Institute for
Interlaboratory Studies

Results of Proficiency Test
Natural Gas (Methane)
April 2022

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the 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 (Methane) every year. During the annual proficiency testing program 2021/2022 it was decided to continue the round robin for the analysis of Natural Gas (Methane).
A co-operation with EffecTech Ltd. (Uttoxeter, United Kingdom) was set up because iis has limited gas-handling facilities in place to prepare gas samples. EffecTech Ltd. is fully equipped and has experience in the preparation of synthetic Natural Gas samples for PT purposes.

In this interlaboratory study 70 laboratories in 38 countries registered for participation, see appendix 2 for the number of participants per country. In this report the results of the Natural Gas (Methane) proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). To optimize the costs for the participating laboratories it was decided to prepare one Natural Gas mixture. The mixture was divided over a batch of 74 cylinders. The cylinder size is a cost-effective one-liter cylinder. Each cylinder was uniquely numbered and labelled #22060. The limited cylinder size is chosen to optimize transport and handling costs.
Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
The 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 the participants on the reported data is encouraged and customer's satisfaction is measured on a regular basis by sending out questionnaires.
EffecTech Ltd. is accredited in conformance with ISO17025:2017 by UKAS (no. 0590).

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is 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

One batch of 74 one-liter cylinders with an artificial Natural Gas mixture was prepared and tested for homogeneity by EffecTech Ltd. (Uttoxeter, United Kingdom) in conformance with ISO Guide 35 and ISO/IEC17025. Each cylinder was uniquely numbered and labelled #22060. Every cylinder in the batch was analyzed using replicate measurements. The within bottle and between bottle variations were assessed in accordance with ISO Guide 35. This evaluation showed that all between bottle variations were small compared to the uncertainties on the reference values on each component.

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

Component	r (observed) in %mol/mol	0.3 * R in %mol/mol	Reference test method
Methane	0.0042	0.0688	ISO06974-3:18
Ethane	0.0030	0.0255	ISO06974-3:18
Propane	0.0014	0.0211	ISO06974-3:18
Iso-Butane	0.0005	0.0071	ISO06974-3:18
n-Butane	0.0013	0.0116	ISO06974-3:18
Carbon Dioxide	0.0003	0.0037	ISO06974-3:18
Nitrogen	0.0006	0.0191	ISO06974-3:18

Table 1: evaluation of the repeatabilities of subsamples #22060

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

To each of the participating laboratories one 1-liter gas cylinder labelled #22060 was sent on March 23, 2022. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

EffecTech Ltd. (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 ANALYZES

The participants were requested to determine Methane, Ethane, Propane, iso-Butane, n-Butane, Carbon Dioxide, Nitrogen, Carbon content and for Real Gas conditions for two different combinations of combustion and metering temperature the following properties: Gross (Superior) Caloric Value, Net (Inferior) Caloric Value, Density, Relative Density and Gross 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 (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

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

3.1 STATISTICS

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

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

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

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

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

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

3.2 GRAPHICS

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

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

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements derived from e.g. ISO and ASTM test methods), 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 literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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

The z-scores were calculated according to:

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

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

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

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

4 EVALUATION

Some problems were encountered with the dispatch of the samples due to COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with another two weeks. Six participants reported test results after the extended reporting date and fifteen participants did not report any test results. Not all laboratories were able to report all the analyzes requested.
In total 55 participants reported 620 numerical test results. Observed were 19 outlying test results, which is 3.1%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER COMPONENT

In this section the reported test results are discussed per component or calculated parameter. 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 in appendix 1. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D1945) and an added designation for the year that the test method was adopted or revised (e.g. D1945:14). When a method has been reapproved an “R” will be added and the year of approval (e.g. D1945:14R19).

Total of the composition or results: The total of the test results of the composition per laboratory was calculated by iis. Since the composition is requested as normalized the total should be 100%. Five calculated results were found to be significantly different than 100%. It was decided to exclude the test results of these laboratories for all further statistical evaluations.

Methane: The determination of this component may be problematic depending on the test method used. Three statistical outliers were observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ISO6974-3:18 but it is not in agreement with the requirements of ASTM D1945:14R19.

Ethane: The determination of this component was not problematic. Two statistical outliers were observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ISO6974-3:18 and ASTM D1945:14R19.

Propane: The determination of this component may be problematic depending on the test method used. Three statistical outliers were observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:18 but it is in agreement with the requirements of ASTM D1945:14R19.

iso-Butane: The determination of this component may be problematic depending on the test method used. Two statistical outliers were observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:18 but it is in agreement with the requirements of ASTM D1945:14R19.

n-Butane: The determination of this component may be problematic depending on the test method used. No statistical outliers were observed and five test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:18 but it is in agreement with the requirements of ASTM D1945:14R19.

Carbon Dioxide: The determination of this component may be problematic depending on the test method used. One statistical outlier was observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ISO6974-3:18 but it is in agreement with the requirements of ASTM D1945:14R19.

Nitrogen: The determination of this component was very problematic. One statistical outlier was observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ISO6974-3:18 nor with the requirements of ASTM D1945:14R19.

Carbon content: The determination of this component was not at all problematic. No statistical outliers were observed and two test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of EN15984:22.

Calculated parameters, general remark:
In this PT the calculated parameters for Real Gas were reported for two combustion temperatures (15 °C and 25 °C). The number of reporting participants for 15 °C and 25 °C varied between 13 and 30. In total thirty calculation differences between iis and participants were observed over ten parameters.

Gross (Superior) Caloric Value: The calculation at combustion temperature 25 °C, metering temperature 0 °C may not be problematic. No statistical outliers were observed and three test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.13 vs. 0.22).

The calculation at combustion temperature 15 °C, metering temperature 15 °C may not be problematic. No statistical outliers were observed and three test results were excluded. The calculated reproducibility after rejection of the suspect data is in line with the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.20 vs. 0.21).

Net (Inferior) Caloric Value: The calculation at combustion temperature 25 °C, metering temperature 0 °C may not be problematic. Two statistical outliers were observed and two other test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (11 vs. 15).

The calculation at combustion temperature 15 °C, metering temperature 15 °C may be problematic. No statistical outliers were observed and five test results were excluded. The calculated reproducibility after rejection of the suspect data is larger than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (23 vs. 15).

Density: The calculation at combustion temperature 25 °C, metering temperature 0 °C may not be problematic. One statistical outlier was observed and three other test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.002 vs. 0.004).

The calculation at combustion temperature 15 °C, metering temperature 15 °C may not be problematic. One statistical outlier was observed and three other test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.003 vs. 0.004).

Relative Density: The calculation at combustion temperature 25 °C, metering temperature 0 °C may not be problematic. No statistical outliers were observed and three test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.002 vs. 0.003).

The calculation at combustion temperature 15 °C, metering temperature 15 °C may not be problematic. Two statistical outliers were observed and three other test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the factors from ISO6976:16 over all reported component concentrations (0.002 vs. 0.003).

Gross Wobbe Index: The calculation at combustion temperature 25 °C, metering temperature 0 °C may not be problematic. No statistical outliers were observed and three test results were excluded. The calculated reproducibility after rejection of the suspect data is in line with the reproducibility calculated by iis using the iis calculated results for Gross (Superior) Caloric Value and Relative Density over all reported component concentrations (0.18 vs. 0.19).

The calculation at combustion temperature 15 °C, metering temperature 15 °C may not be problematic. One statistical outlier was observed and three other test results were excluded. The calculated reproducibility after rejection of the suspect data is smaller than the reproducibility calculated by iis using the iis calculated results for Gross (Superior) Caloric Value and Relative Density over all reported component concentrations (0.14 vs. 0.18).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Component	unit	n	average	2.8 * sd	R(lit)
Methane	%mol/mol	47	91.001	0.235	0.229
Ethane	%mol/mol	48	3.015	0.089	0.085
Propane	%mol/mol	47	2.310	0.084	0.071
iso-Butane	%mol/mol	48	0.503	0.027	0.024
n-Butane	%mol/mol	50	0.996	0.081	0.039
Carbon Dioxide	%mol/mol	49	0.197	0.035	0.012
Nitrogen	%mol/mol	49	1.991	0.152	0.063
Carbon content	g/100g	11	73.37	0.33	2.16

Table 2: reproducibilities of the composition of sample #22060

Without further statistical calculations it can be concluded that for many components there is not a good compliance of the group of participants with the 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.

Parameter	unit	n	average	2.8 * sd	R(all calc)*
Gross (Superior) Caloric Value	MJ/m^3	15	42.592	0.134	0.221
Net (Inferior) Caloric Value	kJ/100g	9	4768	11	15
Density	kg/m^3	15	0.8071	0.0023	0.0042
Relative Density		16	0.6241	0.0020	0.0033
Gross Wobbe Index	MJ/m^3	16	53.900	0.176	0.185

Table 3: performance of the group for Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C
*) calculated by iis using all reported component concentrations

Parameter	unit	n	average	2.8 * sd	R(all calc)*
Gross (Superior) Caloric Value	MJ/m^3	27	40.390	0.201	0.210
Net (Inferior) Caloric Value	kJ/100g	15	4773	23	15
Density	kg/m^3	24	0.7645	0.0034	0.0040
Relative Density		23	0.6239	0.0018	0.0033
Gross Wobbe Index	MJ/m^3	24	51.132	0.138	0.175

Table 4: performance of the group for Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C
*) calculated by iis using all reported component concentrations

4.3 COMPARISON OF THE PROFICIENCY TEST OF APRIL 2022 WITH PREVIOUS PTS

	April 2022	April 2021	April 2020	April 2019	April 2018
Number of reporting laboratories	55	58	58	59	59
Number of test results	620	798	648	698	700
Number of statistical outliers	19	42	33	32	46
Percentage of statistical outliers	3.1%	5.3%	5.1%	4.6%	6.6%

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 to the requirements of the reference test methods. The conclusions are given the following tables.

Component	April 2022	April 2021	April 2020	April 2019	April 2018
Methane	+/-	-	-	+	--
Ethane	+/-	-	-	+	+/-
Propane	-	-	-	+/-	-
iso-Butane	-	-	+/-	-	+
n-Butane	--	-	+/-	-	+
Carbon Dioxide	--	-	-	-	--
Nitrogen	--	-	--	--	--
Carbon content	++	++	++	++	++

Table 6: comparison determination to the reference test methods

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

The consensus values as determined in this PT are compared with the average values from the homogeneity testing by EffecTech Ltd. (Uttoxeter, United Kingdom) in the following table. From this comparison it is clear that the consensus values as determined in this PT are very well in line with the values as determined during the preparation of the gas cylinders.

Component	EffecTech in %mol/mol	Average PT in %mol/mol	Differences in %mol/mol	z-score
Methane	91.007	91.001	0.006	0.07
Ethane	3.000	3.015	-0.015	-0.49
Propane	2.299	2.310	-0.011	-0.42
iso-Butane	0.501	0.503	-0.002	-0.25
n-Butane	0.996	0.996	0.000	-0.00
Carbon Dioxide	0.199	0.197	0.002	0.43
Nitrogen	1.998	1.991	0.007	0.31

Table 7: comparison of average values with the values determined by the supplier EffecTech Ltd.

