:96	E1064:16
0.3 x R (reference test method)	0.0015	7.3

Table 2: evaluation of the repeatabilities of subsamples #21190

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

For the preparation of the UV sample a batch of approximately 16 liters MEG polyester grade was obtained from a local producer. After homogenization 100 amber glass bottles of 100mL were filled and labelled #21191.
The homogeneity of the subsamples was checked by the determination of UV transmittance at 220 nm, 275 nm and 350 nm in accordance with ASTM E2193 option B (not sparged with N_2) using a 50 mm cuvette on 8 stratified randomly selected subsamples.

	UV at 220 nm in %T	UV at 275 nm in %T	UV at 350 nm in %T
sample #21191-1	60.8	89.8	98.6
sample #21191-2	60.7	89.8	98.6
sample #21191-3	60.6	89.7	98.5
sample #21191-4	60.4	89.7	98.6
sample #21191-5	60.3	89.6	98.5
sample #21191-6	60.3	89.6	98.5
sample #21191-7	60.5	89.7	98.5
sample #21191-8	61.1	89.7	98.6

Table 3: homogeneity test results of subsamples #21191

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

	UV at 220 nm in %T	UV at 275 nm in %T	UV at 350 nm in %T
r (observed)	0.8	0.2	0.1
reference test method	E2193-B:16	E2193-B:16	E2193-B:16
0.3 x R (reference test method)	1.2	0.6	0.3

Table 4: evaluation of the repeatabilities of subsamples #21191

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

To each of the participating laboratories one sample MEG polyester grade labelled #21190 and one sample MEG polyester grade labelled #21191 were sent on September 22, 2021. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYZES

The participants were requested to determine on sample #21190: Acidity as Acetic Acid (E2679 and D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Inorganic Chloride as Cl, Color Pt/Co (Manual and Automated), Density at 20°C, Diethylene Glycol, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Iron as Fe, Miscibility with water (Hydrocarbons), Purity by GC as received, Specific Gravity at 20/20°C and Water. On sample #21191 it was requested to determine UV Transmittance at 350, 275, 250 and 220 nm.

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

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

3 RESULTS

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

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

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as ‘<…’ or ‘>…’ were not used in the statistical evaluation.

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

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

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

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

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

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

The z-scores were calculated according to:

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

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

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

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

4 EVALUATION

Some problems were encountered with the dispatch of the samples due to the COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with another week. When considering the test results of the two samples together seventeen participants reported test results after the final reporting date and eight other participants did not report any test results. Not all participants were able to report all tests requested.

In total 61 participants reported 856 numerical test results. Observed were 44 outlying test results, which is 5.1%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

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

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

sample #21190

Acidity as Acetic Acid (E2679): This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the strict precision data of ASTM E2679:09e1(2016).

Acidity as Acetic Acid (D1613): This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1613:17.

Aldehydes as Acetaldehyde: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM E2313:21a.

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

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

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

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

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

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

Diethylene Glycol: This determination was very problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM E2409:20a.

Distillation: This determination was not problematic. In total two statistical outliers were observed over three distillation parameters. All three calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of ASTM D1078:11 automated and manual modes.

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

Miscibility with water: This determination was not problematic. All reporting participants agreed on a test result of 'Passes test' or 'Pass'.

Purity by GC as received: Regretfully, no reproducibility data for purity is mentioned in ASTM E2409:20a. Therefore, no z-scores are calculated.
The calculated reproducibility of the 2021 PT is higher than the reproducibility of the 2020 PT (0.063 vs 0.031).

Specific Gravity: 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 E202:18.

Water: This determination was problematic. Five 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 #21191

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

Option A: This determination was not problematic. Five statistical outliers were observed and three other test results were excluded over four parameters. For the transmittance at 350, 250 and 220 nm the calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM E2193:16. For the transmittance at 275 nm the calculated reproducibility is not in agreement.

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

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Acidity as Acetic Acid (E2679)	mg/kg	7	1.41	1.16	0.71
Acidity as Acetic Acid (D1613)	mg/kg	47	6.5	5.4	14
Aldehydes as Acetaldehyde	mg/kg	41	36.1	12.0	31.1
Appearance		53	Pass	n.a.	n.a.
Ash content	%M/M	38	<0.01	n.e.	n.e.
Inorganic Chloride as Cl	mg/kg	17	0.017	0.024	0.014
Color Pt/Co (Manual)		25	1.6	2.1	7
Color Pt/Co (Automated)		42	1.5	1.7	4.8
Density at 20°C	kg/L	51	1.1133	0.0002	0.0005
Diethylene Glycol	mg/kg	40	20.4	12.9	5.2
Initial Boiling Point	°C	43	197.0	0.9	3.1
50% recovered	°C	42	197.5	0.5	1.3
Dry Point	°C	42	197.9	0.9	2.1
Iron as Fe	mg/kg	35	0.015	0.018	0.016
Miscibility with water (Hydrocarb)		38	Passes test	n.a.	n.a.
Purity by GC as received	%M/M	42	99.937	0.063	n.a.
Specific Gravity 20/20°C		53	1.1154	0.0003	0.0005
Water	mg/kg	54	175	45	28
UV Transmittance at 350 nm (N_2)	%T	11	98.69	0.67	0.94
UV Transmittance at 275 nm (N_2)	%T	11	89.42	2.24	1.10
UV Transmittance at 250 nm (N_2)	%T	9	80.27	1.32	2.06
UV Transmittance at 220 nm (N_2)	%T	11	69.83	4.29	9.68
UV Transmittance at 350 nm	%T	42	98.67	1.04	1.15
UV Transmittance at 275 nm	%T	43	89.86	1.49	2.11
UV Transmittance at 250 nm	%T	42	79.19	1.52	1.10
UV Transmittance at 220 nm	%T	42	61.31	2.50	4.05

Table 5: reproducibilities of tests on samples #21190 and #21191

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2021 WITH PREVIOUS PTS

	October 2021	October 2020	October 2019	October 2018	October 2017
Number of reporting laboratories	61	60	54	61	62
Number of test results	856	852	759	855	880
Number of statistical outliers	44	45	30	33	37
Percentage of statistical outliers	5.1%	5.3%	4.0%	3.9%	4.2%

Table 6: comparison with previous proficiency tests

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

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

	October 2021	October 2020	October 2019	October 2018	October 2017
Acidity as Acetic Acid (E2679)	-	--	--	(--)	--
Acidity as Acetic Acid (D1613)	++	++	+	++	++
Aldehydes as Acetaldehyde	++	+	+	++	++
Ash content	n.e.	n.e.	(++)	(++)	(++)
Inorganic Chloride as Cl	-	--	--	-	--
Color Pt/Co (Manual)	++	++	+	+	++
Color Pt/Co (Automated)	++	++	+/-	+	++
Density at 20°C	++	+	++	+	+
Diethylene Glycol	--	-	-	--	-
Distillation	++	++	++	++	+
Iron as Fe	-	-	--	+/-	+
Specific Gravity 20/20°C	+	+	++	+	+
Water	-	-	+/-	-	--
UV Transmittance at 350nm	+	++	+/-	+/-	+/-
UV Transmittance at 275nm	+/-	+	+/-	+	-
UV Transmittance at 250nm	+/-	-	-	-	-
UV Transmittance at 220nm	+	+	+	+	+

Table 7: comparison determinations against the reference test methods

Results between brackets should be used with due care

The following performance categories were used:

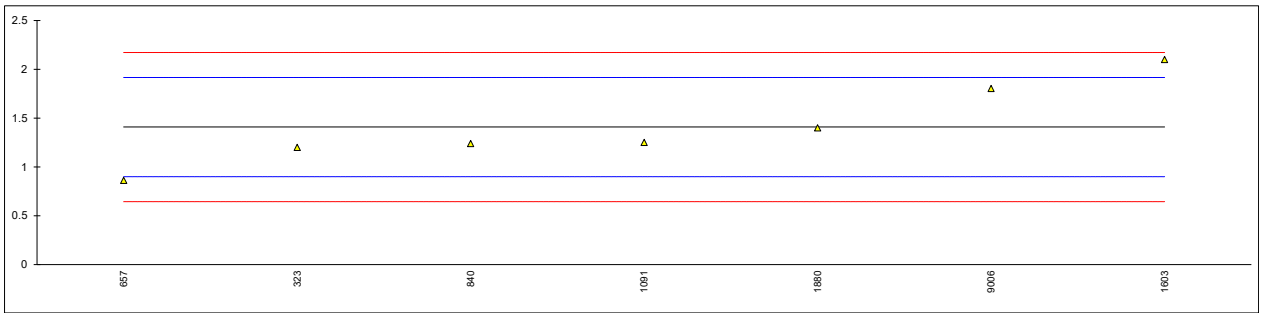
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test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

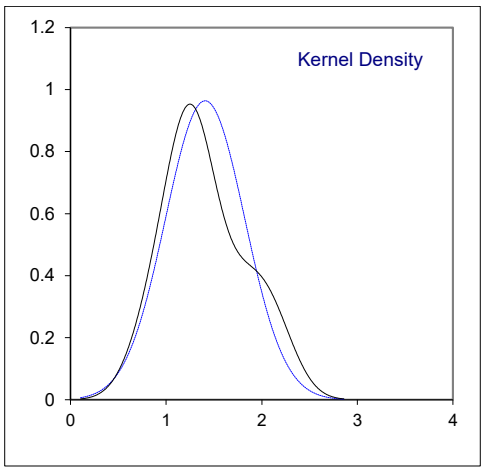
APPENDIX 1

Determination of Acidity as Acetic Acid (E2679) on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169		-----		-----	
171		-----		-----	
172		-----		-----	
174		-----		-----	
315		-----		-----	
323	E2679	1.2		-0.82	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2679	0.8633		-2.14	
840	E2679	1.24		-0.66	
848		-----		-----	
852		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865		-----		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2679	1.25		-0.62	
1117		-----		-----	
1135		-----		-----	
1151		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603	In house	2.1		2.72	
1614		-----		-----	
1656		-----		-----	
1718		-----		-----	
1742		-----		-----	
1823		-----		-----	
1868		-----		-----	
1880	E2679	1.4		-0.03	
1954		-----		-----	
6013		-----		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----		-----	
6406		-----		-----	
7006		-----		-----	
7013		-----		-----	
9006	E2679	1.804		1.56	
9008		-----		-----	
9009		-----		-----	

normality	unknown
n	7
outliers	0
mean (n)	1.408
st.dev. (n)	0.4141
R(calc.)	1.159
st.dev.(E2679:09e1)	0.2545
R(E2679:09e1)	0.713

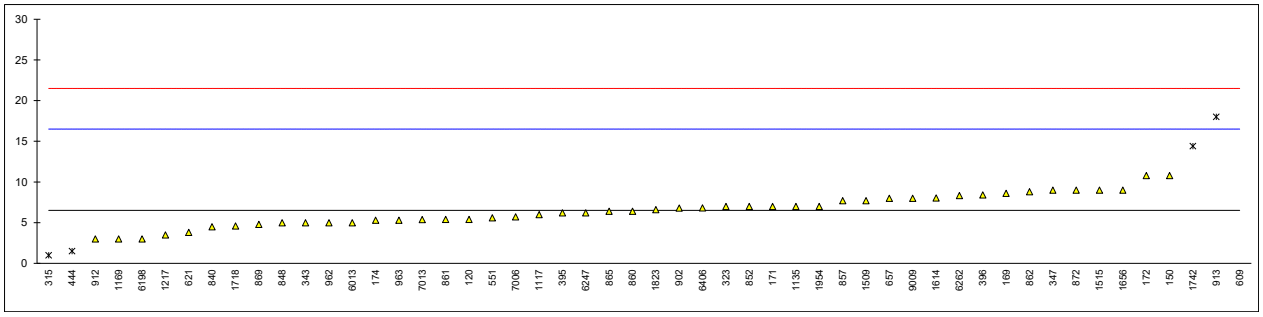


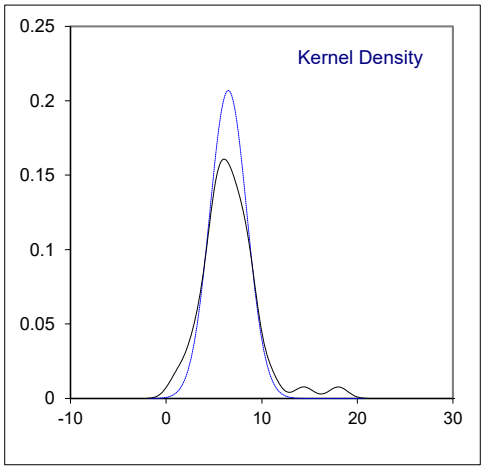


Determination of Acidity as Acetic Acid (D1613) on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	5.4		-0.22	
150	D1613	10.8		0.86	
168		-----		-----	
169	D1613	8.6		0.42	
171	D1613	7		0.10	
172	D1613	10.8		0.86	
174	D1613	5.3		-0.24	
315	D1613	1	R(0.01)	-1.10	
323	D1613	7		0.10	
343	D1613	5		-0.30	
347	D1613	9		0.50	
370		-----		-----	
395	D1613	6.2		-0.06	
396	D1613	8.4		0.38	
444	INH-101370	1.5	R(0.01)	-1.00	
522		-----		-----	
528		-----		-----	
551	D1613	5.6		-0.18	
557		-----		-----	
558		-----		-----	
609	D1613	76	R(0.01)	13.90	
610		-----		-----	
621	D1613	3.8		-0.54	
657	D1613	8		0.30	
840	D1613	4.5		-0.40	
848	D1613	5.0		-0.30	
852	D1613	7.0		0.10	
857	D1613	7.7		0.24	
860	D1613	6.4		-0.02	
861	D1613	5.4		-0.22	
862	D1613	8.8		0.46	
865	D1613	6.4		-0.02	
869	D1613	4.8		-0.34	
872	D1613	9	C	0.50	first reported 0.0009 mg/kg
886		-----		-----	
902	D1613	6.8		0.06	
912	D1613	3		-0.70	
913	D1613	18	R(0.01)	2.30	
962	D1613	5		-0.30	
963	D1613	5.3		-0.24	
1091		-----		-----	
1117	D1613	6		-0.10	
1135	D1613	7		0.10	
1151		-----		-----	
1169	D1613	3		-0.70	
1217		3.5		-0.60	
1261		-----		-----	
1467		-----		-----	
1509	D1613	7.7		0.24	
1515	D1613	9.0		0.50	
1603		-----		-----	
1614	D1613	8.04		0.31	
1656	D1613	9		0.50	
1718	D1613	4.6		-0.38	
1742	D1613	14.4	C,R(0.01)	1.58	first reported as E2679
1823	D1613	6.6		0.02	
1868		-----		-----	
1880		-----		-----	
1954	D1613	7.0		0.10	
6013	D1613	5		-0.30	
6198	D1613	3		-0.70	
6247	D1613	6.2		-0.06	
6262	D1613	8.33		0.36	
6406	D1613	6.817		0.06	
7006	D1613	5.71		-0.16	
7013	D1613	5.38		-0.23	
9006		-----		-----	
9008		-----		-----	
9009	D1613	8.0		0.30	

normality	OK
n	47
outliers	5
mean (n)	6.508
st.dev. (n)	1.9270
R(calc.)	5.396
st.dev.(D1613:17)	5.0000
R(D1613:17)	14

