

Results of Proficiency Test
Biogasoline E85
May 2019

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: A. Lewinska, MSc.
Correctors: ing. A.S. Noordman-de Neef & ing. R.J. Starink
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1 INTRODUCTION

Since 2010, the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for Bio gasoline E85 every year. During the annual proficiency testing program 2018/2019, it was decided to continue the round robin for the analysis of Biogasoline E85 in accordance with the latest applicable version of CEN/TS15293 and ASTM D5798. During the period of the PT it became clear that CEN/TS15293:11 has been replaced by EN15293:18 (see for more information chapter 4).

In this interlaboratory study 15 laboratories in 10 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2019 Bio gasoline E85 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 Spijkensisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send one sample of 1 liter Bio gasoline E85 labelled #19078.

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 Spijkensisse, 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 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 50 liters of Bio gasoline E85 was purchased from a local supplier. The bulk material was homogenized and transferred into 49 amber glass bottles of 1 liter and labelled #19078. The homogeneity of the subsamples #19078 was checked by determination of Density at 15°C in accordance with ISO12185 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m ³
Sample #19078-1	784.82
Sample #19078-2	784.80
Sample #19078-3	784.84
Sample #19078-4	784.79
Sample #19078-5	784.92
Sample #19078-6	784.82
Sample #19078-7	784.81
Sample #19078-8	784.83

Table 1: homogeneity test results of subsamples #19078

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

	Density at 15°C in kg/m ³
r (observed)	0.11
Reference test method	ISO12185:96
0.3 * R (reference test method)	0.45

Table 2: evaluation of repeatability of the subsamples #19078

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples #19078 was assumed.

To each of the participating laboratories one 1L bottle labelled #19078 was sent on April 24, 2019. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Biogasoline E85 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 #19078: Acidity (Total as Acetic Acid), Chloride (Inorganic), Copper Corrosion 3hrs at 50°C, Copper, Density at 15°C, Electrical Conductivity at 25°C, Existent Gum (solvent washed), Oxidation Stability, Methanol, Ethanol and Higher Saturated Alcohols, Ethers (5 or more C atoms), Higher Saturated Mono Alcohols (C3-C5), Total (Organically bound) Oxygen, pHe, Phosphorus, Sulfate, Sulfur and Water.

It was explicitly requested to treat the sample as if it was a routine sample 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.

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 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 them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

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

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ISO 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:

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

The $Z_{(\text{target})}$ 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. The usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this interlaboratory study no problems were encountered with the dispatch of the samples. The reporting participants submitting the test results before the deadline. One participant did not report any test results. Not all laboratories were able to perform all requested analyses. Finally, 14 laboratories did report 115 numerical test results. Observed were 9 outlying test results, which is 7.8%. In proficiency tests, 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”, “suspect” or “unknown”. The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

4.1 EVALUATION PER TEST

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

The scope of this PT was based on latest applicable version of CEN/TS15293 and ASTM D5798. During the period of the PT it became clear that CEN/TS15293:11 has been replaced by EN15293:18. The evaluation of the test results is done with the best appropriated test method. In case this is different from CEN/TC15293 but mentioned in EN15293 and used by majority of the participants the test results are evaluated against EN15293 specification. In case that majority of the group still have used CEN/TC15293 the test results are evaluated against CEN/TC15293. The scope of the proficiency test of 2020 will be based on the latest version of EN15293.

Total Acidity: 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 EN15491:07.

Chloride, Inorganic: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN15492:12.

Copper corrosion: No problems have been observed. All reporting participants agreed on a test result of 1 (1a, 1b).

Copper as Cu: No problems have been observed. Five “less than” test results were reported. Therefore, no z-scores are calculated.

Density at 15°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12185:96.

Electrical Conductivity: 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 EN15938:10.

Existent Gum: This determination was not problematic. No statistical outliers were observed but one test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ISO6246:17.

Oxidation Stability: In this determination no problems have been observed. All reporting participants agreed on a test result above 360 minutes according to specification EN15293:2018.

Methanol: No problems have been observed. All reporting participants agreed on a test result below 0.2 % V/V. Therefore, no z-scores are calculated.

Ethanol and higher saturated alcohols: 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 ISO22854-B:16.
In specification EN15293 test method EN1601 has been replaced by ISO22854. It was decided to use ISO22854-B because there more test results from ISO22854 than from EN1601.

Ethers (5 or more C atoms): 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 ISO22854-B:16.
In specification EN15293 test method EN1601 has been replaced by ISO22854. It was decided to use ISO22854-B because there more test results from ISO22854 than from EN1601.

Higher Sat. Alcohols: No problems have been observed. Six participants reported a test result for higher saturated alcohols. All reporting participants agreed on a test result below 0.2 % V/V. Therefore, no z-scores are calculated.

Total Oxygen: This determination was problematic dependent on test method used. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ISO22854-A:16 but is in agreement with EN1601:14.
In method ISO22854:16 the precision data for Oxygen content is only given for method A. It is decided to use the reproducibility from method A because the difference between method A and B is the dilution.

- pHe:** This determination may be problematic as two different electrodes were used (KCl and LiCl electrodes). Therefore, it was decided to split the test results based on the electrode used. It is known that electrodes with LiCl give significantly lower pHe values than other types of electrodes (e.g. KCl electrodes) (see lit.18).
The determination was not problematic for both electrodes. No statistical outliers were observed. The calculated reproducibilities are in agreement with the respective requirements of EN15490:07 or D6423:18.
- Phosphorus:** No problems have been observed. The reporting participants agreed on a value close or below the application range. Therefore, no z-scores are calculated.
- Sulfate:** No problems have been observed. The reporting participants agreed on a value close or below the application range. Therefore, no z-scores are calculated.
- Sulfur:** No problems have been observed. The reporting participants agreed on a value close or below the application range. Therefore, no z-scores are calculated.
- Water:** This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of EN15489:07.

