

**Results of Proficiency Test
AdBlue, 32% Urea Solution
June 2019**

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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Report: iis19G04

September 2019

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1 INTRODUCTION

Since 2017 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of AdBlue 32% Urea Solution in accordance with the latest applicable version of the ISO22241 part 1 every year. During the annual proficiency testing program 2018/2019 it was decided to continue the round robin for the analysis of AdBlue 32% Urea Solution. In this interlaboratory study 18 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 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 organiser 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 liter PE wide-neck bottle with AdBlue 32% Urea Solution, labelled #19092. Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 QUALITY SYSTEM

The Institute for Interlaboratory Studies in Spijkensisse, the Netherlands, has implemented a quality system based on ISO/IEC17043:2010. 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 Organization, 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 sample material of approximately 30 liters of AdBlue 32% Urea solution was purchased from a local supplier. After homogenisation in a pre-cleaned drum, 25 wide-neck PE bottles of 1L were filled and labelled #19092. The homogeneity of the subsamples #19092 was checked by determination of the Density at 20°C in accordance with ISO12185 on 4 stratified randomly selected samples.

	Density at 20°C in kg/m ³
sample #19092-1	1089.43
sample #19092-2	1089.42
sample #19092-3	1089.43
sample #19092-4	1089.43

Table 1: homogeneity test results of subsamples #19092

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

	Density at 20°C in kg/m ³
r (observed)	0.01
reference test method	ISO22241-2 Annex K:19
0.3 x R (reference test method)	0.15

Table 2: evaluation of repeatability of the subsamples #19092

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the target method. Therefore, homogeneity of the subsamples #19092 was assumed.

To each of the participating laboratories one sample of 1 liter of AdBlue 32% Urea solution, labelled #19092 was sent on May 15, 2019. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of AdBlue 32% Urea solution packed in the PE 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: Aldehyde as Formaldehyde, Alkalinity as NH₃, Biuret, Density at 20°C, Insoluble matter, Phosphate as PO₄, Refractive Index at 20°C, Urea content (total Nitrogen and by Refractive Index) and Trace elements (Al, Ca, Cr, Cu, Fe, Mg, Ni, K, Na and Zn).

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 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 reanalyzes). Additional or corrected test results are used for data analysis and original 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.

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

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. 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 analysis results are plotted. The corresponding laboratory numbers are on the X-axis.

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

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

3.3 Z-SCORES

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

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

4 EVALUATION

In this proficiency test, no problems were encountered. Not all laboratories were able to perform all analyses requested. Finally, all 18 laboratories did report 192 numerical test results. Observed were 7 outlying test results, which is 3.6%. 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” or “suspect”. 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 were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 3.

Aldehyde as Formaldehyde: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ISO22241-2 Annex K:19.

Alkalinity as NH_3 : This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO22241-2 Annex K:19.

- Biuret: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ISO22241-2 Annex K:19.
- Density at 20°C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ISO22241-2 Annex K:19.
- Insoluble Matter: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ISO22241-2 Annex K:19.
- Phosphate as PO₄: No problems have been observed, all except one participant agreed that the Phosphate as PO₄ is <1.0 mg/kg. It was decided not to calculate z-scores due to the low Phosphate content.
- Refractive Index at 20°C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO22241-2 Annex K:19.
- Urea (total Nitrogen): Regretfully, only one laboratory reported a test result. Therefore, no z-scores was calculated.
- Urea (Refractive Index): 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 ISO22241-2 Annex K:19.
The determinations of Refractive Index at 20°C and Biuret are not problematic, therefore it is remarkable that the determination Urea (Refractive Index) was problematic. A possible explanation could be that incorrect evaluation factors as per IOS22241-2 Annex C 5.2 are used. Another explanation could be that the requirements of ISO22241-2 Annex K:19 are much more strict than the requirements of the 2006 version (0.211 vs 1.0).
- Trace elements: Requested was to determine Aluminium, Calcium, Chromium, Copper, Iron, Magnesium, Nickel, Potassium, Sodium and Zinc. None of the requested elements was found positive. All participants had agreed on the absence of trace elements. Therefore, no z-scores were calculated.

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 average results, calculated reproducibilities and reproducibilities derived from reference test methods (in casu ISO, EN reference test methods) are compared in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
Aldehyde as Formaldehyde	mg/kg	13	0.86	0.48	0.46
Alkalinity as NH ₃	%M/M	14	0.126	0.036	0.124
Biuret	%M/M	16	0.23	0.04	0.04
Density at 20°C	kg/m ³	17	1089.5	0.5	0.5
Insoluble Matter	mg/kg	13	2.55	8.01	8.22
Phosphate as PO ₄	mg/kg	14	<1.0	n.a.	n.a.
Refractive index at 20°C	--	16	1.3828	0.0001	0.0003
Urea content (total Nitrogen)	%M/M	1	n.a.	n.a.	n.a.
Urea content (by Refractive Index)	%M/M	16	32.39	0.28	0.21
Trace elements	mg/kg	14	<0.5	n.e.	n.e.