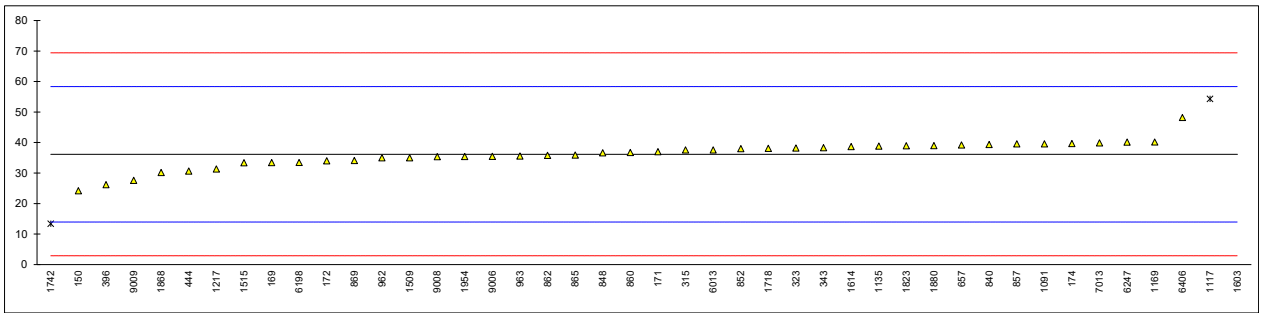


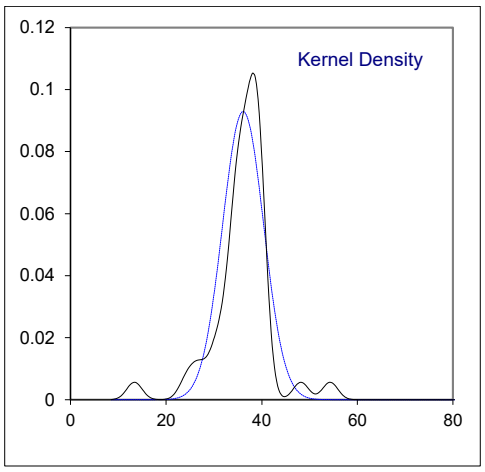


Determination of Aldehydes as Acetaldehyde on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	E2313	24.2		-1.07	
168		-----		-----	
169	E2313	33.4		-0.25	
171	E2313	37		0.08	
172	E2313	34.0		-0.19	
174	E2313	39.7		0.32	
315	E2313	37.6		0.13	
323	E2313	38.2		0.19	
343	E2313	38.3		0.20	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396	E2313	26.2		-0.89	
444	E2313	30.64		-0.49	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2313	39.2		0.28	
840	E2313	39.32		0.29	
848	E2313	36.6		0.04	
852	E2313	38.0		0.17	
857	E2313	39.6		0.31	
860	E2313	36.7		0.05	
861		-----		-----	
862	E2313	35.8		-0.03	
865	E2313	35.9		-0.02	
869	E2313	34.1		-0.18	
872		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962	E2313	35		-0.10	
963	E2313	35.6		-0.05	
1091	E2313	39.6		0.31	
1117		54.32	C,R(0.01)	1.64	first reported 0.67
1135	E2313	38.8		0.24	
1151		-----		-----	
1169	E2313	40.15		0.36	
1217		31.3		-0.43	
1261		-----		-----	
1467		-----		-----	
1509	E2313	35.00		-0.10	
1515	E2313	33.37		-0.25	
1603	In house	119.7	C,R(0.01)	7.53	first reported 115.4
1614	E2313	38.68		0.23	
1656		-----		-----	
1718	E2313	38.09		0.18	
1742	E2313	13.4	R(0.01)	-2.05	
1823	E2313	38.958		0.26	
1868	E2313	30.2		-0.53	
1880	E2313	39.0		0.26	
1954	E2313	35.38		-0.07	
6013	E2313	37.6		0.13	
6198	E2313	33.44		-0.24	
6247	E2313	40.1		0.36	
6262		-----		-----	
6406	E2313	48.20		1.09	
7006		-----		-----	
7013	E2313	39.869		0.34	
9006	E2313	35.45		-0.06	
9008	E2313	35.35		-0.07	
9009	E2313	27.6		-0.77	

normality	suspect
n	41
outliers	3
mean (n)	36.127
st.dev. (n)	4.2946
R(calc.)	12.025
st.dev.(E2313:21a)	11.0985
R(E2313:21a)	31.076





Determination of Appearance on sample #21190;

lab	method	value	mark	z(targ)	remarks
120	D4176	Pass		-----	
150	Visual	C&B		-----	
168		-----		-----	
169	Visual	Pass		-----	
171	E2680	Pass		-----	
172	Visual	Pass		-----	
174	Visual	Clear & Free		-----	
315	E2680	pass		-----	
323	E2679	clear and bright		-----	
343	E2680	PASS		-----	
347	E2680	Pass		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	Pass		-----	
444	E2680	Pass		-----	
522		-----		-----	
528		-----		-----	
551	E2680	Pass		-----	
557		-----		-----	
558		-----		-----	
609	E2680	Pass		-----	
610		-----		-----	
621	Visual	Pass		-----	
657	E2680	Pass		-----	
840	E2680	Pass		-----	
848		Bright&Clear		-----	
852	Visual	Clear&Bright		-----	
857	E2680	Pass		-----	
860	E2680	Pass		-----	
861	E2680	Bright clear		-----	
862	E2680	pass		-----	
865	Visual	Pass		-----	
869	E2680	Pass		-----	
872		-----		-----	
886		-----		-----	
902	E2680	PASS		-----	
912	E2680	Pass		-----	
913	E2680	Clear and Bright		-----	
962	D4176	Pass		-----	
963	E2680	Pass		-----	
1091		-----		-----	
1117	E2680	pass		-----	
1135	Visual	CFSM		-----	
1151		-----		-----	
1169	D4176	Pass		-----	
1217		pass		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2680	Clear & FFSM		-----	
1515	E2680	Pass		-----	
1603	Visual	PASS		-----	
1614	D4176	Clear Colourless liquid		-----	
1656	Visual	pass		-----	
1718	E2680	CFFSM		-----	
1742	E2680	Fail		-----	
1823	D4176	Pass		-----	
1868		Clear		-----	
1880	E2680	Pass		-----	
1954	Visual	Clear Colorless Liquid		-----	
6013	D4176	Clear&Bright		-----	
6198	D4176	pass		-----	
6247	D4176	clear colourless liquid		-----	
6262	Visual	Cl. & Br.		-----	
6406	E2680	Pass		-----	
7006		-----		-----	
7013		-----		-----	
9006	E2680	Pass		-----	
9008		-----		-----	
9009	E2680	PASS		-----	
	n	53	1		
	mean (n)	Pass (Clear & Bright)	Fail		

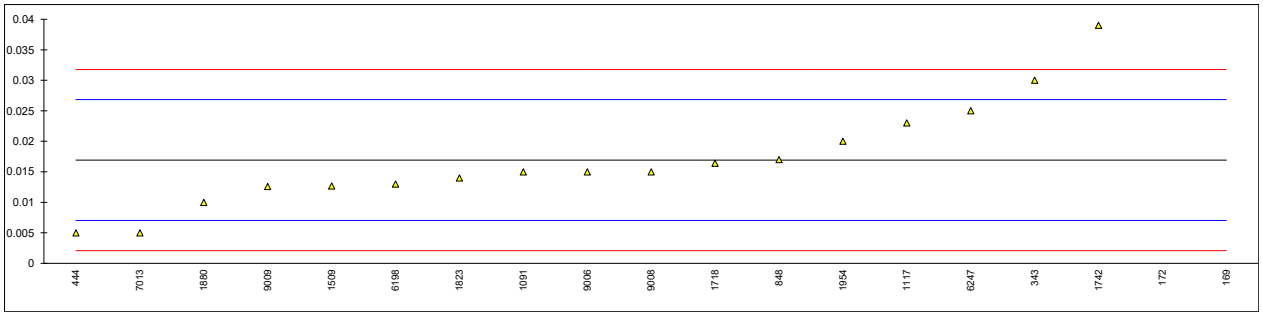
Determination of Ash content on sample #21190; results in %M/M

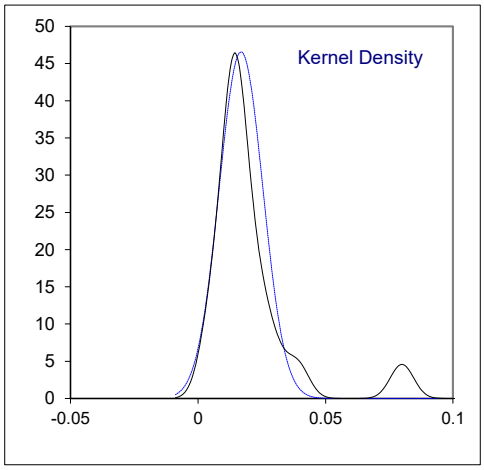
lab	method	value	mark	z(targ)	remarks
120	D482	<0.001		-----	
150	D482	<0.010		-----	
168		-----		-----	
169	D482	0.0		-----	
171	D482	<0.010		-----	
172	D482	<0.010		-----	
174	D482	<0.001		-----	
315	D482	<0.001		-----	
323	D482	< 0.001		-----	
343	D482	<0.01	C	-----	first reported 0.01
347		-----		-----	
370		-----		-----	
395		-----		-----	
396	D482	<0,01		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D482	<0.001		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D482	< 0.01		-----	
657	D482	<0.010		-----	
840	D482	0.0001		-----	
848	D482	0.0002		-----	
852	D482	<0.001		-----	
857	D482	<0.001		-----	
860	D482	0.0003		-----	
861	D482	<0.001		-----	
862	D482	0.0002		-----	
865	D482	0.0003		-----	
869	D482	0.0005		-----	
872		-----		-----	
886	D482	<0.001		-----	
902		-----		-----	
912	D482	<0.001		-----	
913	D482	<0.001		-----	
962	D482	<0.01		-----	
963	D482	<0.01		-----	
1091		-----		-----	
1117	D482	< 10		-----	
1135	D482	<0.001		-----	
1151		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D482	0.0000		-----	
1515		-----		-----	
1603	In house	<LOQ		-----	
1614		-----		-----	
1656	D482	<0.001		-----	
1718	D482	0.0000		-----	
1742		-----		-----	
1823	D482	0.0008		-----	
1868		-----		-----	
1880		-----		-----	
1954	D482	0.000337		-----	
6013	D482	<0.001		-----	
6198		-----		-----	
6247	D482	0.0002		-----	
6262	D482	<0.001		-----	
6406		-----		-----	
7006		-----		-----	
7013	D482	0.0002997		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
	n	38			
	mean (n)	<0.01			range ASTM D482:19: 0.010 to 0.180 %M/M

Determination of Inorganic Chloride as Cl on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169	E2469	0.348	G(0.01)	66.92	
171		-----		-----	
172	E2469	0.08	C,G(0.01)	12.75	first reported 0.06
174	E2469	<0.01		-----	
315	E2469	<0.01		-----	
323	E2469	< 0.03		-----	
343	E2469	0.03		2.64	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2469	0.005		-2.41	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657		-----		-----	
840	IMPCA002	<0.2		-----	
848	E2469	0.017		0.02	
852		-----		-----	
857	INH-4649	<0.5		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865	INH-001	<0.3		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2469	0.015		-0.39	
1117	E2469	0.023		1.23	
1135		-----		-----	
1151		-----		-----	
1169	E2469	<0.1		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2469	0.0127		-0.85	
1515		-----		-----	
1603	In house	<LOQ		-----	
1614		-----		-----	
1656	E2469	<0.01		-----	
1718	E2469	0.0164		-0.11	
1742	E2469	0.039		4.46	
1823	E2469	0.014		-0.59	
1868		-----		-----	
1880	E2469	0.01		-1.40	
1954	E2469	0.02		0.62	
6013		-----		-----	
6198	E2469	0.013		-0.79	
6247	E2469	0.025		1.63	
6262		-----		-----	
6406		-----		-----	
7006		-----		-----	
7013	E2469	0.005		-2.41	
9006	E2469	0.015		-0.39	
9008	E2469	0.015		-0.39	
9009	E2469	0.0126		-0.87	

normality	not OK
n	17
outliers	2
mean (n)	0.0169
st.dev. (n)	0.00857
R(calc.)	0.0240
st.dev.(E2469:16)	0.00495
R(E2469:16)	0.0139

