

**Results of Proficiency Test  
Biogasoline E10  
June 2021**

**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 Biogasoline E10 in accordance with the latest version of EN228 and ASTM D4814 every year. During the annual proficiency testing program 2020/2021 it was decided to continue the round robin for the analysis of Biogasoline E10.

In this interlaboratory study registered for participation:

- 52 laboratories in 21 countries for the regular Biogasoline E10 PT (iis21B03),
- 46 participants in 18 countries for the DVPE PT (iis21B03DVPE),
- 31 participants in 17 countries for the RON/MON PT (iis21B03RON).

In total 54 laboratories in 21 different countries registered for participation in one or more PTs. See appendix 4 for the number of participants per country. In this report the results of the Biogasoline E10 proficiency tests are presented and discussed. This report is also electronically available through the iis website [www.iisnl.com](http://www.iisnl.com).

## 2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.

It was decided, depending on the registration, to send the following samples of Biogasoline E10: a one liter bottle labelled #21080 for the regular round and/or a one liter bottle at 75% filled labelled #21081 for TVP/DVPE only and/or two 1L bottles labelled #21082 for RON/MON only.

The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

### 2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

### 2.2 PROTOCOL

The protocol followed in the 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 electronically available through the iis website [www.iisnl.com](http://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

A batch of approximately 200 liters of Biogasoline E10 was obtained from a local petrol supplier. After homogenization 188 amber glass bottles of 1L were filled. For the regular round 84 bottles were labelled #21080 and for the RON/MON round 104 bottles were labelled #21082.

The homogeneity of the subsamples was checked by determination of Density at 15°C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15°C in kg/m <sup>3</sup>
sample 1	728.25
sample 2	728.50
sample 3	728.37
sample 4	728.31
sample 5	728.34
sample 6	728.33
sample 7	728.40
sample 8	728.38

Table 1: homogeneity test results of subsamples #21080 and #21082

From the above test results the repeatability was calculated and 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.

	Density at 15°C in kg/m <sup>3</sup>
r (observed)	0.21
reference test method	ISO12185:96
0.3 x R (reference test method)	0.45

Table 2: evaluation of the repeatability of subsamples #21080 and #21082

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

For the DVPE round a batch of approximately 200 liters of Biogasoline E10 was obtained from a local petrol supplier. After homogenization 78 bottles of 1L were 75% filled and labelled #21081.

The homogeneity of the subsamples was checked by determination of Dry Vapor Pressure Equivalent in accordance with ASTM D5191 on 8 stratified randomly selected subsamples.

	DVPE in psi
sample #21081-1	12.08
sample #21081-2	12.08
sample #21081-3	12.07
sample #21081-4	12.08
sample #21081-5	12.08
sample #21081-6	12.08
sample #21081-7	12.08
sample #21081-8	12.07

Table 3: homogeneity test results of subsamples #21081

From the above test results the repeatability was calculated and 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.

	DVPE in psi
r (observed)	0.01
reference test method	D5191:20
0.3 x R (reference test method)	0.11

Table 4: evaluation of the repeatability of subsamples #21081

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

Depending on the registration of the participant the appropriate set of PT samples was sent on May 19, 2021. An SDS was added to the sample package.

## 2.5 STABILITY OF THE SAMPLES

The stability of Biogasoline E10 packed in amber glass bottles was checked. The material was found sufficiently stable for the period of the proficiency test.

## 2.6 ANALYZES

The participants were requested to determine on sample #21080: API Gravity, Aromatics (by FIA and GC), Benzene, Copper corrosion 3 hrs at 50°C, Density at 15°C, Distillation at 760 mmHg, Doctor test, Gum (solvent washed), Lead as Pb, Manganese as Mn, Mercaptan Sulfur as S, Olefins (by FIA and GC), Oxidation Stability, Oxygenates, Oxygen content and Sulfur.

On sample #21081 it was requested to determine Total Vapor Pressure and to calculate DVPE (in accordance with ASTM D5191 and EPA requirements). The formulas were given in the letter of instructions.

On sample #21082 it was requested to determine RON and MON (EN228 correction not applied).

It was explicitly requested to treat the samples as if they were routine samples 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/](http://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](http://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/](http://www.kpmd.co.uk/sgs-iis/). The reported test results are tabulated per determination in appendix 1 and 2 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, e.g. ASTM, EN or ISO reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, 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:

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

The  $Z_{(\text{target})}$  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

In this proficiency test no problems were encountered with the dispatch of the samples. When considering the three rounds together three participants reported test results after the final reporting date and two other participants were not able to report any test results. Not all participants were able to report all tests requested. In total 52 participants reported 940 numerical test results. Observed were 40 outlying test results, which is 4.3%. In proficiency studies 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 SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data. The abbreviations, used in these tables, are explained in appendix 5.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D3831) and an added designation for the year that the test method was adopted or revised (e.g. D3831:12). If applicable, a designation in the parentheses is added to designate the year of reapproval (e.g. D3831:12(2017)). In the test results tables of appendix 1 only the test method number and year of adoption or revision (e.g. D3831:12) will be used.

##### **Sample #21080**

API Gravity: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D4052:18a.