APPENDIX 1

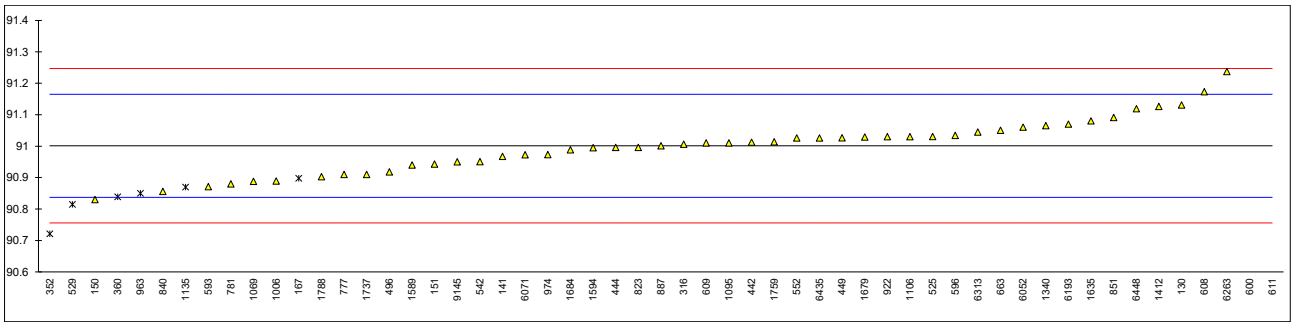
Total of reported (normalized) composition test results; results in %mol/mol

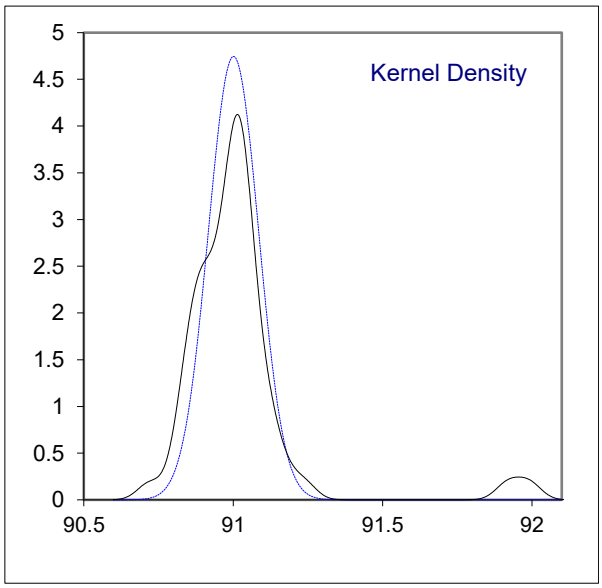
lab	method	iis calculated	remarks
130	ISO6974-3	100.00	
141	GPA2261	100.00	
150	D1945	99.98	
151	GPA2261	100.00	
167	GPA2286	**99.86**	not 100% and excluded from evaluations
225		-----	
316	ISO6974-3	100.00	
352	ISO6974-3	100.00	
360	ISO6974-3	**100.20**	not 100% and excluded from evaluations
442	D1945	100.00	
444	D1945	100.00	
449	ISO6974-3	100.00	
496	EN15984	100.00	
525	D1945	100.00	
529	GPA2261	**99.87**	not 100% and excluded from evaluations
542	D1945	100.00	
552	NBR14903	100.00	
593	D1945	100.00	
596	GPA2261	100.00	
600	GPA2261Mod.	100.00	
608	GPA2261	100.00	
609	GPA2261	100.00	
611	GPA2261	100.00	
663	D1945	100.00	
777	ISO6974-6	100.00	
781	GOST31371.7-B	100.01	
823	GPA2261	100.00	
840	D1945	100.00	
851	GPA2261	100.00	
861		-----	
862		-----	
887	D1945	100.00	
922	D1945	100.00	
963	D1945	**99.37**	not 100% and excluded from evaluations
974	ISO6974-5	100.00	
1006	D1945	100.00	
1069	In house	100.00	
1095	EN15984	100.01	
1106	GPA2261	100.00	
1135	D1945	**99.81**	not 100% and excluded from evaluations
1340	ISO6974-6	100.00	
1357		-----	
1388		-----	
1412	ISO6974-3	100.00	
1489		-----	
1589	D1945	100.00	
1594	GPA2261	100.00	
1635	D1945	100.00	
1679	ISO6974-3	100.00	
1684	ISO6974-3	100.00	
1737	In house	100.00	
1759	ISO6974-5	100.00	
1779		-----	
1788	D7833	100.00	
6052	D1945	100.00	
6071	GPA2261	100.00	
6104		-----	
6130		-----	
6177		-----	
6193	EN15984	100.00	
6237		-----	
6263	GPA2261	100.00	
6313	GPA2286	100.00	
6383		-----	
6435	GPA2261	100.00	
6440		-----	
6448	GPA2261	100.00	
6449		-----	
6476		-----	
9145		100.00	

Determination of Methane on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	91.1309		1.58	
141	GPA2261	90.9675	C	-0.41	first reported: 90.9076
150	D1945	90.83		-2.09	
151	GPA2261	90.943		-0.71	
167	GPA2286	90.898	ex,C	-1.26	test result excluded, see §4.1, first reported: 89.67118
225		-----		-----	
316	ISO6974-3	91.0063		0.06	
352	ISO6974-3	90.7207	C,R(0.05)	-3.43	first reported: 90.5191
360	ISO6974-3	90.839	ex	-1.98	test result excluded, see §4.1
442	D1945	91.0123		0.14	
444	D1945	90.9959		-0.07	
449	ISO6974-3	91.0262		0.30	
496	EN15984	90.918		-1.02	
525	D1945	91.0303		0.35	
529	GPA2261	90.8148	ex	-2.28	test result excluded, see §4.1
542	D1945	90.950445		-0.62	
552	NBR14903	91.026		0.30	
593	D1945	90.871	C	-1.59	first reported: 90.895
596	GPA2261	91.034	C	0.40	first reported: 61.173
600	GPA2261Mod.	91.92	R(0.01)	11.22	
608	GPA2261	91.173	C	2.10	first reported: 91.034
609	GPA2261	91.010		0.11	
611	GPA2261	91.9910	R(0.01)	12.08	
663	D1945	91.050		0.60	
777	ISO6974-6	90.91		-1.11	
781	GOST31371.7-B	90.88		-1.48	
823	GPA2261	90.996		-0.06	
840	D1945	90.8556		-1.78	
851	GPA2261	91.09137	C	1.10	first reported: 91.14565
861		-----		-----	
862		-----		-----	
887	D1945	91.001		0.00	
922	D1945	91.03		0.35	
963	D1945	90.85	ex	-1.85	test result excluded, see §4.1
974	ISO6974-5	90.973		-0.34	
1006	D1945	90.889		-1.37	
1069	In house	90.888		-1.38	
1095	EN15984	91.01		0.11	
1106	GPA2261	91.030		0.35	
1135	D1945	90.87	ex	-1.60	test result excluded, see §4.1
1340	ISO6974-6	91.065		0.78	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	91.126		1.52	
1489		-----		-----	
1589	D1945	90.940		-0.75	
1594	GPA2261	90.9950		-0.08	
1635	D1945	91.08		0.96	
1679	ISO6974-3	91.029		0.34	
1684	ISO6974-3	90.988		-0.16	
1737	In house	90.91		-1.11	
1759	ISO6974-5	91.014		0.16	
1779		-----		-----	
1788	D7833	90.9028		-1.20	
6052	D1945	91.0605		0.72	
6071	GPA2261	90.97240		-0.35	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	91.07		0.84	
6237		-----		-----	
6263	GPA2261	91.2372055		2.88	
6313	GPA2286	91.0450		0.53	
6383		-----		-----	
6435	GPA2261	91.0260		0.30	
6440		-----		-----	
6448	GPA2261	91.1187		1.43	
6449		-----		-----	
6476		-----		-----	
9145		90.95		-0.63	

	normality	OK
	n	47
	outliers	3 (+5ex)
	mean (n)	91.0012
	st.dev. (n)	0.08408
	R(calc.)	0.2354
	st.dev.(ISO6974-3:18)	0.08190
	R(ISO6974-3:18)	0.2293
compare		
	R(D1945:14R19)	0.15

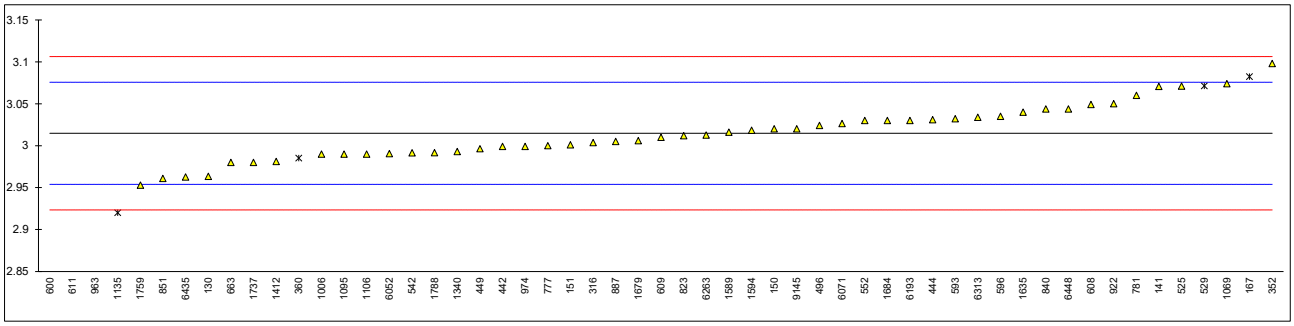


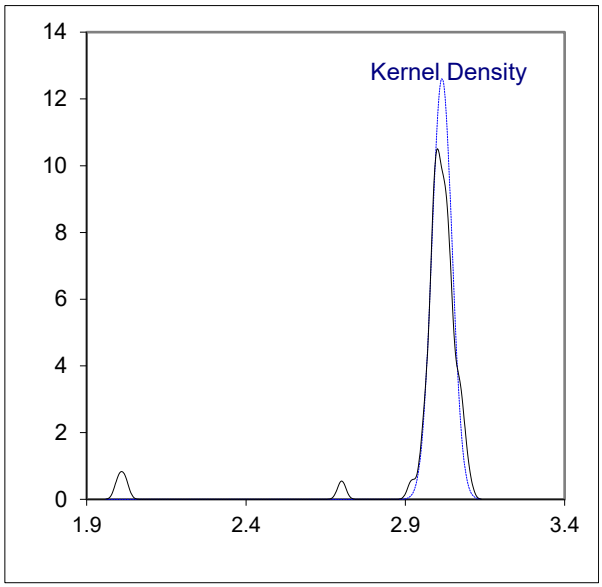


Determination of Ethane on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	2.9634		-1.69	
141	GPA2261	3.0706	C	1.83	first reported: 3.0972
150	D1945	3.02		0.17	
151	GPA2261	3.001		-0.45	
167	GPA2286	3.08228	ex	2.22	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	3.0037		-0.36	
352	ISO6974-3	3.0980	C	2.73	first reported: 3.1596
360	ISO6974-3	2.985	ex	-0.98	test result excluded, see §4.1
442	D1945	2.9990		-0.52	
444	D1945	3.0309		0.53	
449	ISO6974-3	2.9963		-0.61	
496	EN15984	3.024		0.30	
525	D1945	3.0711		1.85	
529	GPA2261	3.071216	ex,C	1.85	test result excluded, see §4.1, first reported: 3.142
542	D1945	2.991496		-0.76	
552	NBR14903	3.030		0.50	
593	D1945	3.032	C	0.57	first reported: 3.029
596	GPA2261	3.035	C	0.66	first reported: 3.149
600	GPA2261Mod.	2.00	R(0.01)	-33.30	
608	GPA2261	3.049	C	1.12	first reported: 3.035
609	GPA2261	3.010		-0.16	
611	GPA2261	2.0196	R(0.01)	-32.66	
663	D1945	2.980		-1.14	
777	ISO6974-6	3.00		-0.48	
781	GOST31371.7-B	3.06		1.48	
823	GPA2261	3.012		-0.09	
840	D1945	3.0438		0.95	
851	GPA2261	2.96089	C	-1.77	first reported: 2.94244
861		-----		-----	
862		-----		-----	
887	D1945	3.005		-0.32	
922	D1945	3.05		1.16	
963	D1945	2.7	ex,C	-10.33	test result excluded, see §4.1, first reported: 2.88
974	ISO6974-5	2.999		-0.52	
1006	D1945	2.990		-0.81	
1069	In house	3.074		1.94	
1095	EN15984	2.99		-0.81	
1106		2.990		-0.81	
1135	D1945	2.92	ex	-3.11	test result excluded, see §4.1
1340	ISO6974-6	2.993		-0.71	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	2.981		-1.11	
1489		-----		-----	
1589	D1945	3.016		0.04	
1594	GPA2261	3.0184		0.12	
1635	D1945	3.04		0.83	
1679	ISO6974-3	3.006		-0.29	
1684	ISO6974-3	3.030		0.50	
1737	In house	2.98		-1.14	
1759	ISO6974-5	2.953		-2.03	
1779		-----		-----	
1788	D7833	2.9916		-0.76	
6052	D1945	2.9906		-0.79	
6071	GPA2261	3.02648		0.38	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	3.03		0.50	
6237		-----		-----	
6263	GPA2261	3.0127000		-0.07	
6313	GPA2286	3.0339		0.63	
6383		-----		-----	
6435	GPA2261	2.9625		-1.72	
6440		-----		-----	
6448	GPA2261	3.0438		0.95	
6449		-----		-----	
6476		-----		-----	
9145		3.02		0.17	

	normality	OK
	n	48
	outliers	2 (+5ex)
	mean (n)	3.0148
	st.dev. (n)	0.03163
	R(calc.)	0.0886
	st.dev.(ISO6974-3:18)	0.03047
	R(ISO6974-3:18)	0.0853
compare		
	R(D1945:14R19)	0.10