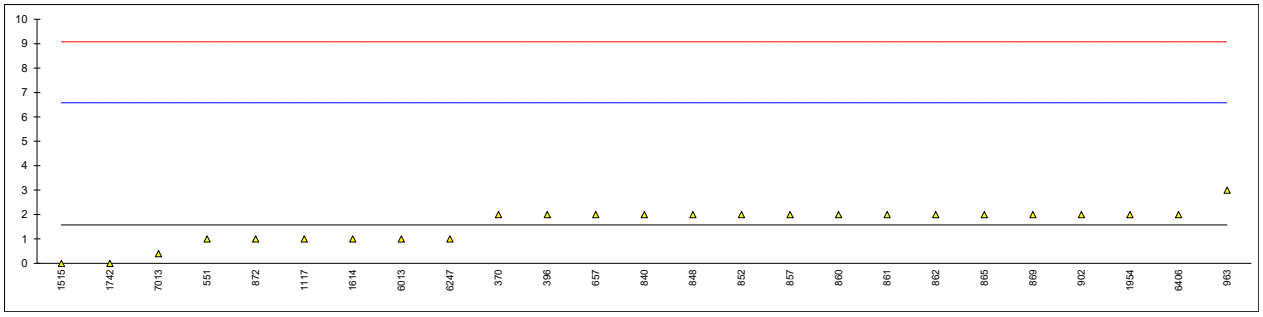


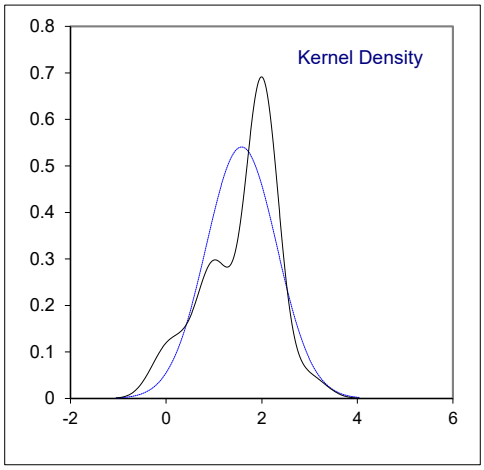


Determination of Color Pt/Co (Manual) on sample #21190

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169	D1209	<5		-----	
171	D1209	<5		-----	
172	D1209	<0.0		-----	
174		-----		-----	
315	D1209	<5		-----	
323	D1209	< 5		-----	
343		-----		-----	
347		-----		-----	
370	D1209	2		0.17	
395		-----		-----	
396	D1209	2		0.17	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D1209	1		-0.23	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D1209	<5		-----	
657	D1209	2		0.17	
840	D1209	2		0.17	
848	D1209	2		0.17	
852	D1209	2		0.17	
857	D1209	2		0.17	
860	D1209	2		0.17	
861	D1209	2		0.17	
862	D1209	2		0.17	
865	D1209	2		0.17	
869	D1209	2		0.17	
872	D1209	1		-0.23	
886	D1209	<5		-----	
902	D1209	2		0.17	
912		-----		-----	
913	D1209	<5		-----	
962	D1209	<5		-----	
963	D1209	3		0.57	
1091		-----		-----	
1117	D1209	1		-0.23	
1135		-----		-----	
1151		-----		-----	
1169	D1209	<1		-----	
1217		<5		-----	
1261		-----		-----	
1467		-----		-----	
1509	D1209	<5		-----	
1515	D1209	0		-0.63	
1603		-----		-----	
1614	D1209	1		-0.23	
1656		-----		-----	
1718	D1209	<5		-----	
1742	D1209	0.0		-0.63	
1823		-----		-----	
1868	D1209	<5		-----	
1880		-----		-----	
1954	D1209	2		0.17	
6013	D1209	1		-0.23	
6198		-----		-----	
6247	D1209	1		-0.23	
6262	D1209	<5		-----	
6406	D1209	2		0.17	
7006		-----		-----	
7013	D1209	0.4		-0.47	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	

normality	OK
n	25
outliers	0
mean (n)	1.58
st.dev. (n)	0.738
R(calc.)	2.07
st.dev.(D1209:05)	2.500
R(D1209:05)	7

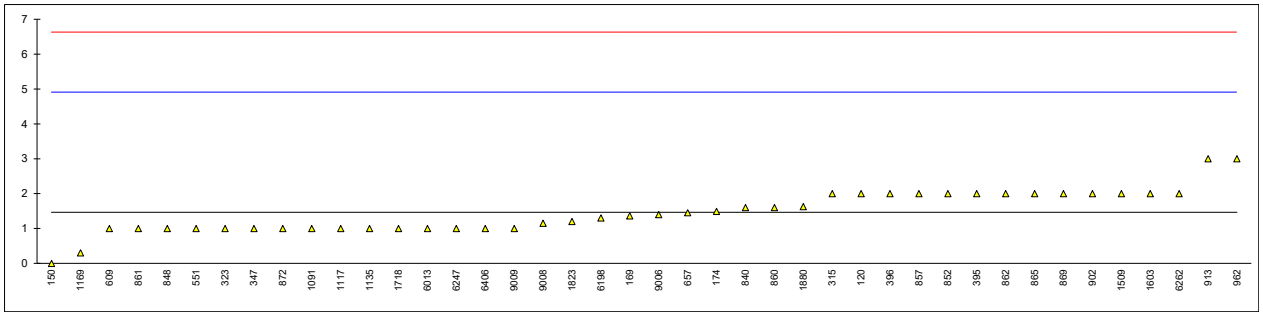


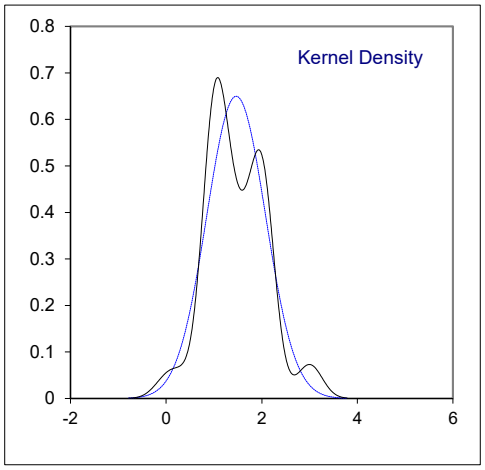


Determination of Color Pt/Co (Automated) on sample #21190

lab	method	value	mark	z(targ)	remarks
120	D5386	2		0.31	
150	D5386	0		-0.85	
168		-----		-----	
169	D5386	1.36		-0.06	
171	D5386	<5		-----	
172	D5386	<0.0		-----	
174	D5386	1.49		0.02	
315	D5386	2		0.31	
323	D5386	1		-0.27	
343		-----		-----	
347	D5386	1		-0.27	
370		-----		-----	
395	D5386	2		0.31	
396	D5386	2		0.31	
444	D5386	<5		-----	
522		-----		-----	
528		-----		-----	
551	D5386	1		-0.27	
557		-----		-----	
558		-----		-----	
609	D5386	1.0		-0.27	
610		-----		-----	
621		-----		-----	
657	D5386	1.45		-0.01	
840	D5386	1.6		0.08	
848	D5386	1		-0.27	
852	D5386	2		0.31	
857	D5386	2		0.31	
860	D5386	1.6		0.08	
861	D5386	1		-0.27	
862	D5386	2		0.31	
865	D5386	2		0.31	
869	D5386	2		0.31	
872	D5386	1		-0.27	
886		-----		-----	
902	D5386	2		0.31	
912		-----		-----	
913	D5386	3		0.89	
962	D5386	3		0.89	
963		-----		-----	
1091	D5386	1		-0.27	
1117		1		-0.27	
1135	D5386	1		-0.27	
1151		-----		-----	
1169	D5386	0.3		-0.68	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D5386	2		0.31	
1515		-----		-----	
1603	In house	2		0.31	
1614		-----		-----	
1656	D5386	<5		-----	
1718	D5386	1		-0.27	
1742		-----		-----	
1823	D5386	1.2		-0.15	
1868		-----		-----	
1880	D5386	1.63		0.10	
1954		-----		-----	
6013	D5386	1		-0.27	
6198	D5386	1.3		-0.10	
6247	D5386	1		-0.27	
6262	D5386	2		0.31	
6406	D5386	1		-0.27	
7006		-----		-----	
7013		-----		-----	
9006	D5386	1.4		-0.04	
9008	D5386	1.15		-0.18	
9009	D5386	1.0		-0.27	

normality	OK
n	42
outliers	0
mean (n)	1.46
st.dev. (n)	0.614
R(calc.)	1.72
st.dev.(D5386:16)	1.724
R(D5386:16)	4.83

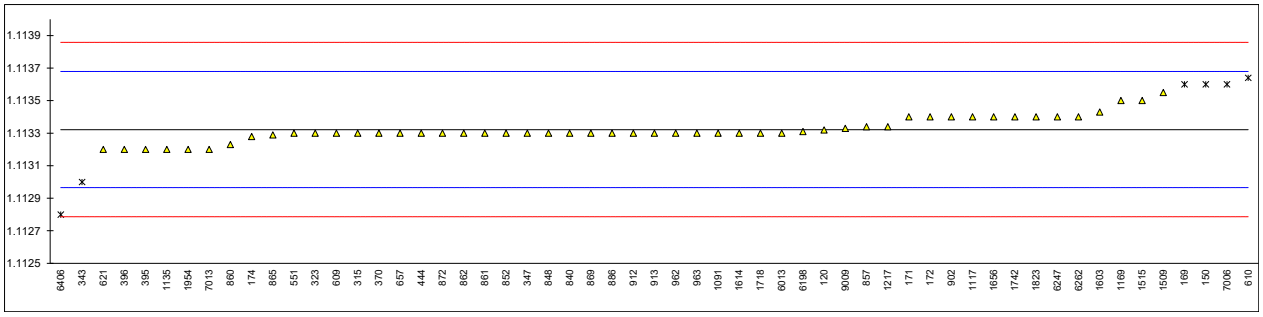


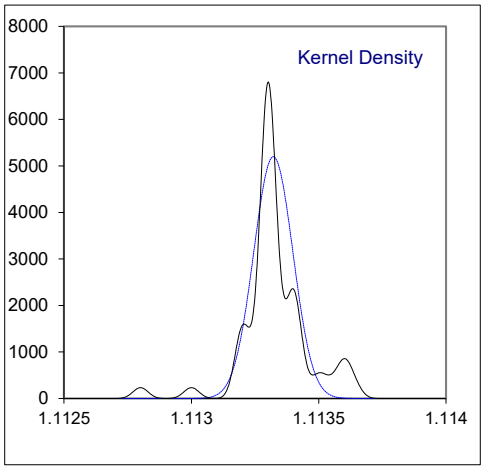


Determination of Density at 20°C on sample #21190; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11332		-0.01	
150	D4052	1.1136	R(0.05)	1.56	
168		-----		-----	
169	D4052	1.1136	R(0.05)	1.56	
171	D4052	1.1134		0.44	
172	D4052	1.1134		0.44	
174	D4052	1.11328		-0.23	
315	D4052	1.1133		-0.12	
323	D4052	1.1133		-0.12	
343	D4052	1.113	R(0.05)	-1.80	
347	D4052	1.1133		-0.12	
370	D4052	1.1133		-0.12	
395	D4052	1.1132		-0.68	
396	D4052	1.1132		-0.68	
444	D4052	1.1133		-0.12	
522		-----		-----	
528		-----		-----	
551	D4052	1.1133		-0.12	
557		-----		-----	
558		-----		-----	
609	D4052	1.1133		-0.12	
610	D4052	1.11364	C,R(0.05)	1.78	first reported 1.114
621	D4052	1.1132		-0.68	
657	D4052	1.1133		-0.12	
840	D4052	1.1133		-0.12	
848	D4052	1.1133		-0.12	
852	D4052	1.1133		-0.12	
857	D4052	1.11334		0.10	
860	D4052	1.11323		-0.51	
861	D4052	1.1133		-0.12	
862	D4052	1.1133		-0.12	
865	D4052	1.11329		-0.18	
869	D4052	1.1133		-0.12	
872	D4052	1.1133		-0.12	
886	D4052	1.1133		-0.12	
902	D4052	1.1134		0.44	
912	D4052	1.1133		-0.12	
913	D4052	1.1133		-0.12	
962	D4052	1.1133	C	-0.12	first reported 1.1153
963	ISO12185	1.1133		-0.12	
1091	D4052	1.1133		-0.12	
1117	D4052	1.1134		0.44	
1135	ISO12185	1.1132		-0.68	
1151		-----		-----	
1169	D4052	1.11350		1.00	
1217		1.11334		0.10	
1261		-----		-----	
1467		-----		-----	
1509	D4052	1.11355		1.28	
1515	D4052	1.1135		1.00	
1603	In house	1.11343		0.61	
1614	D4052	1.1133		-0.12	
1656	D4052	1.1134		0.44	
1718	D4052	1.11330		-0.12	
1742	ISO12185	1.1134		0.44	
1823	D4052	1.1134		0.44	
1868		-----		-----	
1880		-----		-----	
1954	D4052	1.1132		-0.68	
6013	ISO12185	1.1133		-0.12	
6198	D4052	1.11331		-0.07	
6247	D4052	1.1134		0.44	
6262	ISO12185	1.1134		0.44	
6406	ISO12185	1.1128	R(0.01)	-2.92	
7006	D4052	1.1136	R(0.05)	1.56	
7013	D4052	1.1132		-0.68	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11333		0.05	

normality	suspect
n	51
outliers	6
mean (n)	1.11332
st.dev. (n)	0.000077
R(calc.)	0.00022
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005