Aromatics by FIA: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D1319:20a.

Aromatics by GC: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO22854:21 and ASTM D5769:20.

Benzene: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ISO22854:21 procedure A but is in agreement with the requirements of ASTM D3606:20e1.

Copper corrosion: This determination was not problematic. All reporting participants agreed on a test result of 1 (1a).

Density at 15°C: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO12185:96.

Distillation at 760 mmHg: This determination was not problematic. In total, over eight distillation parameters, nine statistical outliers were observed and one other test result was excluded. The calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM D86:20b automated mode. All parameters with known requirements are also in agreement with ASTM D86:20b manual mode.

Doctor test: This determination was not problematic. All reporting participants agreed on a test result of "Negative".

Gum (solvent washed): This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D381:19.

Lead as Pb: This determination may not be problematic. All reporting participants agreed on a concentration below the application range of 2.5 mg/L of ASTM D3237:17. Therefore, no z-scores are calculated.

Manganese as Mn: This determination may not be problematic. All reporting participants agreed on a concentration <2 mg/L. Therefore, no z-scores are calculated.

Mercaptans Sulfur: This determination may not be problematic. Almost all reporting participants agreed on a concentration <0.0003 %M/M. Therefore, no z-scores are calculated.

Olefins by FIA: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D1319:20a.

Olefins by GC: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO22854:21.

Oxidation Stability: This determination was not problematic. All reporting participants agreed on a test result >360 minutes.

Ethanol: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ISO22854:21.

MTBE: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO22854:21.

Ethers (C5) only: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO22854:21.

Ethers (C5 or more C atoms): This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO22854:21.

Ethers (C6 or more C atoms): This determination may not be problematic. The concentration was near the application range of ISO22854:21. Therefore, no z-scores are calculated.

The concentration of the other oxygenates were near or below the application range of ISO22854:21. Therefore, no z-scores are calculated. The reported test results are listed in appendix 2.

Oxygen content: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ISO22854:21.

Sulfur: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO20846:19.

### **Sample #21081**

TVP: This determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5191:20 and also in agreement with the stricter requirements of EN13016-1:18.

DVPE (ASTM D5191): The conversion of the measured Total Vapor Pressure (TVP) to the corresponding Dry Vapor Pressure Equivalent (DVPE) as described in the ASTM D5191 was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5191:20 but is not in agreement with the stricter requirements of EN13016-1:18.

DVPE (EPA calculation): The conversion of the measured Total Vapor Pressure (TVP) to the corresponding U.S. EPA guidelines (40 CFR Part 80, App. E, Method 3) was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5191:20 and is in full agreement with the stricter requirements of EN13016-1:18.

### **Sample #21082**

RON: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D2699:19e1.

MON: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D2700:19e1.

## **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 test results, the average, the calculated reproducibility ( $2.8 \cdot$  standard deviation) and the target reproducibility derived from literature reference test methods (in casu ASTM, EN and ISO test methods) are presented in the next three tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
API Gravity		23	62.67	0.25	0.70
Aromatics by FIA	%V/V	13	21.4	5.2	3.7
Aromatics by GC	%V/V	31	19.4	0.9	1.0
Benzene	%V/V	37	0.62	0.04	0.03
Copper corrosion 3 hrs at 50°C		32	1 (1a)	n.a.	n.a.
Density at 15°C	kg/m <sup>3</sup>	42	728.4	0.5	1.5
Initial Boiling Point	°C	45	29.7	4.9	4.7
10% evaporated	°C	45	46.2	2.5	3.6
50% evaporated	°C	45	73.0	3.7	3.9
90% evaporated	°C	42	132.3	2.4	5.7
Final Boiling Point	°C	45	166.8	5.3	7.1
% evaporated at 70°C	%V/V	37	48.5	2.2	2.0
% evaporated at 100°C	%V/V	37	61.4	1.5	1.8
% evaporated at 150°C	%V/V	36	96.5	0.7	1.1
Doctor test		22	Negative	n.a.	n.a.
Gum (solvent washed)	mg/100mL	19	0.46	0.78	1.97
Lead as Pb	mg/L	23	<2.5	n.e.	n.e.
Manganese as Mn	mg/L	16	<2	n.e.	n.e.
Mercaptans Sulfur as S	%M/M	16	<0.0003	n.e.	n.e.
Olefins by FIA	%V/V	14	18.9	4.3	4.8
Olefins by GC	%V/V	25	18.5	1.6	2.7
Oxidation Stability	minutes	26	>360	n.e.	n.e.
Ethanol	%V/V	43	9.1	0.7	0.6
MTBE	%V/V	29	0.60	0.11	0.37
Ethers C5	%V/V	16	0.59	0.09	0.37
Ethers C5 or more C atoms	%V/V	18	0.61	0.07	0.37
Ethers C6 or more C atoms	%V/V	19	<0.8	n.e.	n.e.
Oxygen content	%M/M	34	3.6	0.3	0.2
Sulfur	mg/kg	45	7.7	1.8	2.3

Table 5 reproducibilities of tests on sample #21080

Parameter	unit	n	average	2.8 * sd	R(lit)
TVP acc.to ASTM D5191	psi	35	13.04	0.21	0.37
DVPE acc.to ASTM D5191	psi	39	12.03	0.27	0.36
DVPE acc.to EPA	psi	24	12.16	0.24	0.36