Table 3: reproducibilities of tests on sample #19092

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF JUNE 2019 WITH PREVIOUS PTS.

	June 2019	June 2018	June 2017
Number of reporting labs	18	14	14
Number of results reported	192	146	196
Number of statistical outliers	7	2	4
Percentage outliers	3.6%	1.4%	2.0%

Table 4: comparison with previous proficiency test

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 respective reference test methods. The conclusions are given in the following table.

	June 2019	June 2018	June 2017
Aldehyde as Formaldehyde	+/-	+/-	--
Alkalinity as NH ₃	++	-	-
Biuret	+/-	-	-
Density at 20°C	+/-	+/-	++
Insoluble Matter	+/-	(--)	(--)
Phosphate as PO ₄	n.e.	n.e.	-
Refractive index at 20°C	++	++	++
Urea content (total Nitrogen)	n.e.	n.e.	n.e.
Urea content (by Refractive Index)	-	++	++
Trace elements	n.e.	n.e.	n.e.

Table 5: comparison determinations against the respective reference test methods

Result between brackets has to be evaluate with due care

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

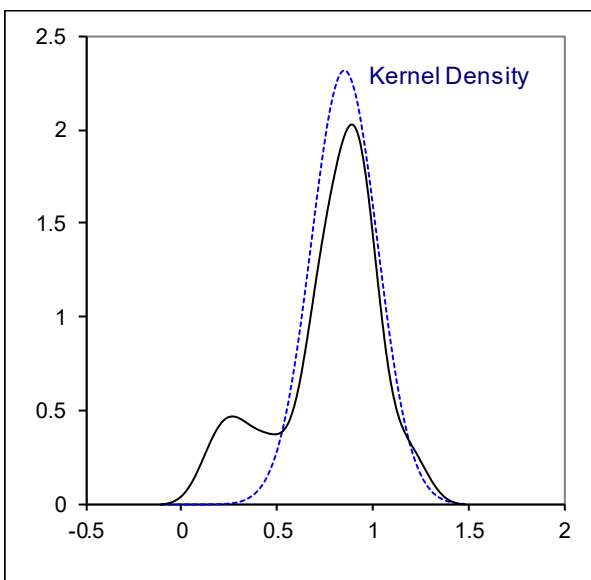
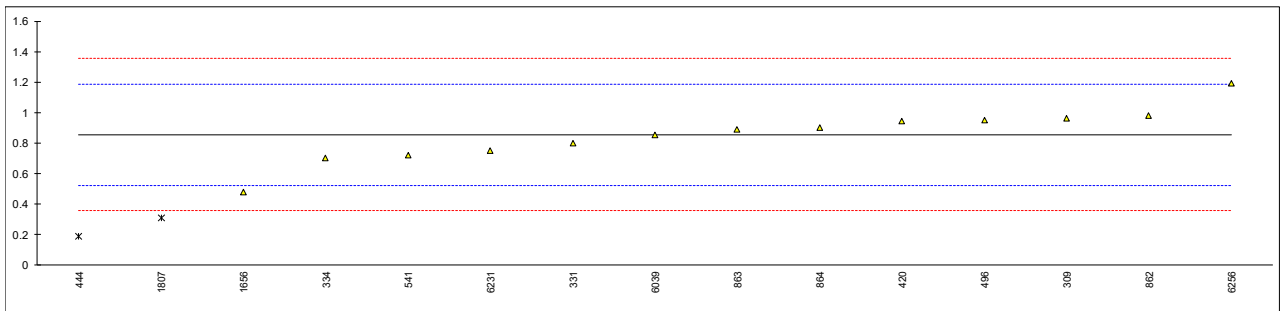
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- : group performed worse than the reference test method
- : group performed much worse than the reference test method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

