Results of Proficiency Test
Natural Gas Analysis
April 2018

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

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1 INTRODUCTION

Since 2009, the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Natural Gas every year. During the annual proficiency testing program 2017/2018, it was decided to continue the round robin for the analysis of Natural Gas.
A co-operation with EffecTech (Uttoxeter, United Kingdom) was set up, because iis has limited gas-handling facilities in place to prepare gas samples. EffecTech is fully equipped and has experience in the preparation of synthetic Natural Gas samples for PT purposes.
In this interlaboratory study 61 laboratories from 32 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2018 proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organiser of this proficiency test (PT). To optimise the costs for the participating laboratories, it was decided to prepare one Natural Gas mixture. Samples were divided over a batch of 65 cylinders. The cylinder size is a cost-effective one-litre cylinder. Each cylinder was uniquely numbered. The limited cylinder size is chosen to optimise transport and handling costs. The analyses of the samples for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. 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 Spijkenisse, 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 participants on the reported data is encouraged and customer's satisfaction is measured on a regular basis by sending out questionnaires.
EffecTech is an accredited provider of proficiency testing schemes for the preparation of PT samples in homogeneous and stable batches under the requirements of ISO/IEC17043:2010 by UKAS (no. 4719). EffecTech maintains also an ISO17025 accreditation for the calibration and assignment of reference values for these samples.

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 March 2017 (iis-protocol, version 3.4). This protocol is also 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

In this proficiency test one gas sample was used. The necessary one litre cylinders with artificial natural gas mixture was prepared and tested for homogeneity by EffecTech (Uttoxeter, United Kingdom) in conformance with ISO Guide 35: 2006 and ISO/IEC17043:2010.
One batch of 65 cylinders was prepared (job 18/0124) starting in January 2018. Each cylinder was uniquely numbered. Every cylinder in the batch was analysed using replicate measurements. The within bottle and between bottle variations were then assessed in accordance with ISO Guide 35:2006 (Annex A.1). This evaluation showed that the between bottle variations were all small compared to the uncertainties on the reference values on each component. Hence, a single reference value could be safely assigned to the entire batch of samples.
The repeatability values (r) were calculated per component by multiplication of the respective standard deviation by 2.8. Subsequently, the calculated repeatabilities were compared with 0.3 times the reproducibility of the reference test method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

Parameter	r (abs, observed) in %mol/mol	0.3xR (abs, ISO6974-3) in %mol/mol
Methane	0.0141	0.0523
Ethane	0.0061	0.0447
Propane	0.0020	0.0227
iso-Butane	0.0015	0.0180
n-Butane	0.0017	0.0179
Carbon dioxide	0.0007	0.0072
Nitrogen	0.0033	0.0270

Table 1: evaluation of homogeneity test results against ISO6974-3 requirements

From the above table, it is clear that all observed repeatabilities are far less than 0.3 times the respective reproducibilities of the reference test method ISO6974-3.
Therefore, the homogeneity of the prepared batch was assumed.

To each of the participating laboratories one 1L gas cylinder, labelled #18040 was sent on March 14, 2018. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

EffecTech (Uttoxeter, United Kingdom) declares that the prepared gas cylinders have a shelf life of at least 6 months. This is sufficient for the proficiency testing purposes.

2.6 ANALYSES

The participants were requested to determine on sample #18040: Methane, Ethane, Propane, iso-Butane, n-Butane, Carbon dioxide, Nitrogen, Carbon content, Caloric Value (superior and inferior), Density, Relative Density and Wobbe index.

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 reanalysis). Additional or corrected test results are used for data analysis and the original test results are placed under 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 March 2017 (iis-protocol, version 3.4).

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.
Accordance to ISO 5725 the original test results per determination were submitted subsequently to Dixon's, Grubbs' and or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have significant consequences for the evaluation of the test results.
Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

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

3.3 Z-SCORES

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

The target standard deviation was calculated from the target reproducibility (preferably taken from a standardized test method) 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 in accordance with:

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

The $z_{(target)}$ scores are listed in the test 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:

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

4 EVALUATION

In this proficiency test several problems were encountered with the dispatch of the samples. Therefore, it was decided to extend the final reporting date to give the participants the opportunity to report still their test results. Laboratories in Mexico and United States of America did receive the samples late due to several reasons.

Finally, ten participants reported the test results after the final reporting date and two participants did not report any test results at all. Not all laboratories were able to report for all analyses requested. In total 59 participants reported 700 numerical test results. Observed were 46 outlying test results, which is 6.6% of the numerical test results. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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, 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.

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.

Four laboratories reported deviating test results for many of the gas composition test results. At least three of the seven test results were statistical outliers. As the seven test results are not independent, it was decided not to use any of the reported results of these laboratories for the statistical evaluation. Also, the reported test results of these four laboratories were excluded, when not marked as an statistical outlier, for the statistical evaluation of the Carbon content, Caloric Value (sup), Caloric Value (inf), Density, Relative Density and Wobbe index, since these values were calculated from the measured gas composition.

Methane: This determination of this component was very problematic. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ISO6974-3:00, nor with the requirements of ASTM D1945:14.

Ethane: This determination of this component may be problematic depending on the test method used as reference method. Four statistical outliers were observed and two test results were excluded. However, the calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of ISO6974-3:00, but is not in agreement with the requirements of ASTM D1945:14.

Propane: This determination of this component may be problematic depending on the test method used as reference method. Four statistical outliers were observed and one test result was excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:00, but it is in agreement with the requirements of ASTM D1945:14.

i-Butane: This determination of this component was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO6974-3:00 and also with the requirements of ASTM D1945:14.

n-Butane: This determination of this component was problematic for a number of laboratories. Six statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO6974-3:00 and also with the requirements of ASTM D1945:14.

Carbon Dioxide: This determination of this component may be problematic depending on the test method used as reference method. Three statistical outliers were observed and four test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:00, but it is in agreement with the requirements of ASTM D1945:14.

Nitrogen: This determination of this component was very problematic. Two statistical outliers were observed and four test results were excluded. The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ISO6974-3:00, nor with the requirements of ASTM D1945:14.

Carbon content: This determination of this component was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN15984:11.

Calculated parameters, general remark:

In this PT, the calculated parameters were reported for two combustion temperatures (15°C and 25°C) for real gas. The number of participants with test results for 15°C and 25°C varied between 14 and 37.

Caloric Value (Sup.): The calculation at combustion temperature 25°C/metering temperature 0°C may be problematic for a number of laboratories. Two statistical outliers were observed and one test results was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M (0.26 vs 0.20).

The calculation at combustion temperature 15°C/metering temperature 15°C may be problematic for a number of laboratories. Two statistical outliers were observed and two test results were excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M (0.19 vs 0.10).

Caloric Value (Inf.): The calculation at combustion temperature 25°C/metering temperature 0°C may be problematic for a number of laboratories. Two statistical outliers were observed. The uncertainty (%) for real gas was equal to the uncertainty of Caloric Value Superior.

The calculation at combustion temperature 15°C/metering temperature 15°C may be problematic for a number of laboratories. No statistical outliers were found, but four test results were excluded. However, the uncertainty (%) for real gas was large compared to the uncertainty of Caloric Value Superior.

Density: The calculation at combustion temperature 25°C/metering temperature 0°C may be problematic for a number of laboratories. Three statistical outliers were observed and one test results was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

The calculation at combustion temperature 15°C/metering temperature 15°C may be problematic. One statistical outlier was observed and one test results was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

Relative density: The calculation at combustion temperature 25°C/metering temperature 0°C may be problematic. One statistical outlier was observed and one test result was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

The calculation at combustion temperature 15°C/metering temperature 15°C may be problematic. One statistical outlier was observed and one test result was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

Wobbe index: The calculation at combustion temperature 25°C/metering temperature 0°C may be problematic for a number of laboratories. One statistical outlier was observed and one test result was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

The calculation at combustion temperature 15°C/metering temperature 15°C may be problematic for a number of laboratories. Three statistical outliers were observed and one test result was excluded. The variation for real gas was large compared to the observed variation in last year's PT: iis17S01M.

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 value per component, calculated reproducibilities and reproducibilities derived from ISO6974-3 and ASTM D1945 are compared in the next table.

Component	unit	n	average	2.8 * sd	R(ISO6974-3)	R(D1945)
Methane	%mol/mol	53	87.117	0.468	0.174	0.15
Ethane	%mol/mol	53	4.978	0.141	0.149	0.12
Propane	%mol/mol	54	2.531	0.092	0.076	0.10
iso-Butane	%mol/mol	54	1.005	0.053	0.060	0.10
n-Butane	%mol/mol	53	1.000	0.054	0.060	0.10
Carbon dioxide	%mol/mol	51	0.395	0.057	0.024	0.07
Nitrogen	%mol/mol	52	2.974	0.218	0.089	0.10
Carbon content	g/100g	12	72.44	0.56	1.59	R(EN15984)

Table 2: performance of the group in comparison with the target reproducibilities

Without further statistical calculations it can be concluded that for several components there is not a good compliance of the group of participating laboratories with the relevant reference test method. The problematic components have been discussed in paragraph 4.1.

The average values for real gas and the corresponding calculated reproducibilities are summarized in tables 3 and 4.

Combustion temperature 25°C, metering temperature 0°C, real gas				
Property	unit	n	average	2.8 * sd
Caloric Value (Sup)	MJ/m^3	23	43.32	0.26
Caloric Value (Inf)	kJ/100g	12	4668	30
Density	kg/m^3	22	0.8400	0.0038
Relative Density		23	0.6496	0.0032
Wobbe Index	MJ/m^3	23	53.75	0.29

Table 3: performance of the group for combustion temperature of 25°C, real gas

Combustion temperature 15°C, metering temperature 15°C, real gas				
Property	unit	n	average	2.8 * sd
Caloric Value (Sup)	MJ/m^3	33	41.07	0.19
Caloric Value (Inf)	kJ/100g	14	4664	59
Density	kg/m^3	35	0.7955	0.0033
Relative Density		34	0.6492	0.0026
Wobbe Index	MJ/m^3	29	50.96	0.17

Table 4: performance of the group for combustion temperature of 15°C, real gas

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

	April 2018	April 2017	April 2016	April 2015	April 2014
Total Number of reporting labs	59	56	60	47	38
Number of results reported	700	650	691	533	600
Statistical outliers	46	41	50	33	38
Percentage outliers	6.6%	6.3%	7.2%	6.2%	6.5%

Table 5: 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 the following table:

	2018 ISO6974-3	2018 D1945	2017 ISO6974-3	2017 D1945	2016 ISO6974-3	2016 D1945	2015 ISO6974-3	2015 D1945
Methane	--	--	-	-	--	--	--	--
Ethane	+/-	-	+/-	+	+/-	-	+/-	+
Propane	-	+/-	-	++	-	++	-	++
iso-Butane	+	++	+/-	++	+/-	++	+/-	++
n-Butane	+	++	+/-	++	-	++	+/-	++
Carbon dioxide	--	+	-	++	--	+/-	--	++
Nitrogen	--	--	--	-	--	--	--	--

Table 6: comparison of observed precision with precision of ISO6974-3 / ASTM D1945

	2018	2017	2016
Carbon content	++	++	++

Table 7: comparison of observed precision with precision of EN15984

The performance of the determinations against the requirements of the respective reference test method 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

5 DISCUSSION

Most of the observed reproducibilities are not in agreement with the reproducibility requirements of ISO6974-3 and therefore it had to be concluded that the group did not improve since the 2015 PT for Natural Gas.

It is remarkable that 21 of the 59 reporting laboratories may have made an error in the calculation(s) of the Physical Properties.

The average values per component as determined in this PT are compared with the average values from the homogeneity testing by the supplier EffecTech in the following table.

Component	Average values by EffecTech in %mol/mol	Average values from participants results in %mol/mol	Absolute differences in %mol/mol
Methane	87.1098	87.1170	0.0072
Ethane	4.9719	4.9775	0.0056
Propane	2.5242	2.5305	0.0063
iso-Butane	0.9998	1.0052	0.0054
n-Butane	0.9965	1.0002	0.0037
Carbon dioxide	0.4004	0.3950	-0.0054
Nitrogen	2.9973	2.9740	-0.0233

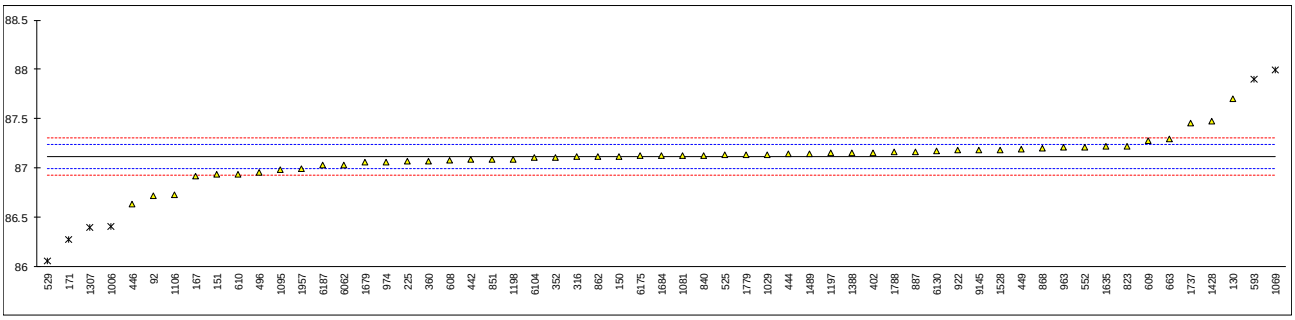
Table 8: comparison of average values with values determined by the supplier EffecTech

From the comparison in table 8 it is clear that the average values as determined in this PT are all very well in line with the values as determined during the preparation of the gas cylinders.