Table 6: reproducibilities of tests on sample #21081

Parameter	unit	n	average	2.8 * sd	R(lit)
RON		27	96.6	0.9	0.7
MON		25	85.1	0.6	0.9

Table 7: reproducibilities of tests on sample #21082

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

#### 4.3 COMPARISON OF THE PROFICIENCY TEST OF JUNE 2021 WITH PREVIOUS PTS

	June 2021	June 2020	May 2019	May 2018	May 2017
Number of reporting laboratories	52	54	50	53	52
Number of test results	940	960	918	1032	967
Number of statistical outliers	40	53	31	45	51
Percentage of statistical outliers	4.3%	5.5%	3.4%	4.4%	5.3%

Table 8: 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 in the following table.

Determination	June 2021	June 2020	May 2019	May 2018	May 2017
API Gravity	++	++	+	++	++
Aromatics by FIA	-	+	+	-	-
Aromatics by GC	+	+/-	-	-	-
Benzene	-	+/-	-	+/-	-
Density at 15°C	++	+	+	+	++
Distillation at 760 mmHg	+	+	+	+/-	+/-
Gum (solvent washed)	++	+	+	+	+
Mercaptans as S	n.e.	++	+/-	+/-	+/-
Olefins by FIA	+	+	+/-	+/-	-
Olefins by GC	+	++	++	+	++
Ethanol	-	+/-	+/-	-	+/-
MTBE	++	++	-	++	+/-
Ethers	++	++	+	+/-	-
Oxygen content	-	+	+/-	+/-	+/-
Sulfur	+	+	+	+/-	+/-
TVP acc.to ASTM D5191	+	+	+/-	+	+
DVPE acc.to ASTM D5191	+	+	+/-	+	+
DVPE acc.to EPA	+	+	+/-	+	+
RON	-	-	-	+/-	-
MON	+	+/-	-	+/-	+

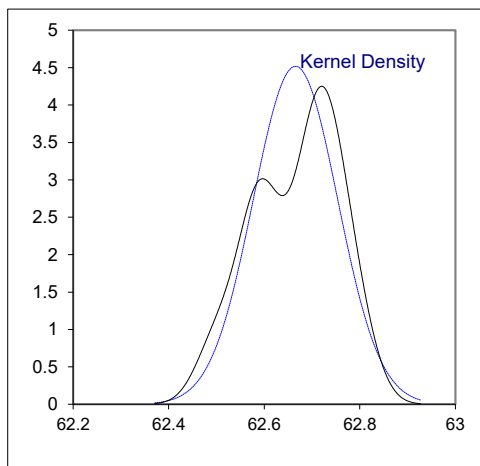
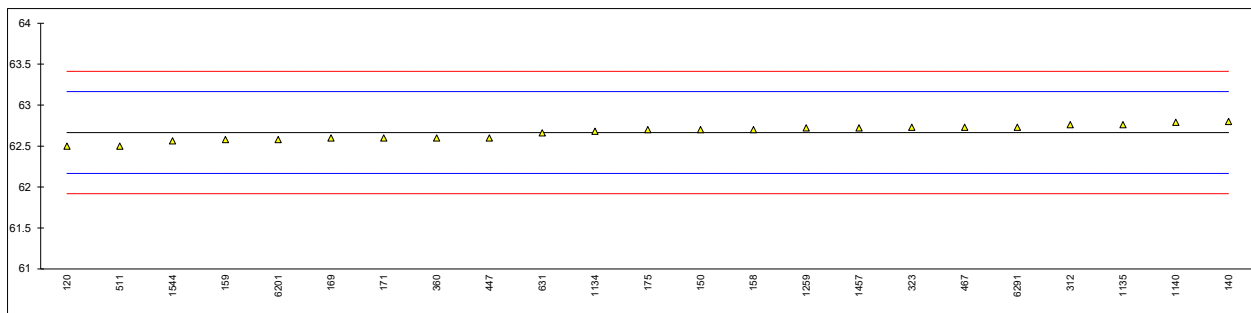
Table 9: comparison determinations against the reference test methods