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 results, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from literature reference test methods (in casu ASTM, EN test methods) or previous proficiency tests are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
Acidity as Acetic Acid, Total	%M/M	9	0.0013	0.0007	0.0014
Chloride, Inorganic	mg/kg	6	1.2	1.2	0.6
Copper Corrosion 3 hrs at 50°C		8	1 (1a,1b)	n.a.	n.a.
Copper as Cu	mg/kg	5	<0.07	n.a.	n.a.
Density at 15°C	kg/m ³	14	785.0	0.6	1.5
Electrical Conductivity at 25°C	µS/cm	6	1.13	0.24	0.20
Existent Gum (solvent washed)	mg/100mL	4	0.60	0.40	2.14
Oxidation Stability	minutes	8	>360	n.a.	n.a.
Methanol	%V/V	8	<0.2	n.a.	n.a.
Ethanol and Higher Saturated Alcohols	%V/V	10	84.73	2.40	4.85

Parameter	unit	n	average	2.8 * sd	R (lit)
Ethers (5 or more C-atoms)	%V/V	6	1.50	0.27	0.33
Higher Saturated Mono Alcohols	%V/V	6	<0.2	n.a.	n.a.
Total Organically Bound Oxygen	%M/M	7	30.1	0.6	0.3
pHe KCl		4	7.14	1.19	1.09
pHe LiCl		3	5.85	0.49	0.56
Phosphorus as P	mg/L	6	<0.2	n.a.	n.a.
Sulfate as SO ₄	mg/kg	6	<1	n.a.	n.a.
Sulfur as S	mg/kg	11	<5	n.a.	n.a.
Water	%M/M	12	0.178	0.018	0.022

Table 3: reproducibilities of test results on sample #19078

Without further statistical calculations it can be concluded that for a number of tests there is a good compliance of the group of participants with the relevant test methods.

The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF PROFICIENCY TEST OF MAY 2019 WITH PREVIOUS PTS

	May 2019	May 2018	May 2017	May 2016	May 2015
Number of reporting labs	14	13	16	16	13
Number of test results reported	115	77	91	117	110
Number of statistical outliers	9	7	5	7	1
Percentage outliers	7.8%	9.1%	5.5%	6.0%	0.9%

Table 4: comparison with previous proficiency tests

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

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

	May 2019	May 2018	May 2017	May 2016	May 2015
Acidity as Acetic Acid, Total	++	+	+	+	++
Chloride, Inorganic	--	-	--	++	(--)
Copper Corrosion 3 hrs at 50°C	n.e.	n.e.	n.e.	n.e.	n.e.
Copper as Cu	n.e.	n.e.	n.e.	n.e.	n.e.
Density at 15°C	++	++	+/-	++	++
Electrical Conductivity at 25°C	-	+	+	-	+
Existent Gum (solvent washed)	++	++	++	++	+
Oxidation Stability	n.e.	n.e.	n.e.	n.e.	n.e.
Methanol	n.e.	n.e.	n.e.	-	n.e.
Ethanol and Higher Saturated Alcohols	++	+	++	+	-
Ethers (5 or more C-atoms)	+	--	--	+/-	--

Higher Saturated Mono Alcohols	n.e.	n.e.	n.e.	n.e.	n.e.
Total Organically Bound Oxygen	-	+	++	++	+/-
pHe KCl	+/-	++	--	--	-
pHe LiCl	+	++			
Phosphorus as P	n.e.	n.e.	n.e.	n.e.	n.e.
Sulfate as SO ₄	n.e.	n.e.	n.e.	(--)	n.e.
Sulfur as S	n.e.	n.e.	++	++	++
Water	+	++	-	+	+

Table 5: comparison determinations against the reference test method
 nb. Results between brackets no z-scores are calculated

The following performance categories were used:

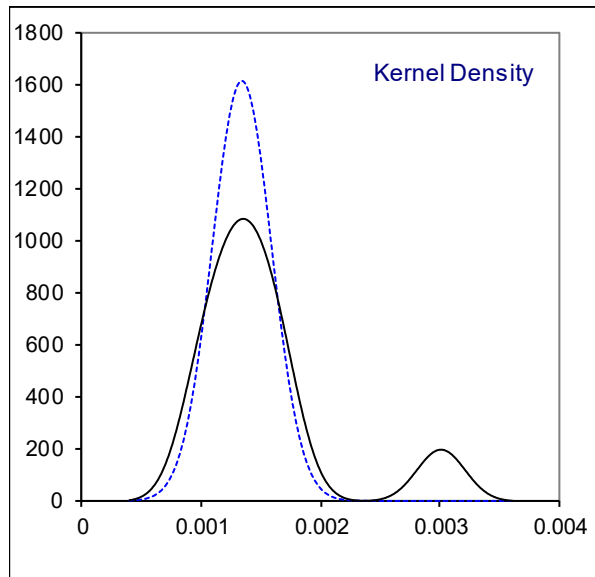
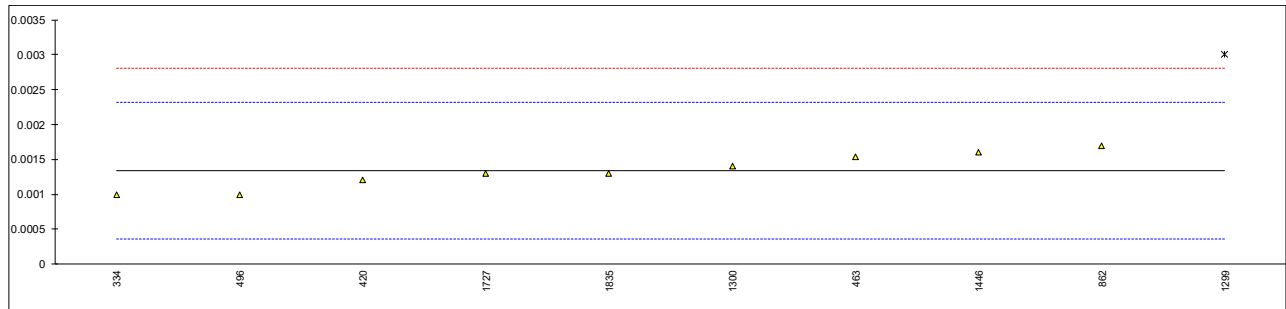
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance similar to the reference test method
- : group performed worse than the reference test method
- : group performed much worse than the reference test method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

