Results of Proficiency Test
Natural Gas Analysis
April 2020

CONTENTS

Appendices:

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 2019/2020 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 71 laboratories from 35 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of this 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 cylinder size is a cost-effective one-liter cylinder. Each cylinder was uniquely numbered and labelled #20055. 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. 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 ISO/IEC17025 accreditation for the calibration and assignment of reference values for these samples.

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

In this proficiency test one gas sample was used. The necessary one-liter cylinders with artificial natural gas mixture were prepared and tested for homogeneity by EffecTech (Uttoxeter, United Kingdom) in conformance with ISO Guide 35: 2006 and ISO/IEC17043:2010.

One batch of 74 cylinders was prepared (job 20/0041) starting in February 2020. Each cylinder was uniquely numbered and labelled #20055. Every cylinder in the batch was analyzed using replicate measurements. The within bottle and between bottle variations were assessed in accordance with ISO Guide 35:2006 (Annex A.1). This evaluation showed that all between bottle variations were small compared to the uncertainties on the reference values on each component.

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 ISO13528, Annex B2 in the next table.

Component	r (abs, observed) in %mol/mol	0.3 x R (abs, ISO6974-3:18) in %mol/mol
Methane	0.0035	0.0690
Ethane	0.0021	0.0319
Propane	0.0007	0.0125
iso-Butane	0.0005	0.0099
n-Butane	0.0005	0.0071
Carbon Dioxide	0.0005	0.0060
Nitrogen	0.0007	0.0180

Table 1: evaluation of homogeneity test results against ISO6974-3 requirements of subsamples #20055

All observed repeatabilities are far less than 0.3 times the respective reproducibilities of the reference test method ISO6974-3:18. Therefore, the homogeneity of the prepared batch was assumed.

To each of the participating laboratories one 1L gas cylinder labelled #20055 was sent on April 1, 2020. 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   ANALYZES

The participants were requested to determine on sample #20055: 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 appropriate reference test methods that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3   RESULTS

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

Directly after the deadline a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no 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 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.

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. In this PT, the criterion of ISO13528, paragraph 9.2.1, was met for all evaluated tests, therefore, the uncertainty of the assigned values may be negligible and need not be included in the PT report.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are on the X-axis.
The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected 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 e.g. ISO, EN or ASTM reproducibilities, 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 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:

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

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:

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

4 EVALUATION

Serious 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 ten weeks to allow (as much as possible) that participants could receive the PT sample and report test results.

Finally, thirteen participants did not report any test results at all and not all laboratories were able to report all the analyses requested. In total 58 participants reported 648 numerical test results. Observed were 33 outlying test results, which is 5.1% of the numerical test results. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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

4.1   EVALUATION PER COMPONENT AND PER PARAMETER

In this section the reported test results are discussed per test and per component. 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 explained in appendix 3.

Two laboratories (1095 and 1528) reported deviating test results for many 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 to exclude the reported results of these laboratories for the statistical evaluation. Also, the reported test results for the parameters calculated from the measured gas composition were excluded for these three laboratories, when not marked as a statistical outlier.

One laboratory (1489) had a large deviation for the sum of the composition results (a total of 99.8%). Since the composition was not normalized the calculated parameters were excluded for the statistical evaluation, when not marked as a statistical outlier.

One laboratory (92) had statistical outliers in the calculation for density and relative density. And the test results for Caloric Value Inferior was reported in a deviating unit. Therefore, the test result for Gross Caloric Value was excluded for statistical calculations.

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

Ethane: The determination of this component may be problematic. Two statistical outliers were observed and three 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 and ASTM D1945:14.

Propane: The determination of this component may be problematic depending on the test method used. Two statistical outliers were observed and two 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 D1945:14.

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

n-Butane: The determination of this component may be problematic depending on the test method used as reference test method. Three statistical outliers were observed and two 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 D1945:14.

Carbon Dioxide: The determination of this component may be problematic depending on the test method used as reference test method. Three statistical outliers were observed and three 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 D1945:14.

Nitrogen: The determination of this component was very problematic. One statistical outlier was observed and two 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 D1945:14.

Carbon content: The determination of this component was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN15984:17.

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 participants with test results for 15°C and 25°C varied between 16 and 30. In total twenty-eight possible calculation errors were observed over ten parameters.

Gross (Superior) Caloric Value: The calculation at combustion temperature 25°C/metering temperature 0°C may not be problematic. One statistical outlier was observed. The reproducibility was somewhat larger compared to the observed reproducibility in last year's PT: iis19S01M (0.14 vs. 0.13).

The calculation at combustion temperature 15°C/metering temperature 15°C may not be problematic. Two statistical outliers were observed and two other test results were excluded. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (0.12 vs. 0.14).

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 one other test result was excluded. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (7 vs. 26).

The calculation at combustion temperature 15°C/metering temperature 15°C may not be problematic. One statistical outlier was observed and two other test results were excluded. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (15 vs. 20).

Density: The calculation at combustion temperature 25°C/metering temperature 0°C may not be problematic. Two statistical outliers were observed. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (0.0012 vs. 0.0030).

The calculation at combustion temperature 15°C/metering temperature 15°C may not be problematic. One statistical outlier was observed and one other test result was excluded. The reproducibility was in line with the observed reproducibility of last year's PT: iis19S01M (0.0027 vs. 0.0028).

Relative Density: The calculation at combustion temperature 25°C/metering temperature 0°C may not be problematic. Two statistical outliers were observed. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (0.0010 vs. 0.0024).

The calculation at combustion temperature 15°C/metering temperature 15°C may not be problematic. One statistical outlier was observed and one other test result was excluded. The reproducibility was in line with the observed reproducibility of last year's PT: iis18S01M (0.0023 vs. 0.0021).

Gross Wobbe Index: The calculation at combustion temperature 25°C/metering temperature 0°C may not be problematic. Two statistical outliers were observed. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (0.101 vs. 0.112).

The calculation at combustion temperature 15°C/metering temperature 15°C may not be problematic. Two statistical outliers were observed and one other test result was excluded. The reproducibility was small compared to the observed reproducibility in last year's PT: iis19S01M (0.056 vs. 0.121).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Component	unit	n	average	2.8 * sd	R(ISO6974-3)	R(D1945)
Methane	%mol/mol	54	91.251	0.301	0.230	0.15
Ethane	%mol/mol	52	4.111	0.132	0.107	0.10
Propane	%mol/mol	53	1.109	0.064	0.042	0.10
iso-Butane	%mol/mol	51	0.796	0.033	0.033	0.07
n-Butane	%mol/mol	52	0.501	0.028	0.024	0.07
Carbon Dioxide	%mol/mol	51	0.392	0.028	0.020	0.07
Nitrogen	%mol/mol	54	1.832	0.128	0.060	0.10
Carbon content	g/100g	12	73.17	0.31	2.16	R(EN15984)

Table 2: reproducibilities of the composition of sample #20055

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.

Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C				
Parameter	unit	n	average	2.8 * sd
Gross (Superior) Caloric Value	MJ/m^3	20	42.005	0.139
Net (Inferior) Caloric Value	kJ/100g	13	4762.83	7.03
Density	kg/m^3	19	0.7967	0.0012
Relative Density		19	0.6162	0.0010
Gross Wobbe Index	MJ/m^3	19	53.509	0.101

Table 3: performance of the group for combustion temperature of 25°C, Real Gas

Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C				
Parameter	unit	n	average	2.8 * sd
Gross (Superior) Caloric Value	MJ/m^3	26	39.842	0.122
Net (Inferior) Caloric Value	kJ/100g	18	4762.54	15.13
Density	kg/m^3	26	0.7549	0.0027
Relative Density		28	0.6161	0.0023
Gross Wobbe Index	MJ/m^3	24	50.755	0.056

Table 4: performance of the group for combustion temperature of 15°C, Real Gas

4.3   COMPARISON OF THE PROFICIENCY TEST OF APRIL 2020 WITH PREVIOUS PTS

	April 2020	April 2019	April 2018	April 2017	April 2016
Number of reporting laboratories	58	59	59	56	60
Number of test results	648	698	700	650	691
Number of statistical outliers	33	32	46	41	50
Percentage of statistical outliers	5.1%	4.6%	6.6%	6.3%	7.2%

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 tables.

Component	2020 ISO6974-3	2019 ISO6974-3	2018 ISO6974-3	2017 ISO6974-3	2016 ISO6974-3
Methane	-	+	--	-	--
Ethane	-	+	+/-	+/-	+/-
Propane	-	+/-	-	-	-
iso-Butane	+/-	-	+	+/-	+/-
n-Butane	+/-	-	+	+/-	-
Carbon Dioxide	-	-	--	-	--
Nitrogen	--	--	--	--	--

Table 6: comparison determinations against test method ISO6974-3

Component	2020 D1945	2019 D1945	2018 D1945	2017 D1945	2016 D1945
Methane	-	-	--	-	--
Ethane	-	+	-	+	-
Propane	+	+	+/-	++	++
iso-Butane	++	++	++	++	++
n-Butane	++	+	++	++	++
Carbon Dioxide	++	+	+	++	+/-
Nitrogen	-	-	--	-	--

Table 7: comparison determinations against test method ASTM D1945

Component	2020 EN15984	2019 EN15984	2018 EN15984	2017 EN15984	2016 EN15984
Carbon content	++	++	++	++	++

Table 8: comparison determination against EN15984

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 observed reproducibilities for the individual components are not in agreement with the reproducibility requirements of ISO6974-3 and therefore it can be concluded that the group has difficulties with the determination of the composition in this proficiency test.

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	Consensus values from participants test results in %mol/mol	Absolute differences in %mol/mol	z-score
Methane	91.2606	91.2510	0.0096	0.12
Ethane	4.1018	4.1110	-0.0092	-0.04
Propane	1.1075	1.1085	-0.0010	-0.01
iso-Butane	0.7957	0.7957	-0.0000	-0.00
n-Butane	0.5027	0.5013	0.0014	0.17
Carbon Dioxide	0.3956	0.3917	0.0039	0.55
Nitrogen	1.8362	1.8323	0.0039	0.18

Table 9: comparison of average values of this PT with the values determined by the supplier EffecTech

From the comparison in table 9 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 #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	91.52		3.28	
130	ISO6974-3	91.3014		0.61	
141	GPA2261/2286	91.2627		0.14	
150	D1945	91.055		-2.39	
151	GPA2261	91.147	C	-1.27	First reported 90.775
167		-----		-----	
225		-----		-----	
316	ISO6974-3	91.2631		0.15	
352	ISO6974-3	91.2831		0.39	
360	ISO6974-3	91.238		-0.16	
442	D1945	91.2729		0.27	
444	D1945	91.3695		1.44	
446		-----		-----	
496	EN15984	91.312		0.74	
525	GPA2261	91.1027		-1.81	
529	GPA2261	91.464	C	2.59	First reported 92.147
552		91.230		-0.26	
593		-----		-----	
596	GPA2261	91.253		0.02	
600	GPA2261 mod.	91.32		0.84	
608	GPA2261	91.4691	C	2.66	First reported 91.7481
609	GPA2261	91.3772		1.54	
610	GPA2261	91.1863		-0.79	
611	GPA2261	91.2081		-0.52	
663	D1945	91.415		2.00	
777		-----		-----	
781		-----		-----	
823	GPA2261	91.25		-0.01	
840	D1945	91.3289		0.95	
851	GPA2261	91.216		-0.43	
862	GPA2261	91.240		-0.13	
868	GPA2261	91.250		-0.01	
887	D1945	91.287		0.44	
922	GPA2261	91.28		0.35	
963		-----		-----	
974	ISO6974-5	91.2537		0.03	
1006	D1945	91.094		-1.91	
1029	D1945	91.1834		-0.82	
1069	UOP539 mod.	91.19		-0.74	
1081	In House	91.234		-0.21	
1095	EN15984	90.76	R(0.05)	-5.98	
1106		-----		-----	
1135	D1945	91.39	C	1.69	First reported 91.65
1197		91.269		0.22	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	91.121	ex	-1.58	Excluded, see paragraph 4.1
1528	UOP539	90.83	C,R(0.01)	-5.13	First reported 91.03
1635	D1945	90.974		-3.37	
1679	ISO6974-3	91.218		-0.40	
1684		91.2526	C	0.02	First reported 90.8999
1737	In House	91.39		1.69	
1759	ISO6974-5	91.040		-2.57	
1788	D7833	91.346		1.16	
1930	DIN51857	91.2216		-0.36	
6062	ISO6974-3	91.2312		-0.24	
6104	GPA2261	91.230		-0.26	
6130	D1945	91.2051		-0.56	
6193	D2163/EN15984	91.29		0.48	
6237	ISO6974-3	91.306		0.67	
6282	GPA2261	91.10		-1.84	
6304	D1945	91.2300		-0.26	
6311	D1945	91.11708		-1.63	
6313		-----		-----	
6323	GPA2261	91.276		0.30	
6326	D1945	91.207		-0.54	
7014	D1945	91.321		0.85	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	91.08		-2.08	