APPENDIX 1

Determination of Methane on sample #18040; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2261	86.719		-6.40	
130	GPA2261	87.6995		9.36	
150	D1945	87.12		0.05	
151	GPA2261	86.934		-2.94	
158		-----		-----	
167	GPA2261	86.9213		-3.14	
171	D7833	86.276	C,R(0.01)	-13.51	First reported 86.5215
225	D1945	87.070		-0.75	
316	ISO6974-3	87.1130		-0.06	
352	ISO6974-3	87.1059		-0.18	
360	ISO6974-3	87.072		-0.72	
402	ISO6974-3	87.1587		0.67	
442	D1945	87.0840		-0.53	
444	D1945	87.1469		0.48	
446	EN15984	86.637		-7.71	
449	ISO6974-3	87.1940		1.24	
496	EN15984	86.953		-2.64	
525	GPA2286/2261	87.1312		0.23	
529	GPA2261	86.0607	R(0.01)	-16.97	
552	D1945	87.212		1.53	
593	D1945	87.901	C,R(0.01)	12.60	First reported 86.5974
608	GPA2261	87.08		-0.59	
609	GPA2261	87.2778		2.58	
610	GPA2261	86.94		-2.84	
663	D1945	87.295		2.86	
823	GPA2261	87.22	C	1.66	First reported 87.52
840	D1945	87.127		0.16	
851	GPA2261	87.08922		-0.45	
862	GPA2261	87.114		-0.05	
868	GPA2261	87.198		1.30	
887	D1945	87.166		0.79	
922	GPA2261	87.18		1.01	
963	D1945	87.210		1.49	
974	ISO6974-5	87.0579		-0.95	
1006	D1945	86.410	C,R(0.01)	-11.36	First reported 87.799
1029	D1945	87.136		0.31	
1069	UOP539Mod.	87.9989	R(0.01)	14.17	
1081	In house	87.126		0.15	
1095	EN15984	86.98		-2.20	
1106	GPA2286	86.73		-6.22	
1197	D1945	87.153		0.58	
1198	D1945	87.092		-0.40	
1307	In house	86.395	R(0.01)	-11.60	
1388	GPA2261	87.157		0.64	
1428	ISO6974-3	87.4753	C	5.76	First reported 88.0984
1489	GPA2261	87.149		0.51	
1528	ISO6975	87.186163		1.11	
1635	D1945	87.217		1.61	
1679	ISO6974-3	87.056		-0.98	
1684	ISO6974-3	87.124		0.11	
1737	In house	87.46		5.51	
1779	GPA2261	87.1322		0.24	
1788	D7833	87.1647		0.77	
1957	GPA2261	86.9941		-1.97	
6062	ISO6974-3	87.0325		-1.36	
6104	GPA2261	87.105		-0.19	
6130	GB/T13610	87.1708		0.87	
6175	In house	87.1224		0.09	
6187	D1945	87.03		-1.40	
9101		-----		-----	
9145	GPA2261	87.18	C	1.01	First reported 87.58
	normality	not OK			
	n	53			
	outliers	6			
	mean (n)	87.1170			
	st.dev. (n)	0.16724			
	R(calc.)	0.4683			
	st.dev.(ISO6974-3:00)	0.06223			
	R(ISO6974-3:00)	0.1742			Compare R(D1945:14) = 0.15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88
87.5
87
86.5
86
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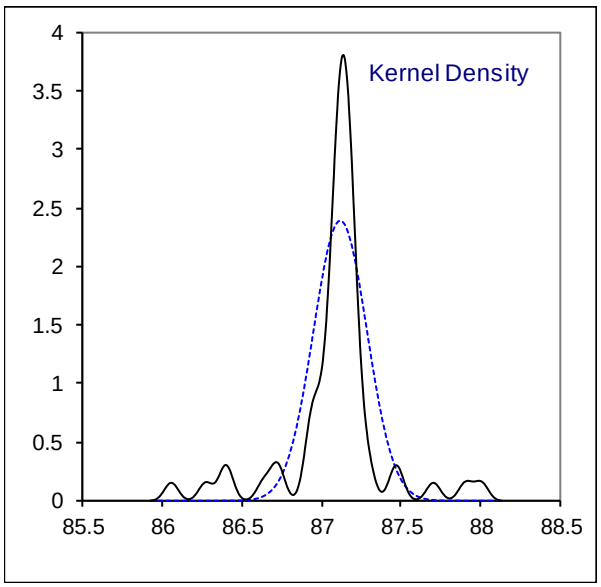
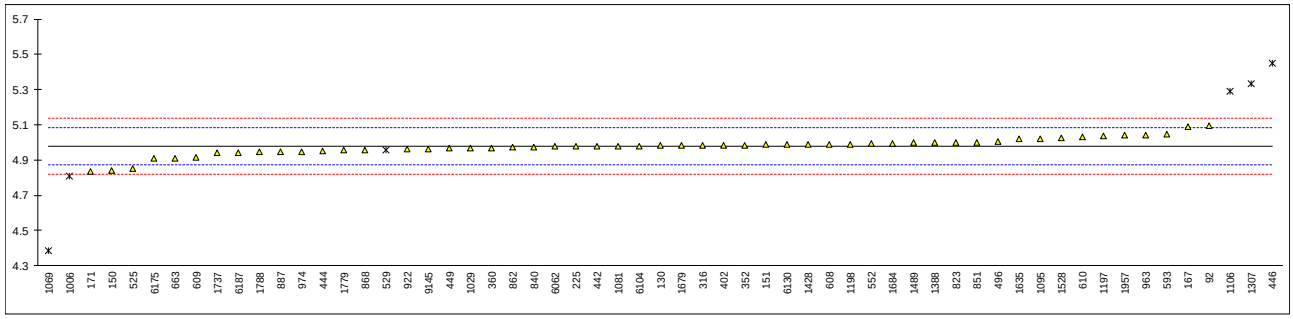
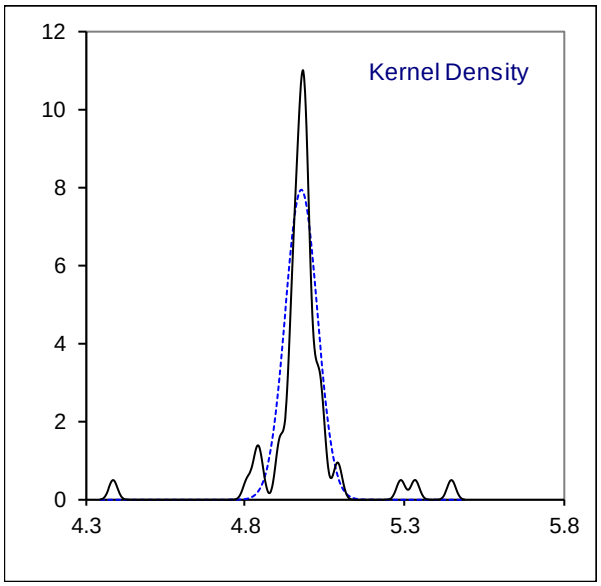

Kernel Density
4
3.5
3
2.5
2
1.5
1
0.5
0
85.5
86
86.5
87
87.5
88
88.5

Determination of Ethane on sample #18040; results in %mol/mol

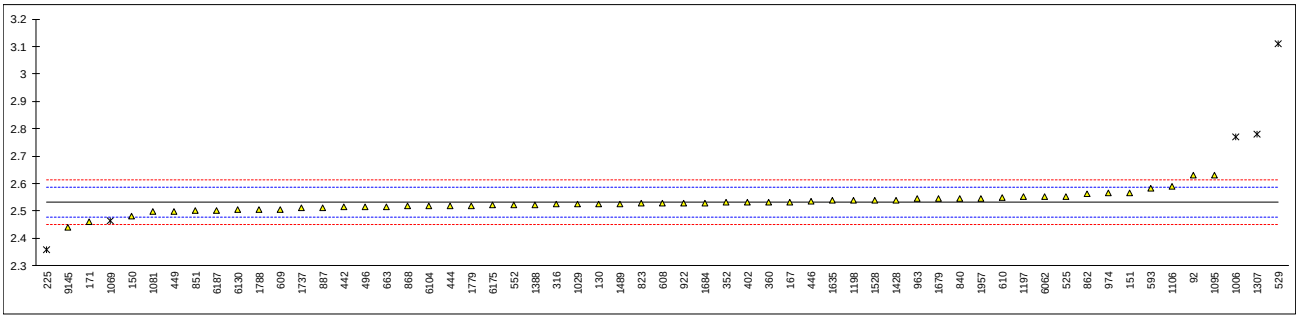
lab	method	value	mark	z(targ)	remarks
92	GPA2261	5.096		2.22	
130	GPA2261	4.9817		0.08	
150	D1945	4.84		-2.58	
151	GPA2261	4.987		0.18	
158		-----		-----	
167	GPA2261	5.0872		2.06	
171	D7833	4.8367		-2.64	
225	D1945	4.976		-0.03	
316	ISO6974-3	4.9852		0.14	
352	ISO6974-3	4.9855		0.15	
360	ISO6974-3	4.970		-0.14	
402	ISO6974-3	4.9853		0.15	
442	D1945	4.9764		-0.02	
444	D1945	4.954		-0.44	
446	EN15984	5.449	R(0.01)	8.84	
449	ISO6974-3	4.9656		-0.22	
496	EN15984	5.005		0.52	
525	GPA2286/2261	4.8505		-2.38	
529	GPA2261	4.9588	ex	-0.35	Result excluded: see §4.1
552	D1945	4.994		0.31	
593	D1945	5.046	C	1.28	First reported 5.0669
608	GPA2261	4.99		0.23	
609	GPA2261	4.9128		-1.21	
610	GPA2261	5.03		0.98	
663	D1945	4.910		-1.27	
823	GPA2261	5.00		0.42	
840	D1945	4.975		-0.05	
851	GPA2261	5.00089		0.44	
862	GPA2261	4.974		-0.07	
868	GPA2261	4.958		-0.37	
887	D1945	4.947		-0.57	
922	GPA2261	4.96		-0.33	
963	D1945	5.043		1.23	
974	ISO6974-5	4.9474		-0.56	
1006	D1945	4.808	ex	-3.18	Result excluded: see §4.1
1029	D1945	4.968		-0.18	
1069	UOP539Mod.	4.3865	R(0.01)	-11.08	
1081	In house	4.977		-0.01	
1095	EN15984	5.02		0.80	
1106	GPA2286	5.29	R(0.01)	5.86	
1197	D1945	5.036		1.10	
1198	D1945	4.991		0.25	
1307	In house	5.3348	C,R(0.01)	6.70	First reported 5.3412
1388	GPA2261	4.999		0.40	
1428	ISO6974-3	4.9886	C	0.21	First reported 5.0288
1489	GPA2261	4.998		0.38	
1528	ISO6975	5.027019		0.93	
1635	D1945	5.019		0.78	
1679	ISO6974-3	4.985		0.14	
1684	ISO6974-3	4.996		0.35	
1737	In house	4.94		-0.70	
1779	GPA2261	4.9555		-0.41	
1788	D7833	4.9462		-0.59	
1957	GPA2261	5.0408		1.19	
6062	ISO6974-3	4.9754		-0.04	
6104	GPA2261	4.979		0.03	
6130	GB/T13610	4.9885		0.21	
6175	In house	4.9077		-1.31	
6187	D1945	4.94		-0.70	
9101		-----		-----	
9145	GPA2261	4.96		-0.33	
	normality	suspect			
	n	53			
	outliers	4 (+2 excl)			
	mean (n)	4.9775			
	st.dev. (n)	0.05037			
	R(calc.)	0.1410			
	st.dev.(ISO6974-3:00)	0.05333			
	R(ISO6974-3:00)	0.1493			Compare R(D1945:14) = 0.12

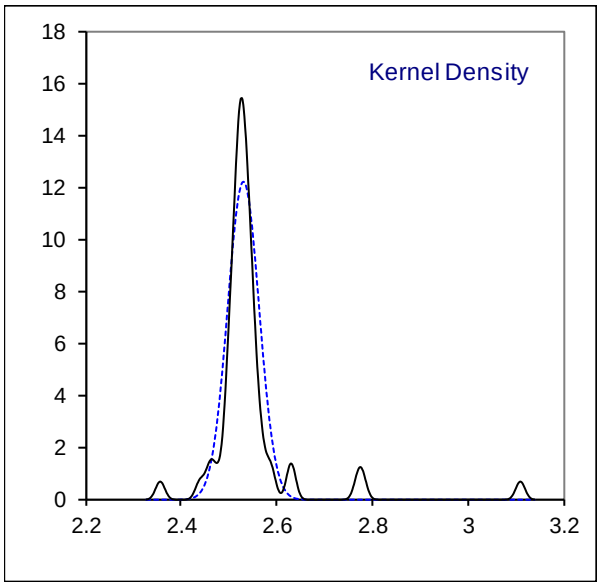

5.7
5.5
5.3
5.1
4.9
4.7
4.5
4.3
1069 1006 171 150 525 6175 663 609 1737 6187 1788 887 974 444 1779 868 529 922 9145 449 1029 360 862 840 6062 225 442 1081 6104 130 1679 316 402 352 151 6130 1428 608 1198 552 1684 1489 1388 823 851 496 1635 1095 1528 610 1197 1957 963 593 167 92 1106 1307 446