APPENDIX 1

Determination of Aldehyde as Formaldehyde on sample #19092; result in mg/kg

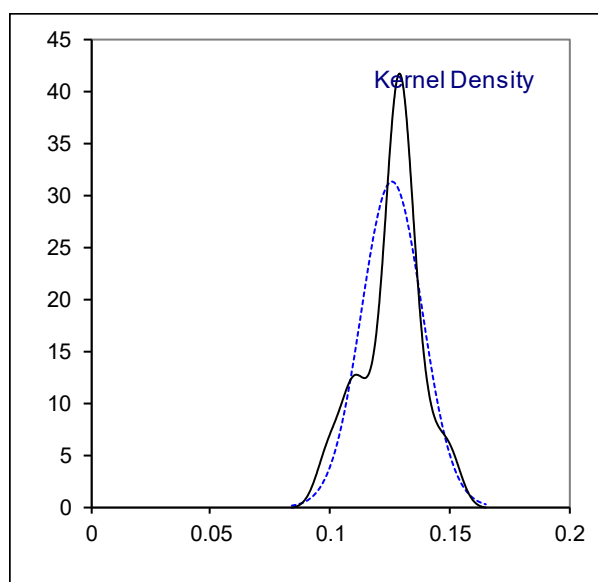
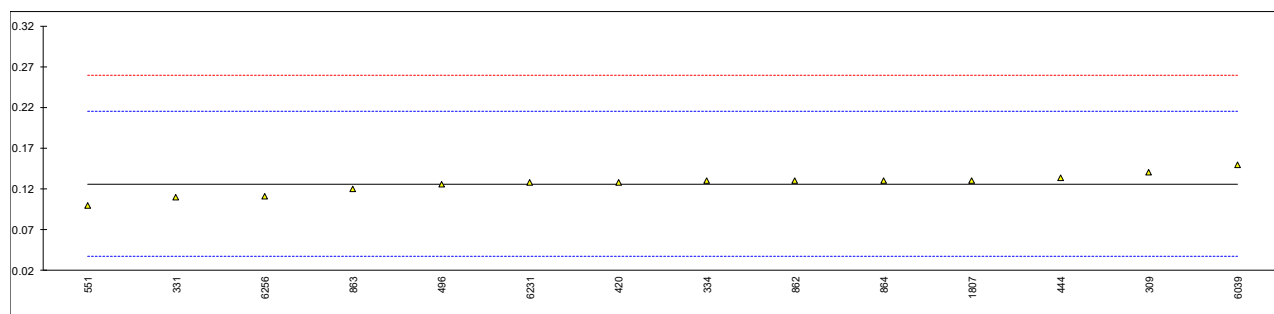
lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex F	0.96		0.63	
331	ISO22241-2 Annex F	0.8		-0.33	
334	ISO22241-2 Annex F	0.7		-0.94	
420	ISO22241-2 Annex F	0.943		0.53	
444	ISO22241-2 Annex F	0.19	D(0.05)	-4.01	
445		----		----	
496	ISO22241-2 Annex F	0.95		0.57	
541	ISO22241-2 Annex F	0.721		-0.81	
551		----		----	
862	ISO22241-2 Annex F	0.98		0.75	
863	ISO22241-2 Annex F	0.89		0.21	
864	ISO22241-2 Annex F	0.9		0.27	
1367		----		----	
1656	ISO22241-2 Annex F	0.48		-2.26	
1807	ISO22241-2 Annex F	0.31	D(0.05)	-3.29	
6039	ISO22241-2 Annex F	0.853		-0.01	
6231	ISO22241-2 Annex F	0.75		-0.63	
6256	ISO22241-2 Annex F	1.19		2.02	

normality suspect
n 13
outliers 2
mean (n) 0.855
st.dev. (n) 0.1721
R(calc.) 0.482
st.dev.(ISO22241-2 annex K:19) 0.1657
R(ISO22241-2 annex K:19) 0.464