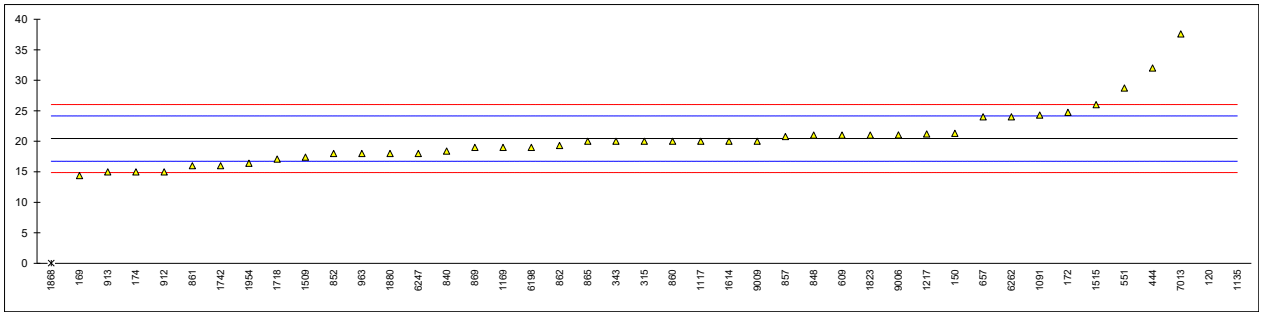


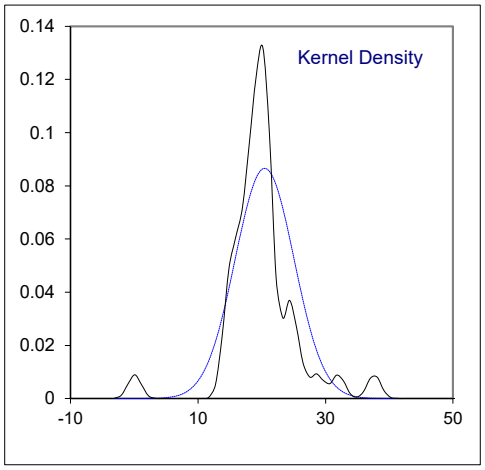


Determination of Diethylene Glycol on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	60.15	R(0.01)	21.38	
150	E2409	21.3		0.46	
168		-----		-----	
169	E2409	14.4		-3.25	
171	E2409	<22		-----	
172	E2409	24.76		2.32	
174	E2409	15		-2.93	
315	E2409	20		-0.24	
323		-----		-----	
343	E2409	20		-0.24	
347	E2409	<22		-----	
370		-----		-----	
395		-----		-----	
396	E2409	<50		-----	
444	E2409	32		6.22	
522		-----		-----	
528		-----		-----	
551	E2409	28.73		4.46	
557		-----		-----	
558		-----		-----	
609	E2409	21		0.30	
610		-----		-----	
621		-----		-----	
657	E2409	24		1.91	
840	E2409	18.4		-1.10	
848	E2409	21.0		0.30	
852	E2409	18		-1.32	
857	E2409	20.8		0.19	
860	E2409	20		-0.24	
861	E2409	16		-2.39	
862	E2409	19.3		-0.62	
865	E2409	20		-0.24	
869	E2409	19		-0.78	
872		-----		-----	
886		-----		-----	
902		-----		-----	
912	E2409	15	C	-2.93	first reported <10
913	E2409	15		-2.93	
962		-----		-----	
963	E2409	18	C	-1.32	first reported 0.0018 mg/kg
1091	E2409	24.3		2.08	
1117	E2409	20		-0.24	
1135	E2409	263	C,R(0.01)	130.58	first reported 10
1151		-----		-----	
1169	E2409	19		-0.78	
1217		21.2		0.41	
1261		-----		-----	
1467		-----		-----	
1509	E2409	17.4		-1.64	
1515	E2409	26.0		2.99	
1603		-----		-----	
1614	E2409	20		-0.24	
1656		-----		-----	
1718	E2409	17.1		-1.80	
1742	E2409	16		-2.39	
1823	E2409	21		0.30	
1868	E2409	0.042	R(0.01)	-10.98	
1880	E2409	18		-1.32	
1954	E2409	16.40		-2.18	
6013		-----		-----	
6198	E2409	19		-0.78	
6247	E2409	18		-1.32	
6262	E2409	24		1.91	
6406		-----		-----	
7006	E2409	<72		-----	
7013	E2409	37.6		9.24	
9006	E2409	21.05		0.33	
9008	E2409	<10		<-5.62	possibly a false negative test result?
9009	E2409	20.0		-0.24	

normality	not OK
n	40
outliers	3
mean (n)	20.44
st.dev. (n)	4.607
R(calc.)	12.90
st.dev.(E2409:20a)	1.858
R(E2409:20a)	5.20

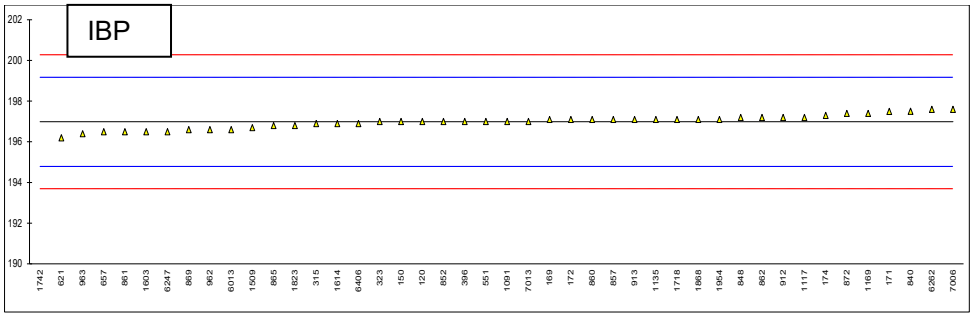


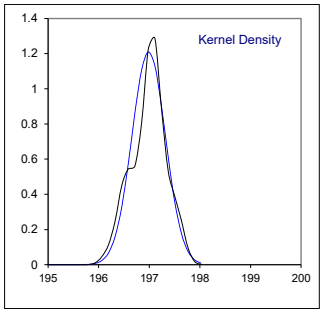


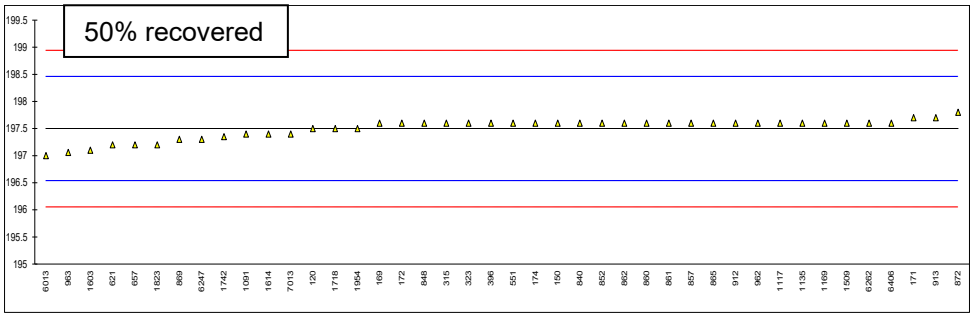
Determination of Distillation: IBP, 50% recovered, Dry Point on sample #21190; results in °C

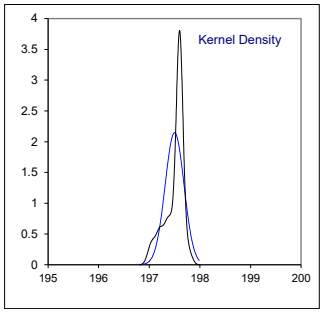
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
120	D1078-automated	197.0		0.01	197.5		0.00	198.2		0.35
150	D1078-automated	197.0		0.01	197.6		0.21	198.6		0.88
168		-----		-----	-----		-----	-----		-----
169	D1078-automated	197.1		0.10	197.6		0.21	197.8		-0.18
171	D1078	197.5		0.47	197.7		0.41	197.8		-0.18
172	D1078-automated	197.1		0.10	197.6		0.21	198.4		0.61
174	D1078-automated	197.3		0.29	197.6		0.21	198.4		0.61
315	D1078-automated	196.9		-0.08	197.6		0.21	197.8		-0.18
323	D1078-manual	197.0		0.01	197.6		0.21	197.9		-0.05
343		-----		-----	-----		-----	-----		-----
347		-----		-----	-----		-----	-----		-----
370		-----		-----	-----		-----	-----		-----
395		-----		-----	-----		-----	-----		-----
396	D1078-manual	197.0		0.01	197.6		0.21	198.0		0.08
444		-----		-----	-----		-----	-----		-----
522		-----		-----	-----		-----	-----		-----
528		-----		-----	-----		-----	-----		-----
551	D1078-automated	197.0		0.01	197.6		0.21	197.8		-0.18
557		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
609		-----		-----	-----		-----	-----		-----
610		-----		-----	-----		-----	-----		-----
621	D1078	196.2		-0.72	197.2		-0.62	197.9		-0.05
657	D1078-manual	196.5		-0.44	197.2		-0.62	197.4		-0.71
840	D1078-automated	197.51		0.48	197.60		0.21	198.17		0.31
848	D1078	197.2		0.19	197.6		0.21	198.3		0.48
852	D1078-manual	197.0		0.01	197.6		0.21	198.0		0.08
857	D1078	197.1		0.10	197.6		0.21	198.0		0.08
860	D1078	197.1		0.10	197.6		0.21	198.0		0.08
861	D1078-manual	196.5		-0.44	197.6		0.21	198.3		0.48
862	D1078	197.2		0.19	197.6		0.21	198.1		0.22
865	D1078	196.8		-0.17	197.6		0.21	198.0		0.08
869	D1078-automated	196.6		-0.35	197.3		-0.42	197.5		-0.58
872	D1078	197.4		0.38	197.8		0.62	198.2		0.35
886		-----		-----	-----		-----	-----		-----
902		-----		-----	-----		-----	-----		-----
912	D1078-manual	197.2		0.19	197.6		0.21	198.0		0.08
913	D1078-manual	197.1		0.10	197.7		0.41	199.3	R(0.01)	1.80
962	D1078-automated	196.6		-0.35	197.6		0.21	197.8		-0.18
963	D1078-automated	196.40		-0.53	197.06		-0.91	197.37		-0.75
1091	D1078-automated	197.0		0.01	197.4		-0.21	197.6		-0.44
1117	D1078-automated	197.2		0.19	197.6		0.21	197.6		-0.44
1135	D1078-automated	197.1		0.10	197.6		0.21	197.9		-0.05
1151		-----		-----	-----		-----	-----		-----
1169	D1078-manual	197.4		0.38	197.6		0.21	198.2		0.35
1217		-----		-----	-----		-----	-----		-----
1261		-----		-----	-----		-----	-----		-----
1467		-----		-----	-----		-----	-----		-----
1509	D1078-automated	196.7		-0.26	197.6		0.21	198.0		0.08
1515		-----		-----	-----		-----	-----		-----
1603	D1078-automated	196.5		-0.44	197.1		-0.83	197.4		-0.71
1614	D1078-automated	196.9		-0.08	197.4		-0.21	197.7		-0.31
1656		-----		-----	-----		-----	-----		-----
1718	D1078-automated	197.1		0.10	197.5		0.00	197.9		-0.05
1742	D1078-automated	165.05	R(0.01)	-29.10	197.35		-0.31	197.88		-0.07
1823	D1078-automated	196.8		-0.17	197.2		-0.62	197.6		-0.44
1868	D1078	197.1		0.10	-----		-----	197.9		-0.05
1880		-----		-----	-----		-----	-----		-----
1954	D1078-automated	197.1		0.10	197.5		0.00	198.0		0.08
6013	D1078-automated	196.6		-0.35	197.0		-1.04	197.3		-0.84
6198		-----		-----	-----		-----	-----		-----
6247	D1078-automated	196.5		-0.44	197.3		-0.42	-----		-----
6262	D1078-automated	197.6		0.56	197.6		0.21	198.0		0.08
6406	D1078-automated	196.9		-0.08	197.6		0.21	197.8		-0.18
7006	D1078-automated	197.6		0.56	-----		-----	198.8		1.14
7013	D1078-automated	197.0		0.01	197.4		-0.21	198.0		0.08
9006		-----		-----	-----		-----	-----		-----
9008		-----		-----	-----		-----	-----		-----
9009		-----		-----	-----		-----	-----		-----

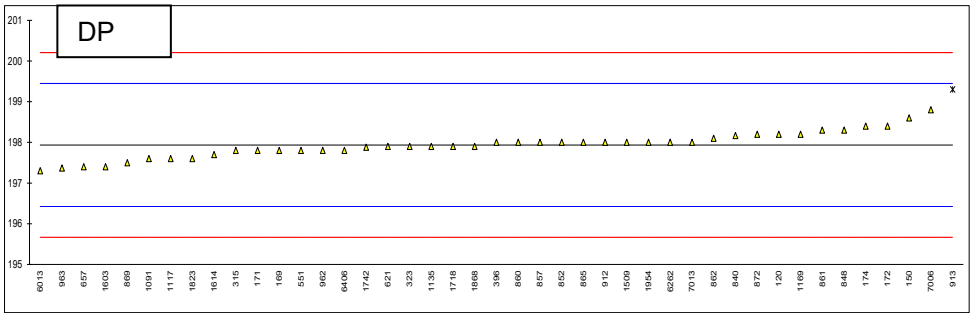
normality	OK	OK	OK
n	43	42	42
outliers	1	0	1
mean (n)	196.99	197.50	197.94
st.dev. (n)	0.330	0.186	0.321
R(calc.)	0.92	0.52	0.90
st.dev.(D1078-A:11)	1.097	0.482	0.756
R(D1078-A:11)	3.07	1.35	2.12
Compare			
R(D1078-M:11)	2.11	1.28	2.58