	normality	OK
	n	54
	outliers	2 (+1ex)
	mean (n)	91.2510
	st.dev. (n)	0.10748
	R(calc.)	0.3009
	st.dev.(ISO6974-3:18)	0.08213
	R(ISO6974-3:18)	0.2300
Compare		
	R(D1945:14)	0.15
	R(ISO6974-3:00)	0.1825
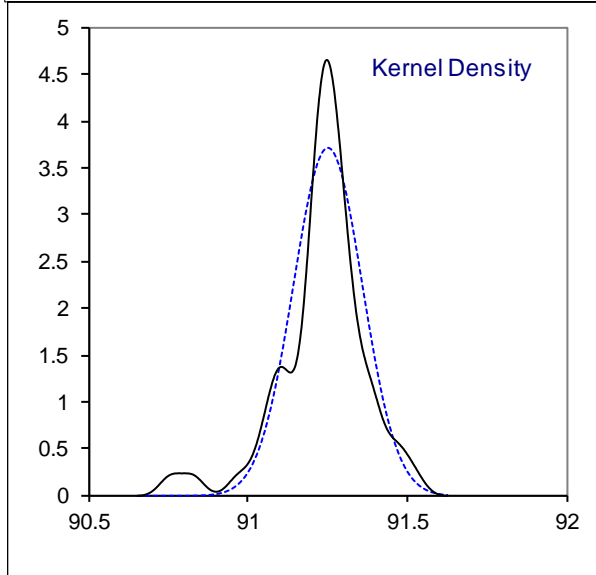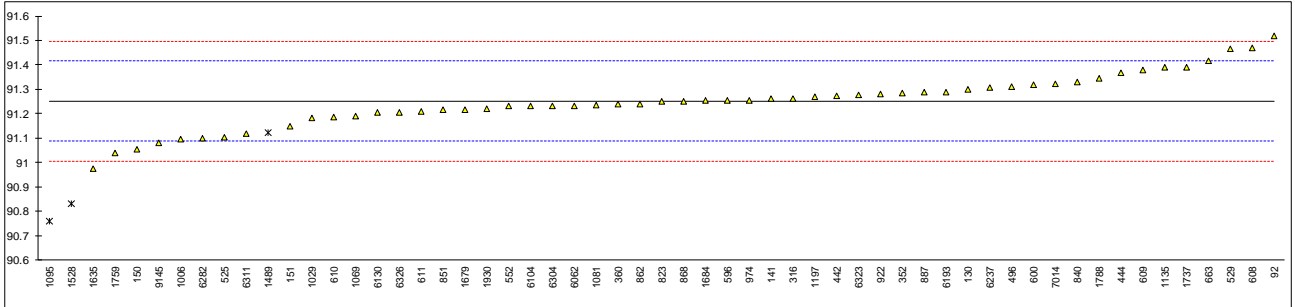
Determination of Ethane on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	3.99		-3.18	
130	ISO6974-3	4.0734		-0.99	
141	GPA2261/2286	4.1653		1.43	
150	D1945	4.137		0.68	
151	GPA2261	4.134	C	0.60	First reported 4.302
167		-----		-----	
225		-----		-----	
316	ISO6974-3	4.1195		0.22	
352	ISO6974-3	4.1153		0.11	
360	ISO6974-3	4.113		0.05	
442	D1945	4.0922		-0.49	
444	D1945	4.0643		-1.23	
446		-----		-----	
496	EN15984	4.103		-0.21	
525	GPA2261	4.3309	R(0.01)	5.78	
529	GPA2261	4.012	C	-2.60	First reported 2.779
552		4.119		0.21	
593		-----		-----	
596	GPA2261	4.177		1.73	
600	GPA2261 mod.	4.03		-2.13	
608	GPA2261	4.0607		-1.32	
609	GPA2261	4.0567		-1.43	
610	GPA2261	4.1619		1.34	
611	GPA2261	4.2044		2.46	
663	D1945	4.100		-0.29	
777		-----		-----	
781		-----		-----	
823	GPA2261	4.10		-0.29	
840	D1945	4.0687		-1.11	
851	GPA2261	4.139		0.74	
862	GPA2261	4.103		-0.21	
868	GPA2261	4.110		-0.03	
887	D1945	4.106		-0.13	
922	GPA2261	4.10		-0.29	
963		-----		-----	
974	ISO6974-5	4.1053		-0.15	
1006	D1945	4.171		1.58	
1029	D1945	4.1146		0.09	
1069	UOP539 mod.	4.20		2.34	
1081	In House	4.141		0.79	
1095	EN15984	4.25	ex	3.65	Excluded, see paragraph 4.1
1106		-----		-----	
1135	D1945	4.07		-1.08	
1197		4.1263		0.40	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	4.082	ex	-0.76	Excluded, see paragraph 4.1
1528	UOP539	4.12	ex	0.24	Excluded, see paragraph 4.1
1635	D1945	4.289	R(0.05)	4.68	
1679	ISO6974-3	4.120		0.24	
1684		4.1025	C	-0.22	First reported 4.2097
1737	In House	4.04		-1.87	
1759	ISO6974-5	4.215		2.73	
1788	D7833	4.048		-1.66	
1930	DIN51857	4.1368		0.68	
6062	ISO6974-3	4.1213		0.27	
6104	GPA2261	4.101		-0.26	
6130	D1945	4.1315		0.54	
6193	D2163/EN15984	4.09		-0.55	
6237	ISO6974-3	4.089		-0.58	
6282	GPA2261	4.19		2.08	
6304	D1945	4.1171		0.16	
6311	D1945	4.09061		-0.54	
6313		-----		-----	
6323	GPA2261	4.101		-0.26	
6326	D1945	4.105		-0.16	
7014	D1945	4.100		-0.29	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	4.19		2.08	

normality	OK
n	52
outliers	2 (+3ex)
mean (n)	4.1110
st.dev. (n)	0.04713
R(calc.)	0.1320
st.dev.(ISO6974-3:18)	0.03804
R(ISO6974-3:18)	0.1065
Compare	
R(D1945:14)	0.10
R(ISO6974-3:00)	0.1233
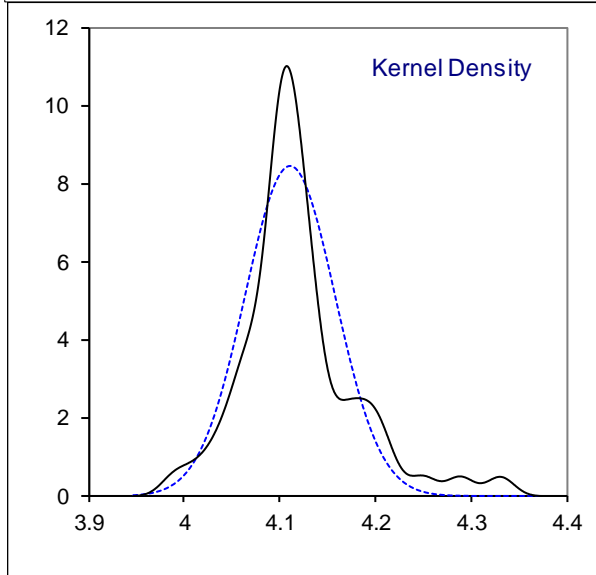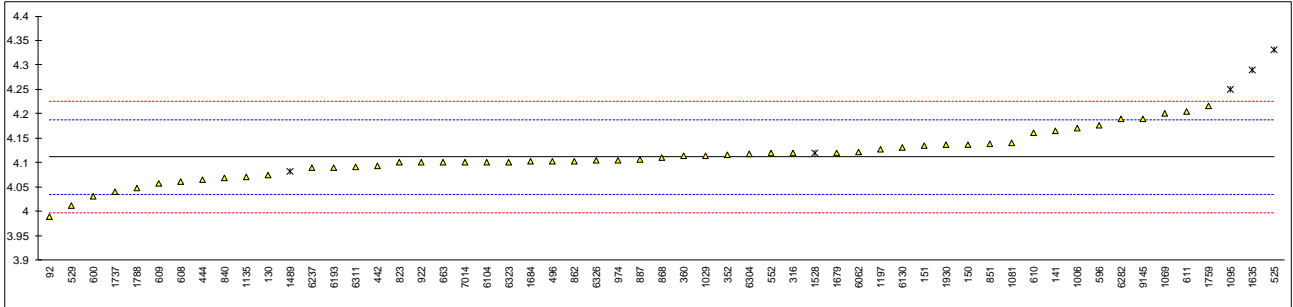
Determination of Propane on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	1.07		-2.58	
130	ISO6974-3	1.1065		-0.13	
141	GPA2261/2286	1.1057		-0.19	
150	D1945	1.148		2.65	
151	GPA2261	1.104	C	-0.30	First reported 1.200
167		-----		-----	
225		-----		-----	
316	ISO6974-3	1.1052		-0.22	
352	ISO6974-3	1.1010		-0.50	
360	ISO6974-3	1.110		0.10	
442	D1945	1.0949		-0.91	
444	D1945	1.0694		-2.62	
446		-----		-----	
496	EN15984	1.095		-0.91	
525	GPA2261	1.1475		2.62	
529	GPA2261	1.061	C	-3.19	First reported 1.579
552		1.095		-0.91	
593		-----		-----	
596	GPA2261	1.125		1.11	
600	GPA2261 mod.	1.05		-3.93	
608	GPA2261	1.0821		-1.77	
609	GPA2261	1.1047		-0.26	
610	GPA2261	1.1184		0.66	
611	GPA2261	1.0947		-0.93	
663	D1945	1.100		-0.57	
777		-----		-----	
781		-----		-----	
823	GPA2261	1.12		0.77	
840	D1945	1.0944		-0.95	
851	GPA2261	1.125		1.11	
862	GPA2261	1.106		-0.17	
868	GPA2261	1.124		1.04	
887	D1945	1.112		0.23	
922	GPA2261	1.11		0.10	
963		-----		-----	
974	ISO6974-5	1.0875		-1.41	
1006	D1945	1.141		2.18	
1029	D1945	1.1158		0.49	
1069	UOP539 mod.	1.11		0.10	
1081	In House	1.103		-0.37	
1095	EN15984	1.23	R(0.01)	8.15	
1106		-----		-----	
1135	D1945	1.02	C,R(0.05)	-5.94	First reported 0.87
1197		1.1022		-0.42	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	1.107	ex	-0.10	Excluded, see paragraph 4.1
1528	UOP539	1.12	ex	0.77	Excluded, see paragraph 4.1
1635	D1945	1.114		0.37	
1679	ISO6974-3	1.107		-0.10	
1684		1.1328		1.63	
1737	In House	1.08		-1.91	
1759	ISO6974-5	1.148		2.65	
1788	D7833	1.0863		-1.49	
1930	DIN51857	1.1265		1.21	
6062	ISO6974-3	1.1089		0.03	
6104	GPA2261	1.098		-0.71	
6130	D1945	1.1189		0.70	
6193	D2163/EN15984	1.13		1.44	
6237	ISO6974-3	1.110		0.10	
6282	GPA2261	1.13		1.44	
6304	D1945	1.1126		0.27	
6311	D1945	1.09499		-0.91	
6313		-----		-----	
6323	GPA2261	1.102		-0.44	
6326	D1945	1.126		1.17	
7014	D1945	1.106		-0.17	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	1.18		4.80	