APPENDIX 1

Determination of Total Acidity as Acetic Acid on sample #19078; results in %M/M

lab	method	value	mark	z(targ)	remarks
323	EN15491	< 0.003		----	
334	EN15491	0.001		-0.69	
420	EN15491	0.0012		-0.28	
463	EN15491	0.00153		0.40	
496	EN15491	0.0010		-0.69	
862	D1613	0.0017		0.74	
1033		----		----	
1161		----		----	
1299	EN15491	0.003	D(0.01)	3.40	
1300	EN15491	0.0014		0.13	
1446	EN15491	0.0016		0.54	
1459		----		----	
1727	EN15491	0.0013		-0.07	
1835	EN15491	0.0013		-0.07	
1984		----		----	

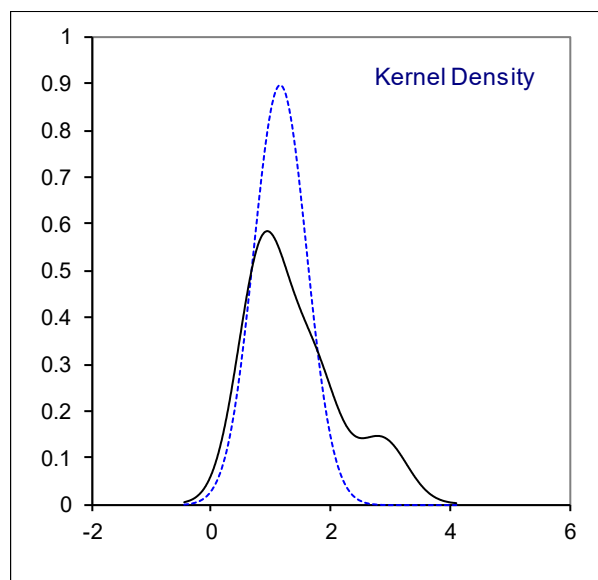
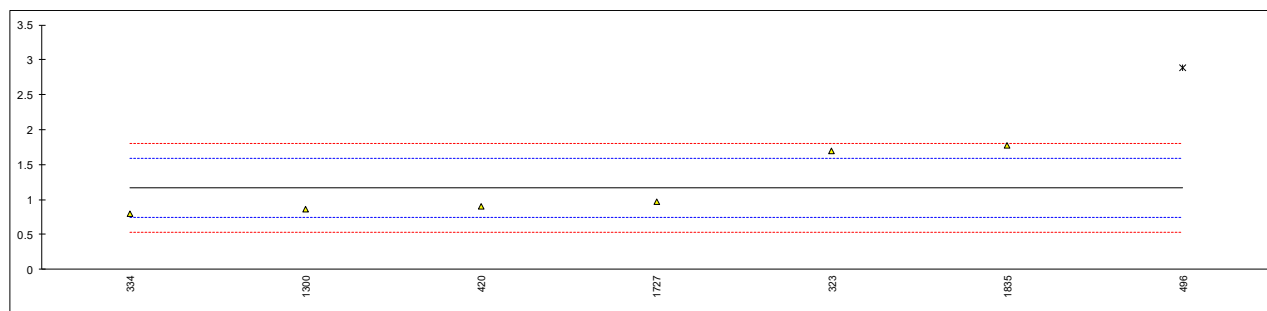
normality OK
n 9
outliers 1
mean (n) 0.00134
st.dev. (n) 0.000248
R(calc.) 0.00069
st.dev.(EN15491:07) 0.000489
R(EN15491:07) 0.00137



Determination of Inorganic Chloride on sample #19078; results in mg/kg

lab	method	value	mark	z(targ)	remarks
323	EN15492	1.7		2.54	
334	EN15492	0.8		-1.75	
420	EN15484	0.90		-1.27	
463		----		----	
496	EN15492	2.88	D(0.01)	8.17	
862	EN15492	<1		----	
1033		----		----	
1161		----		----	
1299		----		----	
1300	EN15492	0.86		-1.46	
1446		----		----	
1459		----		----	
1727	EN15492	0.970		-0.94	
1835	EN15492	1.770	C	2.88	first reported 1.87
1984		----		----	

normality unknown
n 6
outliers 1
mean (n) 1.167
st.dev. (n) 0.4442
R(calc.) 1.244
st.dev.(EN15492:12) 0.2098
R(EN15492:12) 0.587



Determination of Copper Corrosion 3hrs at 50°C on sample #19078; rating

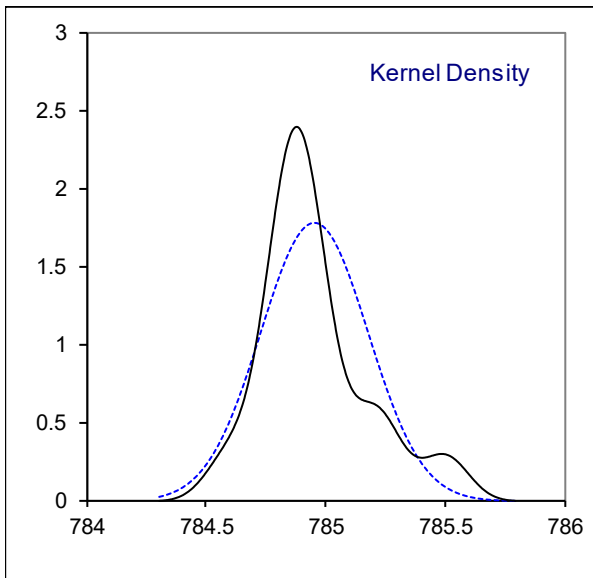
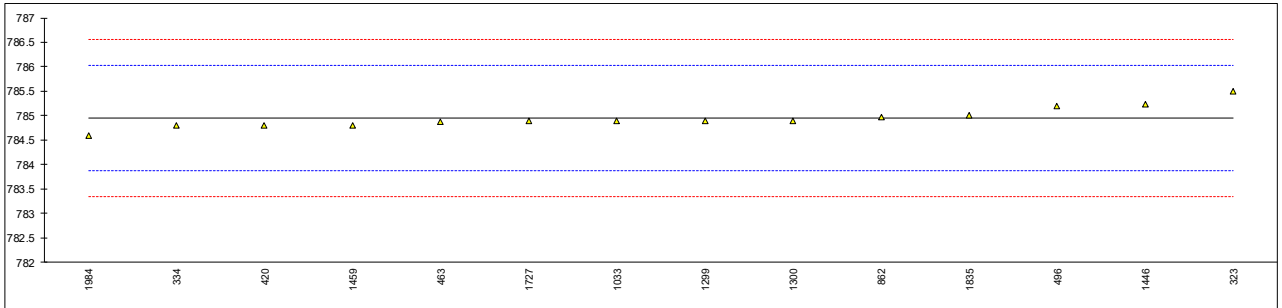
lab	method	value	mark	z(targ)	remarks
323	D130	1B		----	
334	D130	1A		----	
420	ISO2160	class 1a		----	
463	ISO2160	1A		----	
496	ISO2160	1a		----	
862	D130	1a		----	
1033		----		----	
1161		----		----	
1299	D130	1A		----	
1300	ISO2160	1 A		----	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	
n		8			
mean (n)		1 (1a, 1b)			