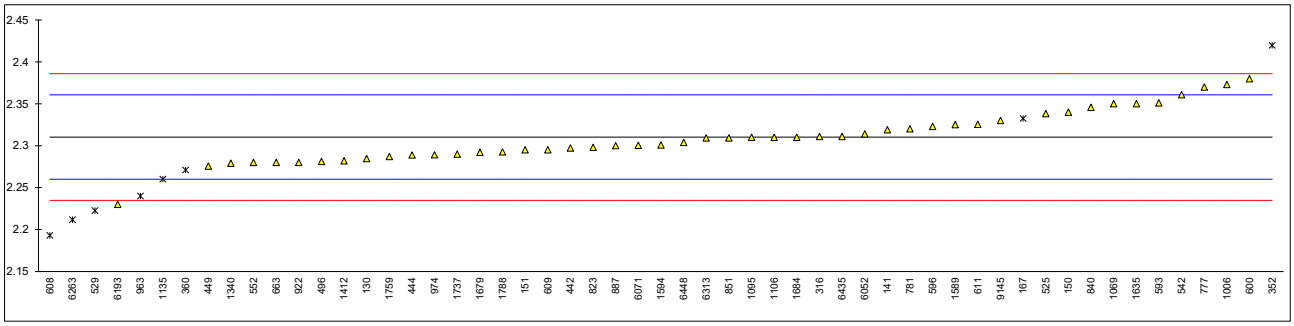


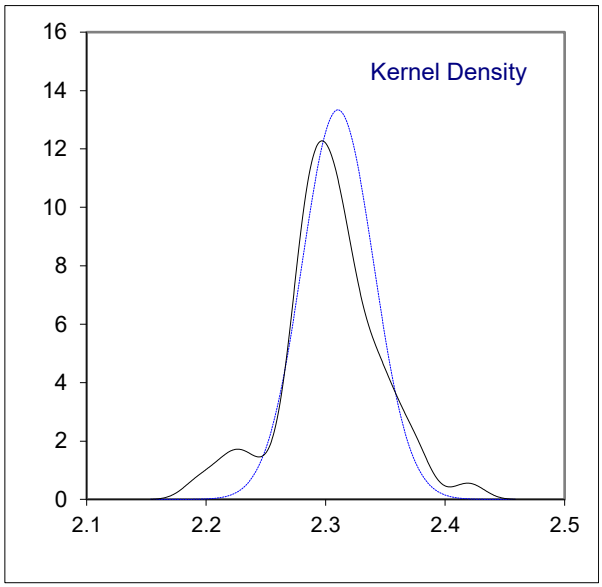


Determination of Propane on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	2.2845		-1.03	
141	GPA2261	2.3189	C	0.34	first reported: 2.3389
150	D1945	2.34		1.18	
151	GPA2261	2.295		-0.61	
167	GPA2286	2.33244	ex	0.88	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	2.3110		0.03	
352	ISO6974-3	2.4196	C,G(0.05)	4.34	first reported: 2.4833
360	ISO6974-3	2.271	ex	-1.56	test result excluded, see §4.1
442	D1945	2.2972		-0.52	
444	D1945	2.2889		-0.85	
449	ISO6974-3	2.2756		-1.38	
496	EN15984	2.281		-1.17	
525	D1945	2.3382		1.10	
529	GPA2261	2.2226	ex	-3.48	test result excluded, see §4.1
542	D1945	2.360696		2.00	
552	NBR14903	2.280		-1.21	
593	D1945	2.351	C	1.61	first reported: 2.355
596	GPA2261	2.323	C	0.50	first reported: 2.193
600	GPA2261Mod.	2.38		2.76	
608	GPA2261	2.193	C,DG(0.05)	-4.66	first reported: 2.323
609	GPA2261	2.295		-0.61	
611	GPA2261	2.3255		0.60	
663	D1945	2.280		-1.21	
777	ISO6974-6	2.37		2.37	
781	GOST31371.7-B	2.32		0.38	
823	GPA2261	2.298		-0.49	
840	D1945	2.3457		1.40	
851	GPA2261	2.30927	C	-0.04	first reported: 2.29774311
861		-----		-----	
862		-----		-----	
887	D1945	2.300		-0.41	
922	D1945	2.28		-1.21	
963	D1945	2.24	ex	-2.79	test result excluded, see §4.1
974	ISO6974-5	2.289		-0.85	
1006	D1945	2.373		2.49	
1069	In house	2.350		1.57	
1095	EN15984	2.31		-0.01	
1106		2.310		-0.01	
1135	D1945	2.26	ex	-2.00	test result excluded, see §4.1
1340	ISO6974-6	2.279		-1.25	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	2.282		-1.13	
1489		-----		-----	
1589	D1945	2.325		0.58	
1594	GPA2261	2.3008		-0.38	
1635	D1945	2.35		1.57	
1679	ISO6974-3	2.292		-0.73	
1684	ISO6974-3	2.310		-0.01	
1737	In house	2.29		-0.81	
1759	ISO6974-5	2.287		-0.93	
1779		-----		-----	
1788	D7833	2.2925		-0.71	
6052	D1945	2.3139		0.14	
6071	GPA2261	2.30043		-0.39	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	2.23		-3.19	
6237		-----		-----	
6263	GPA2261	2.2115655	DG(0.05)	-3.92	
6313	GPA2286	2.3092		-0.05	
6383		-----		-----	
6435	GPA2261	2.3110		0.03	
6440		-----		-----	
6448	GPA2261	2.3040		-0.25	
6449		-----		-----	
6476		-----		-----	
9145		2.33		0.78	

	normality	OK
	n	47
	outliers	3 (+5ex)
	mean (n)	2.3104
	st.dev. (n)	0.02991
	R(calc.)	0.0837
	st.dev.(ISO6974-3:18)	0.02519
	R(ISO6974-3:18)	0.0705
compare		
	R(D1945:14R19)	0.10

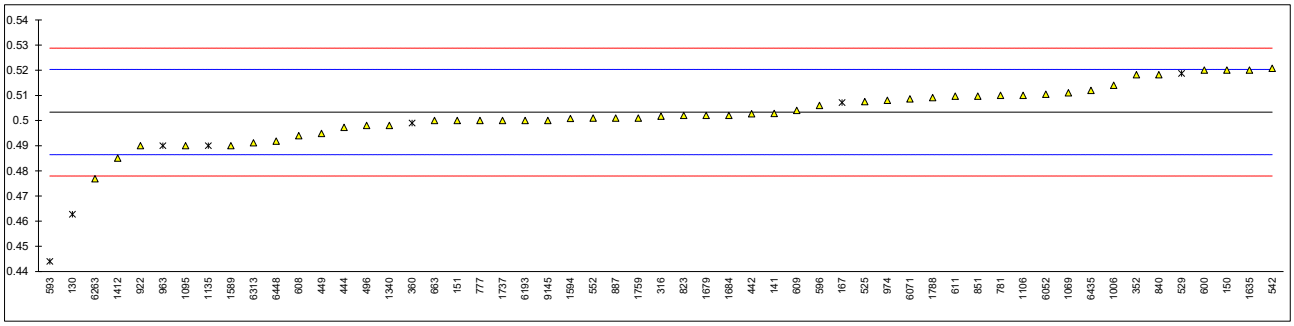


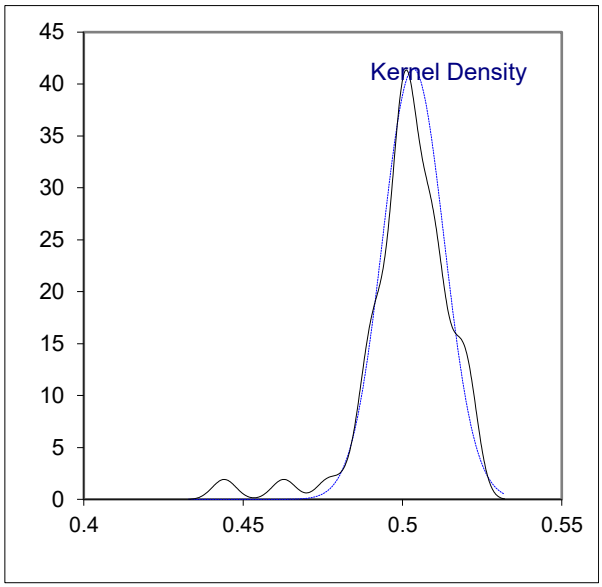


Determination of iso-Butane on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	0.4627	R(0.01)	-4.80	
141	GPA2261	0.5028	C	-0.07	first reported: 0.5072
150	D1945	0.52		1.96	
151	GPA2261	0.500		-0.40	
167	GPA2286	0.507130	ex	0.45	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	0.5017		-0.20	
352	ISO6974-3	0.5182	C	1.75	first reported: 0.5350
360	ISO6974-3	0.499	ex	-0.51	test result excluded, see §4.1
442	D1945	0.5027		-0.08	
444	D1945	0.4973		-0.71	
449	ISO6974-3	0.4949		-1.00	
496	EN15984	0.498		-0.63	
525	D1945	0.5075		0.49	
529	GPA2261	0.5187	ex	1.81	test result excluded, see §4.1
542	D1945	0.52075		2.05	
552	NBR14903	0.501		-0.28	
593	D1945	0.444	C,R(0.01)	-7.01	first reported: 0.457
596	GPA2261	0.506	C	0.31	first reported: 0.494
600	GPA2261Mod.	0.52		1.96	
608	GPA2261	0.494	C	-1.10	first reported: 0.506
609	GPA2261	0.504		0.08	
611	GPA2261	0.5097		0.75	
663	D1945	0.500		-0.40	
777	ISO6974-6	0.50		-0.40	
781	GOST31371.7-B	0.51		0.78	
823	GPA2261	0.502		-0.16	
840	D1945	0.5182		1.75	
851	GPA2261	0.50971	C	0.75	first reported: 0.50660884
861		-----		-----	
862		-----		-----	
887	D1945	0.501		-0.28	
922	D1945	0.49		-1.58	
963	D1945	0.49	ex	-1.58	test result excluded, see §4.1
974	ISO6974-5	0.508		0.55	
1006	D1945	0.514		1.26	
1069	In house	0.511		0.90	
1095	EN15984	0.49		-1.58	
1106		0.510		0.78	
1135	D1945	0.49	ex	-1.58	test result excluded, see §4.1
1340	ISO6974-6	0.498		-0.63	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	0.485		-2.17	
1489		-----		-----	
1589	D1945	0.490		-1.58	
1594	GPA2261	0.5008		-0.30	
1635	D1945	0.52		1.96	
1679	ISO6974-3	0.502		-0.16	
1684	ISO6974-3	0.502		-0.16	
1737	In house	0.50		-0.40	
1759	ISO6974-5	0.501		-0.28	
1779		-----		-----	
1788	D7833	0.5091		0.68	
6052	D1945	0.5104		0.83	
6071	GPA2261	0.50859		0.62	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	0.50		-0.40	
6237		-----		-----	
6263	GPA2261	0.4768905		-3.12	
6313	GPA2286	0.4911		-1.45	
6383		-----		-----	
6435	GPA2261	0.5120		1.02	
6440		-----		-----	
6448	GPA2261	0.4918		-1.36	
6449		-----		-----	
6476		-----		-----	
9145		0.50		-0.40	

	normality	OK
	n	48
	outliers	2 (+5ex)
	mean (n)	0.5034
	st.dev. (n)	0.00963
	R(calc.)	0.0270
	st.dev.(ISO6974-3:18)	0.00847
	R(ISO6974-3:18)	0.0237
compare		
	R(D1945:14R19)	0.07