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

**APPENDIX 1****Determination of API Gravity on sample #21080;**

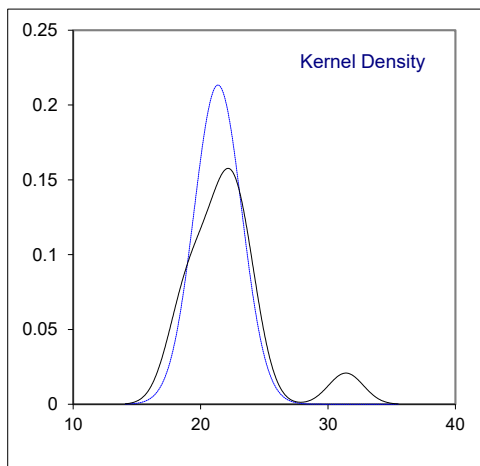
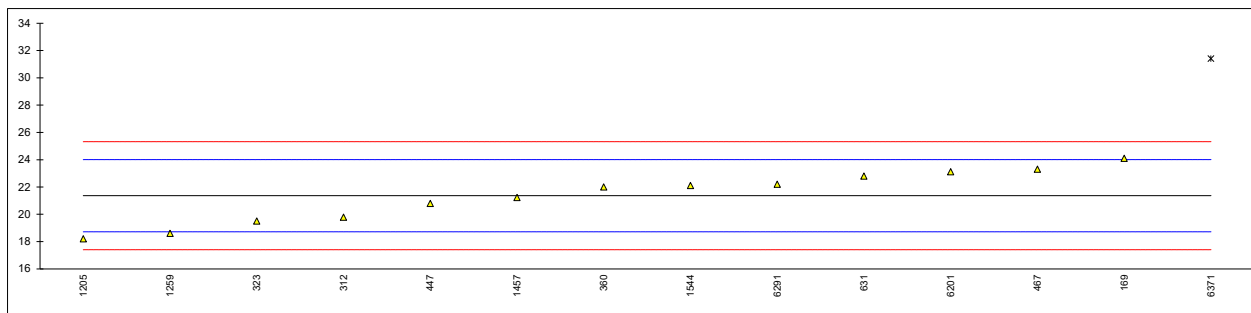
lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D4052	62.498		-0.67	
140	D4052	62.8		0.54	
150	D4052	62.7		0.14	
158	D4052	62.7		0.14	
159	D4052	62.58		-0.34	
169	D4052	62.6	C	-0.26	first reported 62.1
171	D4052	62.6		-0.26	
175	D4052	62.7		0.14	
311		----		----	
312	D4052	62.76		0.38	
323	D4052	62.73		0.26	
328		----		----	
333		----		----	
334		----		----	
335		----		----	
337		----		----	
338		----		----	
360	D4052	62.60		-0.26	
381		----		----	
447	D4052	62.6		-0.26	
467	ISO12185	62.73		0.26	
496		----		----	
511		62.5		-0.66	
631	D4052	62.66		-0.02	
1033		----		----	
1126		----		----	
1134	D4052	62.68		0.06	
1135	D4052	62.76		0.38	
1140	D287	62.79		0.50	
1191		----		----	
1205		----		----	
1259	D4052	62.72		0.22	
1299		----		----	
1320		----		----	
1443		----		----	
1457	D4052	62.72		0.22	
1459		----		----	
1544	ISO12185	62.562		-0.41	
1556		----		----	
1634		----		----	
1656		----		----	
1706		----		----	
1776		----		----	
1807		----		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D4052	62.58		-0.34	
6291	D4052	62.73		0.26	
6370		----		----	
6371		----		----	
normality		OK			
n		23			
outliers		0			
mean (n)		62.665			
st.dev. (n)		0.0883			
R(calc.)		0.247			
st.dev.(D4052:18a)		0.2495			
R(D4052:18a)		0.699			





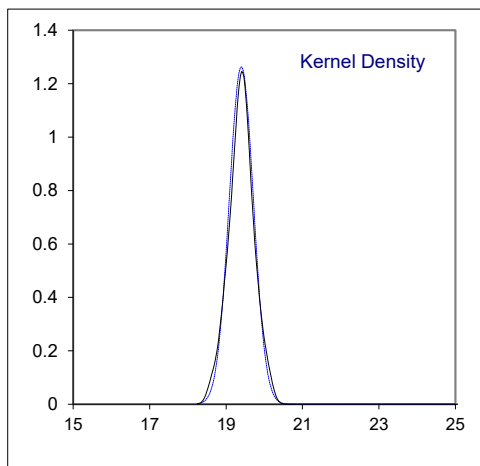
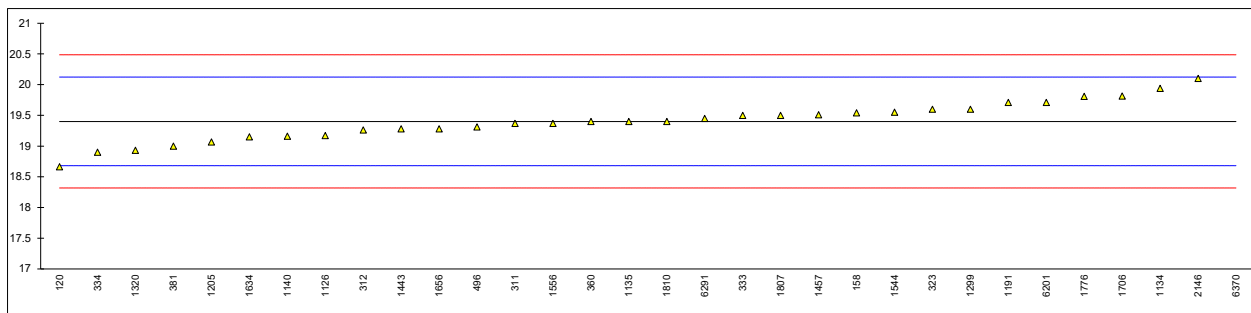
## Determination of Aromatics by FIA (without oxygenates correction) on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150		----		----	
158		----		----	
159		----		----	
169	D1319	24.1		2.07	
171		----		----	
175		----		----	
311		----		----	
312	EN15553	19.78		-1.20	
323	D1319	19.5		-1.41	
328		----		----	
333		----		----	
334		----		----	
335		----		----	
337		----		----	
338		----		----	
360	EN15553	22.0		0.48	
381		----		----	
447	D1319	20.8		-0.43	
467	D1319	23.3		1.47	
496		----		----	
511		----		----	
631	D1319	22.80		1.09	
1033		----		----	
1126		----		----	
1134		----		----	
1135		----		----	
1140		----		----	
1191		----		----	
1205	D1319	18.2		-2.39	
1259	D1319	18.6		-2.09	
1299		----		----	
1320		----		----	
1443		----		----	
1457	D1319	21.22		-0.11	
1459		----		----	
1544	EN15553	22.10		0.56	
1556		----		----	
1634		----		----	
1656		----		----	
1706		----		----	
1776		----		----	
1807		----		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D1319	23.11		1.32	
6291	D1319	22.2	C	0.63	first reported 26.35
6370		----		----	
6371	In house	31.4	C,G(0.01)	7.60	first reported 28.3
	normality	OK			
	n	13			
	outliers	1			
	mean (n)	21.362			
	st.dev. (n)	1.8700			
	R(calc.)	5.236			
	st.dev.(D1319:20a)	1.3214			
	R(D1319:20a)	3.7			