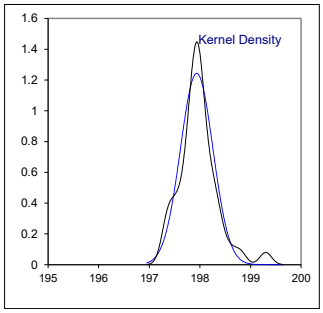








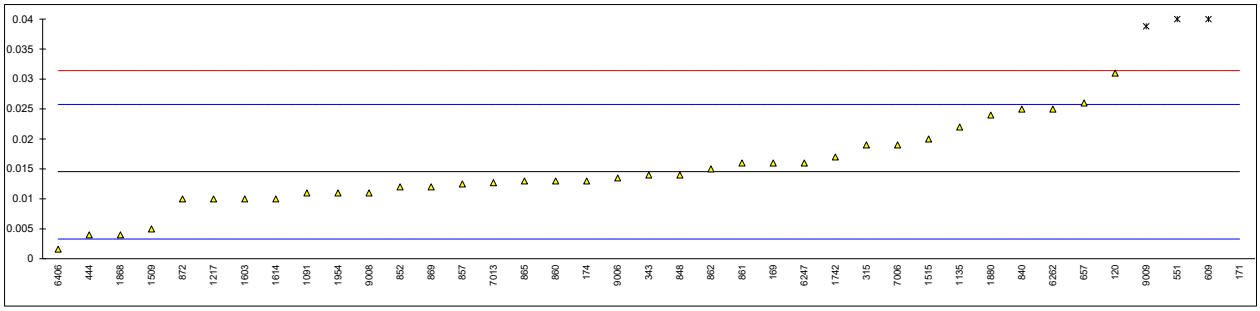


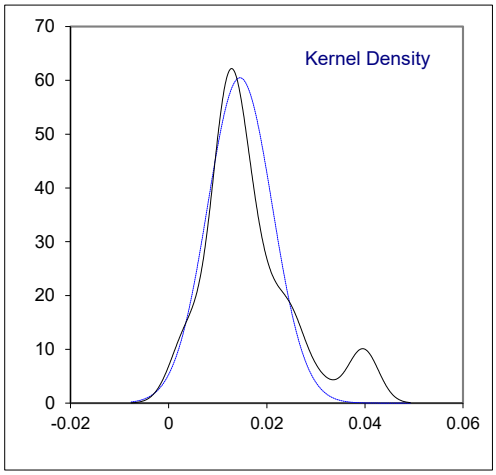


Determination of Iron as Fe on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1615	0.031		2.93	
150	E1615	<0.010		-----	
168		-----		-----	
169	E1615	0.016		0.26	
171	E1615	13	R(0.01)	2309.39	
172	E1615	<0.010		-----	
174	E1615	0.013		-0.27	
315	E1615	0.019		0.80	
323	E1615	< 0.01		-----	
343	E1615	0.014		-0.09	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E1615	0.004		-1.87	
522		-----		-----	
528		-----		-----	
551	E394	0.04	R(0.05)	4.53	
557		-----		-----	
558		-----		-----	
609	E1615	0.040	R(0.05)	4.53	
610		-----		-----	
621	E1615	<0.01		-----	
657	E1615	0.026		2.04	
840	E394	0.025		1.86	
848	E394	0.014		-0.09	
852	E394	0.012		-0.45	
857	E1615	0.0125		-0.36	
860	E394	0.013		-0.27	
861	E394	0.016		0.26	
862	E1615	0.015		0.08	
865	E394	0.013		-0.27	
869	E394	0.012		-0.45	
872	E394	0.01		-0.80	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913	E394	<0.01		-----	
962		-----		-----	
963		-----		-----	
1091	E1615	0.011		-0.63	
1117	E394	<0.01		-----	
1135	E1615	0.022		1.33	
1151		-----		-----	
1169	E394	<0.02		-----	
1217		0.01		-0.80	
1261		-----		-----	
1467		-----		-----	
1509	E394	0.005		-1.69	
1515	E394	0.02		0.97	
1603	In house	0.01		-0.80	
1614	E394	0.01		-0.80	
1656		-----		-----	
1718	E394	<0.001		-----	
1742	In house	0.017		0.44	
1823	E394	ND (<0.02)		-----	
1868	E1615	0.004		-1.87	
1880	E1615	0.024		1.69	
1954	E394	0.011		-0.63	
6013	E1615	<0.01		-----	
6198	E394	<0.02		-----	
6247	E394	0.016		0.26	
6262	E1615	0.025		1.86	
6406	E394	0.0016		-2.30	
7006	E394	0.019		0.80	
7013	E1615	0.0127		-0.32	
9006	E1615	0.0135		-0.18	
9008	E1615	0.011		-0.63	
9009	E1615	0.0388	R(0.05)	4.32	

normality	OK
n	35
outliers	4
mean (n)	0.0145
st.dev. (n)	0.00659
R(calc.)	0.0185
st.dev.(E1615:16)	0.00562
R(E1615:16)	0.0157





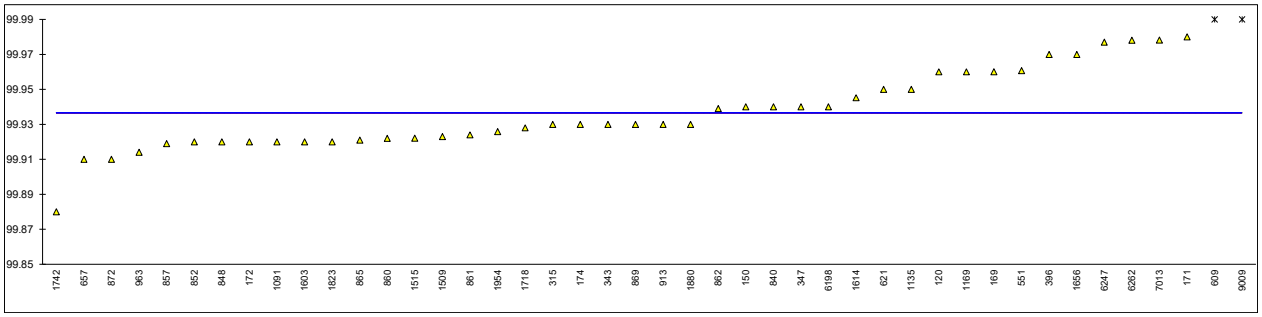
Determination of Miscibility with water (Hydrocarbons) on sample #21190;

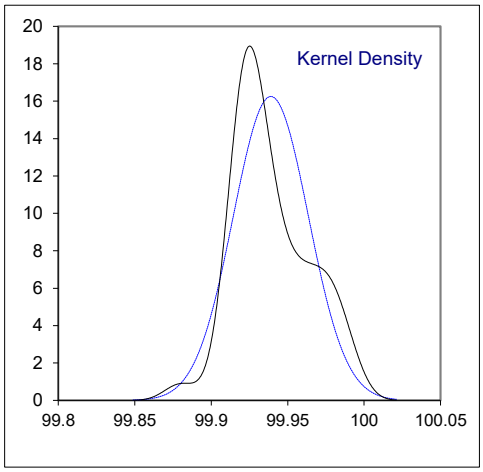
lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D1722	Pass		-----	
168		-----		-----	
169	D1722	Pass		-----	
171	D1722	Pass		-----	
172	D1722	Pass		-----	
174	D1722	Pass		-----	
315	D1722	pass		-----	
323	D1722	pass		-----	
343	D1722	PASS TEST		-----	
347		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Passes Test		-----	
444	D1722	Pass		-----	
522		-----		-----	
528		-----		-----	
551	D1722	Pass		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D1722	Pass		-----	
657		-----		-----	
840	D1722	Passes Test		-----	
848	D1722	Pass		-----	
852	D1722	pass		-----	
857	D1722	Passes		-----	
860	D1722	Pass		-----	
861	D1722	Pass		-----	
862		pass		-----	
865	D1722	Passes		-----	
869		-----		-----	
872	D1722	Passes		-----	
886		-----		-----	
902	D1722	PASS		-----	
912	D1722	Pass		-----	
913	D1722	Pass		-----	
962	D1722	Pass		-----	
963	D1722	Pass		-----	
1091	D1722	passes		-----	
1117	D1722	pass		-----	
1135	D1722	pass		-----	
1151		-----		-----	
1169	D1722	Pass		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D1722	Pass		-----	
1515	D1722	Pass		-----	
1603		-----		-----	
1614		-----		-----	
1656		-----		-----	
1718	D1722	Pass		-----	
1742	D1722	Pass		-----	
1823		-----		-----	
1868		-----		-----	
1880		-----		-----	
1954		-----		-----	
6013	D1722	Pass		-----	
6198		-----		-----	
6247		-----		-----	
6262	D1722	Passes		-----	
6406	D1722	Pass		-----	
7006		-----		-----	
7013		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
	n	38			
	mean (n)	Passes test			

Determination of Purity by GC as received on sample #21190; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E2409	99.96		-----	
150	E2409	99.94		-----	
168		-----		-----	
169	E2409	99.9601		-----	
171	E2409	99.98		-----	
172	E2409	99.92		-----	
174	E2409	99.93		-----	
315	E2409	99.93		-----	
323		-----		-----	
343	E2409	99.93		-----	
347	E2409	99.94		-----	
370		-----		-----	
395		-----		-----	
396	E2409	99.97		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	E2409	99.9607		-----	
557		-----		-----	
558		-----		-----	
609	E2409	99.99	ex	-----	test result reported on dry basis
610		-----		-----	
621	E2409	99.95		-----	
657	E2409	99.91		-----	
840	E2409	99.940		-----	
848	E2409	99.920		-----	
852	E2409	99.92		-----	
857	E2409	99.919		-----	
860	E2409	99.922		-----	
861	E2409	99.924		-----	
862	E202	99.939		-----	
865	E2409	99.921		-----	
869	E2409	99.93		-----	
872	GOST19710	99.91		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913	E2409	99.93		-----	
962		-----		-----	
963	E2409	99.914		-----	
1091	E2409	99.92	C	-----	first reported 99.88
1117	E2409	>99.9		-----	
1135	E2409	99.95	C	-----	first reported 99.98
1151		-----		-----	
1169	E2409	99.96	C	-----	first reported 99.89
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2409	99.923		-----	
1515	E2409	99.9221		-----	
1603	In house	99.9200		-----	
1614	E2409	99.9452		-----	
1656	In house	99.97		-----	
1718	E2409	99.928		-----	
1742	In house	99.88		-----	
1823	E2409	99.92		-----	
1868		-----		-----	
1880	E2409	99.93		-----	
1954	E2409	99.9259		-----	
6013		-----		-----	
6198	E2409	99.94		-----	
6247	E2409	99.977		-----	
6262	E2409	99.9781		-----	
6406		-----		-----	
7006		-----		-----	
7013		99.9782		-----	
9006		-----		-----	
9008		-----		-----	
9009	E2409	99.99	ex	-----	test result reported on dry basis

normality	OK
n	42
outliers	0 +2ex
mean (n)	99.9366
st.dev. (n)	0.02234
R(calc.)	0.0626
st.dev.(lit.)	unknown
R(lit.)	unknown
Compare	
R(iis20C10)	0.0307