Kernel Density
12
10
8
6
4
2
0
4.3
4.8
5.3
5.8

Determination of Propane on sample #18040; results in %mol/mol

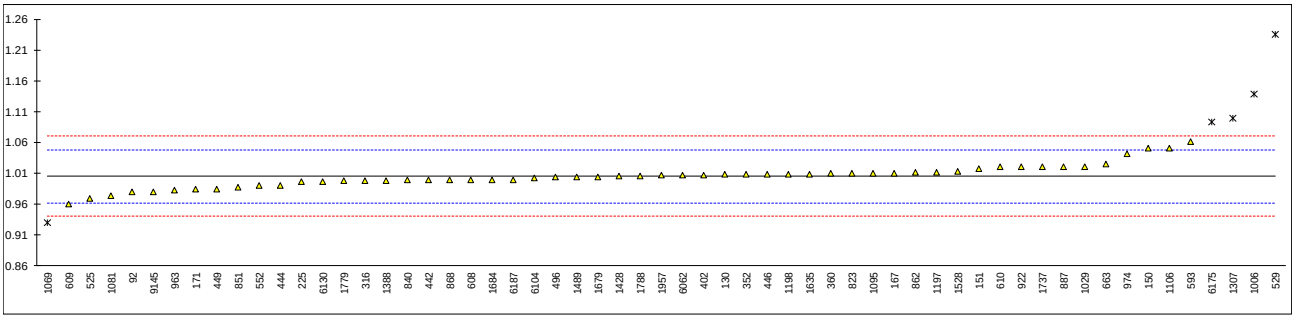
lab	method	value	mark	z(targ)	remarks
92	GPA2261	2.630		3.67	
130	GPA2261	2.5255		-0.18	
150	D1945	2.48		-1.86	
151	GPA2261	2.567		1.35	
158		-----		-----	
167	GPA2261	2.5327		0.08	
171	D7833	2.46		-2.60	
225	D1945	2.357	R(0.01)	-6.40	
316	ISO6974-3	2.5237		-0.25	
352	ISO6974-3	2.5316		0.04	
360	ISO6974-3	2.532		0.06	
402	ISO6974-3	2.5319		0.05	
442	D1945	2.5143		-0.60	
444	D1945	2.519		-0.42	
446	EN15984	2.535		0.17	
449	ISO6974-3	2.4974		-1.22	
496	EN15984	2.515		-0.57	
525	GPA2286/2261	2.5517		0.78	
529	GPA2261	3.10825	R(0.01)	21.31	
552	D1945	2.521		-0.35	
593	D1945	2.583	C	1.94	First reported 2.7407
608	GPA2261	2.53		-0.02	
609	GPA2261	2.5060		-0.90	
610	GPA2261	2.55		0.72	
663	D1945	2.515		-0.57	
823	GPA2261	2.53		-0.02	
840	D1945	2.546		0.57	
851	GPA2261	2.49967		-1.14	
862	GPA2261	2.563		1.20	
868	GPA2261	2.518		-0.46	
887	D1945	2.513		-0.64	
922	GPA2261	2.53		-0.02	
963	D1945	2.544		0.50	
974	ISO6974-5	2.5644		1.25	
1006	D1945	2.770	C,R(0.01)	8.83	First reported 2.393
1029	D1945	2.524		-0.24	
1069	UOP539Mod.	2.4649	ex	-2.42	Result excluded: see §4.1
1081	In house	2.497		-1.24	
1095	EN15984	2.63		3.67	
1106	GPA2286	2.59		2.20	
1197	D1945	2.551		0.76	
1198	D1945	2.539		0.31	
1307	In house	2.7789	C,R(0.01)	9.16	First reported 2.7837
1388	GPA2261	2.523		-0.28	
1428	ISO6974-3	2.5401	C	0.35	First reported 2.5620
1489	GPA2261	2.526		-0.17	
1528	ISO6975	2.539640		0.34	
1635	D1945	2.537		0.24	
1679	ISO6974-3	2.545		0.54	
1684	ISO6974-3	2.530		-0.02	
1737	In house	2.51		-0.76	
1779	GPA2261	2.5198		-0.39	
1788	D7833	2.5047		-0.95	
1957	GPA2261	2.547	C	0.61	First reported 2.6933
6062	ISO6974-3	2.5513		0.77	
6104	GPA2261	2.518		-0.46	
6130	GB/T13610	2.5030		-1.01	
6175	In house	2.5208		-0.36	
6187	D1945	2.50		-1.12	
9101		-----		-----	
9145	GPA2261	2.44		-3.34	
	normality	not OK			
	n	54			
	outliers	4 (+1 excl)			
	mean (n)	2.5305			
	st.dev. (n)	0.03273			
	R(calc.)	0.0916			
	st.dev.(ISO6974-3:00)	0.02710			
	R(ISO6974-3:00)	0.0759			Compare R(D1945:14) = 0.10

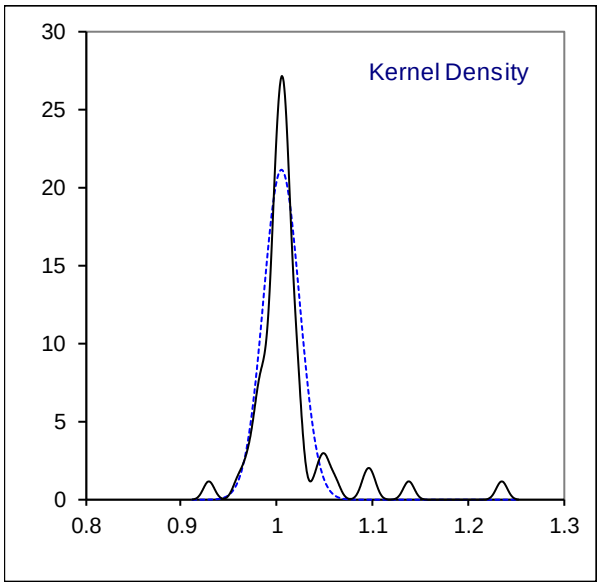

3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
225 9145 171 1069 150 1081 449 851 6187 6130 1788 609 1737 887 442 496 663 868 6104 444 1779 6175 552 1388 316 1029 130 1489 823 608 922 1684 352 402 360 167 446 1635 1198 1528 1428 963 1679 840 1957 610 1197 6062 525 862 974 151 593 1106 92 1095 1006 1307 529


Kernel Density
18
16
14
12
10
8
6
4
2
0
2.2
2.4
2.6
2.8
3
3.2

Determination of iso-Butane on sample #18040; results in %mol/mol

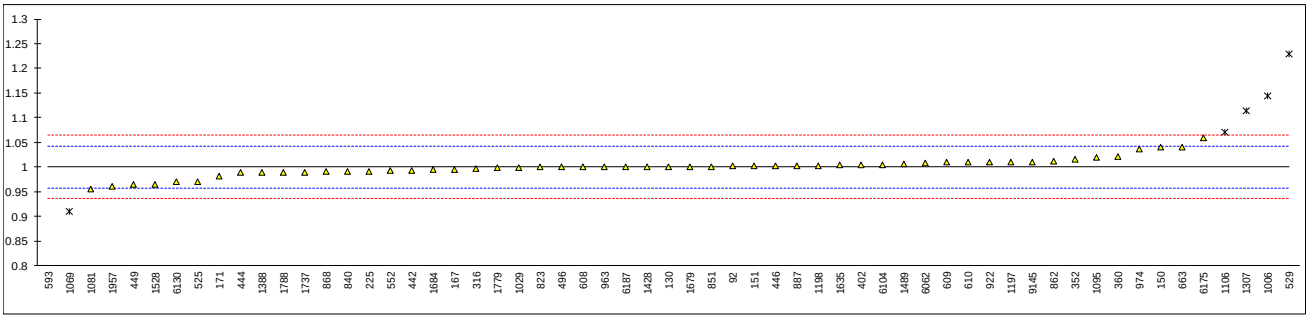
lab	method	value	mark	z(targ)	remarks
92	GPA2261	0.980		-1.17	
130	GPA2261	1.0080		0.13	
150	D1945	1.05		2.08	
151	GPA2261	1.017		0.55	
158		-----		-----	
167	GPA2261	1.0106		0.25	
171	D7833	0.9837		-1.00	
225	D1945	0.996		-0.43	
316	ISO6974-3	0.9980		-0.33	
352	ISO6974-3	1.0090		0.18	
360	ISO6974-3	1.010		0.22	
402	ISO6974-3	1.0075		0.11	
442	D1945	0.9997		-0.26	
444	D1945	0.991		-0.66	
446	EN15984	1.009		0.18	
449	ISO6974-3	0.9845		-0.96	
496	EN15984	1.004		-0.06	
525	GPA2286/2261	0.9693		-1.67	
529	GPA2261	1.235	R(0.01)	10.67	
552	D1945	0.990		-0.71	
593	D1945	1.061	C	2.59	First reported 1.0790
608	GPA2261	1.00		-0.24	
609	GPA2261	0.9601		-2.09	
610	GPA2261	1.02		0.69	
663	D1945	1.025		0.92	
823	GPA2261	1.01		0.22	
840	D1945	0.999		-0.29	
851	GPA2261	0.98784		-0.81	
862	GPA2261	1.012		0.31	
868	GPA2261	1.000		-0.24	
887	D1945	1.021		0.73	
922	GPA2261	1.02		0.69	
963	D1945	0.982		-1.08	
974	ISO6974-5	1.0418		1.70	
1006	D1945	1.138	C,R(0.01)	6.16	First reported 0.929
1029	D1945	1.021		0.73	
1069	UOP539Mod.	0.9295	R(0.01)	-3.52	
1081	In house	0.973		-1.50	
1095	EN15984	1.01		0.22	
1106	GPA2286	1.05		2.08	
1197	D1945	1.012		0.31	
1198	D1945	1.009		0.18	
1307	In house	1.0994	C,R(0.01)	4.37	First reported 1.0994
1388	GPA2261	0.998		-0.33	
1428	ISO6974-3	1.0049	C	-0.01	First reported 1.0142
1489	GPA2261	1.004		-0.06	
1528	ISO6975	1.013269		0.37	
1635	D1945	1.009		0.18	
1679	ISO6974-3	1.004		-0.06	
1684	ISO6974-3	1.000		-0.24	
1737	In house	1.02		0.69	
1779	GPA2261	0.9976		-0.35	
1788	D7833	1.0055		0.01	
1957	GPA2261	1.0066		0.06	
6062	ISO6974-3	1.0074		0.10	
6104	GPA2261	1.003		-0.10	
6130	GB/T13610	0.9963		-0.41	
6175	In house	1.0932	R(0.01)	4.08	
6187	D1945	1.00		-0.24	
9101		-----		-----	
9145	GPA2261	0.98		-1.17	
	normality	suspect			
	n	54			
	outliers	5			
	mean (n)	1.0052			
	st.dev. (n)	0.01883			
	R(calc.)	0.0527			
	st.dev.(ISO6974-3:00)	0.02154			
	R(ISO6974-3:00)	0.0603			Compare R(D1945:14) = 0.10

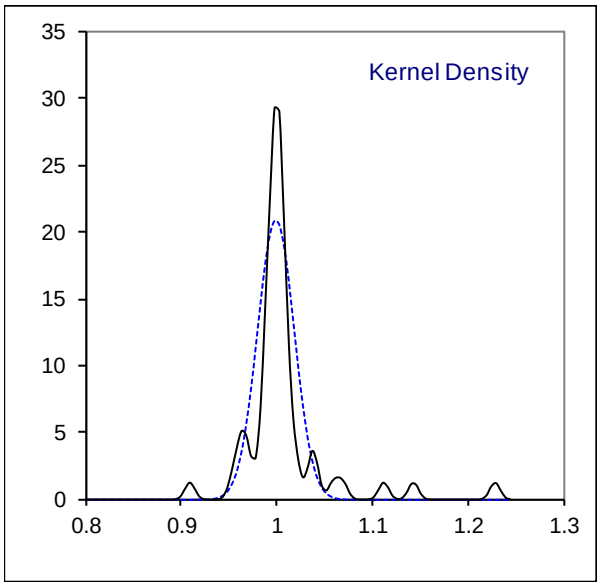

1.26
1.21
1.16
1.11
1.06
1.01
0.96
0.91
0.86
1069 609 525 1081 92 9145 963 171 449 851 552 444 225 6130 1779 316 1388 840 442 868 608 1684 6187 6104 496 1489 1679 1428 1788 1957 6062 402 130 352 446 1198 1635 360 823 1095 167 862 1197 1528 151 610 922 1737 887 1029 663 974 150 1106 593 6175 1307 1006 529