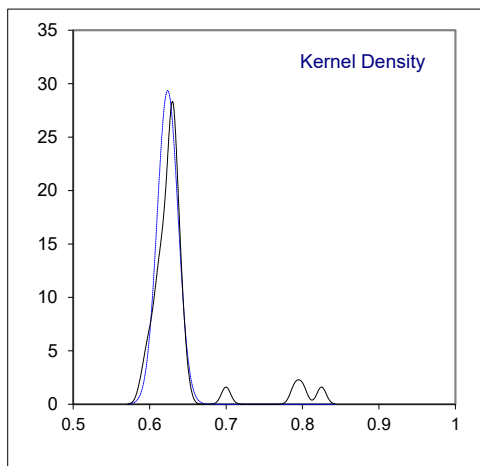
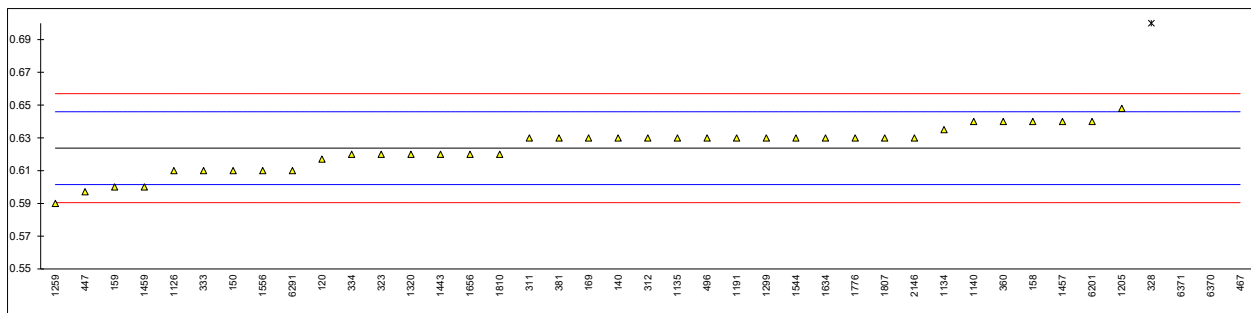
## Determination of Aromatics by GC on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D5769	18.66	C	-2.05	first reported 17.30
140		----		----	
150		----		----	
158	D5580	19.54		0.38	
159		----		----	
169		----		----	
171		----		----	
175		----		----	
311	ISO22854-A	19.37		-0.09	
312	ISO22854-A	19.26		-0.39	
323	ISO22854-A	19.6		0.55	
328		----		----	
333	ISO22854-A	19.5		0.27	
334	ISO22854-A	18.90		-1.39	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	19.40		0.00	
381	ISO22854-A	19.0		-1.11	
447		----		----	
467		----		----	
496	ISO22854-A	19.31		-0.25	
511		----		----	
631		----		----	
1033		----		----	
1126	ISO22854-A	19.17		-0.64	
1134	ISO22854-A	19.94		1.49	
1135	ISO22854-A	19.4		0.00	
1140	D6839	19.16	C	-0.67	first reported 19.61
1191	ISO22854-A	19.71		0.85	
1205	D8071	19.068		-0.92	
1259		----		----	
1299		19.6		0.55	
1320	ISO22854-A	18.93		-1.30	
1443	ISO22854-A	19.28		-0.34	
1457	ISO22854-A	19.51		0.30	
1459		----		----	
1544	ISO22854-A	19.55		0.41	
1556	ISO22854-A	19.37		-0.09	
1634	ISO22854-A	19.15		-0.70	
1656	ISO22854-B	19.28		-0.34	
1706	ISO22854-A	19.815		1.14	
1776	ISO22854-A	19.81		1.13	
1807	ISO22854-A	19.5		0.27	
1810	ISO22854-A	19.4		0.00	
2146	ISO22854-A	20.1		1.93	
6142		----		----	
6201	ISO22854-A	19.71		0.85	
6291	ISO22854-A	19.45		0.13	
6370	In house	30.2	C,R(0.01)	29.89	first reported 27.5
6371		----		----	
	normality	OK			
	n	31			
	outliers	1			
	mean (n)	19.401			
	st.dev. (n)	0.3157			
	R(calc.)	0.884			
	st.dev.(ISO22854:21)	0.3612			
	R(ISO22854:21)	1.011			
Compare	R(D5769:20)	2.256			