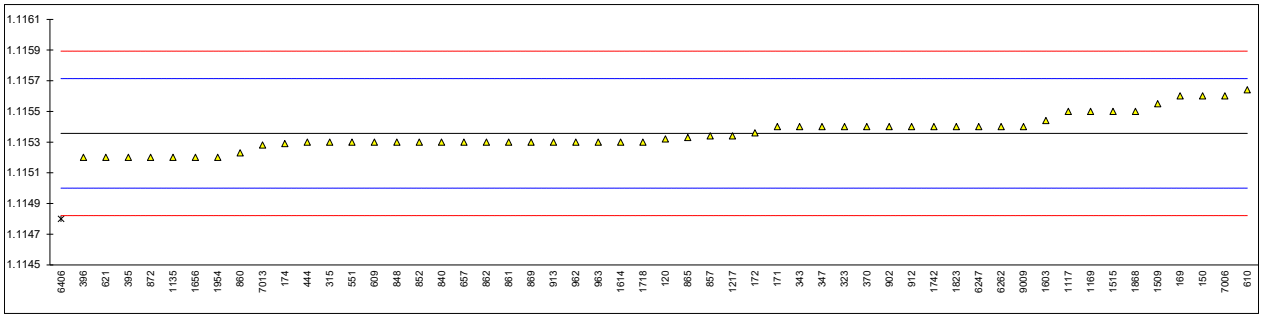


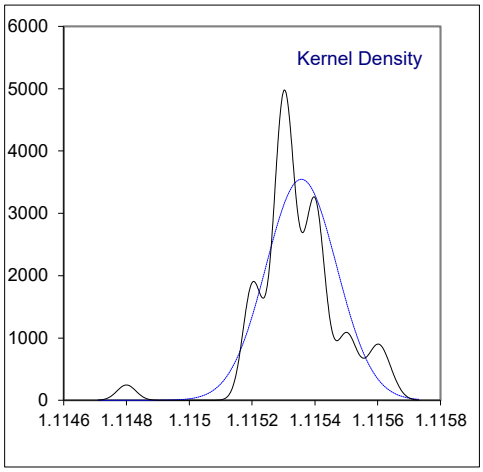


Determination of Specific Gravity 20/20°C on sample #21190;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11532		-0.21	
150	D4052	1.1156		1.36	
168		-----		-----	
169	D4052	1.1156		1.36	
171	D4052	1.1154		0.24	
172	D4052	1.11536		0.02	
174	D4052	1.11529		-0.37	
315	D4052	1.1153		-0.32	
323	D4052	1.1154		0.24	
343	D4052	1.1154		0.24	
347	D4052	1.1154		0.24	
370	E202	1.1154		0.24	
395	D4052	1.1152		-0.88	
396	D4052	1.1152		-0.88	
444	D4052	1.1153		-0.32	
522		-----		-----	
528		-----		-----	
551	D4052	1.1153		-0.32	
557		-----		-----	
558		-----		-----	
609	D4052	1.1153		-0.32	
610	D4052	1.11564	C	1.59	first reported 1.116
621	D4052	1.1152		-0.88	
657	D4052	1.1153		-0.32	
840	D4052	1.1153		-0.32	
848	D4052	1.1153		-0.32	
852	D4052	1.1153		-0.32	
857	D4052	1.11534		-0.09	
860	D4052	1.11523		-0.71	
861	D4052	1.1153		-0.32	
862	D4052	1.1153		-0.32	
865	D4052	1.11533		-0.15	
869	D4052	1.1153		-0.32	
872	D4052	1.1152		-0.88	
886		-----		-----	
902	D4052	1.1154		0.24	
912	D4052	1.1154		0.24	
913	D4052	1.1153		-0.32	
962	D4052	1.1153	C	-0.32	first reported 1.1133
963	D4052	1.1153		-0.32	
1091		-----		-----	
1117	D4052	1.1155		0.80	
1135	D4052	1.1152		-0.88	
1151		-----		-----	
1169	D4052	1.11550		0.80	
1217		1.11534		-0.09	
1261		-----		-----	
1467		-----		-----	
1509	D4052	1.11555		1.08	
1515	D4052	1.1155		0.80	
1603	In house	1.11544		0.47	
1614	D4052	1.1153		-0.32	
1656	E202	1.1152		-0.88	
1718	D4052	1.11530		-0.32	
1742	D4052	1.1154		0.24	
1823	D4052	1.1154		0.24	
1868	E202	1.1155		0.80	
1880		-----		-----	
1954	D4052	1.1152		-0.88	
6013		-----		-----	
6198		-----		-----	
6247	D4052	1.1154		0.24	
6262	D4052	1.1154		0.24	
6406	D4052	1.1148	R(0.01)	-3.12	
7006	D4052	1.1156		1.36	
7013	E202	1.11528		-0.43	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.1154		0.24	

normality	OK
n	53
outliers	1
mean (n)	1.11536
st.dev. (n)	0.000113
R(calc.)	0.00032
st.dev.(E202:18)	0.000179
R(E202:18)	0.0005

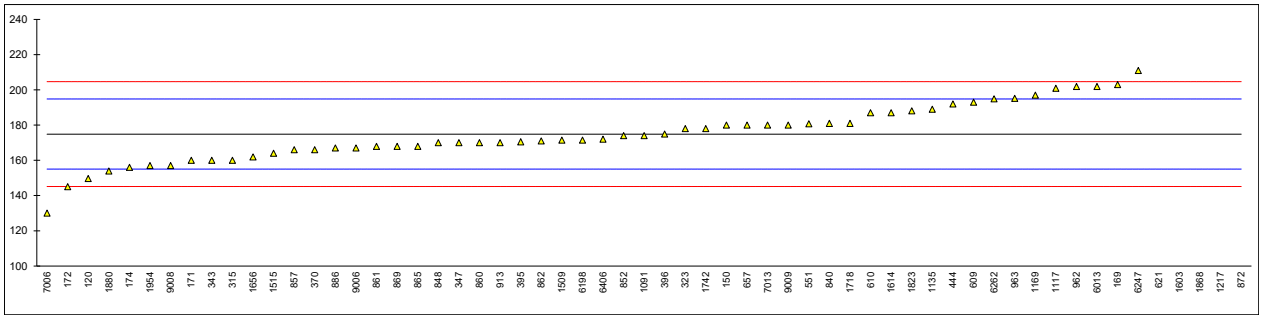


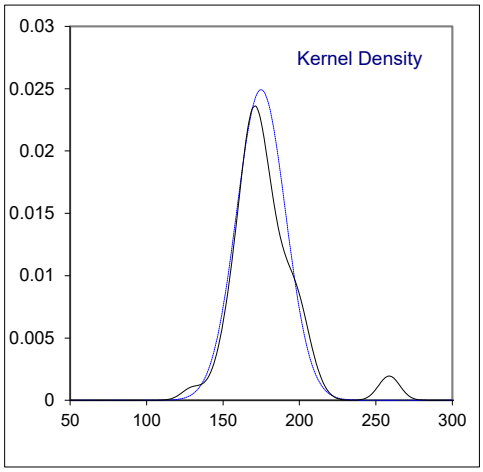


Determination of Water on sample #21190; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1064	149.7		-2.54	
150	E1064	180		0.51	
168		-----		-----	
169	E1064	203		2.83	
171	E1064	160		-1.50	
172	E203	145.0		-3.01	
174	E1064	156		-1.90	
315	E1064	160		-1.50	
323	E1064	178		0.31	
343	E1064	160		-1.50	
347	E1064	170		-0.49	
370	E1064	166		-0.90	
395	E1064	170.5		-0.44	
396	E1064	175		0.01	
444	E1064	192		1.72	
522		-----		-----	
528		-----		-----	
551	E1064	180.7		0.58	
557		-----		-----	
558		-----		-----	
609	E1064	193		1.82	
610	D6304-A	187		1.22	
621	E1064	257.5	R(0.01)	8.32	
657	E1064	180		0.51	
840	E1064	181		0.61	
848	E1064	170		-0.49	
852	E1064	174		-0.09	
857	E1064	166		-0.90	
860	E1064	170		-0.49	
861	E1064	168		-0.70	
862	E1064	171		-0.39	
865	E1064	168		-0.70	
869	E1064	168		-0.70	
872	E1064	630	C,R(0.01)	45.82	first reported 0.063 mg/kg
886	E1064	167		-0.80	
902		-----		-----	
912		-----		-----	
913	E1064	170		-0.49	
962	E1064	202		2.73	
963	E1064	195.2		2.04	
1091	E1064	174		-0.09	
1117	E1064	200.9		2.62	
1135	E1064	189		1.42	
1151		-----		-----	
1169	E1064	197		2.22	
1217		361	R(0.01)	18.74	
1261		-----		-----	
1467		-----		-----	
1509	E1064	171.5		-0.34	
1515	E1064	164		-1.10	
1603	In house	260	R(0.01)	8.57	
1614	E1064	187		1.22	
1656	E1064	162		-1.30	
1718	E1064	181		0.61	
1742	E1064	178		0.31	
1823	E1064	188.1		1.33	
1868	E1064	320	C,R(0.01)	14.61	first reported 0.032 mg/kg
1880	E1064	154		-2.11	
1954	E1064	157		-1.80	
6013	E1064	202		2.73	
6198	E1064	171.5		-0.34	
6247	E1064	211		3.63	
6262	E1064	195		2.02	
6406	E1064	172		-0.29	
7006	E203	130		-4.52	
7013	E1064	180		0.51	
9006	E1064	167		-0.80	
9008	E1064	157		-1.80	
9009	E1064	180		0.51	

normality	OK
n	54
outliers	5
mean (n)	174.91
st.dev. (n)	16.007
R(calc.)	44.82
st.dev.(E1064:16)	9.932
R(E1064:16)	27.81



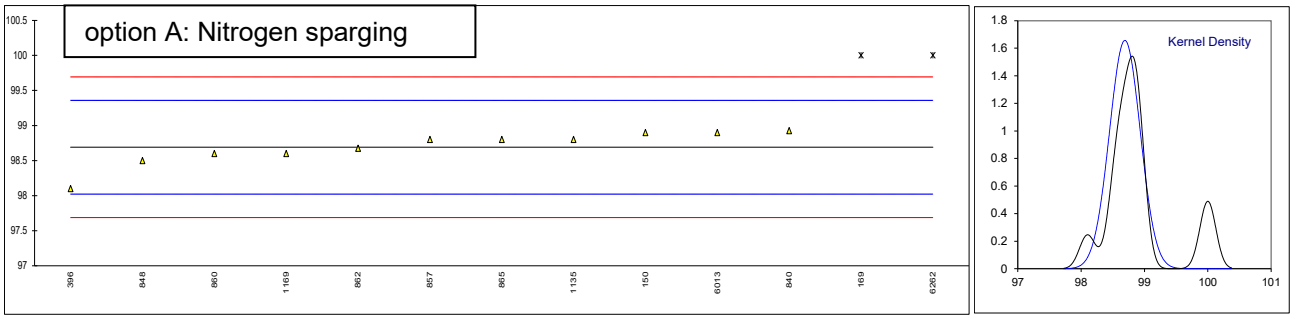


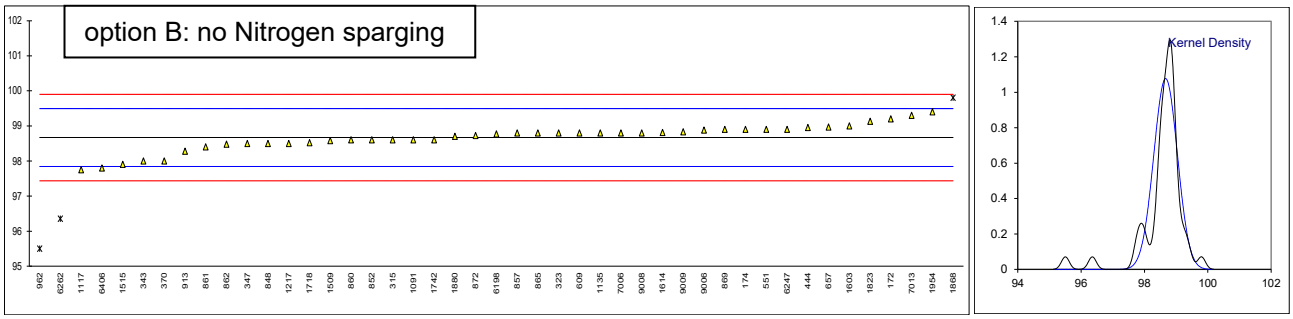
Determination of UV Transmittance at 350 nm on sample #21191; results in %Transmittance

lab	method	cuvette	Option A	mark	z(targ)	method	cuvette	Option B	mark	z(targ)
120		-----	-----		-----		-----	-----		-----
150	E2193 - A	10 mm	98.9		0.63		-----	-----		-----
168		-----	-----		-----		-----	-----		-----
169	E2193 - A	10 mm	100	DG(0.01)	3.92		-----	-----		-----
171		-----	-----		-----		-----	-----		-----
172		-----	-----		-----	E2193 - B	10 mm	99.2		1.29
174		-----	-----		-----	E2193 - B	10 mm	98.9		0.56
315		-----	-----		-----	E2193 - B	50 mm	98.6		-0.17
323		-----	-----		-----		-----	98.8		0.32
343		-----	-----		-----		10 mm	98.0	C	-1.62
347		-----	-----		-----	E2193 - B	50 mm	98.5		-0.41
370		-----	-----		-----	E2193 - B	10 mm	98		-1.62
395		-----	-----		-----		-----	-----		-----
396	E2193 - A	10 mm	98.1		-1.77		-----	-----		-----
444		-----	-----		-----	E2193 - B	10 mm	98.95		0.68
522		-----	-----		-----		-----	-----		-----
528		-----	-----		-----		-----	-----		-----
551		-----	-----		-----	E2193 - B	10 mm	98.9		0.56
557		-----	-----		-----		-----	-----		-----
558		-----	-----		-----		-----	-----		-----
609		-----	-----		-----	E2193 - B	10 mm	98.8		0.32
610		-----	-----		-----		-----	-----		-----
621		-----	-----		-----		-----	-----		-----
657		-----	-----		-----	E2193 - B	10 mm	98.97		0.73
840	E2193 - A	10 mm	98.924		0.70		-----	-----		-----
848	E2193 - A	50 mm	98.5		-0.57	E2193 - B	50 mm	98.5		-0.41
852		-----	-----		-----	E2193 - B	10 mm	98.6		-0.17
857	E2193 - A	10 mm	98.8		0.33	E2193 - B	10 mm	98.8		0.32
860	E2193 - A	10 mm	98.6		-0.27	E2193 - B	10 mm	98.6		-0.17
861		-----	-----		-----	E2193 - B	10 mm	98.4		-0.65
862	E2193 - A	50 mm	98.676		-0.04	E2193 - B	50 mm	98.477		-0.46
865	E2193 - A	-----	98.8		0.33	E2193 - B	-----	98.8		0.32
869		-----	-----		-----	E2193 - B	10 mm	98.9		0.56
872		-----	-----		-----	GOST19710	-----	98.725		0.14
886		-----	-----		-----		-----	-----		-----
902		-----	-----		-----		-----	-----		-----
912		-----	-----		-----		-----	-----		-----
913		-----	-----		-----	E2193 - B	10 mm	98.28		-0.94
962		-----	-----		-----	E2193 - B	50 mm	95.5	C,R(0.01)	-7.69
963		-----	-----		-----		-----	-----		-----
1091		-----	-----		-----	E2193 - B	10 mm	98.6		-0.17
1117		-----	-----		-----	E2193 - B	50 mm	97.75		-2.23
1135	E2193 - A	50 mm	98.8		0.33	E2193 - B	50 mm	98.8		0.32
1151		-----	-----		-----		-----	-----		-----
1169	E2193 - A	50 mm	98.6		-0.27		-----	-----		-----
1217		-----	-----		-----	E2193 - B	-----	98.5		-0.41
1261		-----	-----		-----		-----	-----		-----
1467		-----	-----		-----		-----	-----		-----
1509		-----	-----		-----	E2193 - B	50 mm	98.58		-0.21
1515		-----	-----		-----		50 mm	97.9		-1.86
1603		-----	-----		-----	In house	10 mm	99		0.80
1614		-----	-----		-----	E2193 - B	10 mm	98.813	C	0.35
1656		-----	-----		-----		-----	-----		-----
1718		-----	-----		-----	E2193 - B	50 mm	98.52		-0.36
1742		-----	-----		-----	E2193 - B	10 mm	98.6		-0.17
1823		-----	-----		-----	E2193 - B	50 mm	99.127		1.11
1868		-----	-----		-----	E2193 - B	10 mm	99.8	ex	2.75
1880		-----	-----		-----	E2193 - B	10 mm	98.7		0.08
1954		-----	-----		-----	E2193 - B	10 mm	99.40		1.78
6013	E2193 - A	10 mm	98.9		0.63		-----	-----		-----
6198		-----	-----		-----	E2193 - B	10 mm	98.77		0.25
6247		-----	-----		-----	E2193 - B	10 mm	98.9		0.56
6262	E2193 - A	10 mm	100.0	C,DG(0.01)	3.92	E2193 - B	10 mm	96.353	R(0.01)	-5.62
6406		-----	-----		-----	E2193 - B	10 mm	97.8		-2.11
7006		-----	-----		-----	E2193 - B	-----	98.8		0.32
7013		-----	-----		-----	E2193 - B	10 mm	99.3		1.53
9006		-----	-----		-----	E2193 - B	10 mm	98.88		0.51
9008		-----	-----		-----		-----	98.8		0.32
9009		-----	-----		-----	E2193 - B	10 mm	98.83		0.39

normality	not OK	OK
n	11	42
outliers	2	2 +1ex
mean (n)	98.691	98.668
st.dev. (n)	0.2408	0.3705
R(calc.)	0.674	1.037
st.dev.(E2193:16)	0.3343	0.4121
R(E2193:16)	0.936	1.154