Determination of Alkalinity as NH₃ on sample #19092; result in %M/M

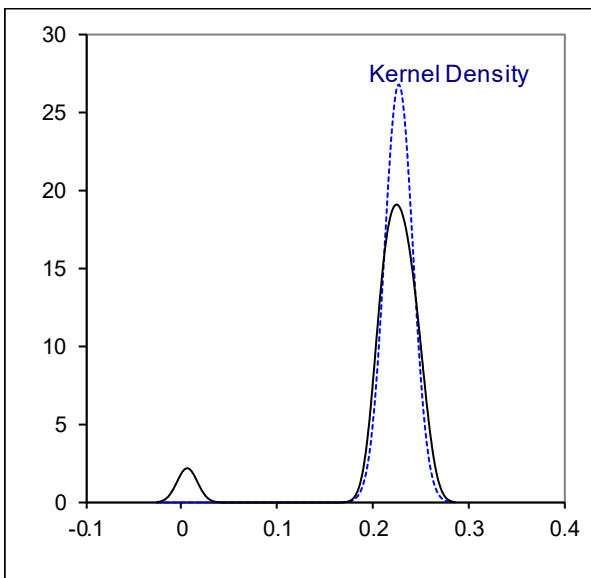
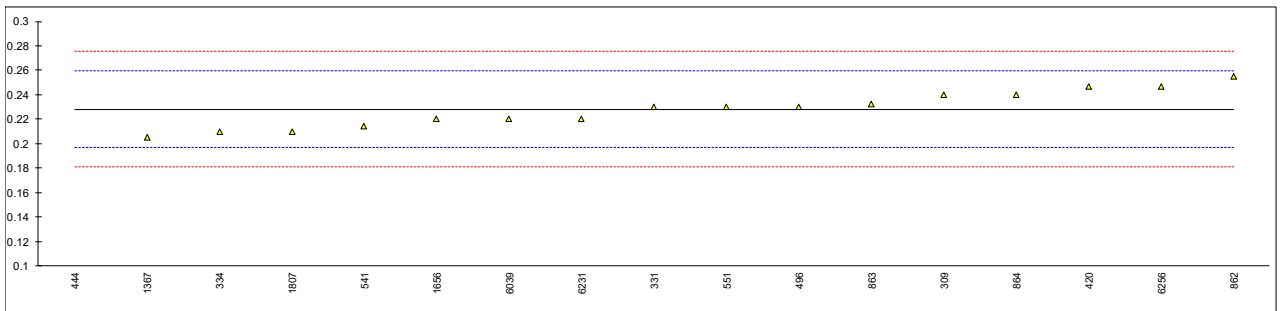
lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex D	0.14		0.31	
331	ISO22241-2 Annex D	0.11		-0.37	
334	ISO22241-2 Annex D	0.13		0.09	
420	ISO22241-2 Annex D	0.1284		0.05	
444	ISO22241-2 Annex D	0.134		0.18	
445		----		----	
496	ISO22241-2 Annex D	0.1255		-0.02	
541	ISO22241-2 Annex D	<0.1		----	
551	ISO22241-2 Annex D	0.10		-0.59	
862	ISO22241-2 Annex D	0.13		0.09	
863	ISO22241-2 Annex D	0.12		-0.14	
864	ISO22241-2 Annex D	0.13		0.09	
1367		----		----	
1656		----		----	
1807	ISO22241-2 Annex D	0.13		0.09	
6039	ISO22241-2 Annex D	0.1497		0.53	
6231	ISO22241-2 Annex D	0.128		0.04	
6256	ISO22241-2 Annex D	0.1107		-0.35	
normality		OK			
n		14			
outliers		0			
mean (n)		0.1262			
st.dev. (n)		0.01270			
R(calc.)		0.0356			
st.dev.(ISO22241-2 annex K:19)		0.04429			
R(ISO22241-2 annex K:19)		0.124			



Determination of Biuret on sample #19092; result in %M/M

lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex E	0.24		0.76	
331	ISO22241-2 Annex E	0.23		0.12	
334	ISO22241-2 Annex E	0.21		-1.15	
420	ISO22241-2 Annex E	0.247		1.20	
444	ISO22241-2 Annex E	0.0059	D(0.01)	-14.14	
445		----		----	
496	ISO22241-2 Annex E	0.23		0.12	
541	ISO22241-2 Annex E	0.214		-0.90	
551	ISO22241-2 Annex E	0.23		0.12	
862	ISO22241-2 Annex E	0.255		1.71	
863	ISO22241-2 Annex E	0.232		0.25	
864	ISO22241-2 Annex E	0.24		0.76	
1367	ISO22241-2 Annex E	0.205		-1.47	
1656	ISO22241-2 Annex E	0.22		-0.52	
1807	ISO22241-2 Annex E	0.21		-1.15	
6039	ISO22241-2 Annex E	0.22		-0.52	
6231	ISO22241-2 Annex E	0.22		-0.52	
6256	ISO22241-2 Annex E	0.247		1.20	