normality	suspect
n	53
outliers	2 (+2ex)
mean (n)	1.1085
st.dev. (n)	0.02273
R(calc.)	0.0637
st.dev.(ISO6974-3:18)	0.01490
R(ISO6974-3:18)	0.0417
Compare	
R(D1945:14)	0.10
R(ISO6974-3:00)	0.0333
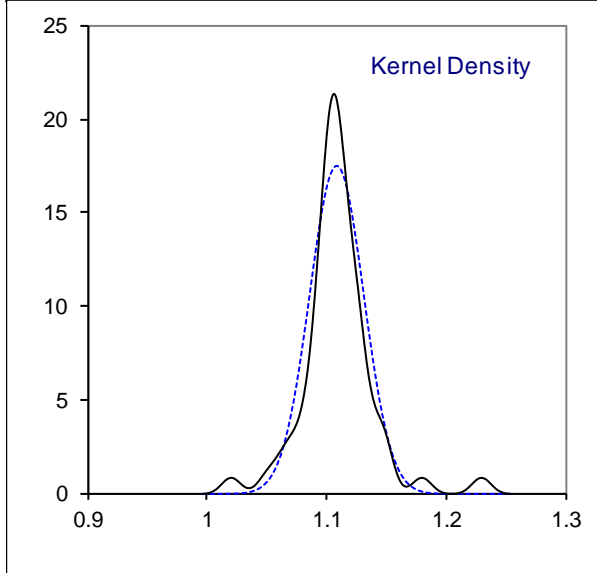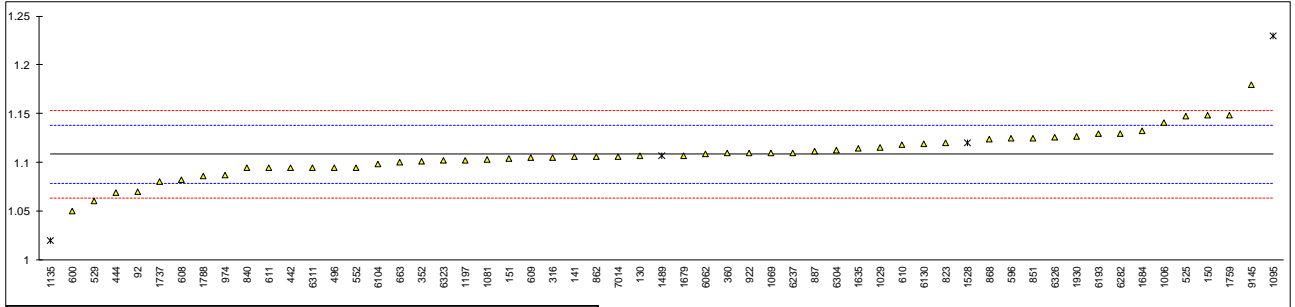
Determination of iso-Butane on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	0.74	R(0.01)	-4.74	
130	ISO6974-3	0.7864		-0.79	
141	GPA2261/2286	0.7844		-0.96	
150	D1945	0.822	C	2.24	First reported 0.832
151	GPA2261	0.800	C	0.37	First reported 0.900
167		-----		-----	
225		-----		-----	
316	ISO6974-3	0.7938		-0.16	
352	ISO6974-3	0.7976		0.16	
360	ISO6974-3	0.800		0.37	
442	D1945	0.7921		-0.30	
444	D1945	0.7771		-1.58	
446		-----		-----	
496	EN15984	0.786		-0.82	
525	GPA2261	0.7945		-0.10	
529	GPA2261	0.751	C,R(0.05)	-3.80	First reported 0.7771
552		0.805		0.79	
593		-----		-----	
596	GPA2261	0.795		-0.06	
600	GPA2261 mod.	0.81		1.22	
608	GPA2261	0.7771		-1.58	
609	GPA2261	0.8071		0.97	
610	GPA2261	0.8042		0.72	
611	GPA2261	0.7658		-2.54	
663	D1945	0.795		-0.06	
777		-----		-----	
781		-----		-----	
823	GPA2261	0.80		0.37	
840	D1945	0.7864		-0.79	
851	GPA2261	0.790		-0.48	
862	GPA2261	0.809		1.13	
868	GPA2261	0.787		-0.74	
887	D1945	0.807		0.96	
922	GPA2261	0.80		0.37	
963		-----		-----	
974	ISO6974-5	0.7894		-0.53	
1006	D1945	0.815		1.64	
1029	D1945	0.7941		-0.13	
1069	UOP539 mod.	0.79		-0.48	
1081	In House	0.768		-2.35	
1095	EN15984	0.90	R(0.01)	8.87	
1106		-----		-----	
1135	D1945	0.78	C	-1.33	First reported 0.89
1197		0.7922		-0.30	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	0.797	ex	0.11	Excluded, see paragraph 4.1
1528	UOP539	0.77	ex	-2.18	Excluded, see paragraph 4.1
1635	D1945	0.807		0.96	
1679	ISO6974-3	0.793		-0.23	
1684		0.8167		1.79	
1737	In House	0.79		-0.48	
1759	ISO6974-5	0.809		1.13	
1788	D7833	0.7815		-1.21	
1930	DIN51857	0.8036		0.67	
6062	ISO6974-3	0.7911		-0.39	
6104	GPA2261	0.787		-0.74	
6130	D1945	0.8031		0.63	
6193	D2163/EN15984	0.80		0.37	
6237	ISO6974-3	0.795		-0.06	
6282	GPA2261	0.80		0.37	
6304	D1945	0.80021		0.39	
6311	D1945	0.78944		-0.53	
6313		-----		-----	
6323	GPA2261	0.793		-0.23	
6326	D1945	0.816		1.73	
7014	D1945	0.803		0.62	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	0.86	R(0.01)	5.47	

normality	OK
n	51
outliers	4 (+2ex)
mean (n)	0.7957
st.dev. (n)	0.01176
R(calc.)	0.0329
st.dev.(ISO6974-3:18)	0.01176
R(ISO6974-3:18)	0.0329
Compare	
R(D1945:14)	0.07
R(ISO6974-3:00)	0.0477
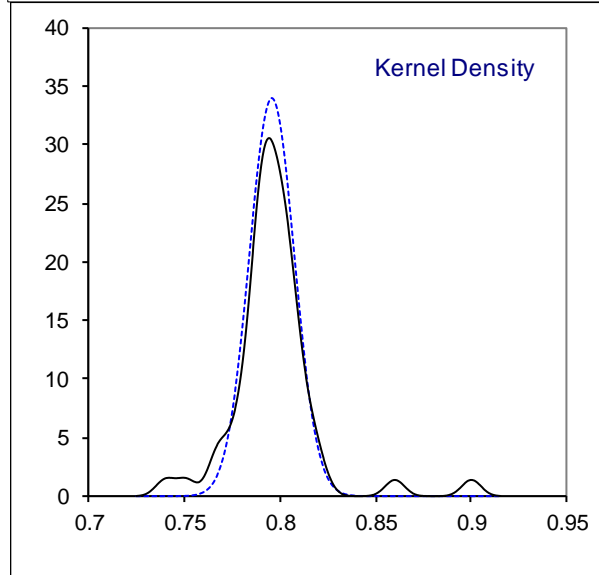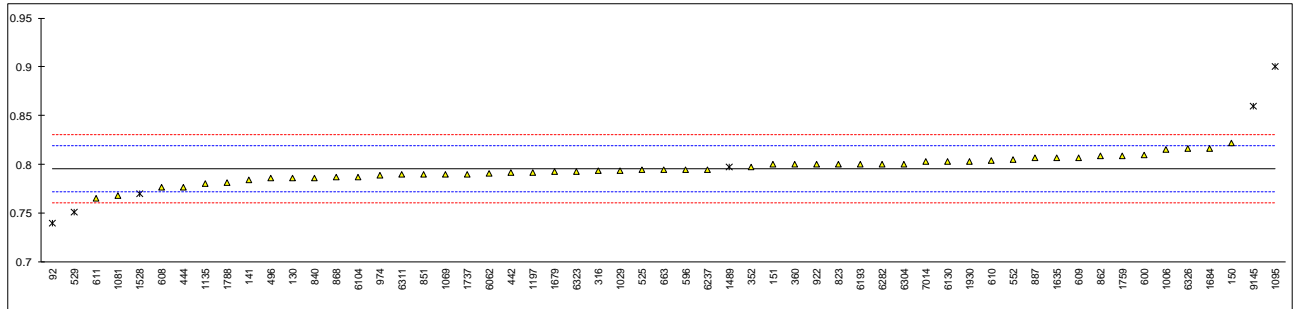
Determination of n-Butane on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	0.48		-2.52	
130	ISO6974-3	0.4988		-0.30	
141	GPA2261/2286	0.4859		-1.82	
150	D1945	0.517	C	1.86	First reported 0.527
151	GPA2261	0.501	C	-0.04	First reported 0.565
167		-----		-----	
225		-----		-----	
316	ISO6974-3	0.5046		0.39	
352	ISO6974-3	0.5003		-0.12	
360	ISO6974-3	0.497		-0.51	
442	D1945	0.4970		-0.51	
444	D1945	0.485		-1.93	
446		-----		-----	
496	EN15984	0.495		-0.75	
525	GPA2261	0.4987		-0.31	
529	GPA2261	0.461	C,R(0.01)	-4.77	First reported 0.495
552		0.508		0.79	
593		-----		-----	
596	GPA2261	0.503		0.20	
600	GPA2261 mod.	0.52		2.21	
608	GPA2261	0.4859		-1.82	
609	GPA2261	0.5071		0.69	
610	GPA2261	0.5135		1.44	
611	GPA2261	0.4983		-0.36	
663	D1945	0.500		-0.16	
777		-----		-----	
781		-----		-----	
823	GPA2261	0.51		1.03	
840	D1945	0.4934		-0.94	
851	GPA2261	0.495		-0.75	
862	GPA2261	0.525		2.80	
868	GPA2261	0.500		-0.16	
887	D1945	0.501		-0.04	
922	GPA2261	0.50		-0.16	
963		-----		-----	
974	ISO6974-5	0.5026		0.15	
1006	D1945	0.514		1.50	
1029	D1945	0.5020		0.08	
1069	UOP539 mod.	0.49		-1.34	
1081	In House	0.473		-3.35	
1095	EN15984	0.57	R(0.01)	8.13	
1106		-----		-----	
1135	D1945	0.49	C	-1.34	First reported 0.59
1197		0.5030		0.20	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	0.503	ex	0.20	Excluded, see paragraph 4.1
1528	UOP539	0.50	ex	-0.16	Excluded, see paragraph 4.1
1635	D1945	0.509		0.91	
1679	ISO6974-3	0.502		0.08	
1684		0.5141		1.51	
1737	In House	0.49		-1.34	
1759	ISO6974-5	0.513		1.38	
1788	D7833	0.4987		-0.31	
1930	DIN51857	0.5008		-0.06	
6062	ISO6974-3	0.5087		0.87	
6104	GPA2261	0.496		-0.63	
6130	D1945	0.5131		1.40	
6193	D2163/EN15984	0.51		1.03	
6237	ISO6974-3	0.502		0.08	
6282	GPA2261	0.51		1.03	
6304	D1945	0.50597		0.55	
6311	D1945	0.48776		-1.60	
6313		-----		-----	
6323	GPA2261	0.502		0.08	
6326	D1945	0.510		1.03	
7014	D1945	0.500		-0.16	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	0.55	R(0.01)	5.76	

normality	OK
n	52
outliers	3 (+2ex)
mean (n)	0.5013
st.dev. (n)	0.01015
R(calc.)	0.0284
st.dev.(ISO6974-3:18)	0.00845
R(ISO6974-3:18)	0.0237
R(D1945:14)	0.07
R(ISO6974-3:00)	0.0301