## Determination of Benzene on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D3606	0.617		-0.60	
140	D3606	0.63		0.57	
150	D3606	0.61		-1.24	
158	D3606	0.64		1.47	
159	D3606	0.60	C	-2.14	first reported 0.900
169	D3606	0.63	C	0.57	first reported 0.85
171		----		----	
175		----		----	
311	ISO22854-A	0.63		0.57	
312	ISO22854-A	0.63		0.57	
323	ISO22854-A	0.62		-0.33	
328	EN238	0.7	R(0.01)	6.88	
333	ISO22854-A	0.61		-1.24	
334	ISO22854-A	0.62		-0.33	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	0.64		1.47	
381	ISO22854-A	0.63		0.57	
447	IP429	0.597		-2.41	
467	EN238	0.825	C,R(0.01)	18.16	first reported 0.75
496	ISO22854-A	0.63		0.57	
511		----		----	
631		----		----	
1033		----		----	
1126	ISO22854-A	0.61		-1.24	
1134	ISO22854-A	0.635		1.02	
1135	ISO22854-A	0.63		0.57	
1140	D6839	0.64		1.47	
1191	ISO22854-A	0.63		0.57	
1205	D8071	0.648		2.19	
1259	EN12177	0.59		-3.04	
1299		0.63		0.57	
1320	ISO22854-A	0.62		-0.33	
1443	ISO22854-A	0.62		-0.33	
1457	ISO22854-A	0.64		1.47	
1459	In house	0.60		-2.14	
1544	ISO22854-A	0.630		0.57	
1556	ISO22854-A	0.61		-1.24	
1634	ISO22854-A	0.63		0.57	
1656	ISO22854-B	0.62		-0.33	
1706		----		----	
1776	ISO22854-A	0.63		0.57	
1807	ISO22854-A	0.63		0.57	
1810	ISO22854-A	0.62		-0.33	
2146	ISO22854-A	0.63		0.57	
6142		----		----	
6201	ISO22854-A	0.64		1.47	
6291	ISO22854-A	0.61		-1.24	
6370	D6277	0.80	C,R(0.01)	15.90	first reported 0.73
6371	D6277	0.79	C,R(0.01)	15.00	first reported 0.7
	normality	OK			
	n	37			
	outliers	4			
	mean (n)	0.624			
	st.dev. (n)	0.0136			
	R(calc.)	0.038			
	st.dev.(ISO22854-A:21)	0.0111			
	R(ISO22854-A:21)	0.031			
Compare	R(D3606:20e1)	0.131			



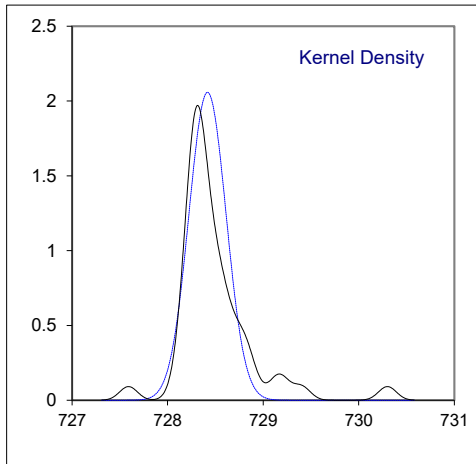
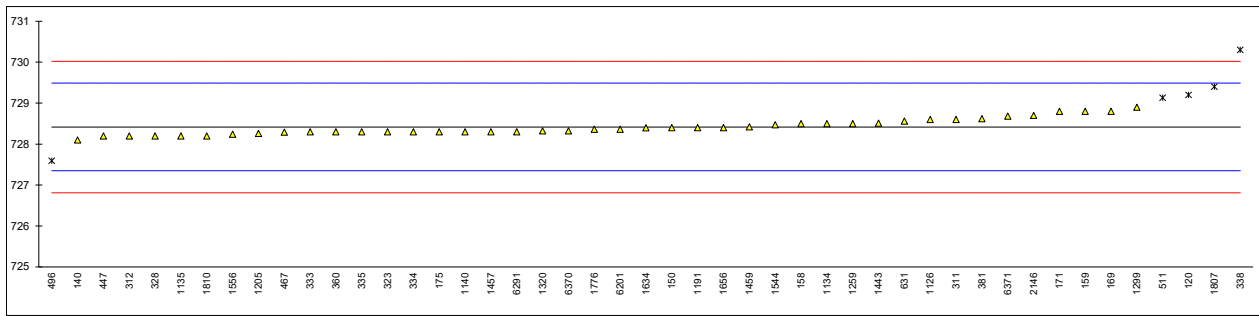
## Determination of Copper corrosion 3 hrs at 50°C on sample #21080