Kernel Density
30
25
20
15
10
5
0
0.8
0.9
1
1.1
1.2
1.3

Determination of n-Butane on sample #18040; results in %mol/mol

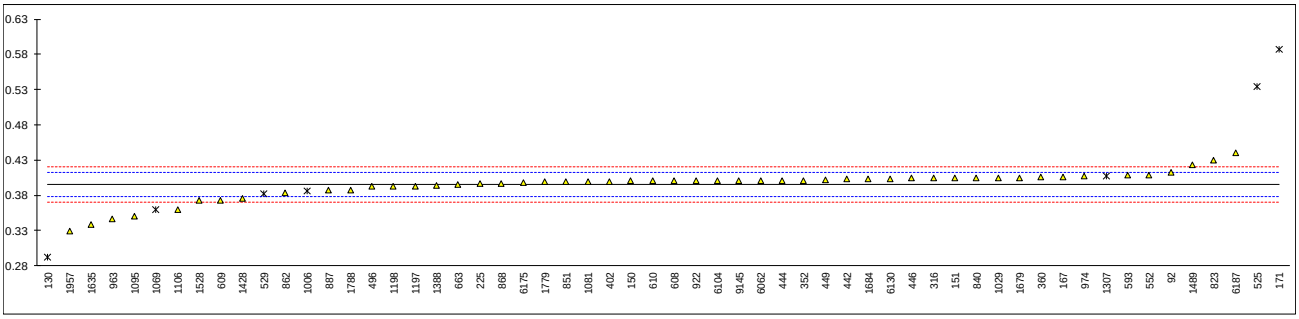
lab	method	value	mark	z(targ)	remarks
92	GPA2261	1.002		0.09	
130	GPA2261	1.0003		0.01	
150	D1945	1.04		1.86	
151	GPA2261	1.003		0.13	
158		-----		-----	
167	GPA2261	0.9954		-0.22	
171	D7833	0.9811		-0.89	
225	D1945	0.992		-0.38	
316	ISO6974-3	0.9975		-0.12	
352	ISO6974-3	1.0151		0.70	
360	ISO6974-3	1.022		1.02	
402	ISO6974-3	1.0044		0.20	
442	D1945	0.9931		-0.33	
444	D1945	0.989		-0.52	
446	EN15984	1.003		0.13	
449	ISO6974-3	0.9644		-1.67	
496	EN15984	1.000		-0.01	
525	GPA2286/2261	0.9706		-1.38	
529	GPA2261	1.2293	R(0.01)	10.69	
552	D1945	0.993		-0.33	
593	D1945	0.004	C,R(0.01)	-46.48	First reported 1.1205
608	GPA2261	1.00		-0.01	
609	GPA2261	1.0095		0.44	
610	GPA2261	1.01		0.46	
663	D1945	1.040		1.86	
823	GPA2261	1.00		-0.01	
840	D1945	0.992		-0.38	
851	GPA2261	1.00144		0.06	
862	GPA2261	1.011		0.51	
868	GPA2261	0.991		-0.43	
887	D1945	1.003		0.13	
922	GPA2261	1.01		0.46	
963	D1945	1.00		-0.01	
974	ISO6974-5	1.0369		1.71	
1006	D1945	1.144	C,R(0.01)	6.71	First reported 0.882
1029	D1945	0.999		-0.05	
1069	UOP539Mod.	0.9102	R(0.01)	-4.20	
1081	In house	0.955		-2.11	
1095	EN15984	1.02		0.93	
1106	GPA2286	1.07	R(0.05)	3.26	
1197	D1945	1.010		0.46	
1198	D1945	1.003		0.13	
1307	In house	1.113	C,R(0.01)	5.26	First reported 1.115
1388	GPA2261	0.989		-0.52	
1428	ISO6974-3	1.0001	C	0.00	First reported 1.0095
1489	GPA2261	1.006		0.27	
1528	ISO6975	0.9654	C	-1.62	First reported 0.915400
1635	D1945	1.004		0.18	
1679	ISO6974-3	1.001		0.04	
1684	ISO6974-3	0.995		-0.24	
1737	In house	0.99		-0.47	
1779	GPA2261	0.9985		-0.08	
1788	D7833	0.9890		-0.52	
1957	GPA2261	0.9607	C	-1.84	First reported 0.9352
6062	ISO6974-3	1.0075		0.34	
6104	GPA2261	1.005		0.23	
6130	GB/T13610	0.9701		-1.40	
6175	In house	1.0601		2.80	
6187	D1945	1.00		-0.01	
9101		-----		-----	
9145	GPA2261	1.01		0.46	
	normality	suspect			
	n	53			
	outliers	6			
	mean (n)	1.0002			
	st.dev. (n)	0.01915			
	R(calc.)	0.0536			
	st.dev.(ISO6974-3:00)	0.02143			
	R(ISO6974-3:00)	0.0600			Compare R(D1945:14) = 0.10

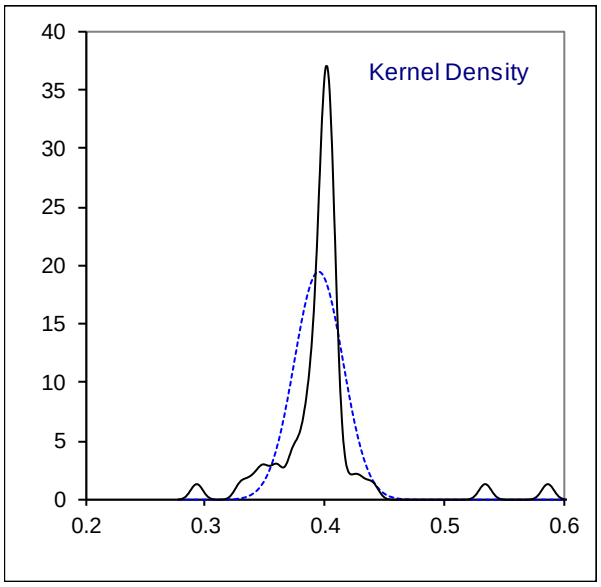

1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
593 1069 1081 1957 449 1528 6130 525 171 444 1388 1788 1737 868 840 225 552 442 1684 167 316 1779 1029 823 496 608 963 6187 1428 130 1679 851 92 151 446 887 1198 1635 402 6104 1489 6062 609 610 922 1197 9145 862 352 1095 360 974 150 663 6175 1106 1307 1006 529


Kernel Density
35
30
25
20
15
10
5
0
0.8
0.9
1
1.1
1.2
1.3

Determination of Carbon Dioxide on sample #18040; results in %mol/mol

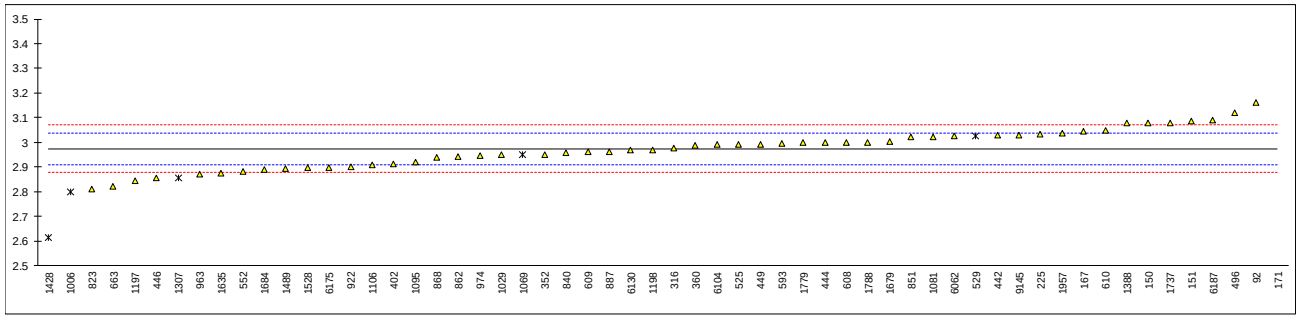
lab	method	value	mark	z(targ)	remarks
92	GPA2261	0.413		2.13	
130	GPA2261	0.2928	R(0.01)	-12.07	
150	D1945	0.40		0.59	
151	GPA2261	0.405		1.18	
158		-----		-----	
167	GPA2261	0.4065		1.36	
171	D7833	0.587	C,R(0.01)	22.69	First reported 0.5346
225	D1945	0.396		0.12	
316	ISO6974-3	0.4047		1.15	
352	ISO6974-3	0.4010		0.71	
360	ISO6974-3	0.406		1.30	
402	ISO6974-3	0.3999		0.58	
442	D1945	0.4033		0.98	
444	D1945	0.401		0.71	
446	EN15984	0.404		1.07	
449	ISO6974-3	0.4024		0.88	
496	EN15984	0.392		-0.35	
525	GPA2286/2261	0.5345	R(0.01)	16.48	
529	GPA2261	0.3818	ex	-1.56	Result excluded: see §4.1
552	D1945	0.408		1.54	
593	D1945	0.408	C	1.54	First reported 0.3118
608	GPA2261	0.40		0.59	
609	GPA2261	0.3727		-2.63	
610	GPA2261	0.40		0.59	
663	D1945	0.395		0.00	
823	GPA2261	0.43		4.14	
840	D1945	0.405		1.18	
851	GPA2261	0.39878		0.45	
862	GPA2261	0.384		-1.30	
868	GPA2261	0.397		0.24	
887	D1945	0.387		-0.94	
922	GPA2261	0.40		0.59	
963	D1945	0.347		-5.67	
974	ISO6974-5	0.4068		1.40	
1006	D1945	0.386	ex	-1.06	Result excluded: see §4.1
1029	D1945	0.405		1.18	
1069	UOP539Mod.	0.36	ex	-4.13	Result excluded: see §4.1
1081	In house	0.399		0.47	
1095	EN15984	0.35		-5.31	
1106	GPA2286	0.36		-4.13	
1197	D1945	0.393		-0.23	
1198	D1945	0.392		-0.35	
1307	In house	0.4068	ex	1.40	Result excluded: see §4.1
1388	GPA2261	0.394		-0.12	
1428	ISO6974-3	0.3759		-2.25	
1489	GPA2261	0.423		3.31	
1528	ISO6975	0.372430		-2.66	
1635	D1945	0.339		-6.61	
1679	ISO6974-3	0.405		1.18	
1684	ISO6974-3	0.4036	C	1.02	First reported 5.078
1737		-----		-----	
1779	GPA2261	0.3987		0.44	
1788	D7833	0.3879		-0.84	
1957	GPA2261	0.3297	C	-7.71	First reported 0.2913
6062	ISO6974-3	0.4006		0.66	
6104	GPA2261	0.400		0.59	
6130	GB/T13610	0.4037		1.03	
6175	In house	0.3976		0.31	
6187	D1945	0.44		5.32	
9101		-----		-----	
9145	GPA2261	0.4	C	0.59	First reported 0
	normality	not OK			
	n	51			
	outliers	3 (+4 excl)			
	mean (n)	0.3950			
	st.dev. (n)	0.02042			
	R(calc.)	0.0572			
	st.dev.(ISO6974-3:00)	0.00846			
	R(ISO6974-3:00)	0.0237			Compare R(D1945:14) = 0.07

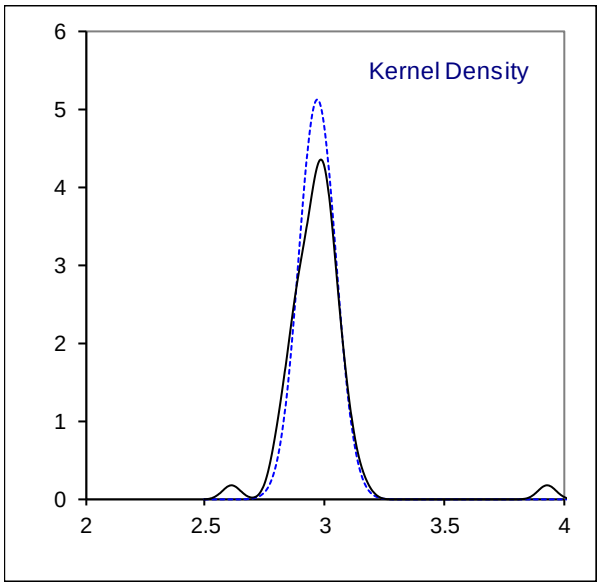

0.63
0.58
0.53
0.48
0.43
0.38
0.33
0.28
130 1957 1635 963 1095 1069 1106 1528 609 1428 529 862 1006 887 1788 496 1198 1197 1388 663 225 868 6175 1779 851 1081 402 150 610 608 922 6104 9145 6062 444 352 449 442 1684 6130 446 316 151 840 1029 1679 360 167 974 1307 593 552 92 1489 823 6187 525 171


Kernel Density
40
35
30
25
20
15
10
5
0
0.2
0.3
0.4
0.5
0.6

Determination of Nitrogen on sample #18040; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2261	3.160		5.84	
130		-----		-----	
150	D1945	3.08		3.33	
151	GPA2261	3.087		3.55	
158		-----		-----	
167	GPA2261	3.0463		2.27	
171	D7833	3.935	C,R(0.01)	30.16	First reported 3.682
225	D1945	3.034		1.88	
316	ISO6974-3	2.9779		0.12	
352	ISO6974-3	2.9519		-0.69	
360	ISO6974-3	2.988		0.44	
402	ISO6974-3	2.9121		-1.94	
442	D1945	3.0292		1.73	
444	D1945	2.998		0.75	
446	EN15984	2.854		-3.77	
449	ISO6974-3	2.9917		0.56	
496	EN15984	3.119		4.55	
525	GPA2286/2261	2.9911		0.54	
529	GPA2261	3.02615	ex	1.64	Result excluded: see §4.1
552	D1945	2.882		-2.89	
593	D1945	2.997	C	0.72	First reported 3.0838
608	GPA2261	3.00		0.82	
609	GPA2261	2.9611		-0.40	
610	GPA2261	3.05		2.39	
663	D1945	2.820		-4.83	
823	GPA2261	2.81	C	-5.15	First reported 2.51
840	D1945	2.956		-0.56	
851	GPA2261	3.02217		1.51	
862	GPA2261	2.942		-1.00	
868	GPA2261	2.938		-1.13	
887	D1945	2.963		-0.35	
922	GPA2261	2.90		-2.32	
963	D1945	2.872		-3.20	
974	ISO6974-5	2.9448		-0.92	
1006	D1945	2.801	ex	-5.43	Result excluded: see §4.1
1029	D1945	2.949		-0.78	
1069	UOP539Mod.	2.95	ex	-0.75	Result excluded: see §4.1
1081	In house	3.023		1.54	
1095	EN15984	2.92		-1.69	
1106	GPA2286	2.910		-2.01	
1197	D1945	2.843		-4.11	
1198	D1945	2.971		-0.09	
1307	In house	2.8541	ex	-3.76	Result excluded: see §4.1
1388	GPA2261	3.077		3.23	
1428	ISO6974-3	2.6151	C,R(0.01)	-11.26	First reported 1.9108
1489	GPA2261	2.893		-2.54	
1528	ISO6975	2.8961	C	-2.44	First reported 2.946080
1635	D1945	2.875		-3.11	
1679	ISO6974-3	3.004		0.94	
1684	ISO6974-3	2.8905	C	-2.62	First reported 3.282
1737	In house	3.08		3.33	
1779	GPA2261	2.9977		0.74	
1788	D7833	3.0000		0.82	
1957	GPA2261	3.0387		2.03	
6062	ISO6974-3	3.0254		1.61	
6104	GPA2261	2.990		0.50	
6130	GB/T13610	2.9676		-0.20	
6175	In house	2.8984		-2.37	
6187	D1945	3.09		3.64	
9101		-----		-----	
9145	GPA2261	3.03		1.76	
	normality	OK			
	n	52			
	outliers	2 (+4 excl)			
	mean (n)	2.9740			
	st.dev. (n)	0.07792			
	R(calc.)	0.2182			
	st.dev.(ISO6974-3:00)	0.03186			
	R(ISO6974-3:00)	0.0892			Compare R(D1945:14) = 0.10