Kernel Density
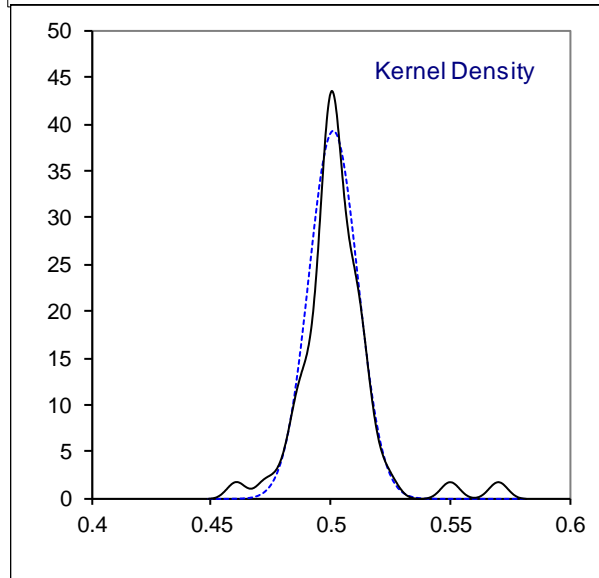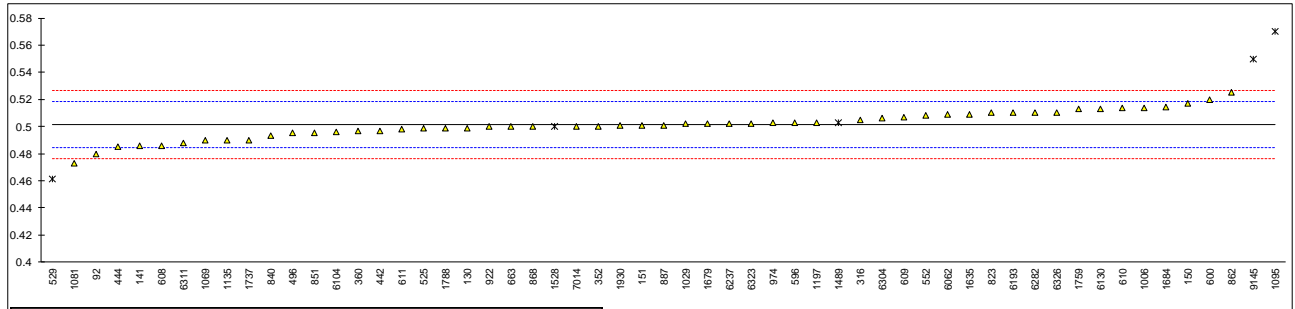
Determination of Carbon Dioxide on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	0.38		-1.66	
130	ISO6974-3	0.3929		0.17	
141	GPA2261/2286	0.3863		-0.77	
150	D1945	0.398		0.89	
151	GPA2261	0.398	C	0.89	First reported 0.376
167		-----		-----	
225		-----		-----	
316	ISO6974-3	0.4001		1.18	
352	ISO6974-3	0.3855		-0.88	
360	ISO6974-3	0.400		1.17	
442	D1945	0.3959		0.59	
444	D1945	0.3831		-1.22	
446		-----		-----	
496	EN15984	0.382		-1.37	
525	GPA2261	0.3301	R(0.01)	-8.70	
529	GPA2261	0.387		-0.67	
552		0.39		-0.24	
593		-----		-----	
596	GPA2261	0.386		-0.81	
600	GPA2261 mod.	0.40		1.17	
608	GPA2261	0.3802		-1.63	
609	GPA2261	0.3620		-4.20	
610	GPA2261	0.3986		0.97	
611	GPA2261	0.4032		1.62	
663	D1945	0.4		1.17	
777		-----		-----	
781		-----		-----	
823	GPA2261	0.38		-1.66	
840	D1945	0.3940		0.32	
851	GPA2261	0.395		0.46	
862	GPA2261	0.388		-0.53	
868	GPA2261	0.392		0.04	
887	D1945	0.384		-1.09	
922	GPA2261	0.40		1.17	
963		-----		-----	
974	ISO6974-5	0.4045		1.80	
1006	D1945	0.402		1.45	
1029	D1945	0.3947		0.42	
1069	UOP539 mod.	0.39		-0.24	
1081	In House	0.400		1.17	
1095	EN15984	0.40	ex	1.17	Excluded, see paragraph 4.1
1106		-----		-----	
1135	D1945	0.37	C	-3.07	First reported 0.42
1197		0.3716		-2.84	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	0.408	ex	2.30	Excluded, see paragraph 4.1
1528	UOP539	0.39	ex	-0.24	Excluded, see paragraph 4.1
1635	D1945	0.351	R(0.05)	-5.75	
1679	ISO6974-3	0.399		1.03	
1684		0.3831		-1.22	
1737	In House	0.39		-0.24	
1759	ISO6974-5	0.393		0.18	
1788	D7833	0.3796		-1.71	
1930	DIN51857	0.3798		-1.68	
6062	ISO6974-3	0.3952		0.49	
6104	GPA2261	0.397		0.74	
6130	D1945	0.4013		1.35	
6193	D2163/EN15984	0.41		2.58	
6237	ISO6974-3	0.390		-0.24	
6282	GPA2261	0.41		2.58	
6304	D1945	0.39530		0.50	
6311	D1945	0.60394	R(0.01)	29.96	
6313		-----		-----	
6323	GPA2261	0.400		1.17	
6326	D1945	0.401		1.31	
7014	D1945	0.379		-1.80	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	0.40		1.17	

normality	OK
n	51
outliers	3 (+3ex)
mean (n)	0.3917
st.dev. (n)	0.01014
R(calc.)	0.0284
st.dev.(ISO6974-3:18)	0.00708
R(ISO6974-3:18)	0.0198
Compare	
R(D1945:14)	0.07
R(ISO6974-3:00)	0.0235
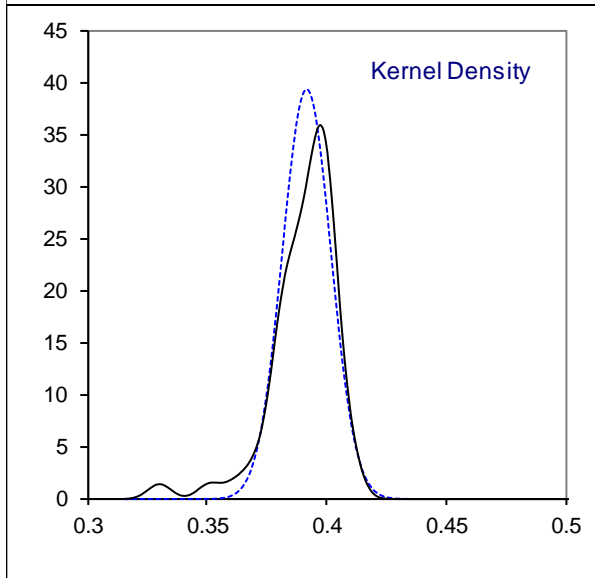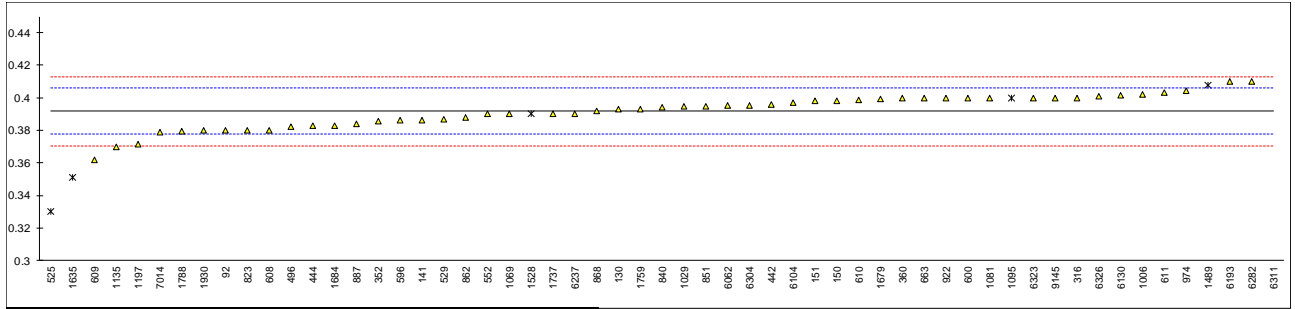
Determination of Nitrogen on sample #20055; results in %mol/mol

lab	method	value	mark	z(targ)	remarks
92	GPA2286	1.82		-0.58	
130	ISO6974-3	1.8406		0.39	
141	GPA2261/2286	1.8097		-1.06	
150	D1945	1.903		3.31	
151	GPA2261	1.916	C	3.92	First reported 1.882
167		-----		-----	
225		-----		-----	
316	ISO6974-3	1.8138		-0.87	
352	ISO6974-3	1.8172		-0.71	
360	ISO6974-3	1.838		0.27	
442	D1945	1.8550		1.06	
444	D1945	1.8517		0.91	
446		-----		-----	
496	EN15984	1.828		-0.20	
525	GPA2261	1.7956		-1.72	
529	GPA2261	1.864	C	1.48	First reported 1.827
552		1.855		1.06	
593		-----		-----	
596	GPA2261	1.761		-3.34	
600	GPA2261 mod.	1.87		1.77	
608	GPA2261	1.7323	C	-4.69	First reported 1.4659
609	GPA2261	1.7853		-2.20	
610	GPA2261	1.8172		-0.71	
611	GPA2261	1.8255		-0.32	
663	D1945	1.690		-6.67	
777		-----		-----	
781		-----		-----	
823	GPA2261	1.89		2.70	
840	D1945	1.8343		0.09	
851	GPA2261	1.839		0.31	
862	GPA2261	1.823		-0.44	
868	GPA2261	1.837		0.22	
887	D1945	1.803		-1.37	
922	GPA2261	1.81		-1.05	
963		-----		-----	
974	ISO6974-5	1.8570		1.16	
1006	D1945	1.863		1.44	
1029	D1945	1.8958		2.97	
1069	UOP539 mod.	1.83		-0.11	
1081	In House	1.881		2.28	
1095	EN15984	1.88	ex	2.23	Excluded, see paragraph 4.1
1106		-----		-----	
1135	D1945	1.77	C	-2.92	First reported 1.51
1197		1.8349		0.12	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489	GPA2261	1.797	ex	-1.65	Excluded, see paragraph 4.1
1528	UOP539	2.27	C,R(0.01)	20.51	First reported 2.07
1635	D1945	1.956		5.79	
1679	ISO6974-3	1.861		1.34	
1684		1.8180	C	-0.67	First reported 2.0435
1737	In House	1.82		-0.58	
1759	ISO6974-5	1.882		2.33	
1788	D7833	1.8595		1.27	
1930	DIN51857	1.8313		-0.05	
6062	ISO6974-3	1.8438		0.54	
6104	GPA2261	1.891		2.75	
6130	D1945	1.8270		-0.25	
6193	D2163/EN15984	1.78		-2.45	
6237	ISO6974-3	1.808		-1.14	
6282	GPA2261	1.86		1.30	
6304	D1945	1.8389		0.31	
6311	D1945	1.81898		-0.63	
6313		-----		-----	
6323	GPA2261	1.826		-0.30	
6326	D1945	1.836		0.17	
7014	D1945	1.791		-1.94	
9101		-----		-----	
9141		-----		-----	
9145	GPA2261	1.74		-4.33	

normality	suspect
n	54
outliers	1 (+2ex)
mean (n)	1.8323
st.dev. (n)	0.04575
R(calc.)	0.1281
st.dev.(ISO6974-3:18)	0.02134
R(ISO6974-3:18)	0.0598
Compare	
R(D1945:14)	0.10
R(ISO6974-3:00)	0.0550