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D130	1A		----	
140		----		----	
150	D130	1a		----	
158	D130	1a		----	
159	D130	1a		----	
169	D130	1a		----	
171	D130	1a		----	
175		----		----	
311	D130	1A		----	
312	D130	1a		----	
323	D130	1A		----	
328	ISO2160	1		----	
333		----		----	
334	ISO2160	1		----	
335	D130	1		----	
337		----		----	
338		----		----	
360	D130	1A		----	
381		----		----	
447	D130	1a		----	
467	ISO2160	1A		----	
496	ISO2160	1a		----	
511	D130	1A		----	
631	D130	1a		----	
1033		----		----	
1126		----		----	
1134	IP154	1a		----	
1135	D130	1A		----	
1140	IP154	1A		----	
1191		----		----	
1205		----		----	
1259		----		----	
1299	D130	1A		----	
1320	D130	1a		----	
1443	ISO2160	1 A		----	
1457	D130	1A		----	
1459		----		----	
1544	ISO2160	1A		----	
1556	ISO2160	Class 1a		----	
1634	ISO2160	1a		----	
1656	ISO2160	1a		----	
1706		----		----	
1776		----		----	
1807	D130	1a		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D130	1a		----	
6291	D130	1a		----	
6370		----		----	
6371		----		----	
n		32			
mean (n)		1 (1a)			

Determination of Density at 15°C on sample #21080; results in kg/m<sup>3</sup>

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D4052	729.2	R(0.05)	1.46	
140	D4052	728.1		-0.59	
150	D4052	728.4		-0.03	
158	D4052	728.5		0.16	
159	D4052	728.8		0.72	
169	D4052	728.8	C	0.72	first reported 730.7
171	D4052	728.8		0.72	
175	D4052	728.3		-0.22	
311	ISO12185	728.6		0.34	
312	ISO12185	728.2		-0.40	
323	ISO12185	728.3		-0.22	
328	ISO12185	728.2		-0.40	
333	ISO12185	728.3		-0.22	
334	ISO12185	728.3		-0.22	
335	ISO12185	728.3		-0.22	
337		-----		-----	
338	ISO12185	730.3	R(0.01)	3.52	
360	D4052	728.3		-0.22	
381	ISO12185	728.62		0.38	
447	D4052	728.2		-0.40	
467	ISO12185	728.29		-0.24	
496	D4052	727.59	R(0.05)	-1.54	
511	D4052	729.13	R(0.05)	1.33	
631	D4052	728.56		0.27	
1033		-----		-----	
1126		728.6		0.34	
1134	ISO12185	728.5		0.16	
1135	ISO12185	728.2		-0.40	
1140	IP365	728.3		-0.22	
1191	ISO12185	728.4		-0.03	
1205	ISO12185	728.26		-0.29	
1259	ISO12185	728.5		0.16	
1299	D4052	728.9		0.90	
1320	ISO12185	728.32		-0.18	
1443	ISO12185	728.51		0.17	
1457	ISO12185	728.3		-0.22	
1459	ISO12185	728.42		0.01	
1544	ISO12185	728.47		0.10	
1556	ISO12185	728.24		-0.33	
1634	ISO12185	728.394		-0.04	
1656	ISO12185	728.4		-0.03	
1706		-----		-----	
1776	ISO12185	728.36		-0.11	
1807	D4052	729.4	C,R(0.05)	1.84	first reported 730.7
1810	ISO12185	728.2		-0.40	
2146	ISO12185	728.7		0.53	
6142		-----		-----	
6201	ISO12185	728.36		-0.11	
6291	ISO12185	728.3		-0.22	
6370	ISO12185	728.32		-0.18	
6371	D7042	728.68		0.49	
	normality	OK			
	n	42			
	outliers	5			
	mean (n)	728.417			
	st.dev. (n)	0.1939			
	R(calc.)	0.543			
	st.dev.(ISO12185:96)	0.5357			
	R(ISO12185:96)	1.5			