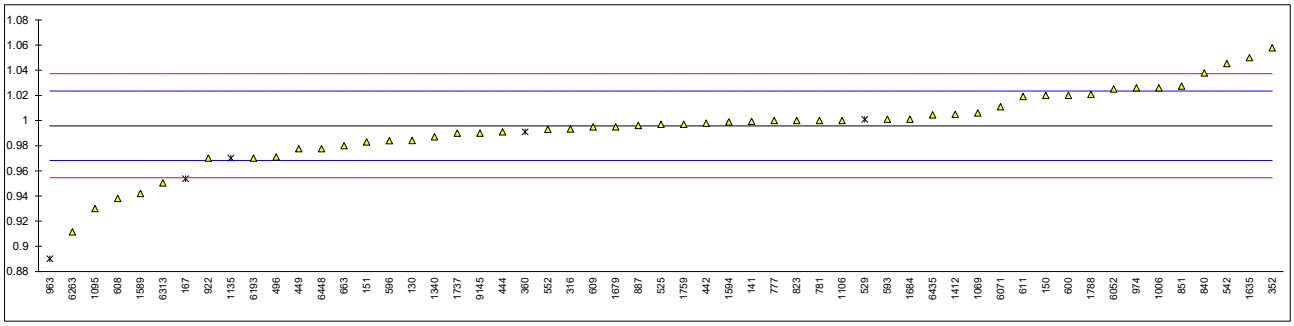


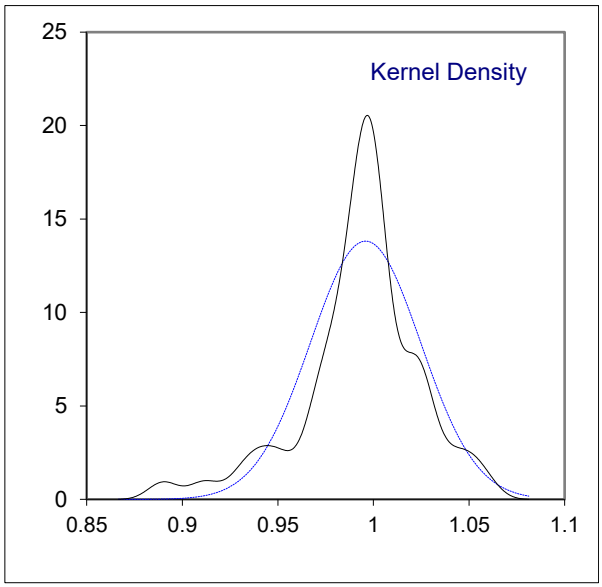


Determination of n-Butane on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	0.9841		-0.85	
141	GPA2261	0.9993	C	0.25	first reported: 1.0080
150	D1945	1.02		1.75	
151	GPA2261	0.983		-0.93	
167	GPA2286	0.953672	ex	-3.06	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	0.9933		-0.19	
352	ISO6974-3	1.0578	C	4.49	first reported:1.1172
360	ISO6974-3	0.991	ex	-0.35	test result excluded, see §4.1
442	D1945	0.9978		0.14	
444	D1945	0.9910		-0.35	
449	ISO6974-3	0.9776		-1.32	
496	EN15984	0.971		-1.80	
525	D1945	0.9970		0.08	
529	GPA2261	1.000899	ex,C	0.37	test result excluded, see §4.1, first reported: 1.0603
542	D1945	1.045196		3.57	
552	NBR14903	0.993		-0.21	
593	D1945	1.001	C	0.37	first reported: 1.000
596	GPA2261	0.984	C	-0.86	first reported: 0.938
600	GPA2261Mod.	1.02		1.75	
608	GPA2261	0.938	C	-4.19	first reported: 0.984
609	GPA2261	0.995		-0.06	
611	GPA2261	1.0191		1.68	
663	D1945	0.980		-1.15	
777	ISO6974-6	1.00		0.30	
781	GOST31371.7-B	1.00		0.30	
823	GPA2261	1.000		0.30	
840	D1945	1.0378		3.04	
851	GPA2261	1.02739	C	2.28	first reported: 1.00225983
861		-----		-----	
862		-----		-----	
887	D1945	0.996		0.01	
922	D1945	0.97		-1.87	
963	D1945	0.89	ex,C	-7.67	test result excluded, see §4.1, first reported: 0.91
974	ISO6974-5	1.026		2.18	
1006	D1945	1.026		2.18	
1069	In house	1.006		0.73	
1095	EN15984	0.93		-4.77	
1106		1.000		0.30	
1135	D1945	0.97	ex	-1.87	test result excluded, see §4.1
1340	ISO6974-6	0.987		-0.64	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	1.005		0.66	
1489		-----		-----	
1589	D1945	0.942		-3.90	
1594	GPA2261	0.9988		0.21	
1635	D1945	1.05		3.92	
1679	ISO6974-3	0.995		-0.06	
1684	ISO6974-3	1.001		0.37	
1737	In house	0.99		-0.42	
1759	ISO6974-5	0.997		0.08	
1779		-----		-----	
1788	D7833	1.0207		1.80	
6052	D1945	1.0251		2.12	
6071	GPA2261	1.01092		1.09	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	0.97		-1.87	
6237		-----		-----	
6263	GPA2261	0.9113970		-6.12	
6313	GPA2286	0.9504		-3.29	
6383		-----		-----	
6435	GPA2261	1.0045		0.63	
6440		-----		-----	
6448	GPA2261	0.9776		-1.32	
6449		-----		-----	
6476		-----		-----	
9145		0.99		-0.42	

	normality	suspect
	n	50
	outliers	0 (+5ex)
	mean (n)	0.9959
	st.dev. (n)	0.02888
	R(calc.)	0.0809
	st.dev.(ISO6974-3:18)	0.01380
	R(ISO6974-3:18)	0.0386
compare		
	R(D1945:14R19)	0.10

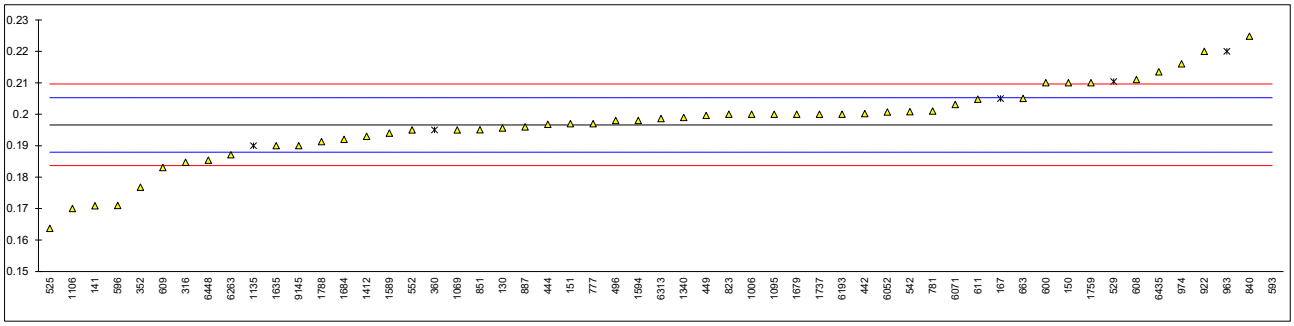


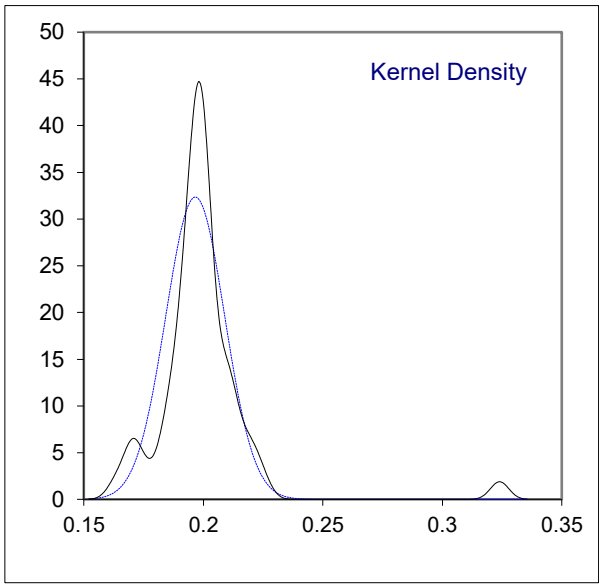


Determination of Carbon Dioxide on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	0.1956		-0.24	
141	GPA2261	0.1709	C	-5.94	first reported: 0.1724
150	D1945	0.21		3.09	
151	GPA2261	0.197		0.09	
167	GPA2286	0.204963	ex	1.93	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	0.1847		-2.76	
352	ISO6974-3	0.1768		-4.58	
360	ISO6974-3	0.195	ex	-0.37	test result excluded, see §4.1
442	D1945	0.2002		0.83	
444	D1945	0.1968		0.04	
449	ISO6974-3	0.1996		0.69	
496	EN15984	0.198		0.32	
525	D1945	0.1637		-7.61	
529	GPA2261	0.2104	ex	3.18	test result excluded, see §4.1
542	D1945	0.200817		0.97	
552	NBR14903	0.195		-0.37	
593	D1945	0.324	C,R(0.01)	29.44	first reported: 0.307
596	GPA2261	0.171	C	-5.92	first reported: 0.211
600	GPA2261Mod.	0.21		3.09	
608	GPA2261	0.211	C	3.32	first reported: 0.171
609	GPA2261	0.183		-3.15	
611	GPA2261	0.2048		1.89	
663	D1945	0.205		1.94	
777	ISO6974-6	0.197		0.09	
781	GOST31371.7-B	0.201		1.01	
823	GPA2261	0.200		0.78	
840	D1945	0.2248		6.51	
851	GPA2261	0.19504	C	-0.37	first reported: 0.16272
861		-----		-----	
862		-----		-----	
887	D1945	0.196		-0.14	
922	D1945	0.22		5.40	
963	D1945	0.22	ex,C	5.40	test result excluded, see §4.1, first reported:0.24
974	ISO6974-5	0.216		4.48	
1006	D1945	0.200		0.78	
1069	In house	0.195		-0.37	
1095	EN15984	0.20		0.78	
1106		0.170		-6.15	
1135	D1945	0.19	ex	-1.53	test result excluded, see §4.1
1340	ISO6974-6	0.199		0.55	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	0.193		-0.84	
1489		-----		-----	
1589	D1945	0.194		-0.61	
1594	GPA2261	0.1980		0.32	
1635	D1945	0.19		-1.53	
1679	ISO6974-3	0.200		0.78	
1684	ISO6974-3	0.192		-1.07	
1737	In house	0.20		0.78	
1759	ISO6974-5	0.210		3.09	
1779		-----		-----	
1788	D7833	0.1913		-1.23	
6052	D1945	0.2007		0.94	
6071	GPA2261	0.203080		1.49	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	0.20		0.78	
6237		-----		-----	
6263	GPA2261	0.1870810		-2.20	
6313	GPA2286	0.1986		0.46	
6383		-----		-----	
6435	GPA2261	0.2135		3.90	
6440		-----		-----	
6448	GPA2261	0.1854		-2.59	
6449		-----		-----	
6476		-----		-----	
9145		0.19		-1.53	

	normality	OK
	n	49
	outliers	1 (+5ex)
	mean (n)	0.1966
	st.dev. (n)	0.01233
	R(calc.)	0.0345
	st.dev.(ISO6974-3:18)	0.00433
	R(ISO6974-3:18)	0.0121
compare		
	R(D1945:14R19)	0.07