Kernel Density
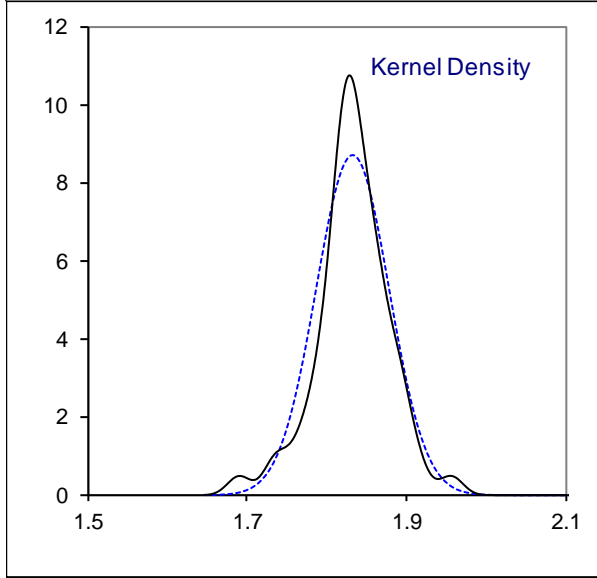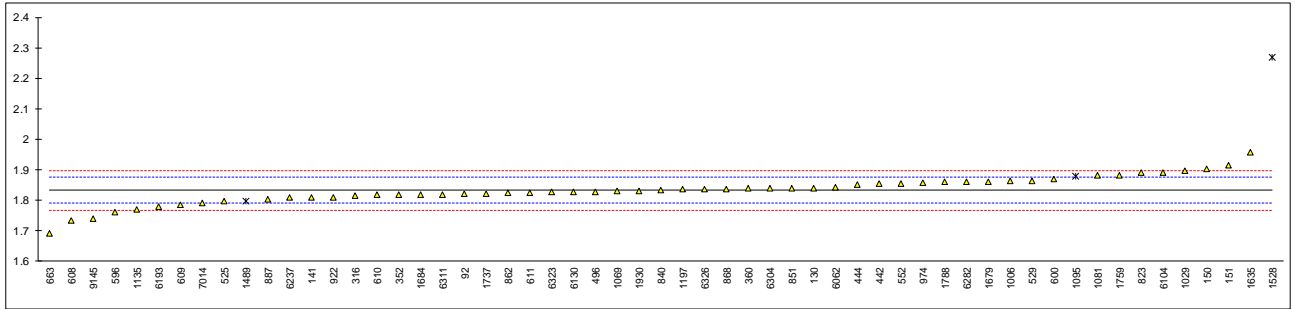
Determination of Carbon content on sample #20055; results in g/100g

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141		73.1541		-0.02	
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	ISO6974-3	73.10		-0.09	
442		-----		-----	
444		-----		-----	
446		73.1		-0.09	
496	EN15984	73.126		-0.06	
525	GPA2261	73.2663		0.12	
529		-----		-----	
552		-----		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	D1945	73.27		0.13	
777		-----		-----	
781		-----		-----	
823		-----		-----	
840	D1945	73.098		-0.10	
851		-----		-----	
862	GPA2261	73.14		-0.04	
868		-----		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069	UOP539 mod.	73.13		-0.06	
1081		-----		-----	
1095	EN15984	73.15		-0.03	
1106		-----		-----	
1135	D1945	73.46		0.37	
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104		-----		-----	
6130		-----		-----	
6193		-----		-----	
6237		-----		-----	
6282	GPA2261	73.08		-0.12	
6304		-----		-----	
6311		-----		-----	
6313		-----		-----	
6323		-----		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	not OK
n	12
outliers	0
mean (n)	73.173
st.dev. (n)	0.1093
R(calc.)	0.306
st.dev.(EN15984:17)	0.7714
R(EN15984:17)	2.16
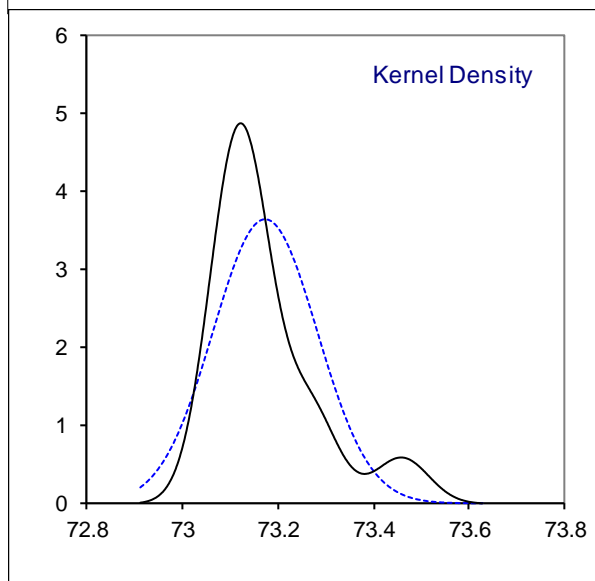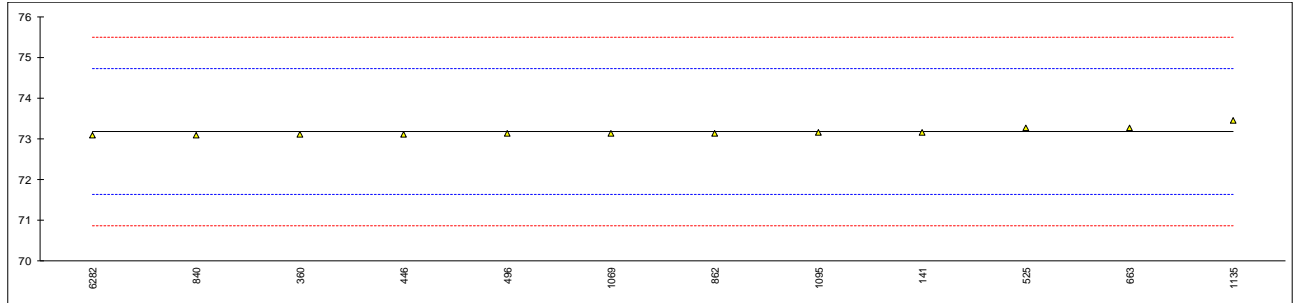
Determination of Gross (Superior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C) on sample #20055; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	42.0046	C	-----	First reported 39.7395
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	42.0116		-----	
352		-----		-----	
360	ISO6976	42.00		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
496	DIN51857	41.9869		-----	
525	ISO6976	39.7926	R(0.01), E	-----	iis calc 42.127
529	ISO6976	41.857		-----	
552		42.0		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	42.05		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	42.02		-----	
840	ISO6976	41.9656		-----	
851		-----		-----	
862	ISO6976	42.04		-----	
868	ISO6976	42.00		-----	
887		-----		-----	
922	ISO6976	42.0116		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	42.128	E	-----	iis calc. 41.902
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	41.9882		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930	DIN51857	42.036		-----	
6062	ISO6976	42.006		-----	
6104	ISO6976	41.96		-----	
6130	ISO6976	42.0304		-----	
6193		-----		-----	
6237		-----		-----	
6282		-----		-----	
6304	ISO6976	42.0110		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	42.00		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality   not OK
n   20
outliers   1
mean (n)   42.0053
st.dev. (n)   0.04948
R(calc.)   0.1386
Compare
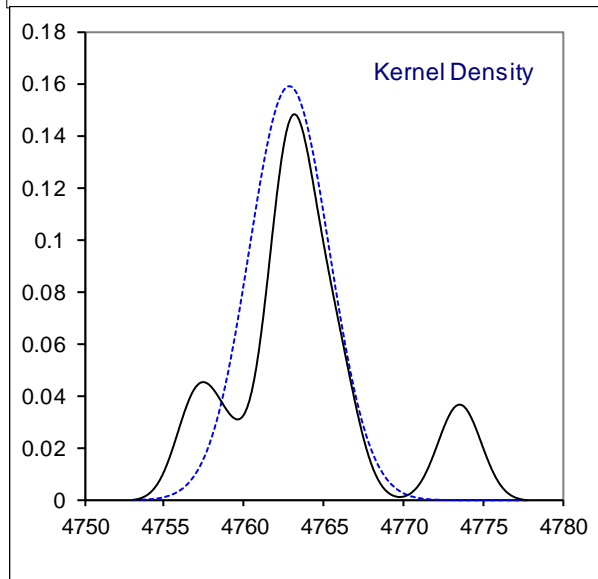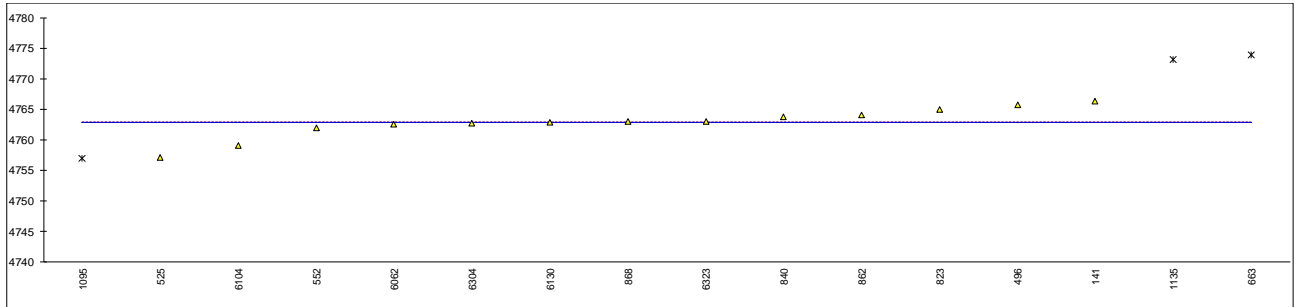R(iis19S01M)   0.1275
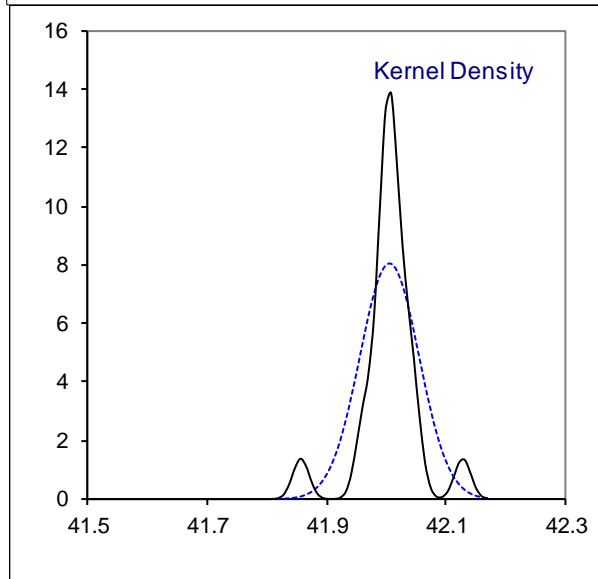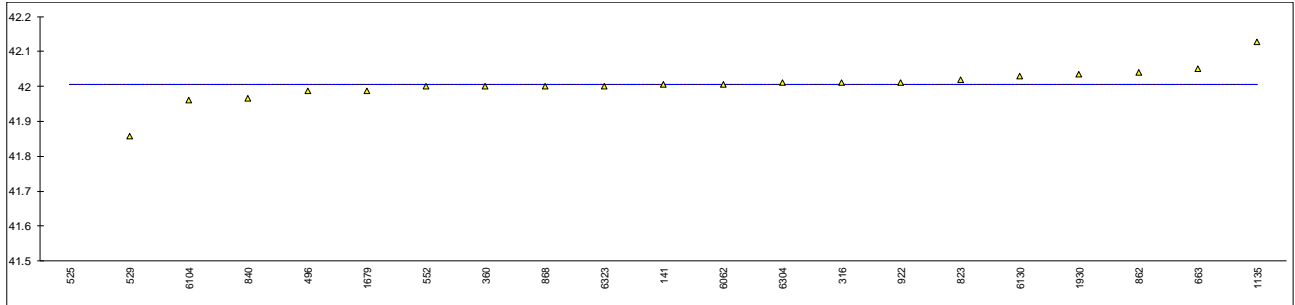
Determination of Net (Inferior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C) on sample #20055; results in kJ/100g