Determination of Copper as Cu on sample #19078; results in mg/kg

lab	method	value	mark	z(targ)	remarks
323	EN15488	< 0.070		----	
334		----		----	
420	EN15837	<0,05		----	
463		----		----	
496		----		----	
862	EN15488	<0.07		----	
1033		----		----	
1161		----		----	
1299		----		----	
1300	EN15837	<0.05		----	
1446		----		----	
1459		----		----	
1727		----		----	
1835	EN15837	<0.050		----	
1984		----		----	
n		5			
mean (n)		<0.07			

Determination of Density at 15°C on sample #19078; results in kg/m³

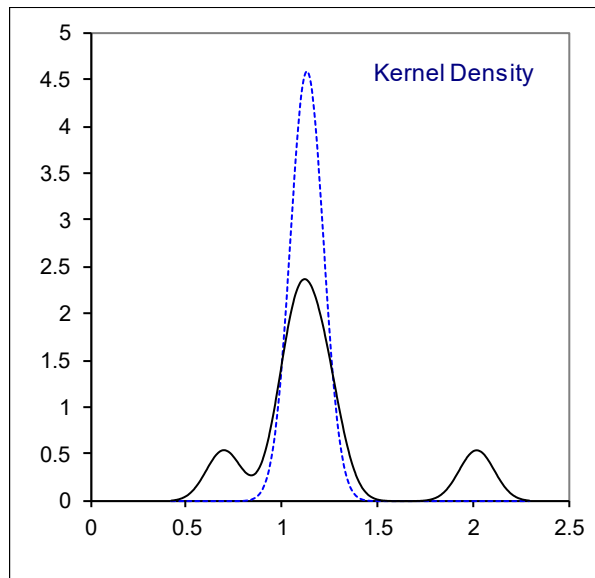
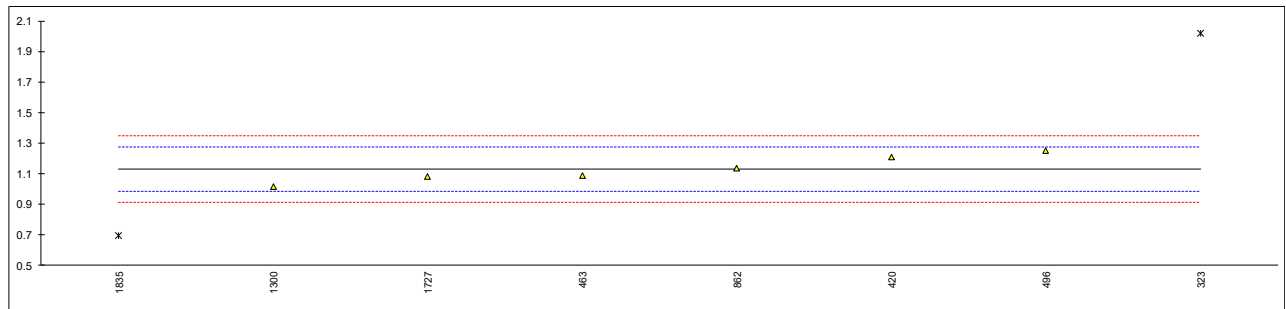
lab	method	value	mark	z(targ)	remarks
323	ISO12185	785.5		1.02	
334	ISO12185	784.8		-0.29	
420	ISO12185	784.8		-0.29	
463	ISO12185	784.87		-0.16	
496	ISO12185	785.19		0.44	
862	ISO12185	784.97		0.03	
1033	IP365	784.9		-0.10	
1161		-----		-----	
1299	D4052	784.9		-0.10	
1300	ISO12185	784.9		-0.10	
1446	ISO12185	785.24		0.53	
1459	ISO12185	784.8		-0.29	
1727	D4052	784.89		-0.12	
1835	ISO12185	785.0	C	0.09	first reported 0.7850 kg/m ³
1984	ISO12185	784.6		-0.66	
normality		not OK			
n		14			
outliers		0			
mean (n)		784.954			
st.dev. (n)		0.2244			
R(calc.)		0.628			
st.dev.(ISO12185:96)		0.5357			
R(ISO12185:96)		1.500			



Determination of Electrical Conductivity at 25°C on sample #19078; results in $\mu\text{S}/\text{cm}$