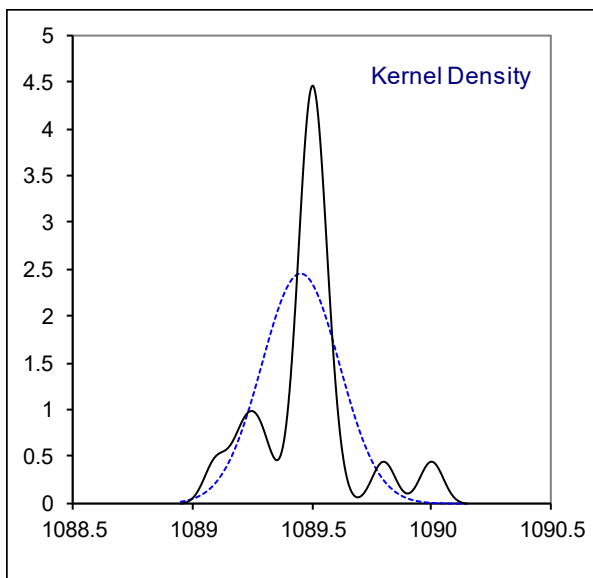
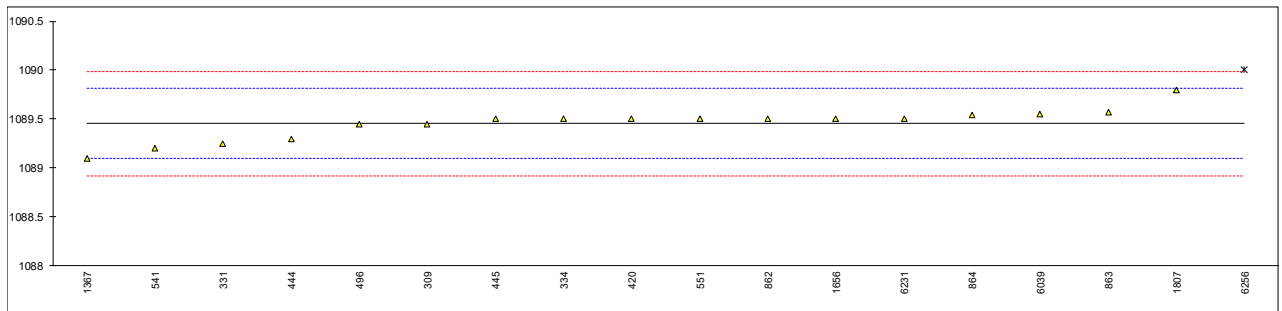
normality OK
 n 16
 outliers 1
 mean (n) 0.2281
 st.dev. (n) 0.01490
 R(calc.) 0.0417
 st.dev.(ISO22241-2 annex K:19) 0.01571
 R(ISO22241-2 annex K:19) 0.044



Determination of Density at 20°C on sample #19092; result in kg/m³

lab	method	value	mark	z(targ)	remarks
309	D4052	1089.45		-0.02	
331	ISO12185	1089.25	C	-1.14	first reported 1.08925 kg/m ³
334	ISO12185	1089.5		0.26	
420	ISO12185	1089.5		0.26	
444	D4052	1089.3		-0.86	
445	D4052	1089.5		0.26	
496	ISO12185	1089.45		-0.02	
541	ISO12185	1089.2		-1.42	
551	D4052	1089.5		0.26	
862	D4052	1089.5		0.26	
863	ISO12185	1089.57		0.65	
864	D4052	1089.54		0.48	
1367	D4052	1089.1	C	-1.98	first reported 1.0891 kg/m ³
1656	D4052	1089.5		0.26	
1807	D4052	1089.8		1.94	
6039	ISO12185	1089.55		0.54	
6231	ISO12185	1089.5		0.26	
6256	ISO3675	1090.0	D(0.05)	3.06	

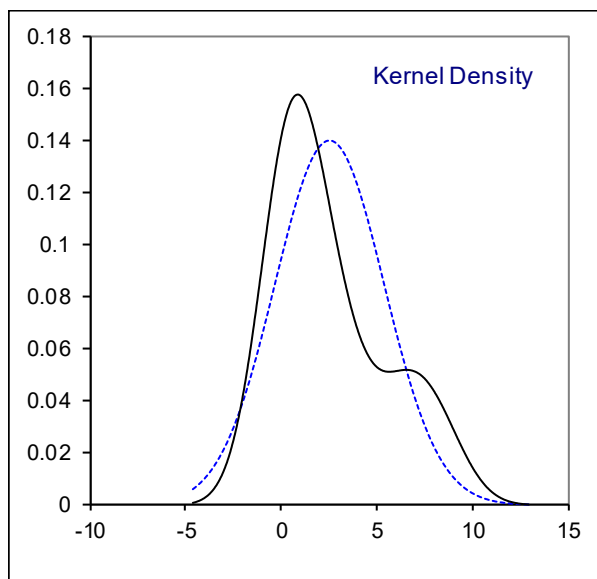
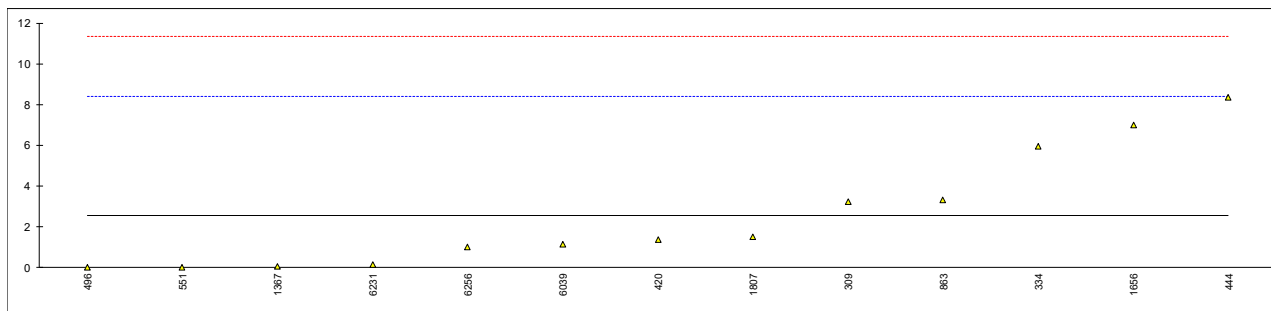
normality suspect
n 17
outliers 1
mean (n) 1089.4536
st.dev. (n) 0.16199
R(calc.) 0.4536
st.dev.(ISO22241-2 annex K:19) 0.17857
R(ISO22241-2 annex K:19) 0.5