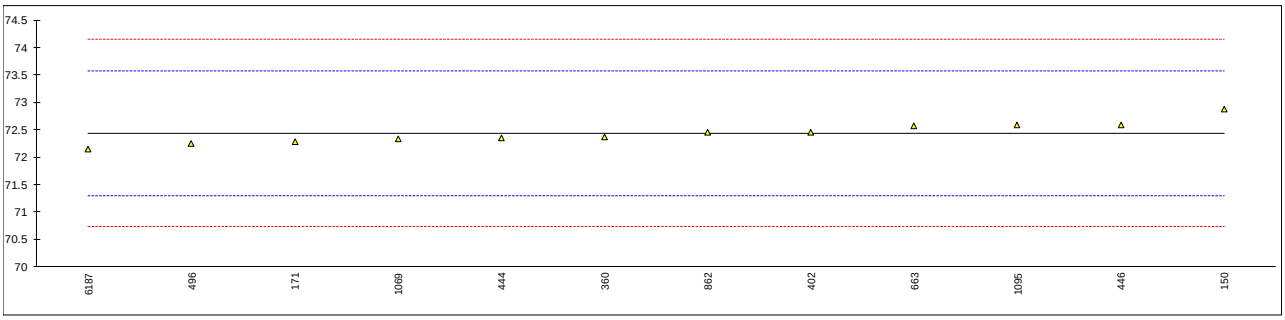

3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
1428 1006 823 663 1197 446 1307 963 1635 552 1684 1489 1528 6175 922 1106 402 1095 868 862 974 1029 1069 352 840 609 887 6130 1198 316 360 6104 525 449 593 1779 444 608 1788 1679 851 1081 6062 529 442 9145 225 1957 167 610 1388 150 1737 151 6187 496 92 171

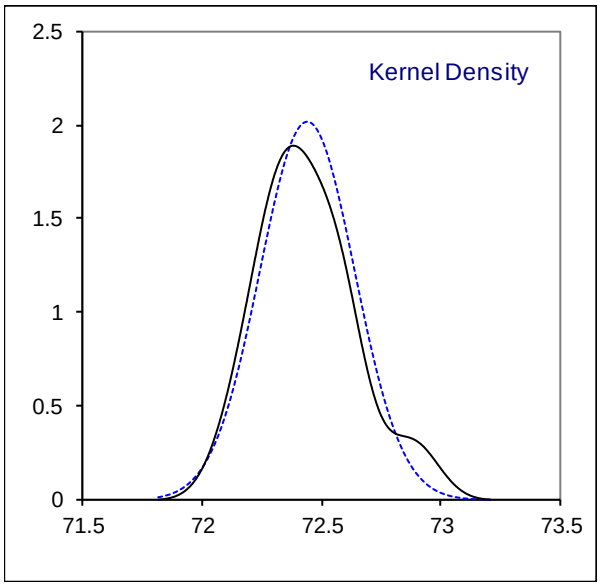

Kernel Density
6
5
4
3
2
1
0
2
2.5
3
3.5
4

Determination of Carbon content on sample #18040; results in g/100g

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	EN15984	72.88		0.78	
151		-----		-----	
158		-----		-----	
167		-----		-----	
171	EN15984	72.28		-0.28	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	EN15984	72.37		-0.12	
402	EN15984	72.4597		0.04	
442		-----		-----	
444	EN15984	72.35		-0.16	
446	EN15984	72.59		0.27	
449		-----		-----	
496	EN15984	72.244		-0.34	
525		-----		-----	
529		-----		-----	
552		-----		-----	
593		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
663	EN15984	72.573		0.24	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	EN15984	72.453		0.03	
868		-----		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069	UOP539Mod.	72.34		-0.17	
1081		-----		-----	
1095	EN15984	72.585		0.26	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388		-----		-----	
1428		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1779		-----		-----	
1788		-----		-----	
1957		-----		-----	
6062		-----		-----	
6104		-----		-----	
6130		-----		-----	
6175		-----		-----	
6187	EN15984	72.14		-0.52	
9101		-----		-----	
9145		-----		-----	

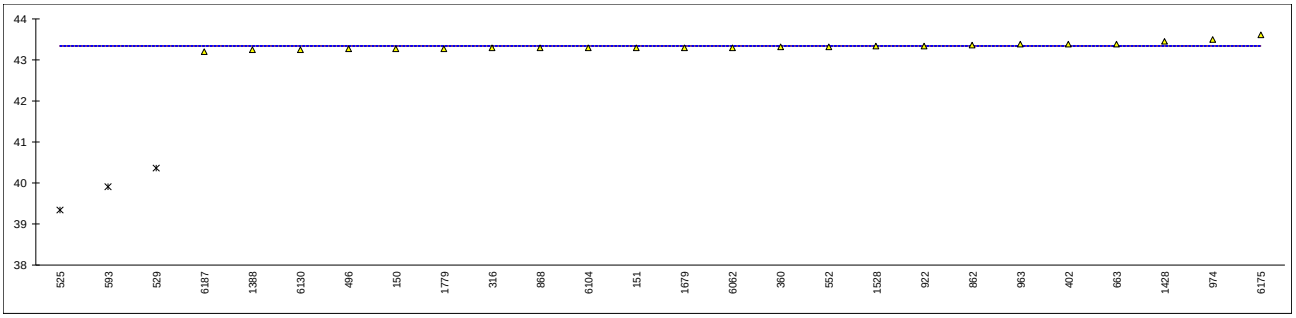
normality	suspect
n	12
outliers	0
mean (n)	72.439
st.dev. (n)	0.1983
R(calc.)	0.555
st.dev.(EN15984:11)	0.5692
R(EN15984:11)	1.594

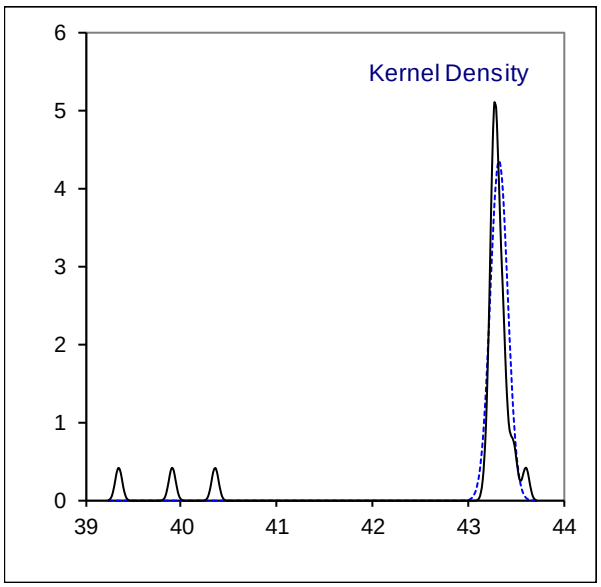

74.5
74
73.5
73
72.5
72
71.5
71
70.5
70
6187
496
171
1069
444
360
862
402
663
1095
446
150


Kernel Density
2.5
2
1.5
1
0.5
0
71.5
72
72.5
73
73.5

Determination of Caloric Value Superior (101.325 kPa, comb. temp. 25°C, metering temp 0°C) on sample #18040; results in MJ/m^3 (real gas)

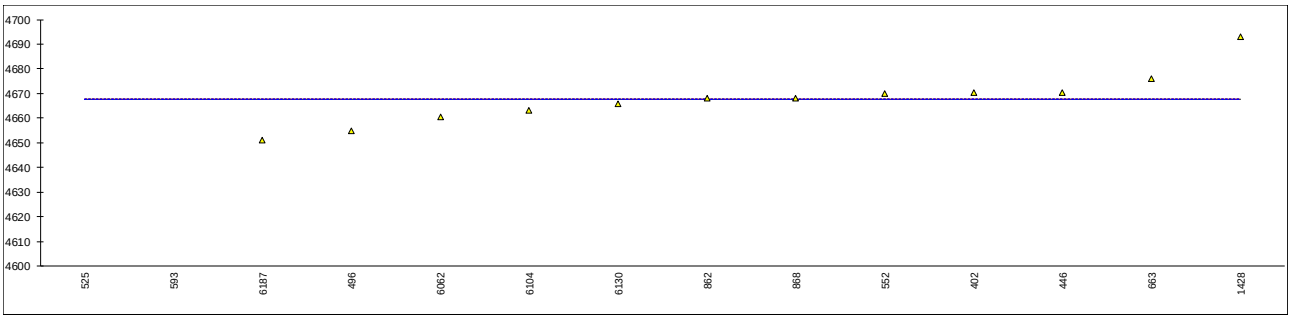
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	43.259		-----	
151	ISO6976	43.285		-----	
158		-----		-----	
167		-----		-----	
171		-----		-----	
225		-----		-----	
316	ISO6976	43.2800		-----	
352		-----		-----	
360	ISO6976	43.30		-----	
402	ISO6976	43.378	E	-----	iis calculated 43.328
442		-----		-----	
444		-----		-----	
446		-----		-----	
449		-----		-----	
496	DIN51857	43.2536	E	-----	iis calculated 43.232
525	ISO6976	39.34959	R(0.01),E	-----	iis calculated 43.149
529	D3588	40.357	E,ex	-----	iis calculated 43.032, result excluded see §4.1
552	ISO6976	43.307		-----	
593	ISO6976	39.909	R(0.01),E	-----	iis calculated 42.490
608		-----		-----	
609		-----		-----	
610		-----		-----	
663	ISO6976	43.381		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	43.35		-----	
868	ISO6976	43.28		-----	
887		-----		-----	
922	ISO6976	43.3400		-----	
963	ISO6976	43.37		-----	
974	GPA2172	43.490	E	-----	iis calculated 43.380
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	43.24	E	-----	iis calculated 43.296
1428	ISO6976	43.4524	C	-----	First reported 43.7761
1489		-----		-----	
1528	ISO6976	43.329	C	-----	First reported 41.01
1635		-----		-----	
1679	ISO6976	43.2908		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	43.2634		-----	
1788		-----		-----	
1957		-----		-----	
6062	ISO6976	43.294		-----	
6104	ISO6976	43.28		-----	
6130	GB/T11062	43.2427		-----	
6175	In house	43.6056	E	-----	iis calculated 43.431
6187	ISO6976	43.20		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	23			
	outliers	2 (+1 excl)			
	mean (n)	43.3248			
	st.dev. (n)	0.09162			
	R(calc.)	0.2565			Compare R(iis17S01M) = 0.1977

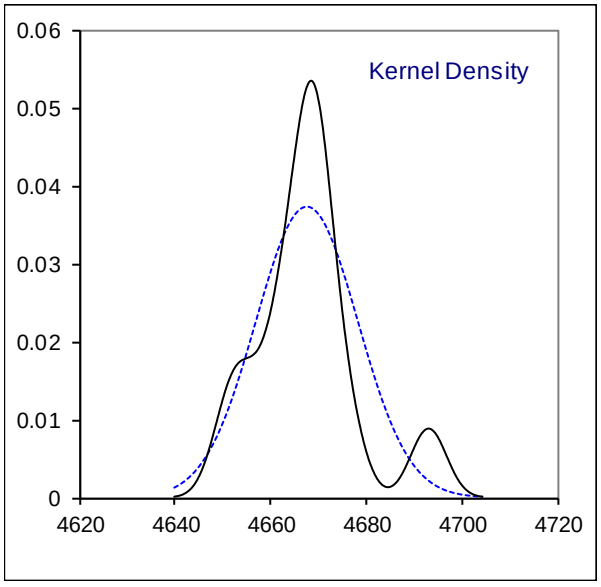

44
43
42
41
40
39
38
525
593
529
6187
1388
6130
496
150
1779
316
868
6104
151
1679
6062
360
552
1528
922
862
963
402
663
1428
974
6175


Kernel Density
6
5
4
3
2
1
0
39
40
41
42
43
44

Determination of Caloric Value Inferior (101.325 kPa, comb. temp. 25°C, metering temp 0°C) on sample #18040; results in kJ/100g (real gas)

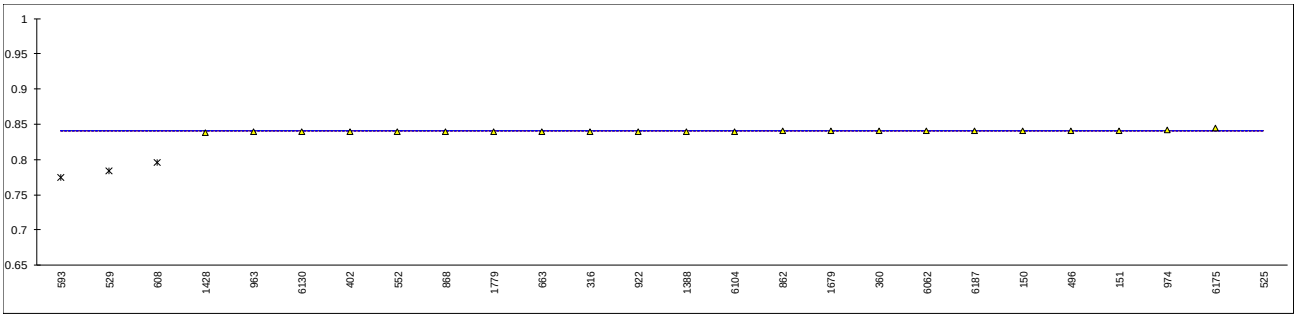
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150		-----		-----	
151		-----		-----	
158		-----		-----	
167		-----		-----	
171		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360		-----		-----	
402	ISO6976	4670.190	E	-----	iis calculated 4668.8
442		-----		-----	
444		-----		-----	
446	EN15984	4670.41	E	-----	iis calculated 4671.6
449		-----		-----	
496	DIN51857	4654.678		-----	
525	ISO6976	29.97785	DG(0.01),E	-----	iis calculated 4648.6
529		-----		-----	
552	ISO6976	4670		-----	
593	ISO6976	36.117	DG(0.01),E	-----	iis calculated 4667.0
608		-----		-----	
609		-----		-----	
610		-----		-----	
663	ISO6976	4675.94		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	4668		-----	
868	ISO6976	4668		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388		-----		-----	
1428	ISO6976	4693.10	C	-----	First reported 4744.29
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1779		-----		-----	
1788		-----		-----	
1957		-----		-----	
6062	ISO6976	4660.55		-----	
6104	ISO6976	4663		-----	
6130	GB/T11062	4665.8	E	-----	iis calculated 4664.8
6175		-----		-----	
6187	ISO6976	4651		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	12			
	outliers	2			
	mean (n)	4667.556			
	st.dev. (n)	10.6903			
	R(calc.)	29.933			Compare R(iis17S01M) = 15.967