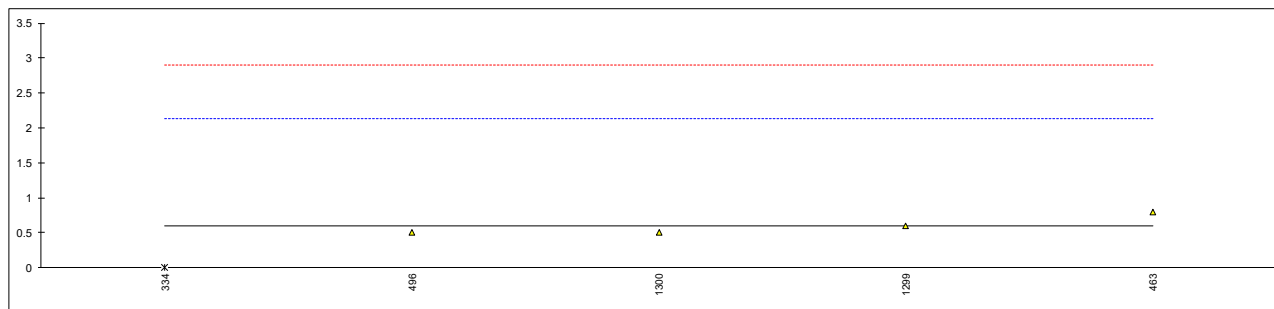
lab	method	value	mark	z(targ)	remarks
323	EN15938	2.02	D(0.01)	12.27	
334		----		----	
420	EN15938	1.21		1.10	
463	EN15938	1.09		-0.55	
496	EN15938	1.2500		1.65	
862	EN15938	1.134		0.05	
1033		----		----	
1161		----		----	
1299	EN15938	>2000		>27557	Possibly a unit error?
1300	EN15938	1.017		-1.56	
1446		----		----	
1459		----		----	
1727	EN15938	1.08		-0.69	
1835	EN15938	0.695	D(0.05)	-6.00	
1984		----		----	

normality unknown
n 6
outliers 2
mean (n) 1.130
st.dev. (n) 0.0868
R(calc.) 0.243
st.dev.(EN15938:10) 0.0725
R(EN15938:10) 0.203



Determination of Existent Gum (solvent washed) on sample #19078; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO6246	0	ex	-0.79	Test result excluded as 0 is not a real test value
420	ISO6246	<1		----	
463	ISO6246	0.8		0.26	
496	D381	0.5		-0.13	
862	D381	<0.5		----	
1033		----		----	
1161		----		----	
1299	D381	0.6		0.00	
1300	ISO6246	0.5		-0.13	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	
normality		unknown			
n		4			
outliers		0+1ex			
mean (n)		0.600			
st.dev. (n)		0.1414			
R(calc.)		0.396			
st.dev.(ISO6246:17)		0.7642			
R(ISO6246:17)		2.140			



Determination of Oxidation Stability on sample #19078; results in minutes

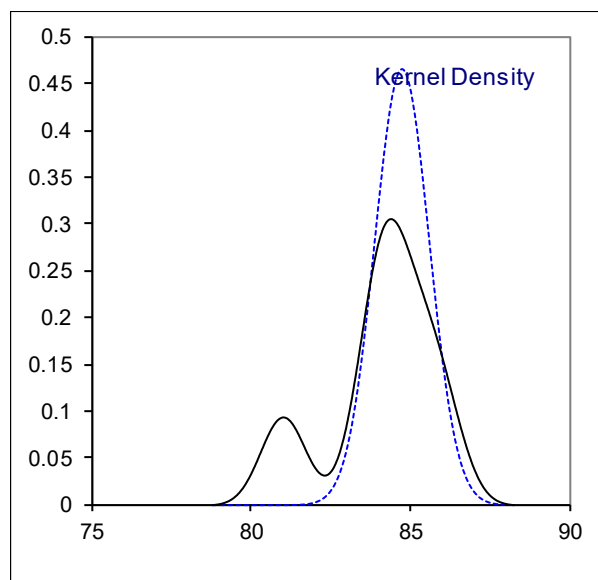
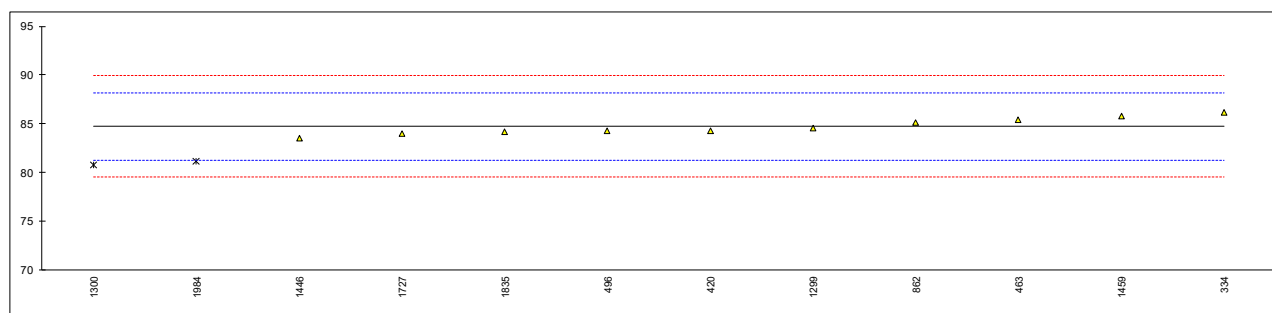
lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO7536	>960		----	
420	ISO7536	>600		----	
463	ISO7536	>360		----	
496	D525	>1000		----	
862	D525	>480		----	
1033	IP40	>900		----	
1161		----		----	
1299	D525	>900		----	
1300	ISO7536	1712.55		----	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	
	n	8			
	mean (n)	>360			

Determination of Methanol on sample #19078; results in %V/V

lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO22854-B	0		----	
420	EN13132	<0,1		----	
463	EN13132	<0,2		----	
496	EN1601	0.00		----	
862	D4815	<0.2		----	
1033		----		----	
1161		----		----	
1299	ISO22854-B	0.03		----	
1300	EN16761-1	0.032		----	
1446		----		----	
1459		----		----	
1727		----		----	
1835	In house	0.0055		----	
1984		----		----	
	n	8			
	mean (n)	<0.2			

Determination of Ethanol and Higher Saturated Alcohols on sample #19078; results in %V/V