Determination of Insoluble Matter on sample #19092; result in mg/kg

lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex G	3.23	C	0.23	first reported 24.74
331	ISO22241-2 Annex G	<1		----	
334	ISO22241-2 Annex G	5.94		1.16	
420	ISO22241-2 Annex G	1.385		-0.40	
444	ISO22241-2 Annex G	8.37		1.98	
445		----		----	
496	ISO22241-2 Annex G	0.0		-0.87	
541	ISO22241-2 Annex G	<1.0		----	
551	ISO22241-2 Annex G	0.0		-0.87	
862	ISO22241-2 Annex G	<1.0		----	
863	ISO22241-2 Annex G	3.34		0.27	
864	ISO22241-2 Annex G	<1		----	
1367	ISO22241-2 Annex G	0.06		-0.85	
1656	ISO22241-2 Annex G	7		1.52	
1807	ISO22241-2 Annex G	1.5		-0.36	
6039	ISO22241-2 Annex G	1.137		-0.48	
6231	ISO22241-2 Annex G	0.14		-0.82	
6256	ISO22241-2 Annex G	1.000		-0.53	

normality suspect
 n 13
 outliers 0
 mean (n) 2.5463
 st.dev. (n) 2.85956
 R(calc.) 8.0068
 st.dev.(ISO22241-2 annex K:19) 2.93571
 R(ISO22241-2 annex K:19) 8.220

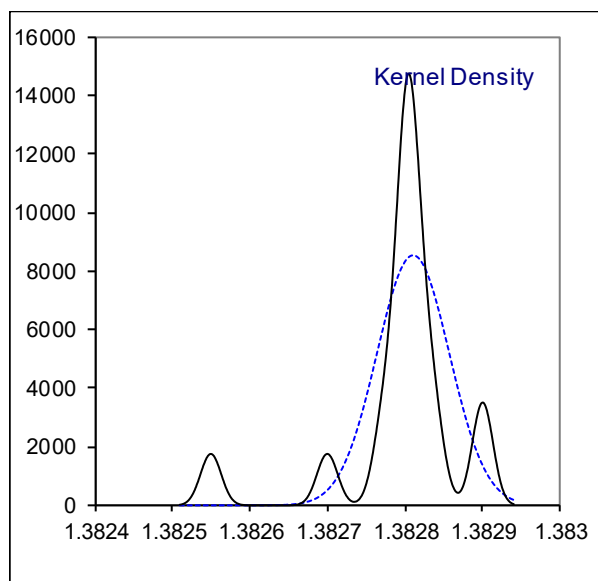
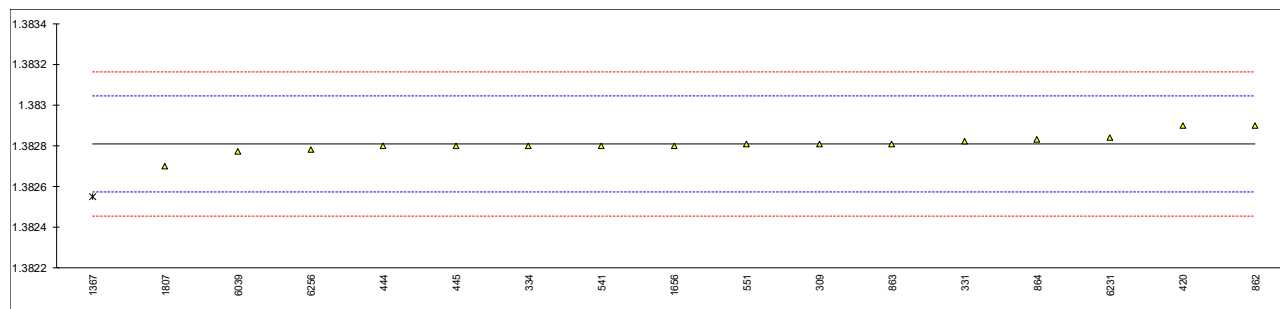