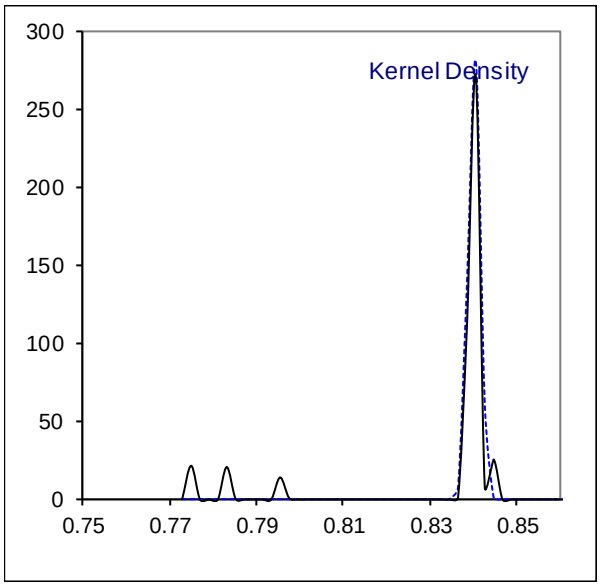

4700
4690
4680
4670
4660
4650
4640
4630
4620
4610
4600
525
593
6187
496
6062
6104
6130
862
868
552
402
446
663
1428


Kernel Density
0.06
0.05
0.04
0.03
0.02
0.01
0
4620
4640
4660
4680
4700
4720

Determination of Density (101.325 kPa, comb. 25°C, metering temp. 0°C) on sample #18040; results in kg/m^3 (real gas)

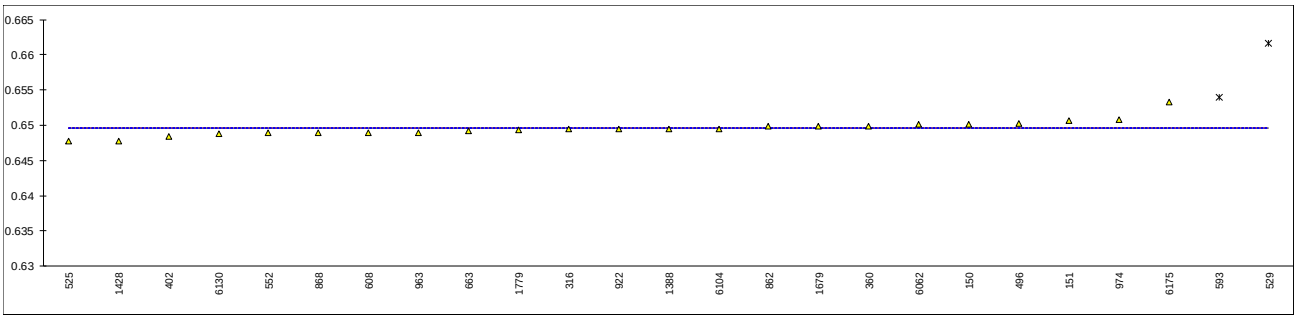
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	0.84051		-----	
151	ISO6976	0.84124		-----	
158		-----		-----	
167		-----		-----	
171		-----		-----	
225		-----		-----	
316	ISO6976	0.83964		-----	
352		-----		-----	
360	ISO6976	0.8403		-----	
402	ISO6976	0.83898		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
449		-----		-----	
496	DIN51857	0.840762		-----	
525	ISO6976	1.293062	R(0.01),E	-----	iis calculated 0.83977
529	D3588	0.7835	E,ex	-----	iis calculated 0.85573, result excluded see §4.1
552	ISO6976	0.8390		-----	
593	ISO6976	0.7745	R(0.01),E	-----	iis calculated 0.82325
608	ISO6976	0.7960	R(0.01),E	-----	iis calculated 0.83989
609		-----		-----	
610		-----		-----	
663	ISO6976	0.83941		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	0.8401		-----	
868	ISO6976	0.8390		-----	
887		-----		-----	
922	ISO6976	0.8398		-----	
963	ISO6976	0.8387		-----	
974	GPA2172	0.8414		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	0.8398	E	-----	iis calculated 0.84093
1428	ISO6976	0.8377	C	-----	First reported 0.8348
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	0.84023		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	0.8394		-----	
1788		-----		-----	
1957		-----		-----	
6062	ISO6976	0.84048		-----	
6104	ISO6976	0.8398		-----	
6130	GB/T11062	0.83877		-----	
6175	In house	0.8447	E	-----	iis calculated 0.84159
6187	ISO6976	0.8405		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	22			
	outliers	3 (+1 excl)			
	mean (n)	0.84001			
	st.dev. (n)	0.001372			
	R(calc.)	0.00384			Compare R(iis17S01M) = 0.00182

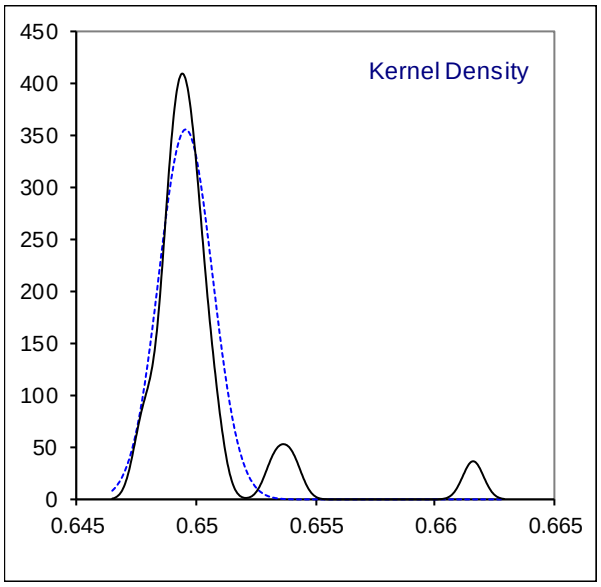

1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
593
529
608
1428
963
6130
402
552
868
1779
663
316
922
1388
6104
882
1679
360
6062
6187
150
496
151
974
6175
525


Kernel Density
300
250
200
150
100
50
0
0.75
0.77
0.79
0.81
0.83
0.85

Determination of Relative Density (101.325 kPa, comb. temp. 25°C, metering temp. 0°C) on sample #18040; results have no unit (real gas)

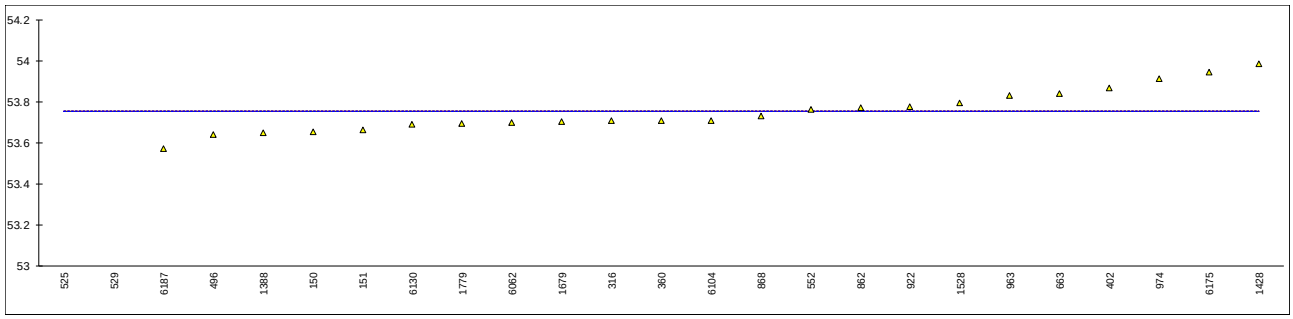
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	0.65009		-----	
151	ISO6976	0.65065		-----	
158		-----		-----	
167		-----		-----	
171		-----		-----	
225		-----		-----	
316	ISO6976	0.64942		-----	
352		-----		-----	
360	ISO6976	0.6499		-----	
402	ISO6976	0.64846		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
449		-----		-----	
496	DIN51857	0.65028		-----	
525	ISO6976	0.647783	E	-----	iis calculated 0.64951
529	D3588	0.6616	ex	-----	Result excluded, see §4.1
552	ISO6976	0.6489		-----	
593	ISO6976	0.6540	R(0.05),E	-----	iis calculated 0.63673
608	ISO6976	0.6490		-----	
609		-----		-----	
610		-----		-----	
663	ISO6976	0.64923		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	0.6498		-----	
868	ISO6976	0.6489		-----	
887		-----		-----	
922	ISO6976	0.6495		-----	
963	ISO6976	0.6490		-----	
974	GPA2172	0.6508		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	0.6495		-----	
1428	ISO6976	0.6478	C	-----	First reported 0.6456
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	0.64981		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	0.6493		-----	
1788		-----		-----	
1957		-----		-----	
6062	ISO6976	0.65006		-----	
6104	ISO6976	0.6495		-----	
6130	GB/T11062	0.64874		-----	
6175	In house	0.6533	E	-----	iis calculated 0.65092
6187		-----		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	23			
	outliers	1 (+1 excl)			
	mean (n)	0.64955			
	st.dev. (n)	0.001125			
	R(calc.)	0.00315			Compare R(iis17S01M) = 0.00150

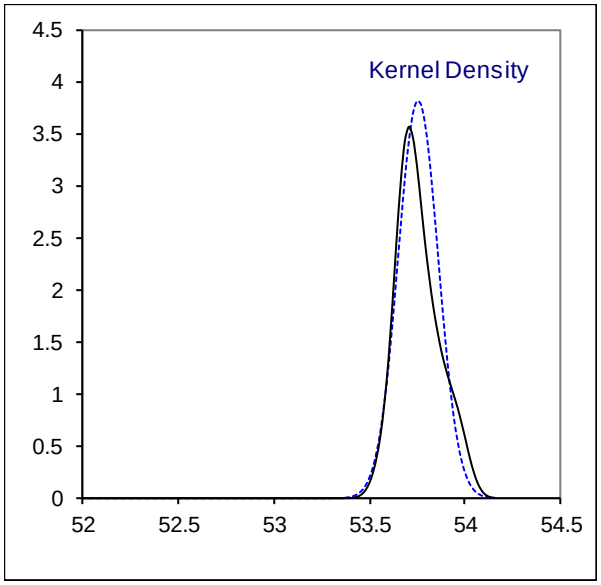

0.665
0.66
0.655
0.65
0.645
0.64
0.635
0.63
525
1428
402
6130
552
868
608
963
663
1779
316
922
1388
6104
862
1679
360
6062
150
496
151
974
6175
593
529


Kernel Density
450
400
350
300
250
200
150
100
50
0
0.645
0.65
0.655
0.66
0.665

Determination of Wobbe Index (101.325 kPa, combustion temp. 25°C, metering temp. 0°C) on sample #18040; results in MJ/m^3 (real gas)

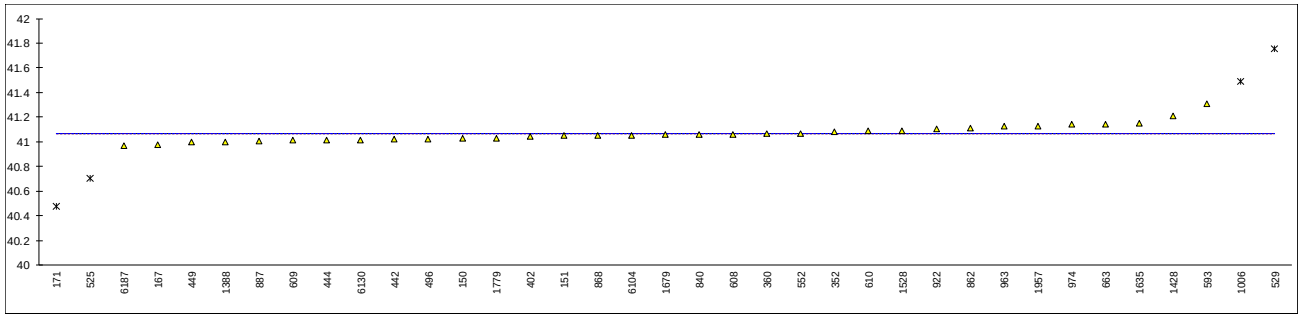
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	53.6532		-----	
151	ISO6976	53.6611		-----	
158		-----		-----	
167		-----		-----	
171		-----		-----	
225		-----		-----	
316	ISO6976	53.7066		-----	
352		-----		-----	
360	ISO6976	53.71		-----	
402	ISO6976	53.868	E	-----	iis calculated 53.766
442		-----		-----	
444		-----		-----	
446		-----		-----	
449		-----		-----	
496	DIN51857	53.638	E	-----	iis calculated 53.626
525	ISO6976	48.89062	R(0.01),E	-----	iis calculated 53.540
529	D3588	49.615	E,ex	-----	iis calculated 54.123, result excluded see §4.1
552	ISO6976	53.761		-----	
593		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
663	ISO6976	53.839		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	53.77		-----	
868	ISO6976	53.73		-----	
887		-----		-----	
922	ISO6976	53.7773		-----	
963	ISO6976	53.83		-----	
974	GPA2172	53.91	E	-----	iis calculated 53.776
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	53.65	E	-----	iis calculated 53.685
1428	ISO6976	53.9858	C	-----	First reported 54.4810
1489		-----		-----	
1528	ISO6976	53.794	C	-----	First reported 46.04
1635		-----		-----	
1679	ISO6976	53.7037		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	53.6924		-----	
1788		-----		-----	
1957		-----		-----	
6062	ISO6976	53.697		-----	
6104	ISO6976	53.71		-----	
6130	GB/T11062	53.6880		-----	
6175	In house	53.945	E	-----	iis calculated 53.831
6187	ISO6976	53.57	E	-----	iis calculated 53.587
9101		-----		-----	
9145		-----		-----	
	normality	OK			
	n	23			
	outliers	1 (+1 excl)			
	mean (n)	53.7517			
	st.dev. (n)	0.10454			
	R(calc.)	0.2927			Compare R(iis17S01M) = 0.0603