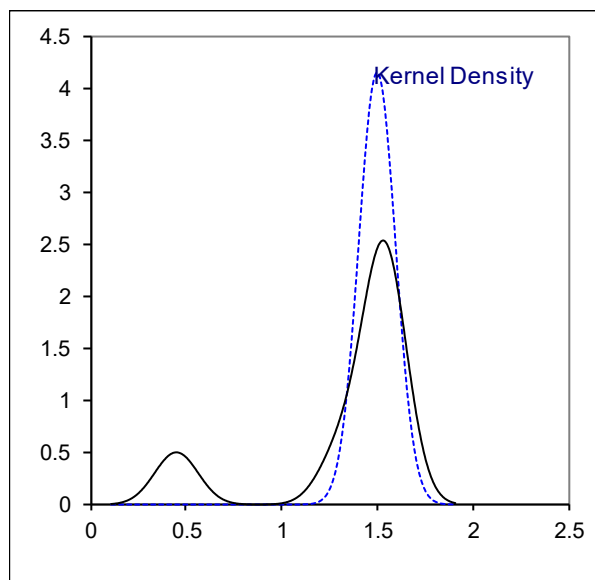
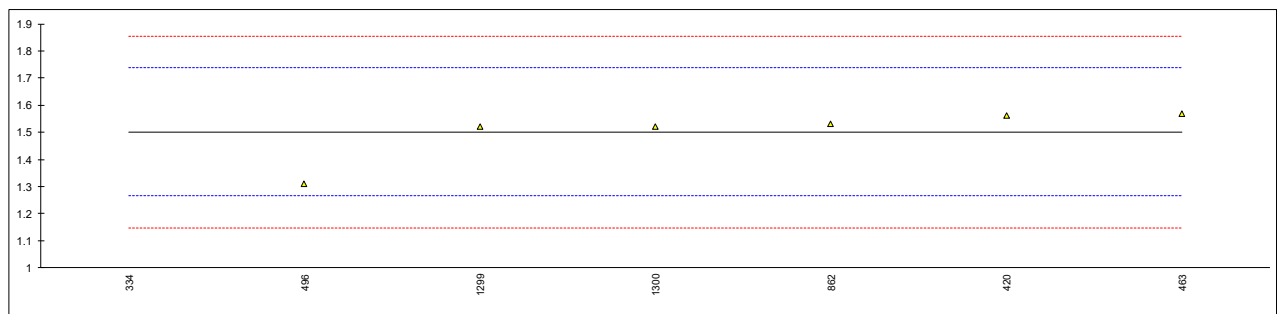
lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO22854-B	86.21		0.86	
420	EN13132	84.26		-0.27	
463	EN13132	85.39		0.38	
496	EN1601	84.24		-0.28	
862	D4815	85.09		0.21	
1033		----		----	
1161		----		----	
1299	ISO22854-B	84.6		-0.07	
1300	ISO22854-B	80.814	DG(0.05)	-2.26	
1446		83.55		-0.68	
1459		85.77		0.60	
1727		83.95		-0.45	
1835	In house	84.21		-0.30	
1984	EN1601	81.2	DG(0.05)	-2.04	
normality		OK			
n		10			
outliers		2			
mean (n)		84.727			
st.dev. (n)		0.8555			
R(calc.)		2.395			
st.dev.(ISO22854-B:16)		1.7321			
R(ISO22854-B:16)		4.85			
Compare					
R(EN1601:14)		5.648			



Determination of Ethers (C5 or more C atoms) on sample #19078; results in %V/V

lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO22854-B	0.45	C,D(0.01)	-8.92	first reported 0.58
420	EN13132	1.56		0.49	
463	EN13132	1.57		0.58	
496	EN1601	1.31		-1.63	
862	D4815	1.53		0.24	
1033		----		----	
1161		----		----	
1299	ISO22854-B	1.52		0.16	
1300	ISO22854-B	1.52		0.16	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	

normality unknown
n 6
outliers 1
mean (n) 1.502
st.dev. (n) 0.0962
R(calc.) 0.269
st.dev.(ISO22854-B:16) 0.1179
R(ISO22854-B:16) 0.33
Compare
R(EN1601:14) 0.3



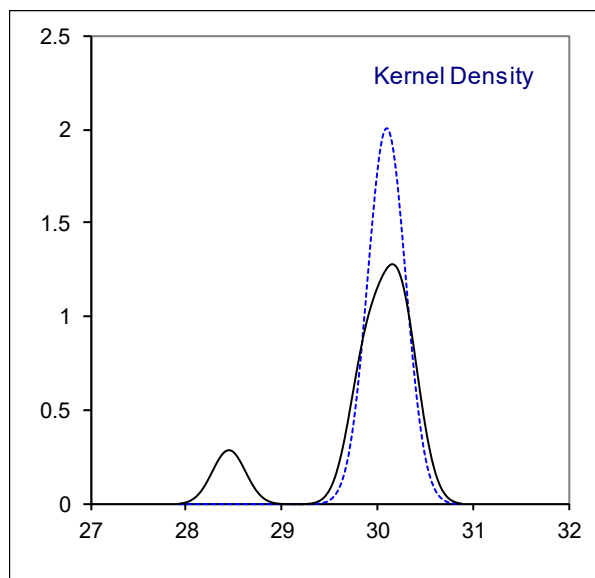
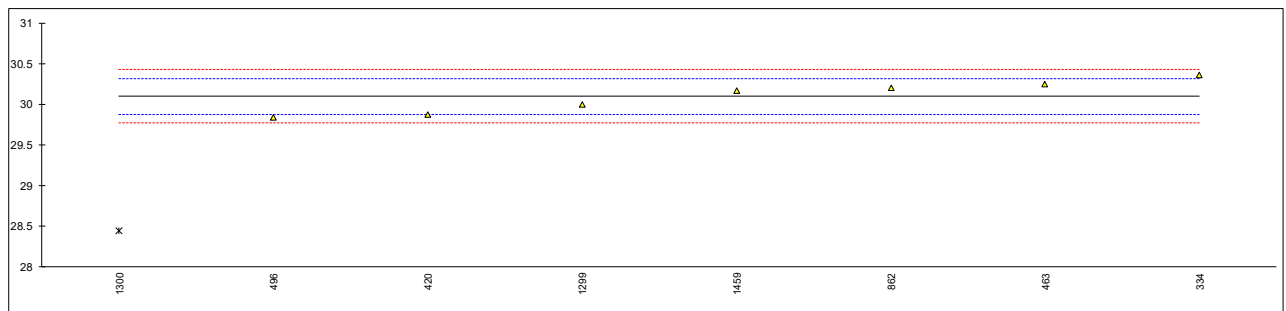
Determination of Higher Saturated Mono Alcohols (C3-C5) on sample #19078; results in %V/V

lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO22854-B	0		----	
420	EN13132	<0,1		----	
463		----		----	
496	EN1601	0.00		----	
862	D4815	<0.2		----	
1033		----		----	
1161		----		----	
1299	ISO22854-B	0.06		----	
1300	ISO22854-B	0.051		----	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	
	n	6			
	mean (n)	<0.2			

Determination of Total "Organically Bound" Oxygen on sample #19078; results in %M/M

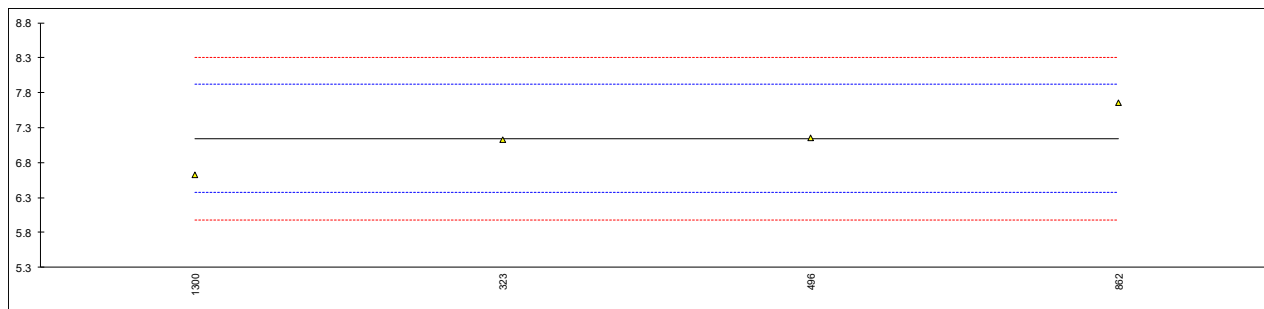
lab	method	value	mark	z(targ)	remarks
323		----		----	
334	ISO22854-B	30.36		2.36	
420	EN13132	29.87		-2.06	
463	EN13132	30.25		1.37	
496	EN1601	29.838		-2.35	
862	D4815	30.2		0.92	
1033		----		----	
1161		----		----	
1299	ISO22854-B	30.0		-0.89	
1300	ISO22854-B	28.444	D(0.01)	-14.94	
1446		----		----	
1459		30.17		0.65	
1727		----		----	
1835		----		----	
1984		----		----	

normality unknown
n 7
outliers 1
mean (n) 30.098
st.dev. (n) 0.1985
R(calc.) 0.556
st.dev.(ISO22854-A:16) 0.1107
R(ISO22854-A:16) 0.31
Compare
R(EN1601:14) 3.164



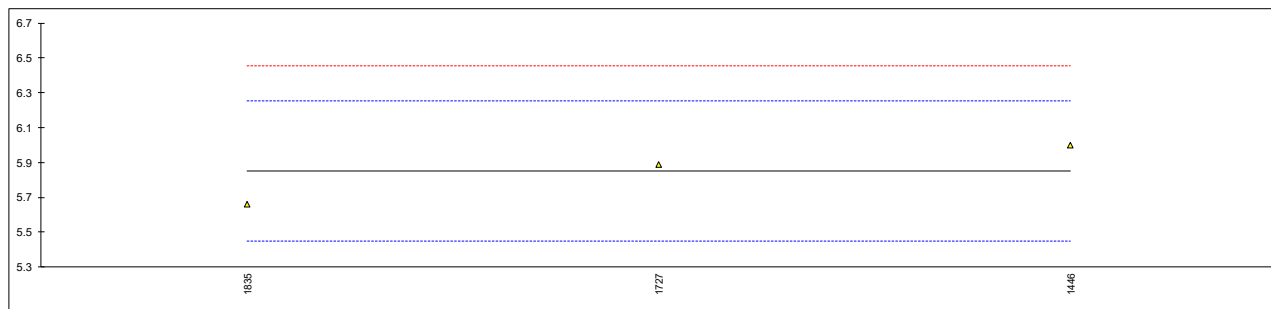
Determination of pHe on sample #19078; KCl electrode

lab	method	value	mark	z(targ)	remarks
323	EN15490	7.13		-0.03	
334		----		----	
420		----		----	
463		----		----	
496	EN15490	7.16		0.05	
862	D6423	7.66		1.34	
1033		----		----	
1161		----		----	
1299		----		----	
1300	EN15490	6.62		-1.35	
1446		----		----	
1459		----		----	
1727		----		----	
1835		----		----	
1984		----		----	
normality		unknown			
n		4			
outliers		0			
mean (n)		7.142			
st.dev. (n)		0.4248			
R(calc.)		1.189			
st.dev.(D6423:18)		0.3876			
R(D6423:18)		1.085			



Determination of pHe on sample #19078; LiCl electrode

lab	method	value	mark	z(targ)	remarks
323		----		----	
334		----		----	
420		----		----	
463		----		----	
496		----		----	
862		----		----	
1033		----		----	
1161		----		----	
1299		----		----	
1300		----		----	
1446	EN15490	6		0.75	
1459		----		----	
1727	EN15490	5.89		0.20	
1835	EN15490	5.66		-0.95	
1984		----		----	
normality		unknown			
n		3			
outliers		0			
mean (n)		5.850			
st.dev. (n)		0.1735			
R(calc.)		0.486			
st.dev.(EN15490:07)		0.2006			
R(EN15490:07)		0.562			