Lab 343 first reported 97.4
Lab 962 first reported 66.6
Lab 1614 first reported 92.709 and 50 mm cuvette size
Lab 1868 test result excluded because of statistical outliers in related test parameters
Lab 6262 first reported 100.445 for option A



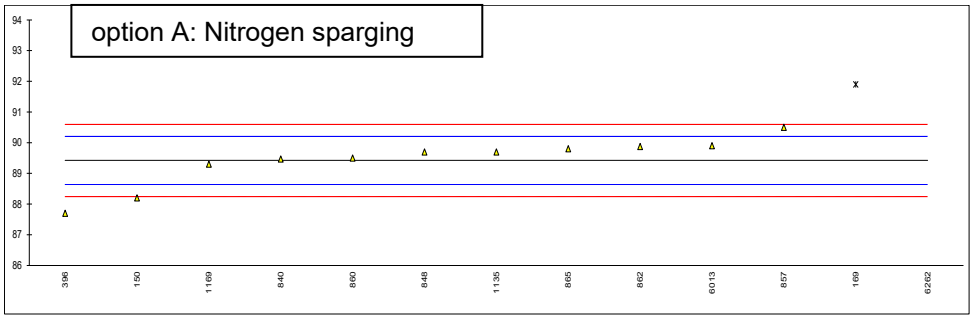


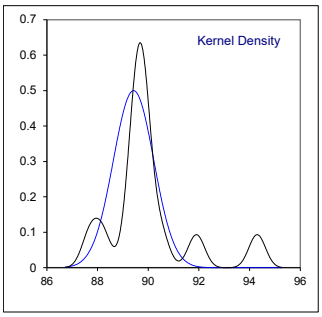
Determination of UV Transmittance at 275 nm on sample #21191; results in %Transmittance

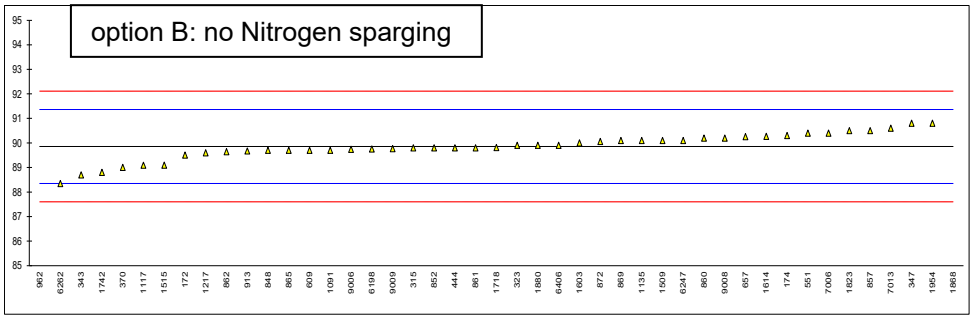
lab	method	cuvette	Option A	mark	z(targ)	method	cuvette	Option B	mark	z(targ)
120		-----	-----		-----		-----	-----		-----
150	E2193 - A	10 mm	88.2		-3.12		-----	-----		-----
168		-----	-----		-----		-----	-----		-----
169	E2193 - A	10 mm	91.9	ex	6.32		-----	-----		-----
171		-----	-----		-----		-----	-----		-----
172		-----	-----		-----	E2193 - B	10 mm	89.5		-0.48
174		-----	-----		-----	E2193 - B	10 mm	90.3		0.59
315		-----	-----		-----	E2193 - B	50 mm	89.8		-0.08
323		-----	-----		-----		-----	89.9		0.06
343		-----	-----		-----		10 mm	88.7		-1.54
347		-----	-----		-----	E2193 - B	50 mm	90.8		1.25
370		-----	-----		-----	E2193 - B	10 mm	89		-1.14
395		-----	-----		-----		-----	-----		-----
396	E2193 - A	10 mm	87.7		-4.39		-----	-----		-----
444		-----	-----		-----	E2193 - B	10 mm	89.80		-0.08
522		-----	-----		-----		-----	-----		-----
528		-----	-----		-----		-----	-----		-----
551		-----	-----		-----	E2193 - B	10 mm	90.4		0.72
557		-----	-----		-----		-----	-----		-----
558		-----	-----		-----		-----	-----		-----
609		-----	-----		-----	E2193 - B	10 mm	89.7		-0.21
610		-----	-----		-----		-----	-----		-----
621		-----	-----		-----		-----	-----		-----
657		-----	-----		-----	E2193 - B	10 mm	90.26		0.53
840	E2193 - A	10 mm	89.467		0.11		-----	-----		-----
848	E2193 - A	50 mm	89.7		0.71	E2193 - B	50 mm	89.7		-0.21
852		-----	-----		-----	E2193 - B	10 mm	89.8		-0.08
857	E2193 - A	10 mm	90.5		2.75	E2193 - B	10 mm	90.5		0.85
860	E2193 - A	10 mm	89.5		0.20	E2193 - B	10 mm	90.2		0.45
861		-----	-----		-----	E2193 - B	10 mm	89.8		-0.08
862	E2193 - A	50 mm	89.874		1.15	E2193 - B	50 mm	89.640		-0.29
865	E2193 - A	-----	89.8		0.96	E2193 - B	-----	89.7		-0.21
869		-----	-----		-----	E2193 - B	10 mm	90.1		0.32
872		-----	-----		-----	GOST19710	-----	90.059		0.27
886		-----	-----		-----		-----	-----		-----
902		-----	-----		-----		-----	-----		-----
912		-----	-----		-----		-----	-----		-----
913		-----	-----		-----	E2193 - B	10 mm	89.67		-0.25
962		-----	-----		-----	E2193 - B	50 mm	82.1	C,R(0.01)	-10.32
963		-----	-----		-----		-----	-----		-----
1091		-----	-----		-----	E2193 - B	10 mm	89.7		-0.21
1117		-----	-----		-----	E2193 - B	50 mm	89.09		-1.02
1135	E2193 - A	50 mm	89.7		0.71	E2193 - B	50 mm	90.1		0.32
1151		-----	-----		-----		-----	-----		-----
1169	E2193 - A	50 mm	89.3		-0.31		-----	-----		-----
1217		-----	-----		-----	E2193 - B	-----	89.6		-0.34
1261		-----	-----		-----		-----	-----		-----
1467		-----	-----		-----		-----	-----		-----
1509		-----	-----		-----	E2193 - B	50 mm	90.10		0.32
1515		-----	-----		-----		50 mm	89.1		-1.01
1603		-----	-----		-----	In house	10 mm	90		0.19
1614		-----	-----		-----	E2193 - B	10 mm	90.273	C	0.55
1656		-----	-----		-----		-----	-----		-----
1718		-----	-----		-----	E2193 - B	50 mm	89.81		-0.06
1742		-----	-----		-----	E2193 - B	10 mm	88.8		-1.41
1823		-----	-----		-----	E2193 - B	50 mm	90.499		0.85
1868		-----	-----		-----	E2193 - B	10 mm	97.4	R(0.01)	10.03
1880		-----	-----		-----	E2193 - B	10 mm	89.9		0.06
1954		-----	-----		-----	E2193 - B	10 mm	90.80		1.25
6013	E2193 - A	10 mm	89.9		1.22		-----	-----		-----
6198		-----	-----		-----	E2193 - B	10 mm	89.75		-0.14
6247		-----	-----		-----	E2193 - B	10 mm	90.1		0.32
6262	E2193 - A	10 mm	94.3	C,G(0.05)	12.44	E2193 - B	10 mm	88.346		-2.01
6406		-----	-----		-----	E2193 - B	10 mm	89.9		0.06
7006		-----	-----		-----	E2193 - B	-----	90.4		0.72
7013		-----	-----		-----	E2193 - B	10 mm	90.6		0.99
9006		-----	-----		-----	E2193 - B	10 mm	89.74		-0.16
9008		-----	-----		-----		-----	90.2		0.45
9009		-----	-----		-----	E2193 - B	10 mm	89.77		-0.12

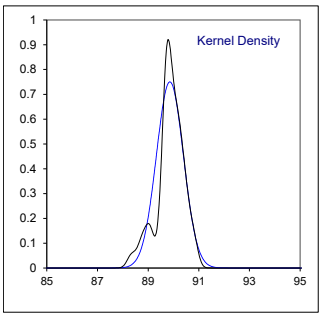
normality	suspect	OK
n	11	43
outliers	1 +1ex	2
mean (n)	89.422	89.858
st.dev. (n)	0.7984	0.5317
R(calc.)	2.235	1.489
st.dev.(E2193:16)	0.3921	0.7518
R(E2193:16)	1.098	2.105

Lab 169 test result excluded because of statistical outliers in related test parameters
Lab 962 first reported 79.8
Lab 1614 first reported 58.704 and 50 mm cuvette size
Lab 6262 first reported 92.186 for option A







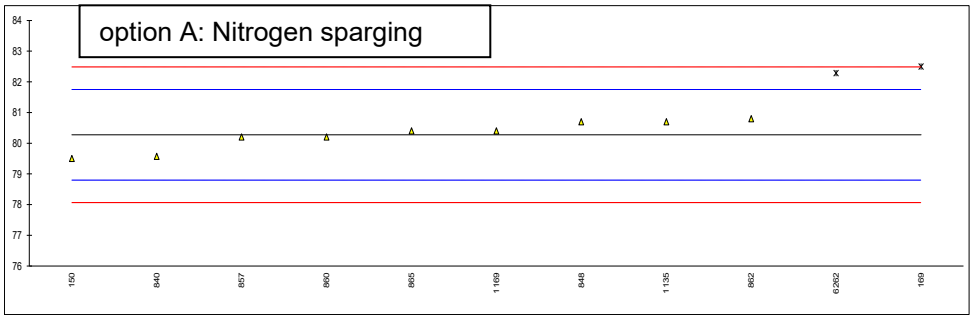


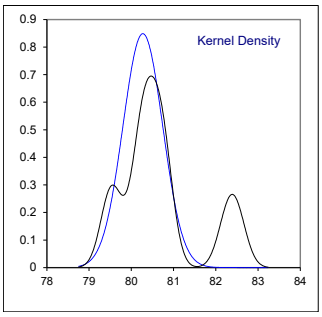
Determination of UV Transmittance at 250 nm on sample #21191; results in %Transmittance