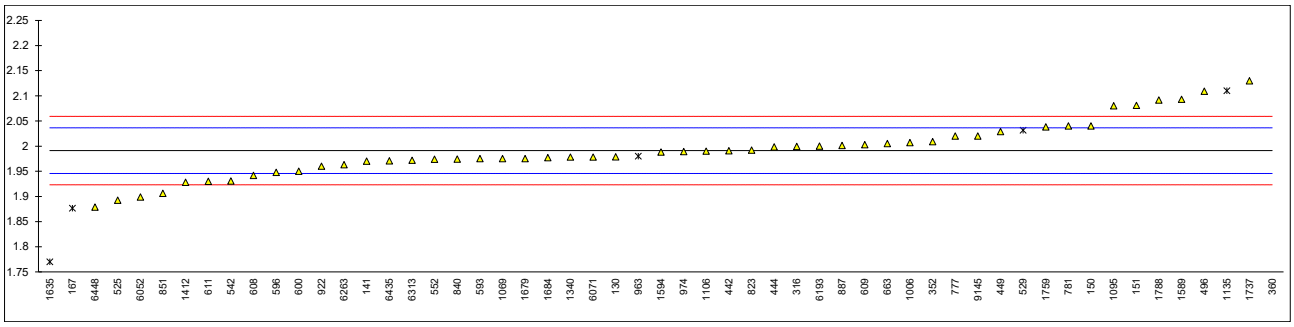


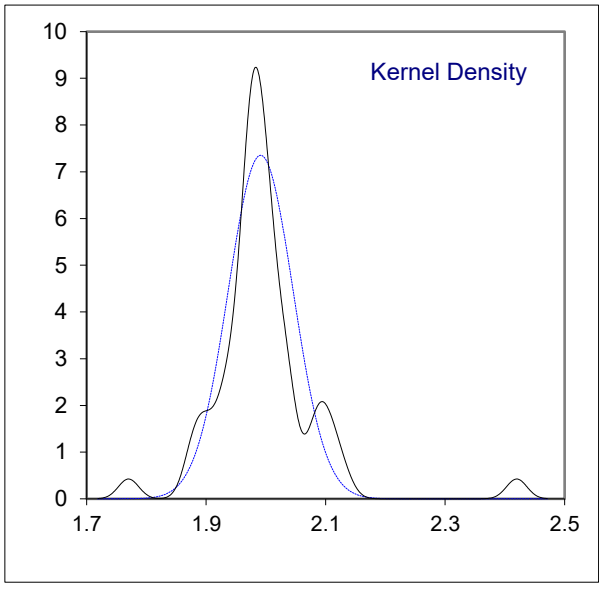


Determination of Nitrogen on sample #22060; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
130	ISO6974-3	1.9788		-0.55	
141	GPA2261	1.9700	C	-0.94	first reported: 1.9687
150	D1945	2.04		2.15	
151	GPA2261	2.081		3.96	
167	GPA2286	1.87656	ex	-5.06	test result excluded, see §4.1
225		-----		-----	
316	ISO6974-3	1.9993		0.36	
352	ISO6974-3	2.0089		0.78	
360	ISO6974-3	2.42	ex,C	18.93	test result excluded, see §4.1, first reported: 2.22
442	D1945	1.9908		-0.02	
444	D1945	1.9983		0.31	
449	ISO6974-3	2.0290		1.67	
496	EN15984	2.109		5.20	
525	D1945	1.8922		-4.37	
529	GPA2261	2.0313	ex	1.77	test result excluded, see §4.1
542	D1945	1.9306		-2.68	
552	NBR14903	1.974		-0.76	
593	D1945	1.975	C	-0.72	first reported: 1.977
596	GPA2261	1.948	C	-1.91	first reported: 1.942
600	GPA2261Mod.	1.95		-1.82	
608	GPA2261	1.942	C	-2.17	first reported: 1.948
609	GPA2261	2.003		0.52	
611	GPA2261	1.9302		-2.69	
663	D1945	2.005		0.61	
777	ISO6974-6	2.02		1.27	
781	GOST31371.7-B	2.04		2.15	
823	GPA2261	1.992		0.03	
840	D1945	1.9741		-0.76	
851	GPA2261	1.90632	C	-3.75	first reported: 1.94259
861		-----		-----	
862		-----		-----	
887	D1945	2.001		0.43	
922	D1945	1.96		-1.38	
963	D1945	1.98	ex	-0.49	test result excluded, see §4.1
974	ISO6974-5	1.989		-0.10	
1006	D1945	2.007		0.70	
1069	In house	1.975		-0.72	
1095	EN15984	2.08		3.92	
1106		1.990		-0.05	
1135	D1945	2.11	ex,C	5.24	test result excluded, see §4.1, first reported: 2.23
1340	ISO6974-6	1.978		-0.58	
1357		-----		-----	
1388		-----		-----	
1412	ISO6974-3	1.928		-2.79	
1489		-----		-----	
1589	D1945	2.093		4.49	
1594	GPA2261	1.9882		-0.13	
1635	D1945	1.77	R(0.01)	-9.77	
1679	ISO6974-3	1.975		-0.72	
1684	ISO6974-3	1.977		-0.63	
1737	In house	2.13		6.13	
1759	ISO6974-5	2.038		2.07	
1779		-----		-----	
1788	D7833	2.0915		4.43	
6052	D1945	1.8988		-4.08	
6071	GPA2261	1.97809		-0.58	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN15984	2.00		0.39	
6237		-----		-----	
6263	GPA2261	1.9631600		-1.24	
6313	GPA2286	1.9718		-0.86	
6383		-----		-----	
6435	GPA2261	1.9705		-0.91	
6440		-----		-----	
6448	GPA2261	1.8787		-4.97	
6449		-----		-----	
6476		-----		-----	
9145		2.02		1.27	

	normality	OK
	n	49
	outliers	1 (+5ex)
	mean (n)	1.9912
	st.dev. (n)	0.05428
	R(calc.)	0.1520
	st.dev.(ISO6974-3:18)	0.02265
	R(ISO6974-3:18)	0.0634
compare		
	R(D1945:14R19)	0.10

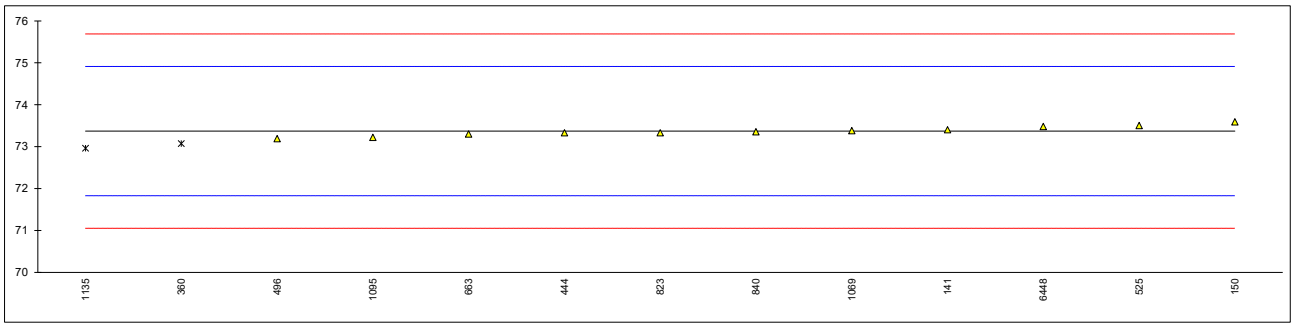


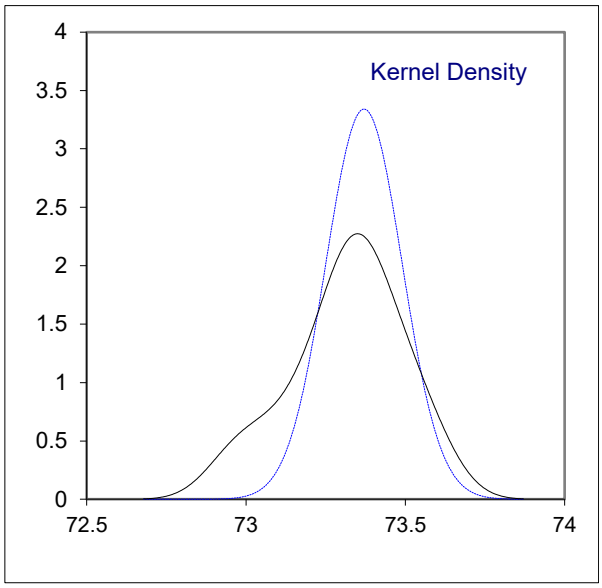


Determination of Carbon content on sample #22060; results in g/100 g

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	EN15984	73.4013	C	0.04	first reported: 73.4112
150	EN15984	73.59		0.28	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	EN15984	73.07	ex	-0.39	test result excluded, see §4.1
442		-----		-----	
444	EN15984	73.33		-0.05	
449		-----		-----	
496	EN15984	73.19		-0.23	
525	EN15984	73.5037		0.17	
529		-----		-----	
542		-----		-----	
552		-----		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	EN15984	73.30		-0.09	
777		-----		-----	
781		-----		-----	
823	EN15984	73.33		-0.05	
840	EN15984	73.353		-0.02	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069	EN15984	73.38		0.01	
1095	EN15984	73.22		-0.20	
1106		-----		-----	
1135	EN15984	72.96	ex	-0.53	test result excluded, see §4.1
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		-----		-----	
6313		-----		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	EN15984	73.48	C	0.14	first reported: 0.735 g/100 g
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

normality	OK
n	11
outliers	0 (+2ex)
mean (n)	73.371
st.dev. (n)	0.1195
R(calc.)	0.335
st.dev.(EN15984:22)	0.7714
R(EN15984:22)	2.16



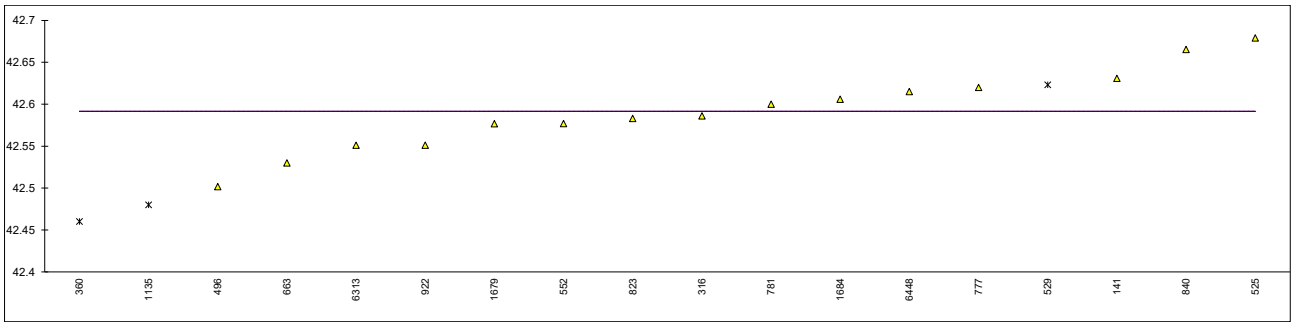


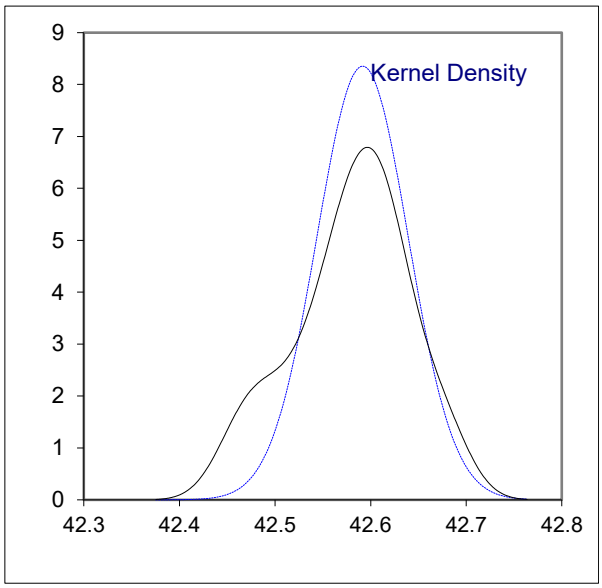
Determination of Gross (Superior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C) on sample #22060; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	42.6309	C	-----	first reported:42.6625
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	42.5860		-----	
352		-----		-----	
360	ISO6976	42.46	ex	-----	test result excluded, see §4.1
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	DIN51857	42.5017		-----	
525	ISO6976	42.679		-----	
529	ISO6976	42.623	ex, E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 42.50
542		-----		-----	
552	ISO6976	42.577		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	42.53		-----	
777	GOST31369	42.62		-----	
781	GOST31369	42.60		-----	
823	ISO6976	42.583		-----	
840	ISO6976	42.6653		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	42.5512		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	42.48	ex,C,E	-----	test result excluded, see §4.1, fr.: 42.00, calc. diff., iis calc.: 42.37
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679	ISO6976	42.5768		-----	
1684	ISO6976	42.606		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		-----		-----	
6313	ISO6976	42.5510		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	42.615		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	OK	suspect
n	15	50
outliers	0 (+3ex)	0 (+5ex)
mean (n)	42.5915	42.5731
st.dev. (n)	0.04777	0.07903
R(calc.)	0.1337	0.2213