Determination of Phosphate as PO₄ on sample #19092; result in mg/kg

lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex H	0.3		----	
331	ISO22241-2 Annex H	<0.05		----	
334	ISO22241-2 Annex H	0.40		----	
420	ISO22241-2 Annex H	0.11		----	
444	ISO22241-2 Annex H	0.029		----	
445		----		----	
496	ISO22241-2 Annex H	0.01		----	
541	ISO22241-2 Annex H	<0.05		----	
551	ISO22241-2 Annex H	1.18		----	Possibly a false positive test result?
862	ISO22241-2 Annex H	<0.05		----	
863	ISO22241-2 Annex H	0.03		----	
864	ISO22241-2 Annex H	<0.05		----	
1367		----		----	
1656		----		----	
1807	ISO22241-2 Annex H	0.2		----	
6039	ISO22241-2 Annex H	0.111		----	
6231	ISO22241-2 Annex H	0.22		----	
6256	ISO22241-2 Annex H	0.01		----	
	n	14			
	mean (n)	<1.0			

Determination of Refractive index at 20°C on sample #19092;

lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex C	1.38281		0.00	
331	ISO22241-2 Annex C	1.38282		0.08	
334	ISO22241-2 Annex C	1.3828		-0.09	
420	ISO22241-2 Annex C	1.3829		0.76	
444	ISO22241-2 Annex C	1.3828		-0.09	
445	ISO22241-2 Annex C	1.3828		-0.09	
496		----		----	
541	ISO22241-2 Annex C	1.38280		-0.09	
551	ISO22241-2 Annex C	1.38281		0.00	
862	ISO22241-2 Annex C	1.3829		0.76	
863	ISO22241-2 Annex C	1.38281		0.00	
864	ISO22241-2 Annex C	1.38283		0.17	
1367	ISO22241-2 Annex C	1.38255	G(0.01)	-2.21	
1656	ISO22241-2 Annex C	1.3828		-0.09	
1807		1.3827		-0.94	
6039	ISO22241-2 Annex C	1.38277		-0.34	
6231	ISO22241-2 Annex C	1.38284		0.25	
6256	ISO22241-2 Annex C	1.38278		-0.26	
normality		not OK			
n		16			
outliers		1			
mean (n)		1.382810			
st.dev. (n)		0.000047			
R(calc.)		0.00013			
st.dev.(ISO22241-2 annex K:19)		0.000118			
R(ISO22241-2 annex K:19)		0.00033			



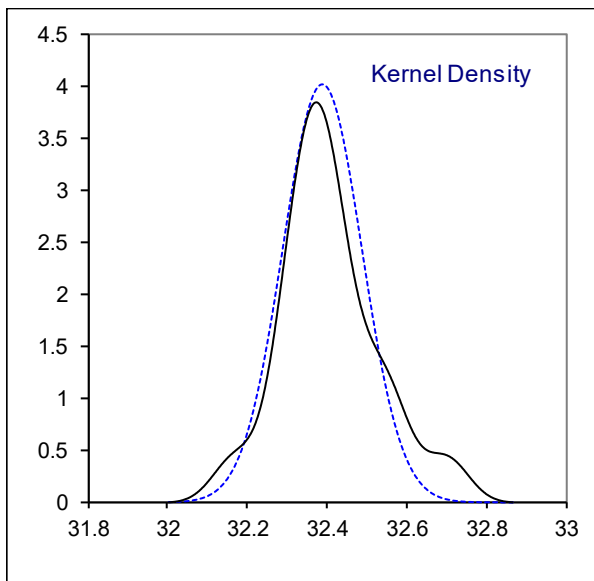
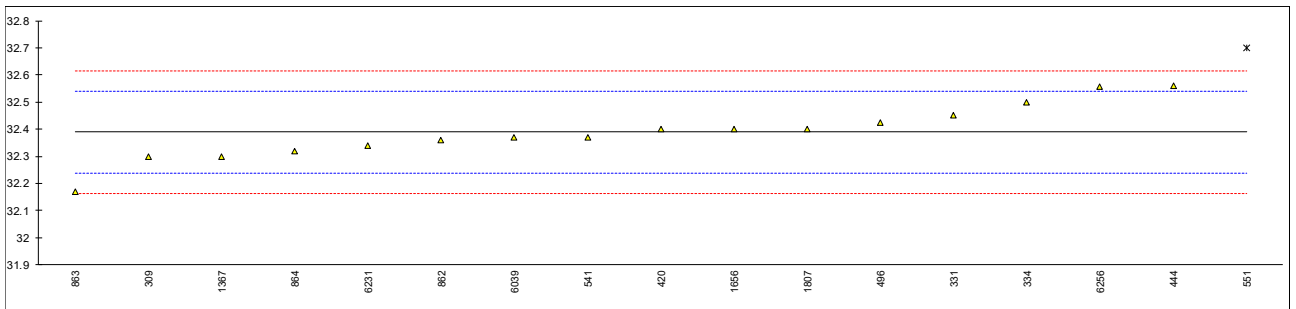
Determination of Urea content (total Nitrogen) on sample #19092; result in %M/M