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	4766.2940	C	-----	First reported 4773.8866
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360		-----		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
496	EN15984	4765.688		-----	
525	ISO6976	4757.0786	E	-----	iis calc. 4773.294
529		-----		-----	
552		4762		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	4773.86	DG(0.05)	-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	4765	E	-----	iis calc. 4760.703
840	ISO6976	4763.68		-----	
851		-----		-----	
862	ISO6976	4764		-----	
868	ISO6976	4763		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095	EN15984	4756.95	ex	-----	Excluded, see paragraph 4.1
1106		-----		-----	
1135	ISO6976	4773.19	C,DG(0.05), E	-----	First reported 4785.07, iis calc. 4771.796
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930		-----		-----	
6062	ISO6976	4762.52		-----	
6104	ISO6976	4759		-----	
6130	ISO6976	4762.774		-----	
6193		-----		-----	
6237		-----		-----	
6282		-----		-----	
6304	ISO6976	4762.73		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	4763		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	suspect
n	13
outliers	2 (+1ex)
mean (n)	4762.828
st.dev. (n)	2.5095
R(calc.)	7.027
Compare	
R(iis19S01M)	26.173

Determination of Density (Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C) on sample #20055; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	0.79626	C	-----	First reported 0.79422
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	0.79672		-----	
352		-----		-----	
360	ISO6976	0.7969		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
496	DIN51857	0.79601		-----	
525	ISO6976	0.79682		-----	
529	ISO6976	0.7939	R(0.01)	-----	
552		0.7969		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	0.7958		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	0.7969		-----	
840	ISO6976	0.79594		-----	
851		-----		-----	
862	ISO6976	0.7972		-----	
868	ISO6976	0.7967		-----	
887		-----		-----	
922	ISO6976	0.7967		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.7945	C,R(0.01), E	-----	First reported 0.7955, iis calc. 0.79335
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	0.79689		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930	DIN51857	0.7971		-----	
6062	ISO6976	0.79691		-----	
6104	ISO6976	0.7966		-----	
6130	ISO6976	0.79736		-----	
6193		-----		-----	
6237		-----		-----	
6282		-----		-----	
6304	ISO6976	0.796987		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	0.7966		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	OK
n	19
outliers	2
mean (n)	0.79670
st.dev. (n)	0.000423
R(calc.)	0.00118
Compare	
R(iis19S01M)	0.00302
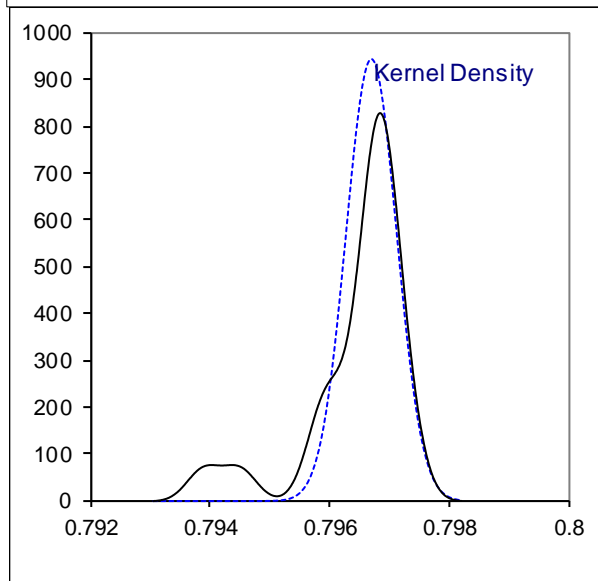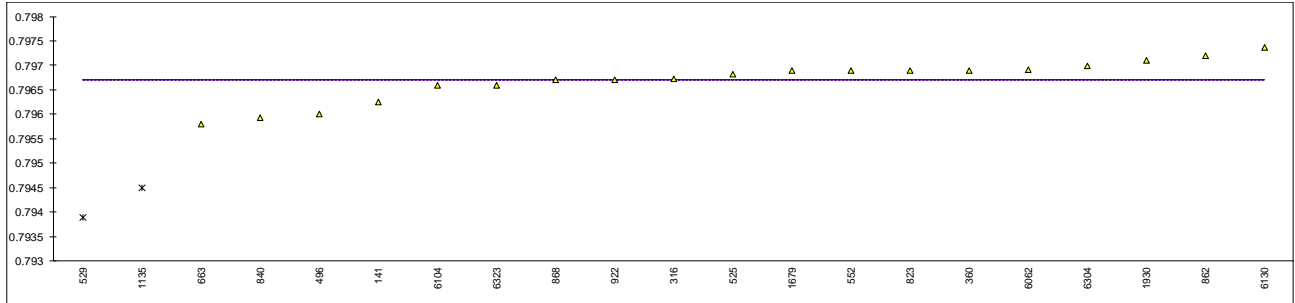
Determination of Relative Density (Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C) on sample #20055; results have no unit

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	0.61580	C	-----	First reported 0.61459
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	0.61622		-----	
352		-----		-----	
360	ISO6976	0.6163		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
496	DIN51857	0.61567		-----	
525	ISO6976	0.61660		-----	
529	ISO6976	0.6140	R(0.01)	-----	
552		0.6163		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	0.6154		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	0.6164		-----	
840	ISO6976	0.61555		-----	
851		-----		-----	
862	ISO6976	0.6166		-----	
868	ISO6976	0.6162		-----	
887		-----		-----	
922	ISO6976	0.6162		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.6147	C,R(0.05), E	-----	First reported 0.6152, iis calc. 0.6147
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	0.61629		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930	DIN51857	0.6165		-----	
6062	ISO6976	0.61636		-----	
6104	ISO6976	0.6161		-----	
6130	ISO6976	0.61665		-----	
6193		-----		-----	
6237		-----		-----	
6282		-----		-----	
6304	ISO6976	0.616364		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	0.6161		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	OK
n	19
outliers	2
mean (n)	0.61619
st.dev. (n)	0.000354
R(calc.)	0.00099
Compare	
R(iis19S01M)	0.00235
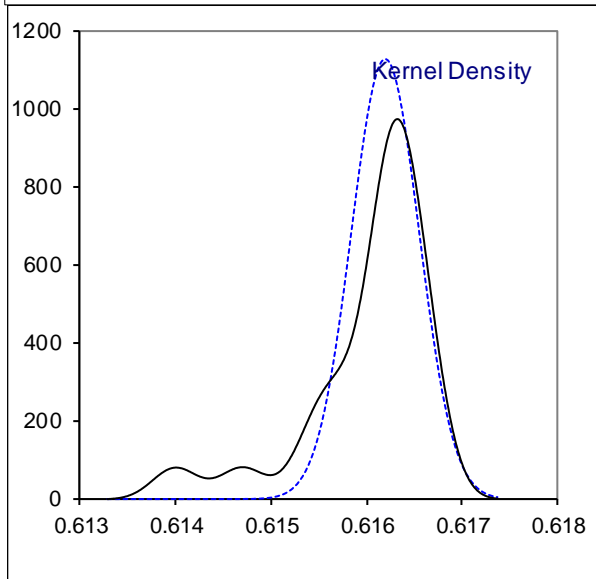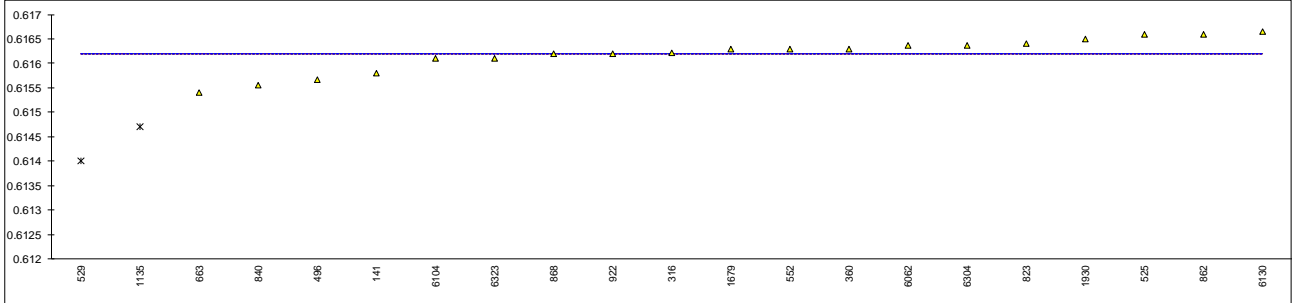
Determination of Gross Wobbe Index (Real Gas, 101.325 kPa, combustion temperature 25°C, metering temperature 0°C) on sample #20055; results in MJ/m³

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	53.5276	C	-----	First reported 50.6998
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316	ISO6976	53.5178		-----	
352		-----		-----	
360	ISO6976	53.50		-----	
442		-----		-----	
444		-----		-----	
446		-----		-----	
496	DIN51857	53.5107		-----	
525	ISO6976	50.7286	R(0.01), E	-----	iis calc.53.6425
529	ISO6976	53.419		-----	
552		53.5		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	53.60		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	53.53	C, E	-----	First reported 53.33, iis calc. 53.5040
840	ISO6976	53.489		-----	
851		-----		-----	
862	ISO6976	53.53		-----	
868	ISO6976	53.51		-----	
887		-----		-----	
922	ISO6976	53.5192		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	53.68	C,R(0.01), E	-----	First reported 53.712, iis calc. 53.4940
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528		-----		-----	
1635		-----		-----	
1679	ISO6976	53.4855		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930	DIN51857	53.538	C	-----	First reported 53.583
6062	ISO6976	53.505		-----	
6104	ISO6976	53.45		-----	
6130	ISO6976	53.5234		-----	
6193		-----		-----	
6237		-----		-----	
6282		-----		-----	
6304	ISO6976	53.5112		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	53.50		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	not OK
n	19
outliers	2
mean (n)	53.5088
st.dev. (n)	0.03616
R(calc.)	0.1013
Compare	
R(iis19S01M)	0.1117
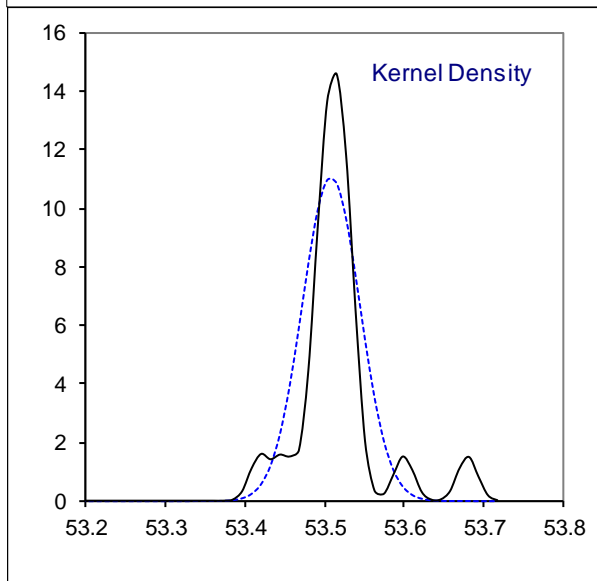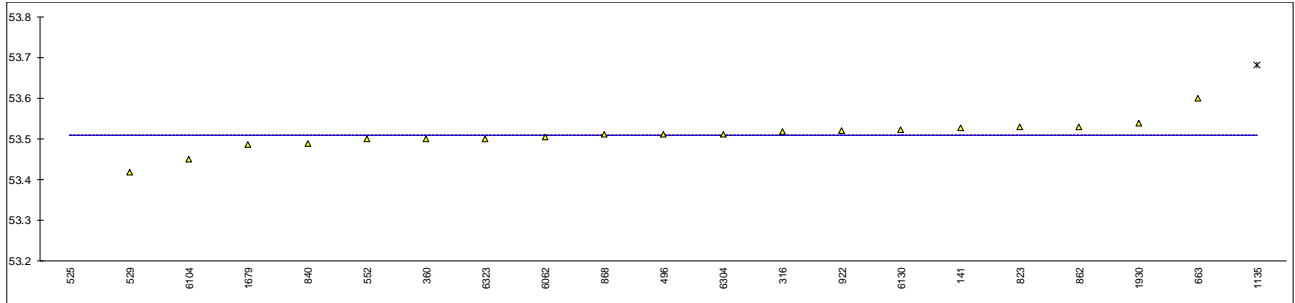
Kernel Density