*) Calculated by iis based on the factors given in table 3 of ISO6976:16



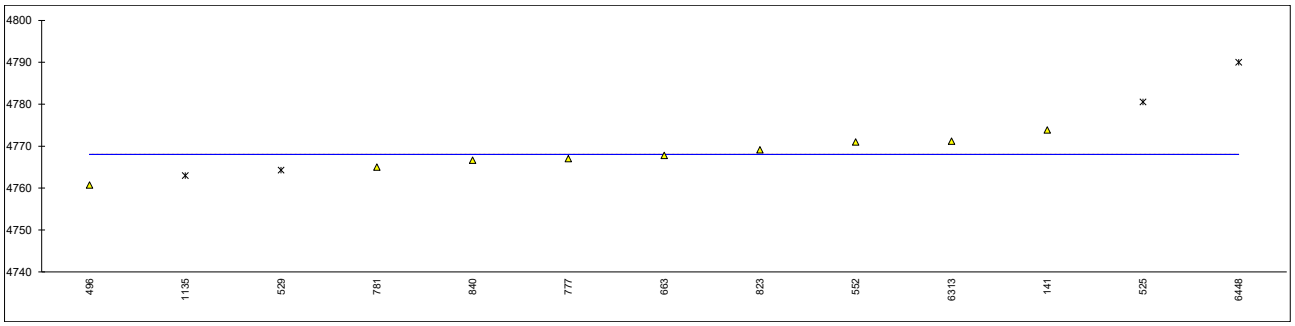


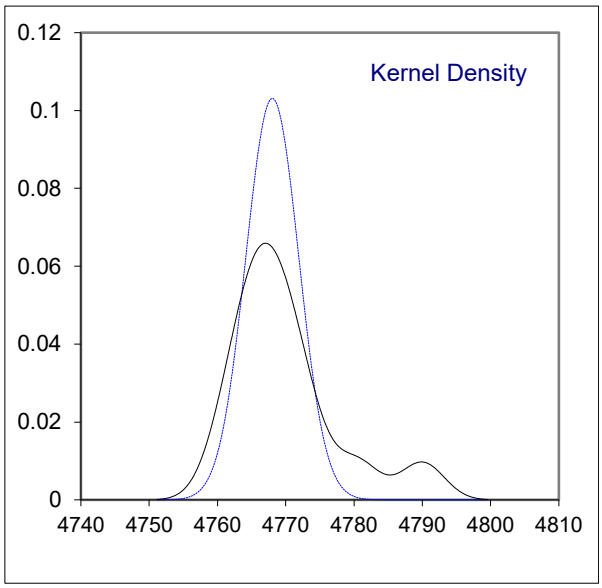
Determination of Net (Inferior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C) on sample #22060; results in kJ/100g

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	4773.8778	C	-----	first reported: 4773.5143
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360		-----		-----	
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	EN15984	4760.72		-----	
525	ISO6976	4780.534	DG(0.05)	-----	
529	ISO6976	4764.2408	ex	-----	test result excluded, see §4.1
542		-----		-----	
552	ISO6976	4771		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	4767.79		-----	
777	GOST31369	4767		-----	
781	GOST31369	4765		-----	
823	ISO6976	4769.1		-----	
840	ISO6976	4766.65		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	4763	ex,C,E	-----	test result excluded, see §4.1, fr.: 37.86, calc. diff., iis calc.: 4761.6
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		-----		-----	
6313	ISO6976	4771.203		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	4790	C,DG(0.05), E	-----	first reported: 5045, calculation difference, iis calc.:4780
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	OK	suspect
n	9	50
outliers	2 (+2ex)	0 (+5ex)
mean (n)	4768.038	4769.585
st.dev. (n)	3.8709	5.4699
R(calc.)	10.838	15.316

*) Calculated by iis based on the factors given in table 1 and A.5 of ISO6976:16



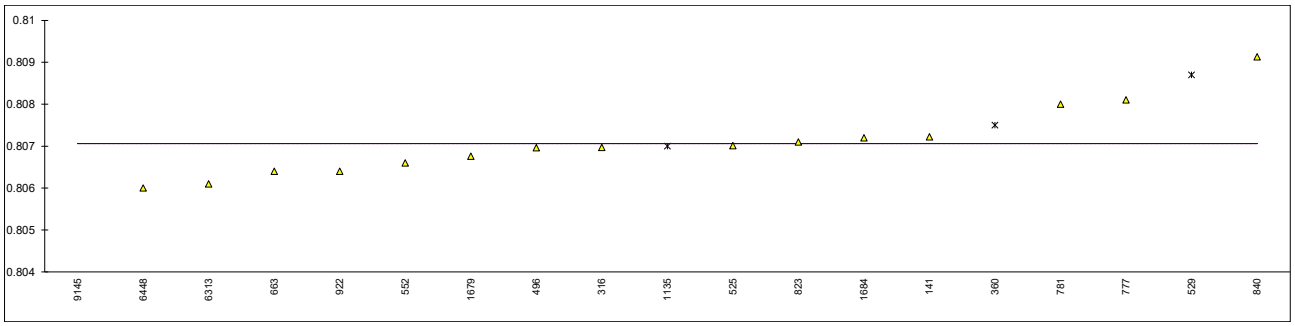


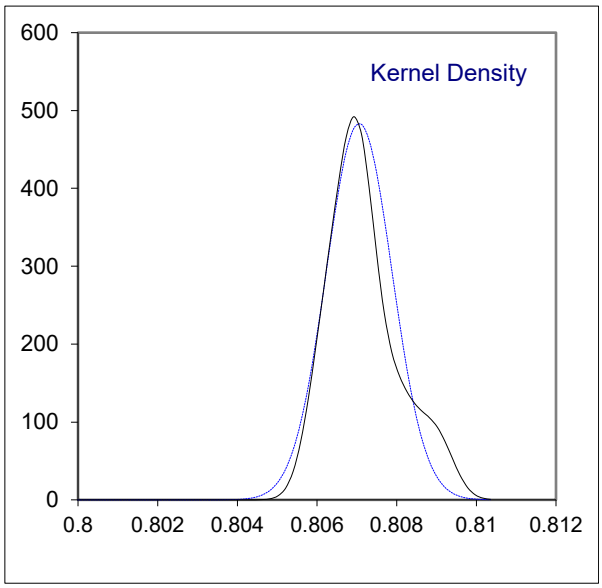
Determination of Density (Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C) on sample #22060; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	0.80722	C	-----	first reported: 0.80790
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	0.80697		-----	
352		-----		-----	
360	ISO6976	0.8075	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.8100
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	DIN51857	0.806961		-----	
525	ISO6976	0.80701		-----	
529	ISO6976	0.8087	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.8062
542		-----		-----	
552	ISO6976	0.8066		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	0.8064		-----	
777	GOST31369	0.8081		-----	
781	GOST31369	0.8080		-----	
823	ISO6976	0.8071		-----	
840	ISO6976	0.80913		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	0.8064		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.8070	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.8043
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679	ISO6976	0.80676		-----	
1684	ISO6976	0.8072		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		-----		-----	
6313	ISO6976	0.8061		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	0.806		-----	
6449		-----		-----	
6476		-----		-----	
9145		0.763	G(0.01),E	-----	Calculation difference, iis calculated: 0.807

		iis calc. based on all reported composition results:*)
normality	not OK	not OK
n	15	50
outliers	1 (+3ex)	0 (+5ex)
mean (n)	0.80706	0.80683
st.dev. (n)	0.000825	0.001512
R(calc.)	0.00231	0.00423

*) Calculated by iis based on the factors given in table 1 of ISO6976:16



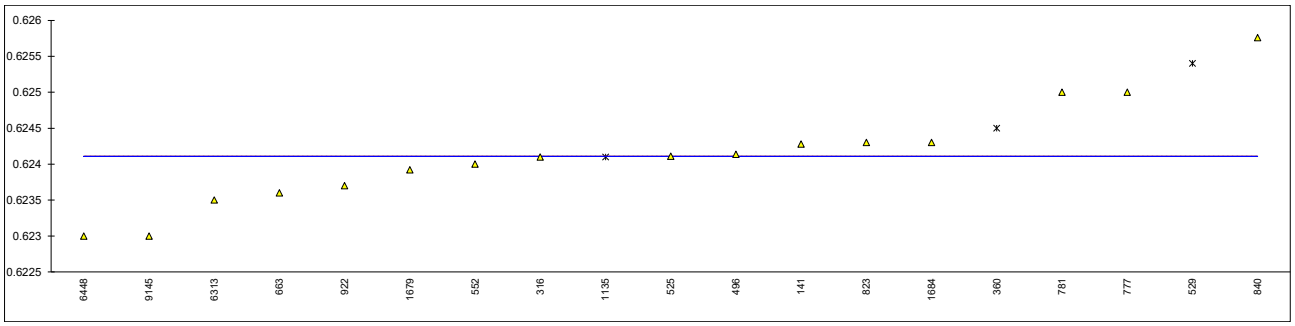


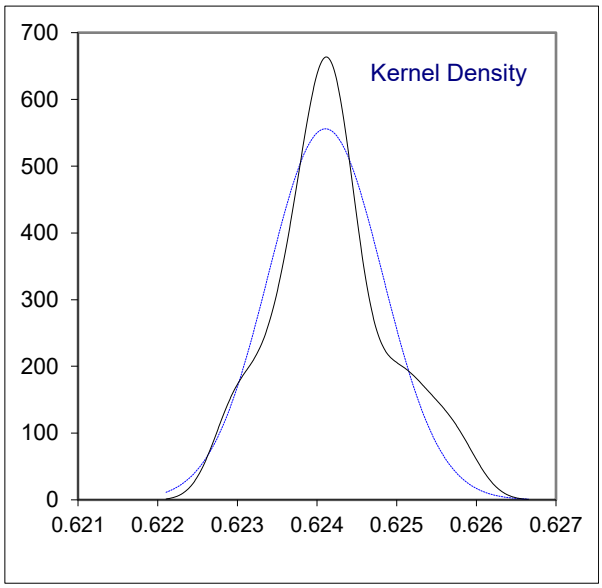
Determination of Relative Density (Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C) on sample #22060;

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	0.62428	C	-----	first reported: 0.62480
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	0.62410		-----	
352		-----		-----	
360	ISO6976	0.6245	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.6264
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	DIN51857	0.624137		-----	
525	ISO6976	0.62411		-----	
529	ISO6976	0.6254	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.6235
542		-----		-----	
552	ISO6976	0.6240		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	0.6236		-----	
777	GOST31369	0.6250		-----	
781	GOST31369	0.6250		-----	
823	ISO6976	0.6243		-----	
840	ISO6976	0.62576		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	0.6237		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.6241	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated.: 0.6220
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679	ISO6976	0.62392		-----	
1684	ISO6976	0.6243		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		-----		-----	
6313	ISO6976	0.6235		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	0.623		-----	
6449		-----		-----	
6476		-----		-----	
9145		0.623		-----	

		iis calc. based on all reported composition results:*)
normality	OK	not OK
n	16	50
outliers	0 (+3ex)	0 (+5ex)
mean (n)	0.62411	0.62397
st.dev. (n)	0.000717	0.001170
R(calc.)	0.00201	0.00328

*) Calculated by iis based on the factors given in table A.3 and A.4 of ISO6976:16



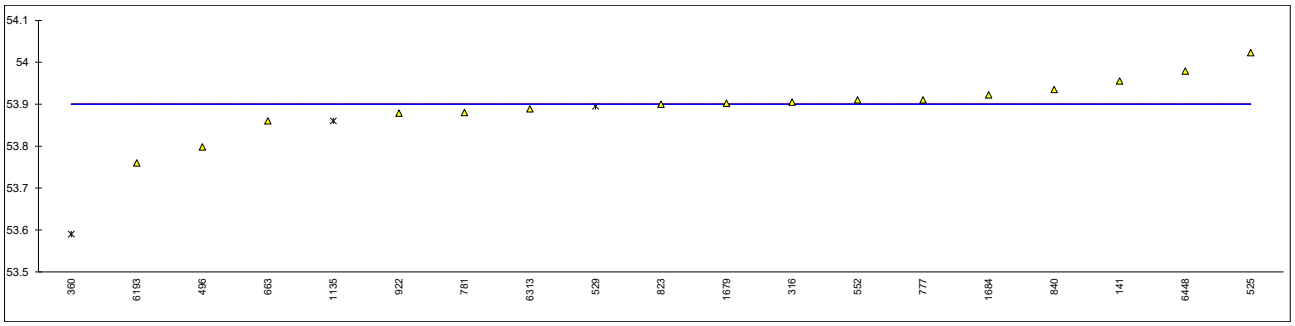


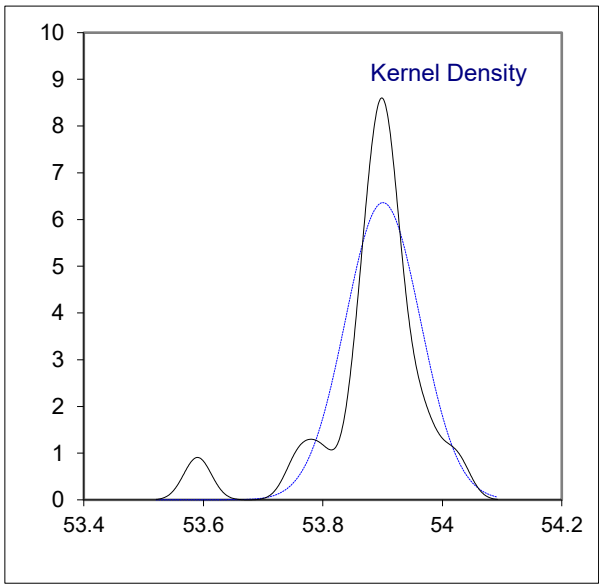
Determination of Gross Wobbe Index (Real Gas, 101.325 kPa, combustion temperature 25 °C, metering temperature 0 °C) on sample #22060; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	53.9555	C	-----	first reported: 53.9728
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	53.9050		-----	
352		-----		-----	
360	ISO6976	53.59	ex,C,E	-----	test result excluded, see §4.1, fr.: 53.73, calc. diff., iis calc.:53.64
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	DIN51857	53.7981		-----	
525	ISO6976	54.023		-----	
529	ISO6976	53.895	ex, E	-----	test result excluded, see §4.1, calc. difference, iis calc.: 53.819
542		-----		-----	
552	ISO6976	53.91		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	53.86		-----	
777	GOST31369	53.91		-----	
781	GOST31369	53.88		-----	
823	ISO6976	53.90		-----	
840	ISO6976	53.935		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	53.8787		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	53.86	ex,C,E	-----	test result excluded, see §4.1, fr.: 53.166, calc. diff., iis calc.:53.72
1340		-----		-----	
1357		-----		-----	
1388		-----		-----	
1412		-----		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635		-----		-----	
1679	ISO6976	53.9023		-----	
1684	ISO6976	53.922		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052		-----		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	EN589	53.760	E	-----	calculation difference, iis calculated: 53.855
6237		-----		-----	
6263		-----		-----	
6313	ISO6976	53.8887		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	53.979		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	suspect	suspect
n	16	50
outliers	0 (+3ex)	0 (+5ex)
mean (n)	53.9005	53.8954
st.dev. (n)	0.06269	0.06613
R(calc.)	0.1755	0.1852

*) Calculated by iis based on reported test results for Gross (Superior) Caloric Value and Relative Density.