lab	method	value	mark	z(targ)	remarks
309		----		----	
331		----		----	
334		----		----	
420		----		----	
444		----		----	
445		----		----	
496		----		----	
541		----		----	
551		----		----	
862	ISO22241-2 Annex B	32.60		----	
863		----		----	
864		----		----	
1367		----		----	
1656		----		----	
1807		----		----	
6039		----		----	
6231		----		----	
6256		----		----	

Determination of Urea content (by refractive index) on sample #19092; result in %M/M

lab	method	value	mark	z(targ)	remarks
309	ISO22241-2 Annex C	32.3		-1.18	
331	ISO22241-2 Annex C	32.45		0.81	
334	ISO22241-2 Annex C	32.5		1.48	
420	ISO22241-2 Annex C	32.4		0.15	
444	ISO22241-2 Annex C	32.56		2.27	
445		----		----	
496	ISO22241-2 Annex C	32.425		0.48	
541	ISO22241-2 Annex C	32.37		-0.25	
551	ISO22241-2 Annex C	32.7	G(0.01)	4.13	
862	ISO22241-2 Annex C	32.36		-0.38	
863	ISO22241-2 Annex C	32.17		-2.90	
864	ISO22241-2 Annex C	32.32		-0.91	
1367	ISO22241-2 Annex C	32.30		-1.18	
1656	ISO22241-2 Annex C	32.4		0.15	
1807	ISO22241-2 Annex C	32.4		0.15	
6039	ISO22241-2 Annex C	32.369		-0.26	
6231	ISO22241-2 Annex C	32.34		-0.65	
6256	ISO22241-2 Annex C	32.5561		2.22	

normality OK
n 16
outliers 1
mean (n) 32.389
st.dev. (n) 0.0991
R(calc.) 0.278
st.dev.(ISO22241-2 annex K:19) 0.0754
R(ISO22241-2 annex K:19) 0.211



Determination of Trace Elements on sample #19092; result in mg/kg

lab	method	Al	Ca	Cr	Cu	Fe	Mg	Ni	K	Na	Zn
309	*)	0.01	<0.01	0.02	0.04	<0.01	<0.01	0.03	<0.2	0.1	0.36
331	*)	<0.5	<0.5	<0.2	<0.2	<0.2	<0.5	<0.2	<0.5	<0.5	0.39
334	*)	0.03	0	0.04	0.04	0.01	0.01	0.04	0.01	0.06	0.47
420	*)	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05
444		----	----	----	----	----	----	----	----	----	----
445		----	----	----	----	----	----	----	----	----	----
496		----	----	----	----	----	----	----	----	----	----
541	*)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.392
551	*)	0.0	0.0	0.05	0.04	0.0	0.0	0.02	0.0	0.0	0.40
862	*)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
863	*)	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
864	*)	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2
1367	*)	0	0	0	0	0	0	0	0.14	0	0.25
1656	*)	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5
1807		----	----	----	----	----	----	----	----	----	----
6039	*)	0.050	0.043	0.043	0.054	0.010	0.006	0.030	0.054	0.083	0.416
6231	*)	0.002	0.004	0.0046	0.0065	0.0022	0.001	0.0054	0.03	0.055	0.0572
6256	*)	0.022	0.216	0.014	0.032	0.012	0.017	0.019	0.010	0.047	0.031

*) ISO22241-2 Annex I

APPENDIX 2

Number of participants per country

1 lab in ARGENTINA
1 lab in BRAZIL
3 labs in CHINA, People's Republic
1 lab in CZECH REPUBLIC
2 labs in FRANCE
3 labs in GERMANY
1 lab in INDIA
1 lab in NETHERLANDS
1 lab in SPAIN
4 labs in UNITED KINGDOM

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= possibly an error in calculations
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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