Determination of Gross (Superior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C) on sample #20055; results in MJ/m^3

lab	method	value	mark	z(targ)	remarks
92	GPA2286	39.73	ex	-----	Excluded, see paragraph 4.1
130		-----		-----	
141	ISO6976	39.8393	C	-----	First reported 39.7395
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	39.84		-----	
360	ISO6976	39.84		-----	
442	ISO6976	39.81		-----	
444	ISO6976	39.768		-----	
446		-----		-----	
496	DIN51857	39.8223		-----	
525	ISO6976	39.7926	E	-----	iis calc. 39.956
529	ISO6976	39.70	DG(0.05)	-----	
552		39.840		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	39.88		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	39.86		-----	
840	ISO6976	39.8009		-----	
851		-----		-----	
862	ISO6976	39.87		-----	
868	ISO6976	39.84		-----	
887	ISO6976	39.863		-----	
922	ISO6976	39.8456		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	39.89		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	39.957	E	-----	iis calc. 39.743
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528	ISO6976	39.73	ex, E	-----	Excluded, see paragraph 4.1. iis calc. 39.658
1635	ISO6976	39.879		-----	
1679	ISO6976	39.8238		-----	
1684		-----		-----	
1737		-----		-----	
1759	ISO6976	39.89		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104	ISO6976	39.80		-----	
6130	ISO6976	39.8638		-----	
6193		-----		-----	
6237		-----		-----	
6282	ISO6976	39.87		-----	
6304	ISO6976	39.8454		-----	
6311	D3588	39.74	C	-----	First reported 1066.9
6313		-----		-----	
6323	ISO6976	39.83		-----	
6326	ISO6976	39.67	DG(0.05), E	-----	iis calc. 39.866
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	suspect
n	26
outliers	2 (+2ex)
mean (n)	39.8423
st.dev. (n)	0.04343
R(calc.)	0.1216
Compare	
R(iis19S01M)	0.1388
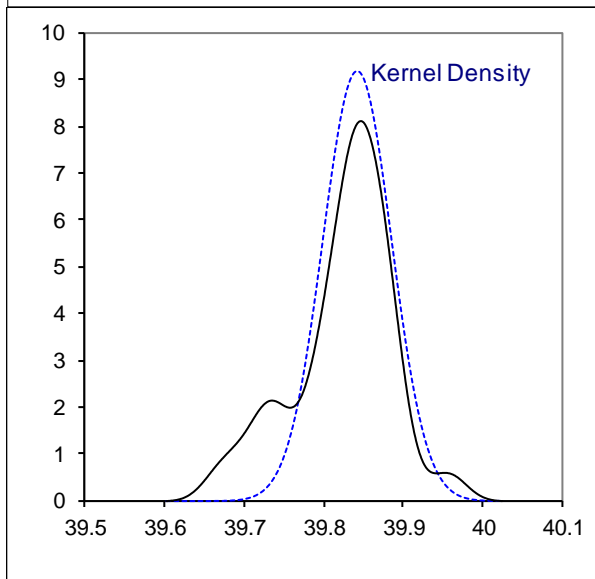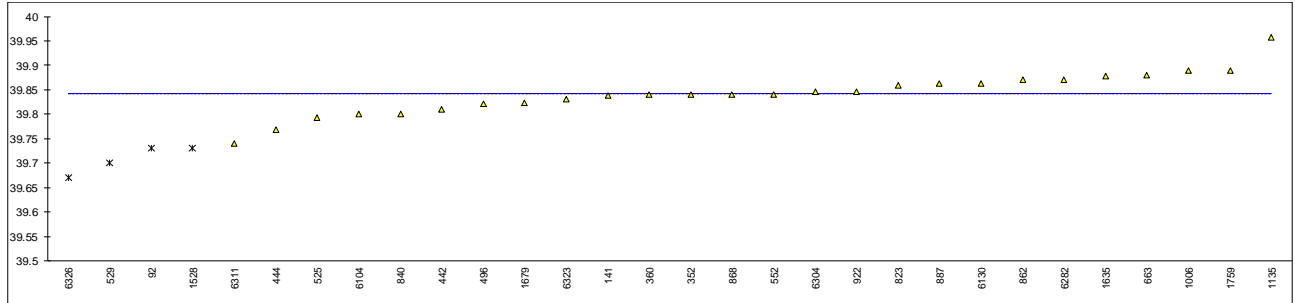
Determination of Net (Inferior) Caloric Value (Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C) on sample #20055; results in kJ/100g

lab	method	value	mark	z(targ)	remarks
92	GPA2286	35.86	ex, E	-----	Excluded, see paragraph 4.1. iis calc. 4767.884
130		-----		-----	
141	ISO6976	4766.8581	C	-----	First reported 4773.8866
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352		-----		-----	
360	EN15984	4762.52		-----	
442		-----		-----	
444		-----		-----	
446	EN15984	4746.73		-----	
496	EN15984	4765.962		-----	
525	ISO6976	4757.0786	E	-----	iis calc. 4773.859
529		-----		-----	
552		4762		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	EN15984	4774.22		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	4765	E	-----	iis calc. 4761.266
840	ISO6976	4764.24		-----	
851	ISO6976	4763		-----	
862	ISO6976	4765		-----	
868	ISO6976	4764		-----	
887		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	4722.32	C,R(0.01), E	-----	First reported 4785.63. iis calc. 4772.360
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528	ISO6976	4731	C,ex	-----	First reported 4746
1635	ISO6976	4758.8		-----	
1679		-----		-----	
1684		-----		-----	
1737		-----		-----	
1759		-----		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104	ISO6976	4760		-----	
6130	ISO6976	4763.337		-----	
6193		-----		-----	
6237		-----		-----	
6282	ISO6976	4759.68		-----	
6304	ISO6976	4763.29		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	4764		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	not OK
n	18
outliers	1 (+2ex)
mean (n)	4762.540
st.dev. (n)	5.4023
R(calc.)	15.126
Compare	
R(iis19S01M)	20.445
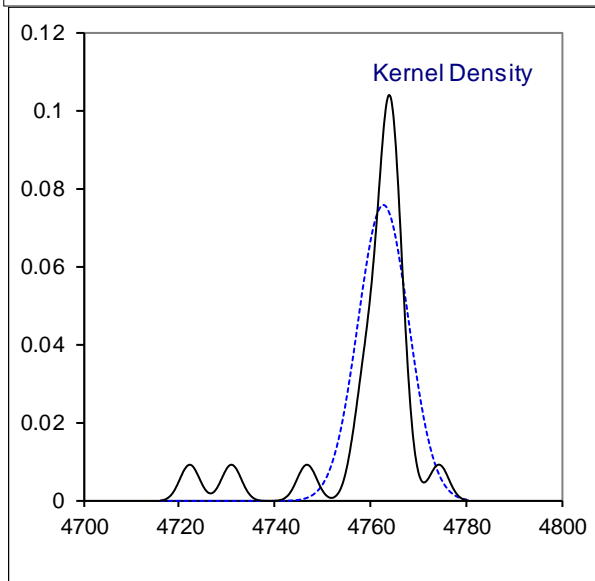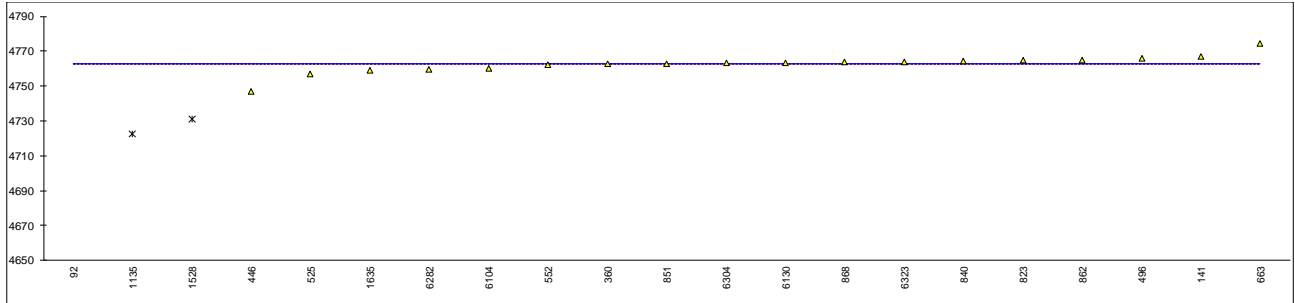
Determination of Density (Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C) on sample #20055; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
92	GPA2286	0.750	R(0.01)	-----	
130		-----		-----	
141	ISO6976	0.75444	C	-----	First reported 0.75265
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	0.7546		-----	
360	ISO6976	0.7550		-----	
442	ISO6976	0.7546		-----	
444	ISO6976	0.7534		-----	
446		-----		-----	
496	DIN51857	0.75420		-----	
525	ISO6976	0.7551		-----	
529	ISO6976	0.7522		-----	
552		0.7551		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	0.7540		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	0.7550		-----	
840	ISO6976	0.75411		-----	
851	ISO6976	0.7551		-----	
862	ISO6976	0.7554		-----	
868	ISO6976	0.7549		-----	
887		-----		-----	
922	ISO6976	0.7548		-----	
963		-----		-----	
974		-----		-----	
1006		-----		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.7537	E	-----	iis calc. 0.75169
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528	ISO6976	0.7557	ex, E	-----	Excluded, see paragraph 4.1. iis calc. 0.75670
1635	ISO6976	0.7565		-----	
1679	ISO6976	0.75504		-----	
1684		-----		-----	
1737		-----		-----	
1759	ISO6976	0.7566		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104	ISO6976	0.7548		-----	
6130	ISO6976	0.75548		-----	
6193		-----		-----	
6237		-----		-----	
6282	ISO6976	0.7562		-----	
6304	ISO6976	0.755131		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	0.7547		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145	D4052	0.756	E	-----	iis calc. 0.75779

normality	suspect
n	26
outliers	1 (+1ex)
mean (n)	0.75485
st.dev. (n)	0.000947
R(calc.)	0.00265
Compare	
R(iis19S01M)	0.00278
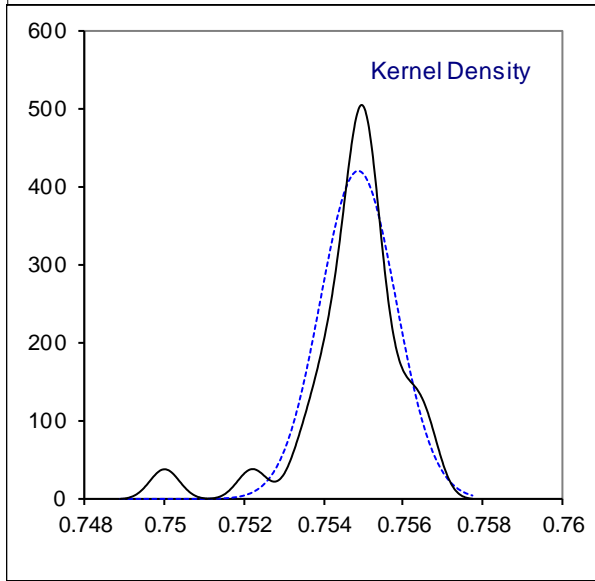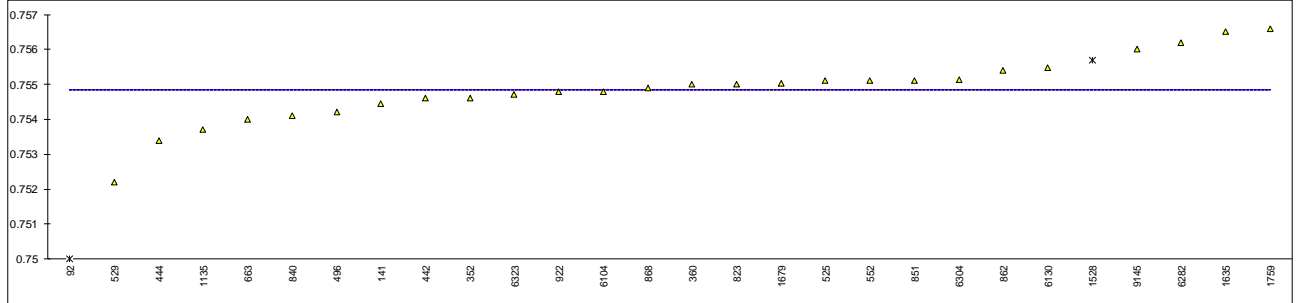
Determination of Relative Density (Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C) on sample #20055; results have no unit