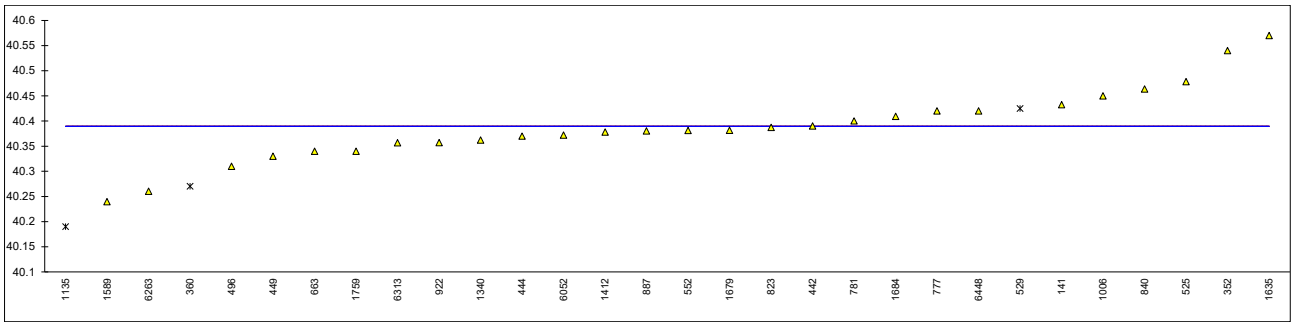


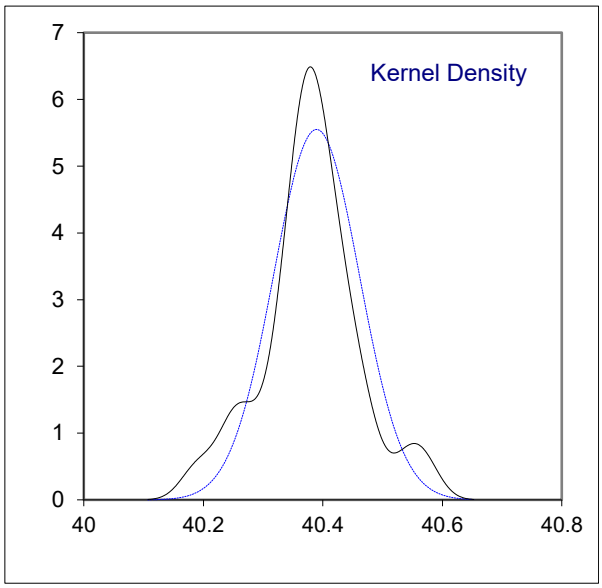
Determination of Gross (Superior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C) on sample #22060; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	40.4325	C	-----	first reported: 0.4624
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	40.54	C	-----	first reported: 40.66
360	ISO6976	40.27	ex	-----	test result excluded, see §4.1
442	ISO6976	40.39		-----	
444	ISO6976	40.37		-----	
449	ISO6976	40.33		-----	
496	DIN51857	40.3099		-----	
525	ISO6976	40.478		-----	
529	ISO6976	40.425	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 40.31
542		-----		-----	
552	ISO6976	40.381		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	40.34		-----	
777	GOST31369	40.42		-----	
781	GOST31369	40.40		-----	
823	ISO6976	40.387		-----	
840	ISO6976	40.4636		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887	ISO6976	40.380		-----	
922	ISO6976	40.3568		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	40.45		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	40.19	ex	-----	test result excluded, see §4.1
1340	ISO6976	40.362	C	-----	first reported: 40.263
1357		-----		-----	
1388		-----		-----	
1412	ISO6976	40.378		-----	
1489		-----		-----	
1589	D3588	40.2397	E	-----	calculation difference, iis calc.: 40.3056
1594		-----		-----	
1635	ISO6976	40.570		-----	
1679	ISO6976	40.3812		-----	
1684	ISO6976	40.409		-----	
1737		-----		-----	
1759	ISO6976	40.34		-----	
1779		-----		-----	
1788		-----		-----	
6052	D3588	40.372	E	-----	calculation difference, iis calc.: 40.451
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		40.26		-----	
6313	ISO6976	40.3566		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	40.42		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	suspect	suspect
n	27	50
outliers	0 (+3ex)	0 (+5ex)
mean (n)	40.3895	40.3777
st.dev. (n)	0.07189	0.07486
R(calc.)	0.2013	0.2096

*) Calculated by iis based on the factors given in table 3 of ISO6976:16



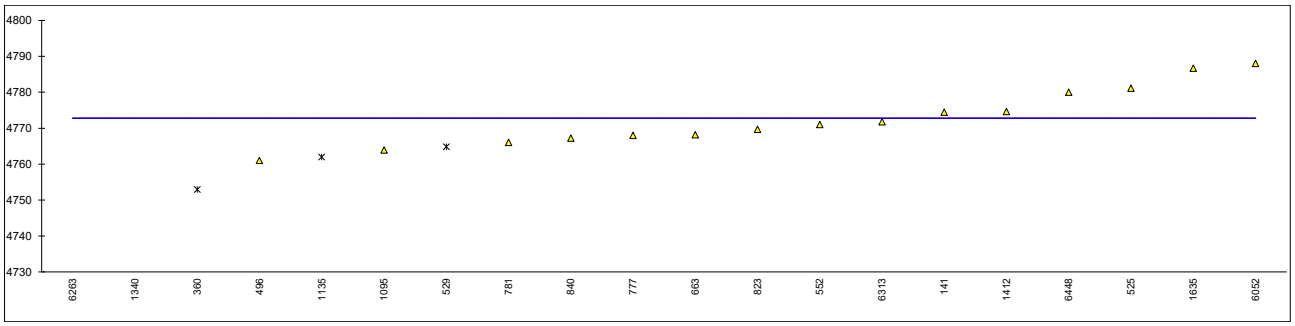


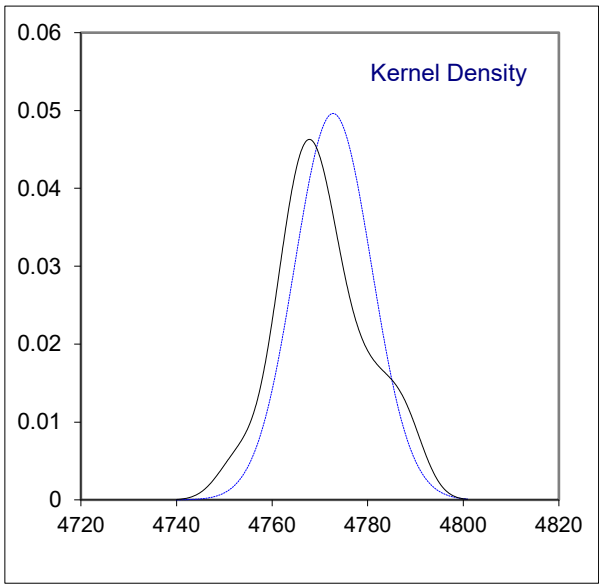
Determination of Net (Inferior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C) on sample #22060; results in kJ/100g

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	4774.4413	C	-----	first reported: 4774.0779
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	EN15984	4752.91	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calc.: 4738.41
442		-----		-----	
444		-----		-----	
449		-----		-----	
496	EN15984	4760.99		-----	
525	ISO6976	4781.098		-----	
529	ISO6976	4764.8030	ex	-----	test result excluded, see §4.1
542		-----		-----	
552	ISO6976	4771		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	EN15984	4768.14		-----	
777	GOST31369	4768		-----	
781	GOST31369	4766		-----	
823	ISO6976	4769.7		-----	
840	ISO6976	4767.21		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095	EN15984	4763.91		-----	
1106		-----		-----	
1135	ISO6976	4762	ex,C	-----	test result excluded, see §4.1, first reported: 36.29
1340	ISO6976	36.444	ex,C	-----	test result excluded for using different unit (MJ/m^3), fr.: 36.361
1357		-----		-----	
1388		-----		-----	
1412	ISO6976	4774.625		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635	ISO6976	4786.7		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1779		-----		-----	
1788		-----		-----	
6052	D3588	4788	E	-----	calculation difference, iis calculated: 4776
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		36.35	ex	-----	test result excluded for using different unit (MJ/m^3)
6313	ISO6976	4771.748		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	4780		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	OK	suspect
n	15	50
outliers	0 (+5ex)	0 (+5ex)
mean (n)	4772.771	4770.148
st.dev. (n)	8.0430	5.4704
R(calc.)	22.520	15.317

*) Calculated by iis based on the factors given in table 1 and A.5 of ISO6976:16



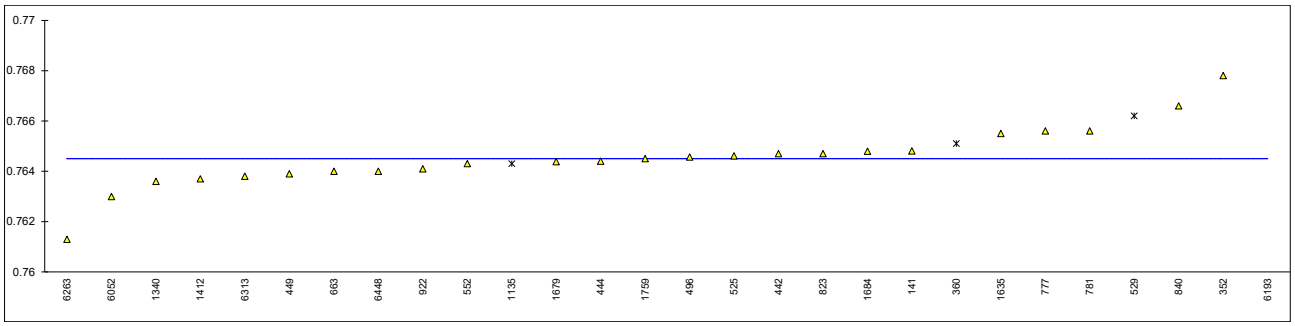


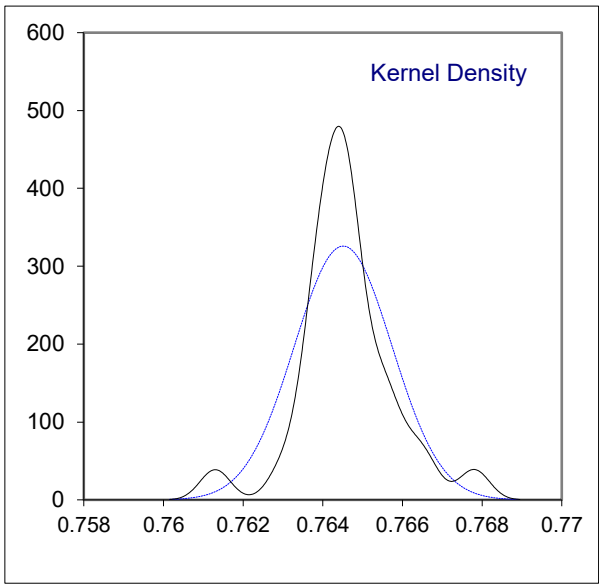
Determination of Density (Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C) on sample #22060; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	0.76481	C	-----	first reported: 0.76546
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	0.7678	C	-----	first reported: 0.7703
360	ISO6976	0.7651	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.7674
442	ISO6976	0.7647		-----	
444	ISO6976	0.7644		-----	
449	ISO6976	0.7639		-----	
496	DIN51857	0.764566		-----	
525	ISO6976	0.76461		-----	
529	ISO6976	0.7662	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.7639
542		-----		-----	
552	ISO6976	0.7643		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	0.7640		-----	
777	GOST31369	0.7656		-----	
781	GOST31369	0.7656		-----	
823	ISO6976	0.7647		-----	
840	ISO6976	0.76660		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	0.7641		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.7643	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 0.7621
1340	ISO6976	0.7636	C	-----	first reported: 0.6221
1357		-----		-----	
1388		-----		-----	
1412	ISO6976	0.7637		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635	ISO6976	0.7655		-----	
1679	ISO6976	0.76438		-----	
1684	ISO6976	0.7648		-----	
1737		-----		-----	
1759	ISO6976	0.7645		-----	
1779		-----		-----	
1788		-----		-----	
6052	D3588	0.7630	E	-----	calculation difference, iis calculated: 0.7649
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193	ISO8973	3086.2	G(0.01)	-----	
6237		-----		-----	
6263		0.7613		-----	
6313	ISO6976	0.7638		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	0.764		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	not OK	not OK
n	24	50
outliers	1 (+3ex)	0 (+5ex)
mean (n)	0.76451	0.76444
st.dev. (n)	0.001225	0.001432
R(calc.)	0.00343	0.00401