Determination of Phosphorus as P on sample #19078; results in mg/L

lab	method	value	mark	z(targ)	remarks
323		----		----	
334		----		----	
420	EN15837	<0,05		----	
463		----		----	
496	EN15487	0.00		----	
862	D3231	<0.2		----	
1033		----		----	
1161		----		----	
1299		----		----	
1300	EN15487	0.025		----	
1446		----		----	
1459		----		----	
1727	EN15487	0.01		----	
1835	EN15837	<0.15		----	
1984		----		----	
n		6			
mean (n)		<0.2			Application range: 0.15 – 1.5 mg/L

Determination of Sulfate as SO₄ on sample #19078; results in mg/kg

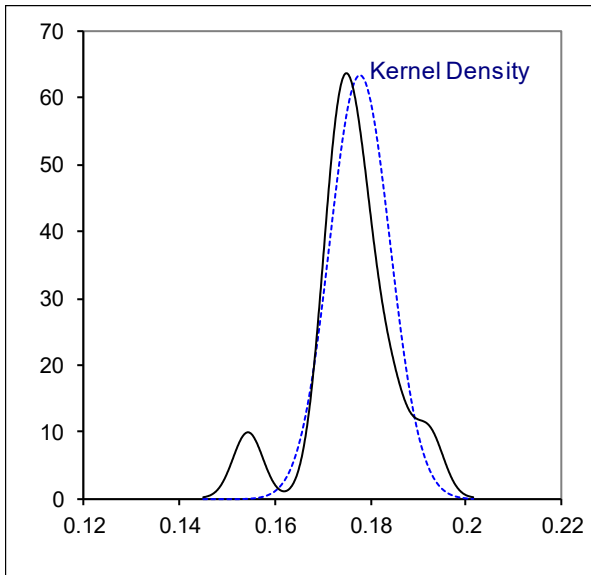
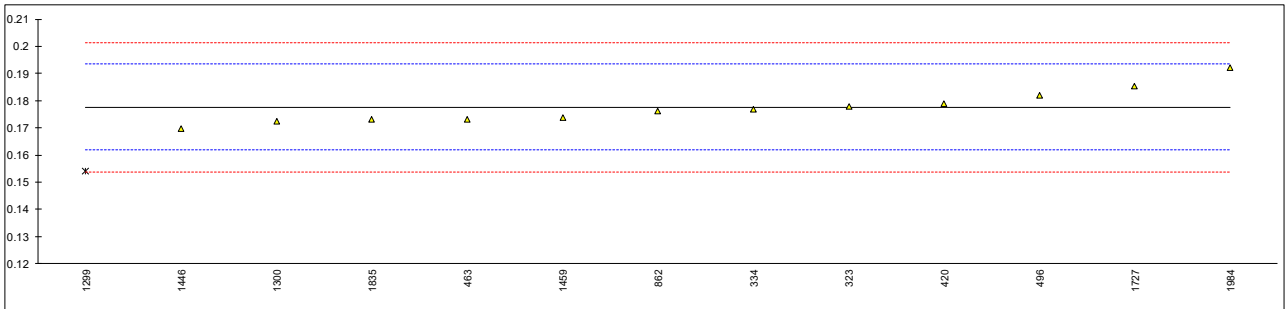
lab	method	value	mark	z(targ)	remarks
323	EN15492	1.1		----	
334	EN15492	0.6		----	
420		----		----	
463		----		----	
496	EN15492	0.08		----	
862	EN15492	<1		----	
1033		----		----	
1161		----		----	
1299		----		----	
1300	EN15492	0.11		----	
1446		----		----	
1459		----		----	
1727	EN15492	0.224		----	
1835	EN15492	<1.0		----	
1984		----		----	
n		6			
mean (n)		<1			Application range: 1 – 20 mg/kg

Determination of Sulfur as S on sample #19078; results in mg/kg

lab	method	value	mark	z(targ)	remarks
323	EN15486	< 5		----	
334	ISO20846	0.1		----	
420	EN15486	<3,0		----	
463	D5453	0.99		----	
496	ISO20846	0.56		----	
862	D5453	<1		----	
1033		----		----	
1161		----		----	
1299	ISO20846	1.2		----	
1300	EN15486	0.8		----	
1446		----		----	
1459	In house	< 1.0		----	
1727		----		----	
1835	EN15486	<1.0		----	
1984	ISO20846	1.25		----	
n		11			
mean (n)		<5			Application range EN15486:07: 5 – 20 mg/kg

Determination of Water on sample #19078; results in %M/M

lab	method	value	mark	z(targ)	remarks
323	EN15489	0.1780		0.05	
334	EN15489	0.1769		-0.09	
420	EN15489	0.179		0.17	
463	D6304	0.1731		-0.57	
496	EN15489	0.1820		0.55	
862	D6304	0.176		-0.20	
1033		----		----	
1161		----		----	
1299	ISO12937	0.1542	D(0.05)	-2.96	
1300	EN15489	0.1725		-0.65	
1446	ISO760	0.1696		-1.01	
1459	ISO12937	0.1739		-0.47	
1727	EN15489	0.1854		0.98	
1835	EN15489	0.1730		-0.58	
1984	E1064	0.192		1.82	
normality		not OK			
n		12			
outliers		1			
mean (n)		0.1776			
st.dev. (n)		0.00631			
R(calc.)		0.0177			
st.dev.(EN15489:07)		0.00791			
R(EN15489:07)		0.0221			



APPENDIX 2

Number of participants per country

1 lab in BELGIUM

1 lab in CHINA, People's Republic

2 labs in CZECH REPUBLIC

1 lab in ESTONIA

3 labs in FRANCE

1 lab in GERMANY

3 labs in SPAIN

1 lab in SWEDEN

1 lab in TURKEY

1 lab in UNITED KINGDOM

APPENDIX 3

Abbreviations

C	= final 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
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
SDS	= Safety Data Sheet

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