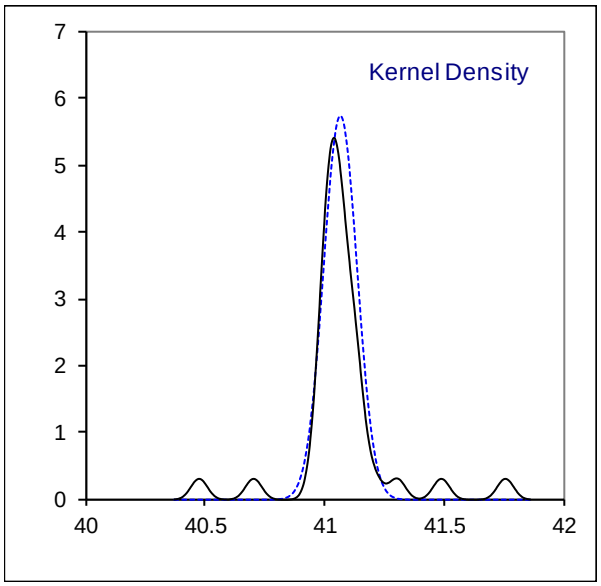

54.2
54
53.8
53.6
53.4
53.2
53
525
529
6187
496
1388
150
151
6130
1779
6062
1679
316
360
6104
868
552
862
922
1528
963
663
402
974
6175
1428


Kernel Density
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
52
52.5
53
53.5
54
54.5

Determination of Caloric Value Superior (101.325 kPa, comb. temp. 15°C, metering temp 15°C) on sample #18040; results in MJ/m^3 (real gas)

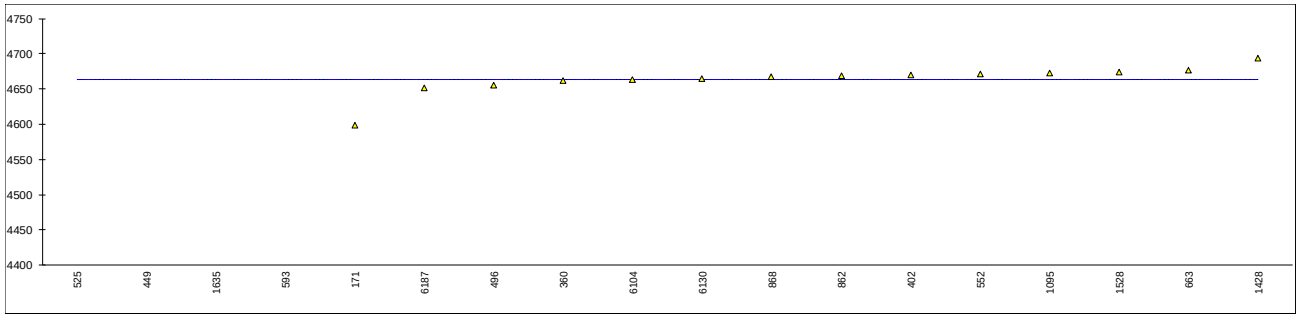
lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	41.027		-----	
151	ISO6976	41.050		-----	
158		-----		-----	
167	ISO6976	40.9735	E	-----	iis calculated 41.063
171	ISO6976	40.48	C,R(0.01),E	-----	First reported 40.62, iis calculated 40.532
225		-----		-----	
316		-----		-----	
352	ISO6976	41.08		-----	
360	ISO6976	41.07		-----	
402	ISO6976	41.0475	E	-----	iis calculated 41.091
442	ISO6976	41.02		-----	
444	ISO6976	41.013		-----	
446		-----		-----	
449	ISO6976	41.00	E	-----	iis calculated 40.982
496	DIN51857	41.021	E	-----	iis calculated 41.001
525	ISO6976	40.70732	R(0.01),E	-----	iis calculated 40.922
529	D3588	41.758	ex	-----	result excluded see §4.1
552	ISO6976	41.07		-----	
593	ISO6976	41.306	E	-----	iis calculated 40.298
608	ISO6976	41.06	E	-----	iis calculated 41.048
609	ISO6976	41.0116		-----	
610	ISO6976	41.09	E	-----	iis calculated 41.077
663	ISO6976	41.142		-----	
823		-----		-----	
840	ISO6976	41.057		-----	
851		-----		-----	
862	ISO6976	41.11		-----	
868	ISO6976	41.05		-----	
887	D3588	41.01	E	-----	iis calculated 41.065
922	ISO6976	41.1028		-----	
963	ISO6976	41.13		-----	
974	GPA2172	41.141		-----	
1006	ISO6976	41.4906	C,E,ex	-----	First reported 8372, iis calculated 41.246, result excluded see §4.1
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	41.00	E	-----	iis calculated 41.061
1428	ISO6976	41.2100	C	-----	First reported 41.5168
1489		-----		-----	
1528	ISO6976	41.09	C	-----	First reported 41.03
1635	ISO6976	41.147		-----	
1679	ISO6976	41.0563		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	41.0307		-----	
1788		-----		-----	
1957	ISO6976	41.13	E	-----	iis calculated 41.025
6062		-----		-----	
6104	ISO6976	41.05		-----	
6130	GB/T11062	41.0149		-----	
6175		-----		-----	
6187	ISO6976	40.97		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	33			
	outliers	2 (+2 excl)			
	mean (n)	41.0691			
	st.dev. (n)	0.06961			
	R(calc.)	0.1949			Compare R(iis17S01M) = 0.1024

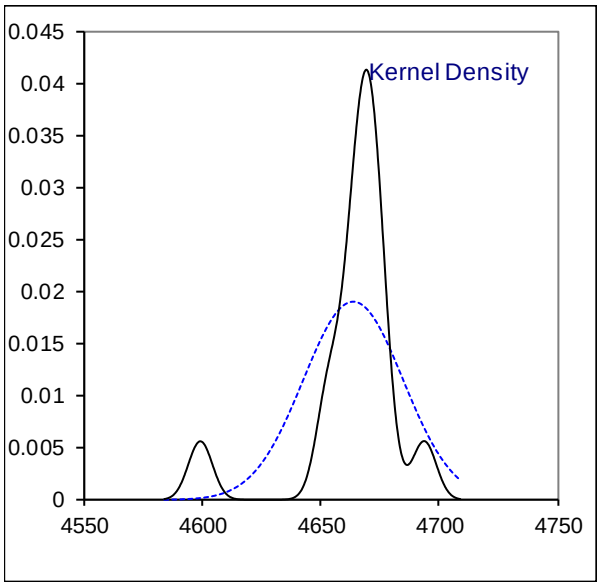

42
41.8
41.6
41.4
41.2
41
40.8
40.6
40.4
40.2
40
171 525 6187 167 449 1388 887 609 444 6130 442 496 150 1779 402 151 868 6104 1679 840 608 360 552 352 610 1528 922 862 963 1957 974 663 1635 1428 593 1006 529


Kernel Density
7
6
5
4
3
2
1
0
40
40.5
41
41.5
42

Determination of Caloric Value Inferior (101.325 kPa, comb. temp. 15°C, metering temp 15°C) on sample #18040; results in kJ/100g (real gas)

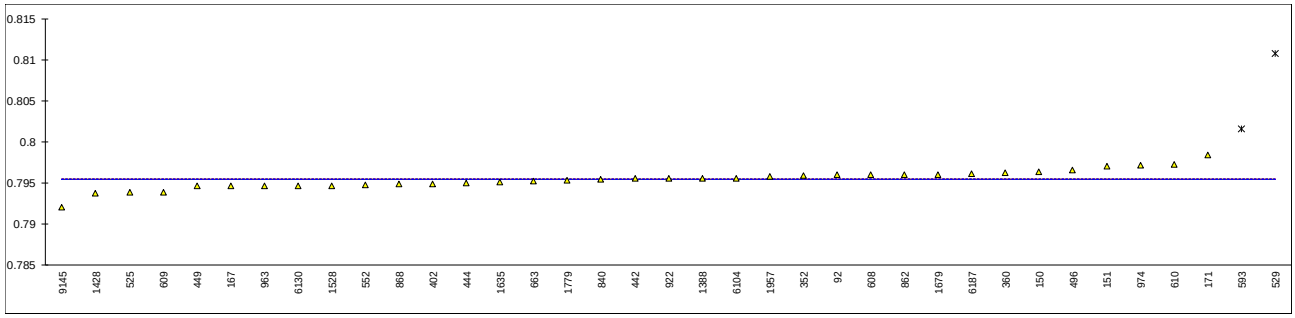
lab	method	value	mark	z(targ)	Remarks
92		-----		-----	
130		-----		-----	
150		-----		-----	
151		-----		-----	
158		-----		-----	
167		-----		-----	
171	EN15984	4599	E	-----	iis calculated 4575.7
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	EN15984	4662.29		-----	
402	EN15984	4669.386		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
449	ISO6976	37.06	E,ex	-----	Reported unit MJ/m^3, iis calculated 4663.9
496	EN15984	4654.978		-----	
525	ISO6976	30.00268	E,ex	-----	Reported unit MJ/m^3, iis calculated 4649.1
529		-----		-----	
552	ISO6976	4671		-----	
593	ISO6976	37.382	E,ex	-----	Reported unit MJ/m^3, iis calculated 4667.5
608		-----		-----	
609		-----		-----	
610		-----		-----	
663	EN15984	4676.24		-----	
823		-----		-----	
840		-----		-----	
851		-----		-----	
862	ISO6976	4669		-----	
868	ISO6976	4668		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095	EN15984	4673.180		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388		-----		-----	
1428	ISO6976	4693.66	C	-----	First reported 4744.86
1489		-----		-----	
1528	ISO6976	4673.69	C	-----	First reported 4105
1635	ISO6976	37.196	E,ex	-----	Reported unit MJ/m^3, iis calculated 4678.9
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1779		-----		-----	
1788		-----		-----	
1957		-----		-----	
6062		-----		-----	
6104	ISO6976	4664		-----	
6130	GB/T11062	4664.4		-----	
6175		-----		-----	
6187	ISO6976	4652		-----	
9101		-----		-----	
9145		-----		-----	
	normality	not OK			
	n	14			
	outliers	0 (+4 excl)			
	mean (n)	4663.631			
	st.dev. (n)	21.0828			
	R(calc.)	59.032			Compare R(iis17S01M) = 10.572

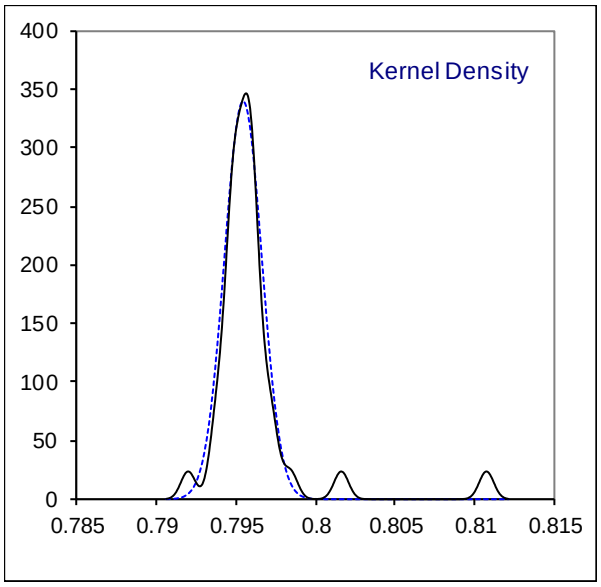

4750
4700
4650
4600
4550
4500
4450
4400
525
449
1635
593
171
6187
496
360
6104
6130
868
862
402
552
1095
1528
663
1428


0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
4550
4600
4650
4700
4750
Kernel Density

Determination of Density (101.325 kPa, combustion temp. 15°C, metering temp. 15°C) on sample #18040; results in kg/m^3 (real gas)