*) Calculated by iis based on the factors given in table 1 of ISO6976:16



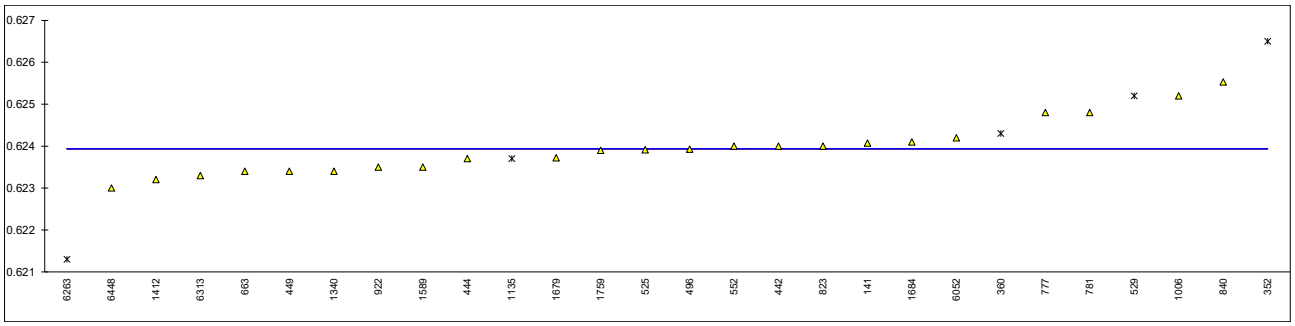


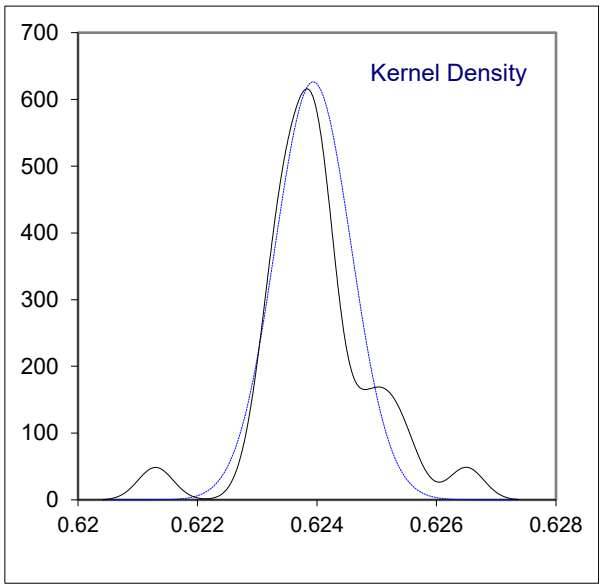
Determination of Relative Density (Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C) on sample #22060;

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	0.62407	C	-----	first reported: 0.62460
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	0.6265	C,G(0.05)	-----	first reported: 0.9285
360	ISO6976	0.6243	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calc: 0.6262
442	ISO6976	0.6240		-----	
444	ISO6976	0.6237		-----	
449	ISO6976	0.6234		-----	
496	DIN51857	0.623927		-----	
525	ISO6976	0.62391		-----	
529	ISO6976	0.6252	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calc.: 0.6233
542		-----		-----	
552	ISO6976	0.6240		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	0.6234		-----	
777	GOST31369	0.6248		-----	
781	GOST31369	0.6248		-----	
823	ISO6976	0.6240		-----	
840	ISO6976	0.62553		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	0.6235		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	0.6252		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.6237	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calc.: 0.6218
1340	ISO6976	0.6234	C	-----	first reported: 0.6221
1357		-----		-----	
1388		-----		-----	
1412	ISO6976	0.6232		-----	
1489		-----		-----	
1589	D3588	0.6235		-----	
1594		-----		-----	
1635		-----		-----	
1679	ISO6976	0.62372		-----	
1684	ISO6976	0.6241		-----	
1737		-----		-----	
1759	ISO6976	0.6239		-----	
1779		-----		-----	
1788		-----		-----	
6052	D3588	0.6242		-----	
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		0.6213	G(0.05)	-----	
6313	ISO6976	0.6233		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	0.623		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	suspect	not OK
n	23	50
outliers	2 (+3ex)	0 (+5ex)
mean (n)	0.62394	0.62377
st.dev. (n)	0.000637	0.001168
R(calc.)	0.00178	0.00327

*) Calculated by iis based on the factors given in table A.3 and A.4 of ISO6976:16



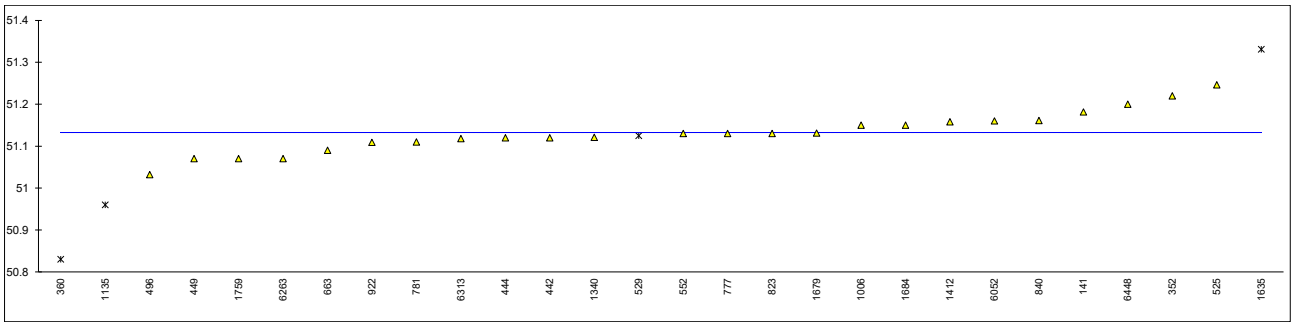


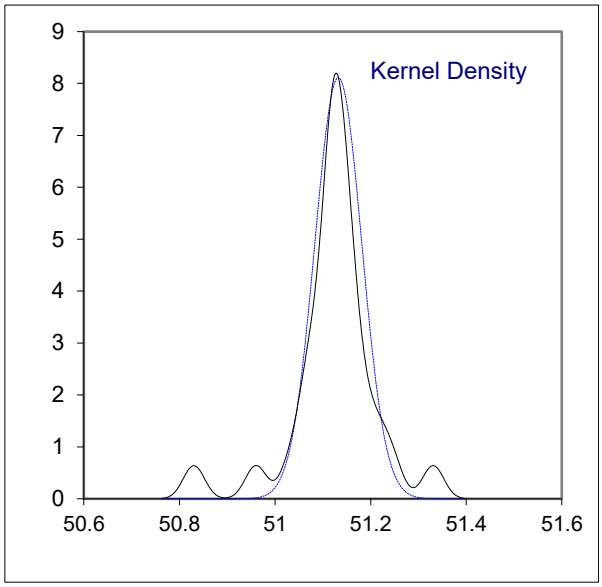
Determination of Gross Wobbe Index (Real Gas, 101.325 kPa, combustion temperature 15 °C, metering temperature 15 °C) on sample #22060; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
130		-----		-----	
141	ISO6976	51.1815	C	-----	first reported: 51.1978
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	51.22	C	-----	first reported: 51.29
360	ISO6976	50.83	ex,C,E	-----	test result excluded, see §4.1, fr.: 50.96, calc. diff., iis calc.: 50.88
442	ISO6976	51.12		-----	
444	ISO6976	51.12		-----	
449	ISO6976	51.07		-----	
496	DIN51857	51.0322		-----	
525	ISO6976	51.246		-----	
529	ISO6976	51.125	ex,E	-----	test result excluded, see §4.1, calc. diff., iis calculated: 51.05
542		-----		-----	
552	ISO6976	51.13		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
611		-----		-----	
663	ISO6976	51.09		-----	
777	GOST31369	51.13		-----	
781	GOST31369	51.11		-----	
823	ISO6976	51.13		-----	
840	ISO6976	51.161		-----	
851		-----		-----	
861		-----		-----	
862		-----		-----	
887		-----		-----	
922	ISO6976	51.1088		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	51.15		-----	
1069		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	50.96	ex,C	-----	test result excluded, see §4.1, first reported: 50.89
1340	ISO6976	51.121	C	-----	first reported: 51.048
1357		-----		-----	
1388		-----		-----	
1412	ISO6976	51.158		-----	
1489		-----		-----	
1589		-----		-----	
1594		-----		-----	
1635	ISO6976	51.331	G(0.05)	-----	
1679	ISO6976	51.1311		-----	
1684	ISO6976	51.15		-----	
1737		-----		-----	
1759	ISO6976	51.07		-----	
1779		-----		-----	
1788		-----		-----	
6052	Calculated	51.16	E	-----	calculation difference, iis calculated: 51.20
6071		-----		-----	
6104		-----		-----	
6130		-----		-----	
6177		-----		-----	
6193		-----		-----	
6237		-----		-----	
6263		51.07		-----	
6313	ISO6976	51.1182		-----	
6383		-----		-----	
6435		-----		-----	
6440		-----		-----	
6448	ISO6976	51.20		-----	
6449		-----		-----	
6476		-----		-----	
9145		-----		-----	

		iis calc. based on all reported composition results:*)
normality	OK	suspect
n	24	50
outliers	1 (+3ex)	0 (+5ex)
mean (n)	51.1324	51.1245
st.dev. (n)	0.04919	0.06267
R(calc.)	0.1377	0.1755

*) Calculated by iis based on reported test results for Gross (Superior) Caloric Value and Relative Density.





APPENDIX 2

Number of participants per country

2 labs in ALGERIA
1 lab in ARGENTINA
1 lab in AZERBAIJAN
1 lab in BELGIUM
1 lab in BOSNIA and HERZEGOVINA
1 lab in BRAZIL
1 lab in BRUNEI
1 lab in BULGARIA
1 lab in CANADA
10 labs in CHINA, People's Republic
1 lab in COTE D'IVOIRE
1 lab in CROATIA
1 lab in DENMARK
1 lab in ECUADOR
1 lab in FINLAND
1 lab in FRANCE
1 lab in GERMANY
2 labs in HONG KONG
1 lab in INDONESIA
1 lab in KOREA, Republic of
5 labs in MALAYSIA
2 labs in MEXICO
1 lab in NETHERLANDS
2 labs in OMAN
2 labs in PAKISTAN
1 lab in PERU
3 labs in PORTUGAL
1 lab in ROMANIA
2 labs in RUSSIAN FEDERATION
1 lab in SAUDI ARABIA
1 lab in SERBIA
1 lab in SLOVAKIA
3 labs in TAIWAN
1 lab in THAILAND
3 labs in UNITED ARAB EMIRATES
4 labs in UNITED KINGDOM
5 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

APPENDIX 3

Abbreviations

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

Literature

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