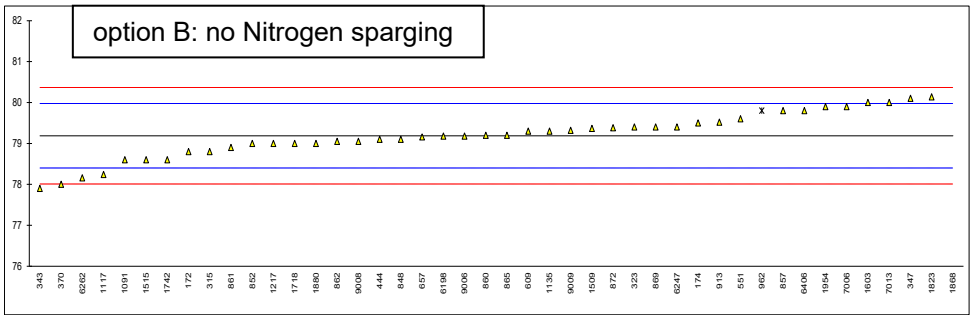
lab	method	cuvette	Option A	mark	z(targ)	method	cuvette	Option B	mark	z(targ)
120		-----	-----		-----		-----	-----		-----
150	E2193 - A	10 mm	79.5		-1.05		-----	-----		-----
168		-----	-----		-----		-----	-----		-----
169	E2193 - A	10 mm	82.5	DG(0.05)	3.02		-----	-----		-----
171		-----	-----		-----		-----	-----		-----
172		-----	-----		-----	E2193 - B	10 mm	78.8		-0.99
174		-----	-----		-----	E2193 - B	10 mm	79.5		0.79
315		-----	-----		-----	E2193 - B	50 mm	78.8		-0.99
323		-----	-----		-----		-----	79.4		0.54
343		-----	-----		-----		10 mm	77.9		-3.28
347		-----	-----		-----	E2193 - B	50 mm	80.1		2.31
370		-----	-----		-----	E2193 - B	10 mm	78		-3.02
395		-----	-----		-----		-----	-----		-----
396		-----	-----		-----		-----	-----		-----
444		-----	-----		-----	E2193 - B	10 mm	79.10		-0.23
522		-----	-----		-----		-----	-----		-----
528		-----	-----		-----		-----	-----		-----
551		-----	-----		-----	E2193 - B	10 mm	79.6		1.04
557		-----	-----		-----		-----	-----		-----
558		-----	-----		-----		-----	-----		-----
609		-----	-----		-----	E2193 - B	10 mm	79.3		0.28
610		-----	-----		-----		-----	-----		-----
621		-----	-----		-----		-----	-----		-----
657		-----	-----		-----	E2193 - B	10 mm	79.16		-0.07
840	E2193 - A	10 mm	79.574		-0.95		-----	-----		-----
848	E2193 - A	50 mm	80.7		0.58	E2193 - B	50 mm	79.1		-0.23
852		-----	-----		-----	E2193 - B	10 mm	79.0		-0.48
857	E2193 - A	10 mm	80.2		-0.10	E2193 - B	10 mm	79.8		1.55
860	E2193 - A	10 mm	80.2		-0.10	E2193 - B	10 mm	79.2		0.03
861		-----	-----		-----	E2193 - B	10 mm	78.9		-0.73
862	E2193 - A	50 mm	80.796		0.71	E2193 - B	50 mm	79.049		-0.36
865	E2193 - A	-----	80.4		0.17	E2193 - B	-----	79.2		0.03
869		-----	-----		-----	E2193 - B	10 mm	79.4		0.54
872		-----	-----		-----	GOST19710	-----	79.383		0.49
886		-----	-----		-----		-----	-----		-----
902		-----	-----		-----		-----	-----		-----
912		-----	-----		-----		-----	-----		-----
913		-----	-----		-----	E2193 - B	10 mm	79.52		0.84
962		-----	-----		-----	E2193 - B	50 mm	79.8	ex,C	1.55
963		-----	-----		-----		-----	-----		-----
1091		-----	-----		-----	E2193 - B	10 mm	78.6		-1.50
1117		-----	-----		-----	E2193 - B	50 mm	78.24		-2.41
1135	E2193 - A	50 mm	80.7		0.58	E2193 - B	50 mm	79.3		0.28
1151		-----	-----		-----		-----	-----		-----
1169	E2193 - A	50 mm	80.4		0.17		-----	-----		-----
1217		-----	-----		-----	E2193 - B	-----	79.0		-0.48
1261		-----	-----		-----		-----	-----		-----
1467		-----	-----		-----		-----	-----		-----
1509		-----	-----		-----	E2193 - B	50 mm	79.37		0.46
1515		-----	-----		-----		50 mm	78.6		-1.50
1603		-----	-----		-----	In house	10 mm	80		2.06
1614		-----	-----		-----		-----	-----		-----
1656		-----	-----		-----		-----	-----		-----
1718		-----	-----		-----	E2193 - B	50 mm	79.00		-0.48
1742		-----	-----		-----	E2193 - B	10 mm	78.6		-1.50
1823		-----	-----		-----	E2193 - B	50 mm	80.139		2.41
1868		-----	-----		-----	E2193 - B	10 mm	93	R(0.01)	35.09
1880		-----	-----		-----	E2193 - B	10 mm	79.0		-0.48
1954		-----	-----		-----	E2193 - B	10 mm	79.90		1.81
6013		-----	-----		-----		-----	-----		-----
6198		-----	-----		-----	E2193 - B	10 mm	79.18		-0.02
6247		-----	-----		-----	E2193 - B	10 mm	79.4		0.54
6262	E2193 - A	10 mm	82.283	DG(0.05)	2.73	E2193 - B	10 mm	78.156		-2.63
6406		-----	-----		-----	E2193 - B	10 mm	79.8		1.55
7006		-----	-----		-----	E2193 - B	-----	79.9		1.81
7013		-----	-----		-----	E2193 - B	10 mm	80.0		2.06
9006		-----	-----		-----	E2193 - B	10 mm	79.18		-0.02
9008		-----	-----		-----		-----	79.05		-0.35
9009		-----	-----		-----	E2193 - B	10 mm	79.32		0.33

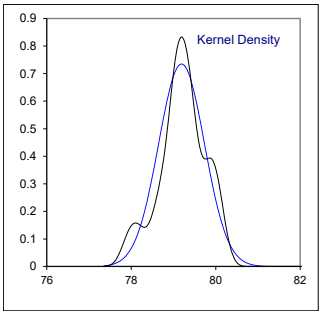
normality	OK	OK
n	9	42
outliers	2	1 +1ex
mean (n)	80.274	79.189
st.dev. (n)	0.4700	0.5431
R(calc.)	1.316	1.521
st.dev.(E2193:16)	0.7368	0.3936
R(E2193:16)	2.063	1.102

Lab 962 test result excluded because of statistical outliers in related test parameters, first reported 82.1







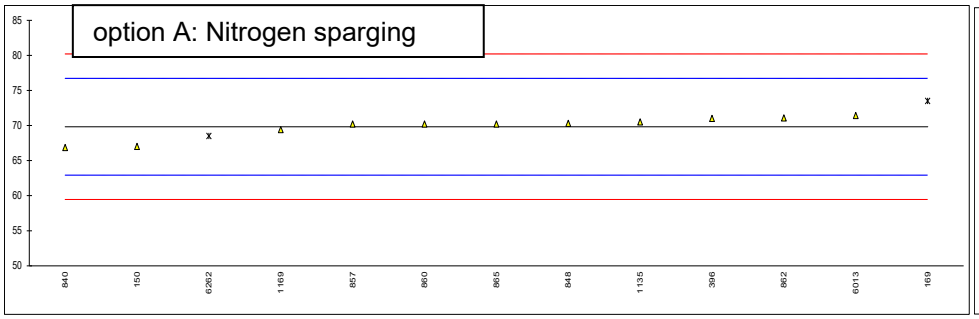


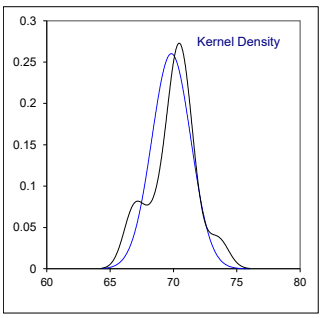
Determination of UV Transmittance at 220 nm on sample #21191; results in %Transmittance

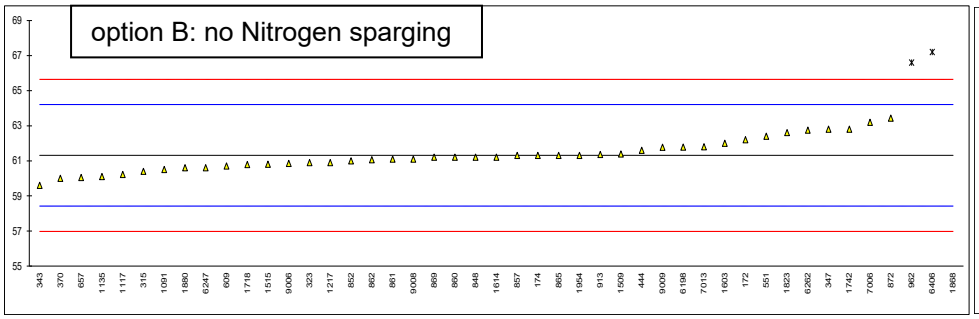
lab	method	cuvette	Option A	mark	z(targ)	method	cuvette	Option B	mark	z(targ)
120		-----	-----		-----		-----	-----		-----
150	E2193 - A	10 mm	67.0		-0.82		-----	-----		-----
168		-----	-----		-----		-----	-----		-----
169	E2193 - A	10 mm	73.5	ex	1.06		-----	-----		-----
171		-----	-----		-----		-----	-----		-----
172		-----	-----		-----	E2193 - B	10 mm	62.2		0.61
174		-----	-----		-----	E2193 - B	10 mm	61.3		-0.01
315		-----	-----		-----	E2193 - B	50 mm	60.4		-0.63
323		-----	-----		-----		-----	60.9		-0.29
343		-----	-----		-----		10 mm	59.6		-1.19
347		-----	-----		-----	E2193 - B	50 mm	62.8		1.03
370		-----	-----		-----	E2193 - B	10 mm	60		-0.91
395		-----	-----		-----		-----	-----		-----
396	E2193 - A	10 mm	71.0		0.34		-----	-----		-----
444		-----	-----		-----	E2193 - B	10 mm	61.6		0.20
522		-----	-----		-----		-----	-----		-----
528		-----	-----		-----		-----	-----		-----
551		-----	-----		-----	E2193 - B	10 mm	62.4		0.75
557		-----	-----		-----		-----	-----		-----
558		-----	-----		-----		-----	-----		-----
609		-----	-----		-----	E2193 - B	10 mm	60.7		-0.42
610		-----	-----		-----		-----	-----		-----
621		-----	-----		-----		-----	-----		-----
657		-----	-----		-----	E2193 - B	10 mm	60.05		-0.87
840	E2193 - A	10 mm	66.850		-0.86		-----	-----		-----
848	E2193 - A	50 mm	70.3		0.14	E2193 - B	50 mm	61.2		-0.08
852		-----	-----		-----	E2193 - B	10 mm	61.0		-0.22
857	E2193 - A	10 mm	70.2		0.11	E2193 - B	10 mm	61.3		-0.01
860	E2193 - A	10 mm	70.2		0.11	E2193 - B	10 mm	61.2		-0.08
861		-----	-----		-----	E2193 - B	10 mm	61.1		-0.15
862	E2193 - A	50 mm	71.066		0.36	E2193 - B	50 mm	61.055		-0.18
865	E2193 - A	-----	70.2		0.11	E2193 - B	-----	61.3		-0.01
869		-----	-----		-----	E2193 - B	10 mm	61.2		-0.08
872		-----	-----		-----	GOST19710	-----	63.437		1.47
886		-----	-----		-----		-----	-----		-----
902		-----	-----		-----		-----	-----		-----
912		-----	-----		-----		-----	-----		-----
913		-----	-----		-----	E2193 - B	10 mm	61.36		0.03
962		-----	-----		-----	E2193 - B	50 mm	66.6	C,R(0.01)	3.66
963		-----	-----		-----		-----	-----		-----
1091		-----	-----		-----	E2193 - B	10 mm	60.5		-0.56
1117		-----	-----		-----	E2193 - B	50 mm	60.22		-0.76
1135	E2193 - A	50 mm	70.5		0.19	E2193 - B	50 mm	60.1		-0.84
1151		-----	-----		-----		-----	-----		-----
1169	E2193 - A	50 mm	69.4		-0.12		-----	-----		-----
1217		-----	-----		-----	E2193 - B	-----	60.9		-0.29
1261		-----	-----		-----		-----	-----		-----
1467		-----	-----		-----		-----	-----		-----
1509		-----	-----		-----	E2193 - B	50 mm	61.39		0.05
1515		-----	-----		-----		50 mm	60.8		-0.36
1603		-----	-----		-----	In house	10 mm	62		0.47
1614		-----	-----		-----	E2193 - B	10 mm	61.206	C	-0.07
1656		-----	-----		-----		-----	-----		-----
1718		-----	-----		-----	E2193 - B	50 mm	60.79		-0.36
1742		-----	-----		-----	E2193 - B	10 mm	62.8		1.03
1823		-----	-----		-----	E2193 - B	50 mm	62.609		0.90
1868		-----	-----		-----	E2193 - B	10 mm	75	R(0.01)	9.47
1880		-----	-----		-----	E2193 - B	10 mm	60.6		-0.49
1954		-----	-----		-----	E2193 - B	10 mm	61.30		-0.01
6013	E2193 - A	10 mm	71.4		0.45		-----	-----		-----
6198		-----	-----		-----	E2193 - B	10 mm	61.78		0.32
6247		-----	-----		-----	E2193 - B	10 mm	60.6		-0.49
6262	E2193 - A	10 mm	68.482	ex	-0.39	E2193 - B	10 mm	62.750		0.99
6406		-----	-----		-----	E2193 - B	10 mm	67.2	R(0.01)	4.07
7006		-----	-----		-----	E2193 - B	-----	63.2		1.31
7013		-----	-----		-----	E2193 - B	10 mm	61.8		0.34
9006		-----	-----		-----	E2193 - B	10 mm	60.85		-0.32
9008		-----	-----		-----		-----	61.1		-0.15
9009		-----	-----		-----	E2193 - B	10 mm	61.77		0.32

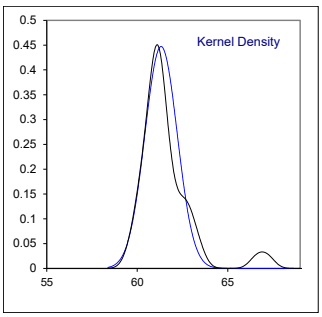
normality	OK	OK
n	11	42
outliers	0 +2ex	3
mean (n)	69.829	61.313
st.dev. (n)	1.5335	0.8922
R(calc.)	4.294	2.498
st.dev.(E2193:16)	3.4579	1.4454
R(E2193:16)	9.682	4.047

Lab 169 test result excluded because of statistical outliers in related test parameters
Lab 962 first reported 95.5
Lab 1614 first reported 8.443 and 50 mm cuvette size
Lab 6262 test result excluded because of statistical outliers in related test parameters









APPENDIX 2

Number of participants per country

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

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ISO5725:86
3 ISO5725 parts 1-6:94
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