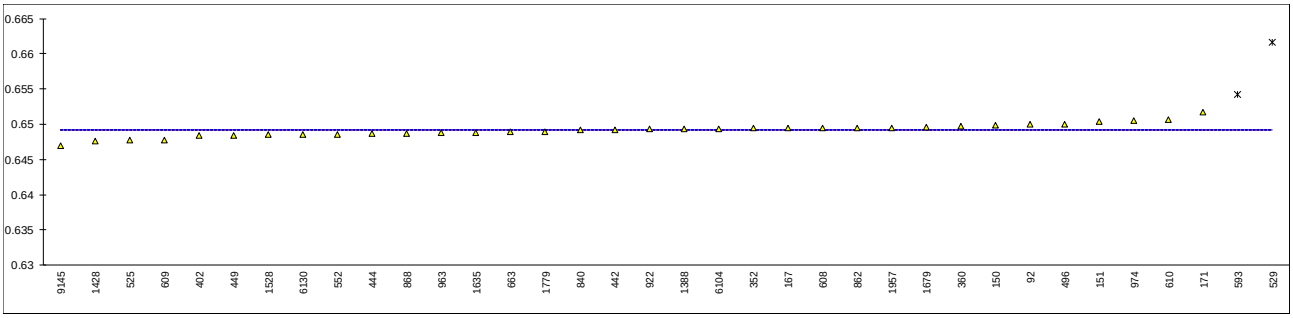
lab	method	value	mark	z(targ)	remarks
92	ISO6976	0.796	E	-----	iis calculated 0.79820
130		-----		-----	
150	ISO6976	0.79632		-----	
151	ISO6976	0.79701		-----	
158		-----		-----	
167	ISO6976	0.7946	E	-----	iis calculated 0.79676
171	ISO6976	0.7984	E	-----	iis calculated 0.80070
225		-----		-----	
316		-----		-----	
352	ISO6976	0.7959		-----	
360	ISO6976	0.7962		-----	
402	ISO6976	0.79492		-----	
442	ISO6976	0.7956		-----	
444	ISO6976	0.7950		-----	
446		-----		-----	
449	ISO6976	0.7946		-----	
496	DIN51857	0.796558		-----	
525	ISO6976	0.79388	E	-----	iis calculated 0.79562
529	D3588	0.8107	ex	-----	result excluded see §4.1
552	ISO6976	0.7948		-----	
593	ISO6976	0.8016	R(0.01),E	-----	iis calculated 0.77999
608	ISO6976	0.7960		-----	
609	ISO6976	0.7939		-----	
610	ISO6976	0.7973		-----	
663	ISO6976	0.79527		-----	
823		-----		-----	
840	ISO6976	0.79546		-----	
851		-----		-----	
862	ISO6976	0.7960		-----	
868	ISO6976	0.7949		-----	
887		-----		-----	
922	ISO6976	0.7956		-----	
963	ISO6976	0.7946		-----	
974	GPA2172	0.7972		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----	W	-----	Result withdrawn, reported 0.785
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	0.7956	E	-----	iis calculated 0.79672
1428	ISO6976	0.7937	C	-----	First reported 0.7909
1489		-----		-----	
1528	ISO6976	0.7947	C	-----	First reported 0.7941
1635	ISO6976	0.7951		-----	
1679	ISO6976	0.79605		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	0.7953		-----	
1788		-----		-----	
1957	ISO6976	0.7958	E	-----	iis calculated 0.79445
6062		-----		-----	
6104	ISO6976	0.7956		-----	
6130	GB/T11062	0.79467		-----	
6175		-----		-----	
6187	ISO6976	0.7961		-----	
9101		-----		-----	
9145		0.792	E	-----	iis calculated 0.79444
	normality	suspect			
	n	35			
	outliers	1 (+1 excl)			
	mean (n)	0.79545			
	st.dev. (n)	0.001174			
	R(calc.)	0.00329			Compare R(iis17S01M) = 0.00172

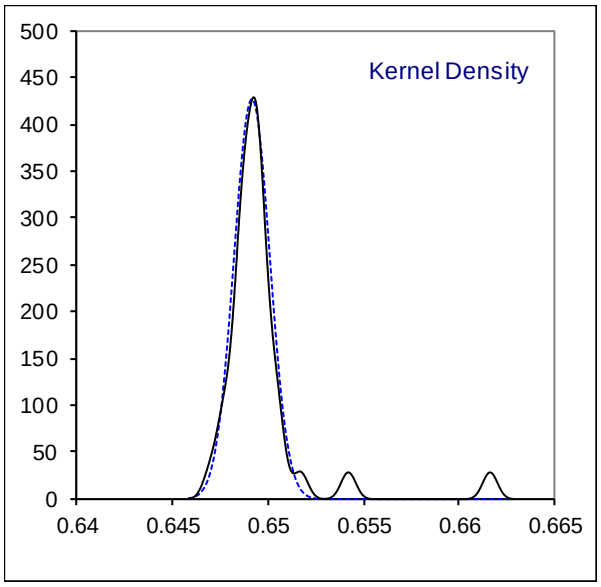

0.815
0.81
0.805
0.8
0.795
0.79
0.785
9145
1428
525
609
449
167
963
6130
1528
552
868
402
444
1635
663
1779
840
442
922
1388
6104
1957
352
92
608
862
1679
6187
360
150
496
151
974
610
171
593
529


Kernel Density
400
350
300
250
200
150
100
50
0
0.785
0.79
0.795
0.8
0.805
0.81
0.815

Determination of Relative Density (101.325 kPa, comb. temp. 15°C, metering temp. 15°C) on sample #18040; results have no unit (real gas)

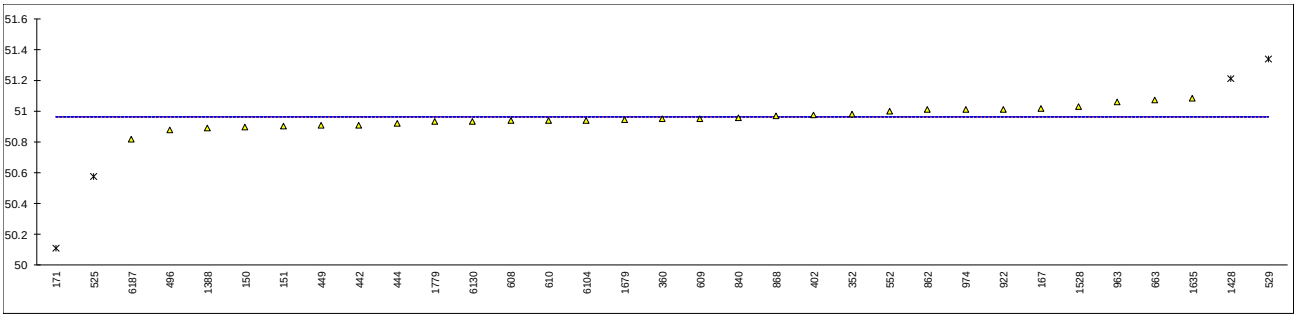
lab	method	value	mark	z(targ)	remarks
92	ISO6976	0.650	E	-----	iis calculated 0.65137
130		-----		-----	
150	ISO6976	0.64984		-----	
151	ISO6976	0.65040		-----	
158		-----		-----	
167	ISO6976	0.6495		-----	
171	ISO6976	0.6517	E	-----	iis calculated 0.65341
225		-----		-----	
316		-----		-----	
352	ISO6976	0.6494		-----	
360	ISO6976	0.6497		-----	
402	ISO6976	0.64837		-----	
442	ISO6976	0.6492		-----	
444	ISO6976	0.6487		-----	
446		-----		-----	
449	ISO6976	0.6484		-----	
496	DIN51857	0.650034		-----	
525	ISO6976	0.647783	E	-----	iis calculated 0.64927
529	D3588	0.6616	E,ex	-----	iis calculated 0.63651, result excluded see §4.1
552	ISO6976	0.6486		-----	
593	ISO6976	0.6542	R(0.01)	-----	
608	ISO6976	0.6495		-----	
609	ISO6976	0.6478		-----	
610	ISO6976	0.6506		-----	
663	ISO6976	0.64898		-----	
823		-----		-----	
840	ISO6976	0.64915		-----	
851		-----		-----	
862	ISO6976	0.6495		-----	
868	ISO6976	0.6487		-----	
887		-----		-----	
922	ISO6976	0.6493		-----	
963	ISO6976	0.6488		-----	
974	GPA2172	0.6505		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----	W	-----	Result withdrawn, reported 0.654
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	0.6493		-----	
1428	ISO6976	0.6476	C	-----	First reported 0.6454
1489		-----		-----	
1528	ISO6976	0.6485	C	-----	First reported 0.6480
1635	ISO6976	0.6488		-----	
1679	ISO6976	0.64956		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	0.6490		-----	
1788		-----		-----	
1957	ISO6976	0.6495	E	-----	iis calculated 0.64831
6062		-----		-----	
6104	ISO6976	0.6493		-----	
6130	GB/T11062	0.64850		-----	
6175		-----		-----	
6187		-----		-----	
9101		-----		-----	
9145		0.647	C,E	-----	First reported 0.643, iis calculated 0.64831
	normality	OK			
	n	34			
	outliers	1 (+1 excl)			
	mean (n)	0.64916			
	st.dev. (n)	0.000934			
	R(calc.)	0.00262			Compare R(iis17S01M) = 0.00138

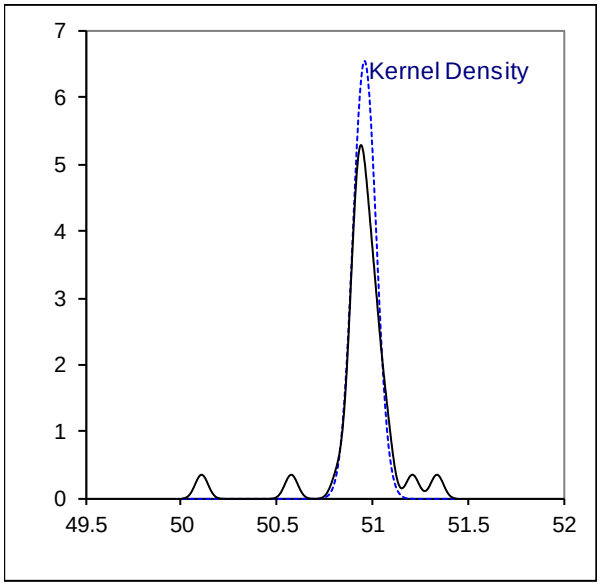

0.665
0.66
0.655
0.65
0.645
0.64
0.635
0.63
9145
1428
525
609
402
449
1528
6130
552
444
868
963
1635
663
1779
840
442
922
1388
6104
352
167
608
862
1957
1679
360
150
92
496
151
974
610
171
593
529


Kernel Density
500
450
400
350
300
250
200
150
100
50
0
0.64
0.645
0.65
0.655
0.66
0.665

Determination of Wobbe Index (101.325 kPa, combustion temp. 15°C, metering temp. 15°C) on sample #18040; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
150	ISO6976	50.8934		-----	
151	ISO6976	50.9009		-----	
158		-----		-----	
167	ISO6976	51.0152	E	-----	iis calculated 50.924
171	ISO6976	50.11	C,R(0.01),E	-----	First reported 50.32, iis calculated 50.143
225		-----		-----	
316		-----		-----	
352	ISO6976	50.98		-----	
360	ISO6976	50.95		-----	
402	ISO6976	50.977	E	-----	iis calculated 51.000
442	ISO6976	50.91		-----	
444	ISO6976	50.921		-----	
446		-----		-----	
449	ISO6976	50.91		-----	
496	DIN51857	50.8790	E	-----	iis calculated 50.867
525	ISO6976	50.57756	R(0.01),E	-----	iis calculated 50.786
529	D3588	51.337	ex	-----	result excluded see §4.1
552	ISO6976	50.996		-----	
593		-----		-----	
608	ISO6976	50.94		-----	
609	ISO6976	50.9521		-----	
610	ISO6976	50.94		-----	
663	ISO6976	51.070		-----	
823		-----		-----	
840	ISO6976	50.959		-----	
851		-----		-----	
862	ISO6976	51.01		-----	
868	ISO6976	50.97		-----	
887		-----		-----	
922	ISO6976	51.0111		-----	
963	ISO6976	51.06		-----	
974	GPA2172	51.01		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1197		-----		-----	
1198		-----		-----	
1307		-----		-----	
1388	ISO6976	50.89	E	-----	iis calculated 50.923
1428	ISO6976	51.2090	C,R(0.05)	-----	First reported 51.6787
1489		-----		-----	
1528	ISO6976	51.03	C	-----	First reported 50.99
1635	ISO6976	51.084		-----	
1679	ISO6976	50.9412		-----	
1684		-----		-----	
1737		-----		-----	
1779	ISO6976	50.9311		-----	
1788		-----		-----	
1957		-----		-----	
6062		-----		-----	
6104	ISO6976	50.94		-----	
6130	GB/T11062	50.9316		-----	
6175		-----		-----	
6187	ISO6976	50.82	E	-----	iis calculated 50.831
9101		-----		-----	
9145		-----		-----	
	normality	OK			
	n	29			
	outliers	3 (+1 excl)			
	mean (n)	50.9594			
	st.dev. (n)	0.06094			
	R(calc.)	0.1706			Compare R(iis17S01M) = 0.0893


51.6
51.4
51.2
51
50.8
50.6
50.4
50.2
50
171
525
6187
496
1388
150
151
449
442
444
1779
6130
608
610
6104
1679
360
609
840
868
402
352
552
862
974
922
167
1528
963
663
1635
1428
529


Kernel Density
7
6
5
4
3
2
1
0
49.5
50
50.5
51
51.5
52

APPENDIX 2

Number of participants per country

1 lab in AZERBAIJAN
1 lab in BELGIUM
1 lab in BRAZIL
1 lab in BRUNEI
1 lab in BULGARIA
2 labs in CANADA
7 labs in CHINA, People's Republic
1 lab in COTE D'IVOIRE
1 lab in CROATIA
1 lab in ECUADOR
1 lab in FINLAND
1 lab in FRANCE
2 labs in GERMANY
1 lab in HONG KONG
7 labs in MALAYSIA
2 labs in MEXICO
2 labs in NETHERLANDS
1 lab in NIGERIA
1 lab in PAKISTAN
3 labs in PORTUGAL
3 labs in ROMANIA
1 lab in SAUDI ARABIA
1 lab in SLOVAKIA
1 lab in SOUTH KOREA
1 lab in SWITZERLAND
2 labs in TAIWAN
1 lab in THAILAND
1 lab in TURKEY
1 lab in UNITED ARAB EMIRATES
4 labs in UNITED KINGDOM
6 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	= probably an error in calculations
U	= test result probably reported in a different unit
W	= test result withdrawn on request of participant
ex	= test result excluded from the statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
SDS	= Safety Data Sheet

Literature:

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