lab	method	value	mark	z(targ)	remarks
92	GPA2286	0.612	R(0.01), E	-----	iis calc. 0.61365
130		-----		-----	
141	ISO6976	0.61561	C	-----	First reported 0.61441
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	0.6158		-----	
360	ISO6976	0.6161		-----	
442	ISO6976	0.6158		-----	
444	ISO6976	0.6148		-----	
446		-----		-----	
496	DIN51857	0.61547		-----	
525	ISO6976	0.6164		-----	
529	ISO6976	0.6138		-----	
552		0.6161		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	0.6152		-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	0.6162		-----	
840	ISO6976	0.61534		-----	
851	ISO6976	0.6162		-----	
862	ISO6976	0.6164		-----	
868	ISO6976	0.6160		-----	
887		-----		-----	
922	ISO6976	0.6160		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	0.6172		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	0.6150	E	-----	iis calc. 0.61337
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528	ISO6976	0.6166	ex	-----	Excluded, see paragraph 4.1
1635	ISO6976	0.6173		-----	
1679	ISO6976	0.61609		-----	
1684		-----		-----	
1737		-----		-----	
1759	ISO6976	0.6174		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104	ISO6976	0.6159		-----	
6130	ISO6976	0.61646		-----	
6193		-----		-----	
6237		-----		-----	
6282	ISO6976	0.6173		-----	
6304	ISO6976	0.616172		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	0.6159		-----	
6326		0.6167		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		0.617	E	-----	iis calc. 0.61834

normality	suspect
n	28
outliers	1 (+1ex)
mean (n)	0.61606
st.dev. (n)	0.000810
R(calc.)	0.00227
Compare	
R(iis19S01M)	0.00208
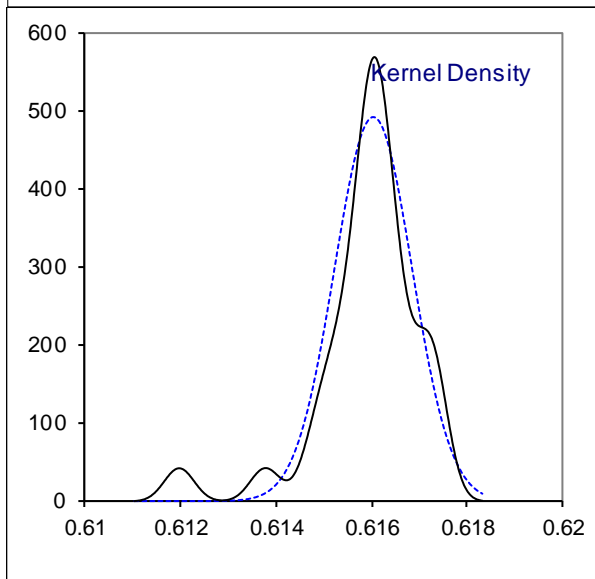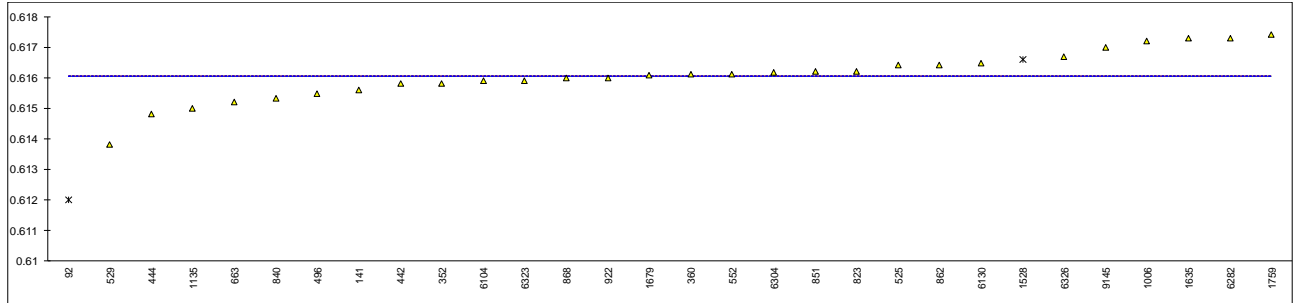
Determination of Gross Wobbe Index (Real Gas, 101.325 kPa, combustion temperature 15°C, metering temperature 15°C) on sample #20055; results in MJ/m³

lab	method	value	mark	z(targ)	remarks
92		-----		-----	
130		-----		-----	
141	ISO6976	50.7762	C	-----	First reported 50.6998
150		-----		-----	
151		-----		-----	
167		-----		-----	
225		-----		-----	
316		-----		-----	
352	ISO6976	50.77		-----	
360	ISO6976	50.75		-----	
442	ISO6976	50.73		-----	
444	ISO6976	50.720		-----	
446		-----		-----	
496	DIN51857	50.7602		-----	
525	ISO6976	50.7286	E	-----	iis calc. 50.886
529	ISO6976	50.673	R(0.05)	-----	
552		50.75		-----	
593		-----		-----	
596		-----		-----	
600		-----		-----	
608		-----		-----	
609		-----		-----	
610		-----		-----	
611		-----		-----	
663	ISO6976	50.84	R(0.05)	-----	
777		-----		-----	
781		-----		-----	
823	ISO6976	50.77	E	-----	iis calc. 50.755
840	ISO6976	50.738		-----	
851	ISO6976	50.76		-----	
862	ISO6976	50.78		-----	
868	ISO6976	50.76		-----	
887		-----		-----	
922	ISO6976	50.7682		-----	
963		-----		-----	
974		-----		-----	
1006	ISO6976	50.77		-----	
1029		-----		-----	
1069		-----		-----	
1081		-----		-----	
1095		-----		-----	
1106		-----		-----	
1135	ISO6976	50.79	C, E	-----	First reported 50.951. iis calc. 50.745
1197		-----		-----	
1198		-----		-----	
1388		-----		-----	
1469		-----		-----	
1489		-----		-----	
1528	ISO6976	50.47	C,ex	-----	First reported 50.6. Excluded, see paragraph 4.1.
1635	ISO6976	50.756		-----	
1679	ISO6976	50.7363		-----	
1684		-----		-----	
1737		-----		-----	
1759	ISO6976	50.77		-----	
1788		-----		-----	
1930		-----		-----	
6062		-----		-----	
6104	ISO6976	50.71		-----	
6130	ISO6976	50.7723		-----	
6193		-----		-----	
6237		-----		-----	
6282	ISO6976	50.74	E	-----	iis calc. 50.753
6304	ISO6976	50.7606		-----	
6311		-----		-----	
6313		-----		-----	
6323	ISO6976	50.75		-----	
6326		-----		-----	
7014		-----		-----	
9101		-----		-----	
9141		-----		-----	
9145		-----		-----	

normality	OK
n	24
outliers	2 (+1ex)
mean (n)	50.7549
st.dev. (n)	0.02010
R(calc.)	0.0563
Compare	
R(iis19S01M)	0.1207
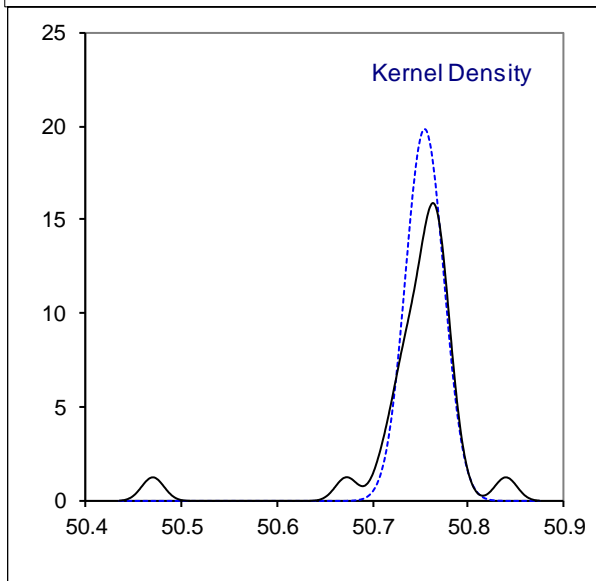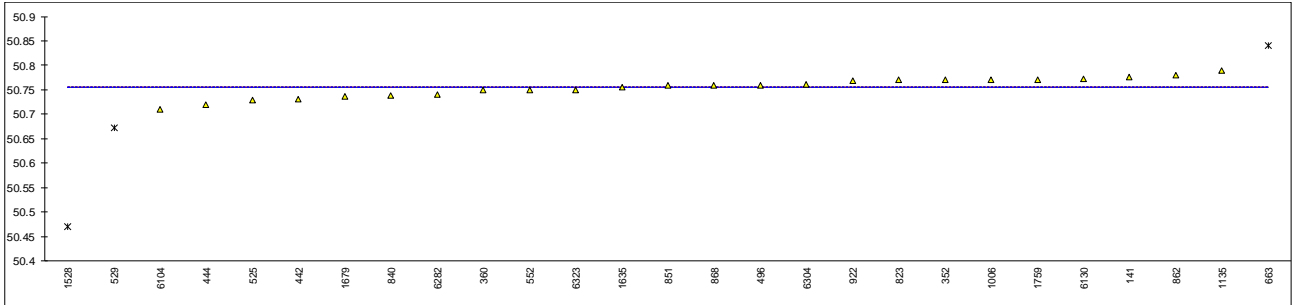
APPENDIX 2

Number of participants per country

  1 lab in BELGIUM
  1 lab in BRAZIL
  1 lab in BRUNEI
  1 lab in BULGARIA
  2 labs in CANADA
  8 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 EGYPT
  1 lab in FINLAND
  1 lab in FRANCE
  3 labs in GERMANY
  1 lab in HONG KONG
  1 lab in INDONESIA
  1 lab in IRAN, Islamic Republic of
11 labs in MALAYSIA
  2 labs in MEXICO
  2 labs in NETHERLANDS
  2 labs in NIGERIA
  1 lab in PAKISTAN
  3 labs in PORTUGAL
  2 labs in ROMANIA
  2 labs in RUSSIAN FEDERATION
  1 lab in SAUDI ARABIA
  1 lab in SERBIA
  1 lab in SLOVAKIA
  1 lab in SOUTH KOREA
  4 labs in TAIWAN
  1 lab in THAILAND
  1 lab in UNITED ARAB EMIRATES
  3 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	= possibly an error in calculations
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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2   ISO6974, Natural Gas – Determination of composition with defined uncertainty by GC
3   ASTM D1945, 2014 – Analysis of Natural Gas by Gaschromatography
4   W. Horwitz and R. Albert, J. AOAC Int., 79, 3, 589, (1996)
5   ASTM E178:02
6   ASTM E1301:03
7   ISO13528:05
8   ISO5725:86
9   ISO5725, parts 1-6, 1994
10   M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
11   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
12   IP367/84
13   DIN38402 T41/42
14   P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
15   J.N. Miller, Analyst, 118, 455, (1993)
16   Analytical Methods Committee Technical brief, No 4, January 2001.
17   P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364 (2002)
18   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)