## Determination of Distillation at 760 mmHg on sample #21080; results in °C

lab	method	IBP	mark	10% eva	mark	50% eva	mark	90% eva	mark	FBP	mark
62		----		----		----		----		----	
120	D86-automated	30.1		47.4		73.8		133.2		167.3	
140	D86-automated	29.6		45.6		71.4		132.5		166.0	
150	D86-automated	28.1		45.4		70.8		131.7		166.5	
158		----		----		----		----		----	
159	D86-automated	25.8		46.1		72.5		132.8		169.9	
169	D86-automated	33.0		46.8	C	74.1	C	130.6		167.3	
171	D86-automated	31.2		47.2		74.2		131.9		167.6	
175	D86-automated	29.4		45.2		71.9		132.2		167.2	
311	D86-automated	30.2		45.5		71.6		132.1		167.0	
312	D86-automated	27.9		45.9		72.0		132.0		165.7	C
323	D86-automated	30.9		45.4		72.2		132.2		165.9	
328	D86-automated	28.8		45.8		73.8		133.2		164.5	
333	ISO3405-automated	29.3		46.6		73.8		132.1		167.9	
334	D86-automated	30.6		46.3		73.0		132.1		165.3	
335	D86	33.0		47.9		73.6		132.6		165.8	
337		----		----		----		----		----	
338	ISO3405-automated	31.6		44.5		73.0		132.5		169.4	
360	D86-automated	29.8		46.5		73.3		132.5		164.2	
381	D86-automated	30.1		47.5		76.7		134.9		161.5	
447	D86-automated	28.4		46.1		73.1		132.2		167.2	
467	ISO3405-automated	34.0		45.8		72.7		132.3		168.5	
496	D86-automated	30.7		45.6		72.0		132.0		166.8	
511		----		----		----		----		----	
631	D86-manual	30.0		46.0		75.5		132.0		166.5	
1033		----		----		----		----		----	
1126		30.6		46.4	C	72.9	C	132.8	C	171.8	
1134	D86-automated	29.2		47.4		73.7	C	135.4		169.3	
1135	D86-automated	28.8		45.8		72.8		132.6		165.6	
1140	IP123-automated	30.4		47.9	C	74.2	C	131.5	C	166.2	
1191	ISO3405-automated	29.3		45.6		71.1		131.8		167.2	
1205	D86-automated	29.6		46.4		72.8		132.7		169.4	
1259	D86-automated	26.4		46.8		74.3		131.3		168.8	
1299		29.0		45.6		72.1		131.3		168.0	
1320		----		----		----		----		----	
1443	ISO3405-automated	31.37		46.63		73.81		137.18	R(0.01)	165.71	
1457	D86-automated	26.0		43.8		72.9		132.0		165.1	
1459	ISO3405-automated	29.4		45.6		70.8		131.9		164.7	
1544	ISO3405-automated	28.60		46.55		73.35		132.80		166.05	
1556	ISO3405-automated	26.4		45.7		71.7		132.5		166.9	
1634	D86-automated	29.8		46.7		75.8		133.6		168.7	
1656	ISO3405-automated	30.4		45.0		70.8		131.8		164.1	
1706	ISO3405-automated	28.8		46.5		72.1		131.8		166.4	
1776	ISO3405-automated	29.7	C	46.1	C	72.9	C	131.5	C	166.6	C
1807	D86-automated	29		45.1		72.1		131.4		165	
1810	D86-automated	30.3		48.0		73.3		132.0		165.5	
2146	ISO3405-automated	29.3		46.4		73.1		131.8		167.0	
6142		----		----		----		----		----	
6201	D86-automated	28.7		46.2		72.8		132.2		165.4	
6291		28.0		45.0		70.9		131.9		165.8	
6370	ISO3405-automated	31.8		47.2		74.1		148.4	C,R(0.01)	169.1	
6371	ISO3405-automated	32.5		46.8		75.1		149.2	C,R(0.01)	170.3	
	normality	OK		OK		OK		not OK		OK	
	n	45		45		45		42		45	
	outliers	0		0		0		3		0	
	mean (n)	29.69		46.18		72.99		132.29		166.81	
	st.dev. (n)	1.751		0.903		1.335		0.860		1.902	
	R(calc.)	4.90		2.53		3.74		2.41		5.33	
	st.dev.(D86-A:20b)	1.679		1.291		1.381		2.047		2.536	
	R(D86-A:20b)	4.7		3.61		3.87		5.73		7.1	
Compare											
	R(D86-M:20b)	5.6		3.51		3.87		4.07		7.2	

Lab 169 first reported 51.1 at 10% eva and 80.3 at 50% eva

Lab 312 first reported 16.5 at FBP

Lab 1126 first reported 47.8 at 10% eva, 78.3 at 50% eva and 136.6 at 90% eva

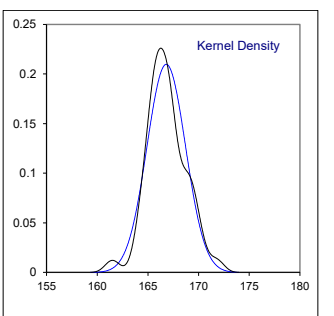
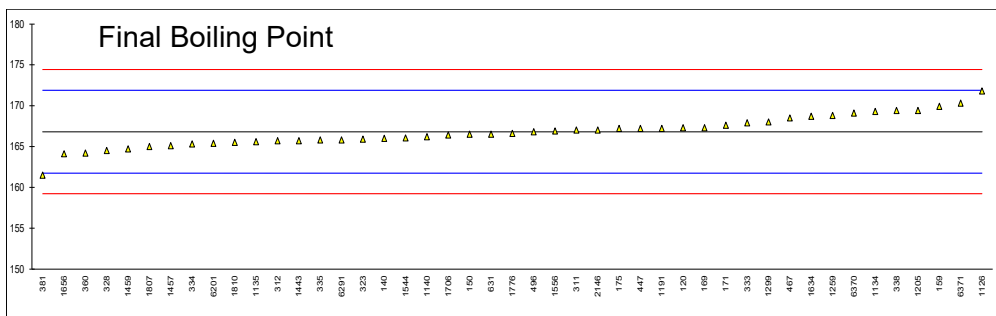
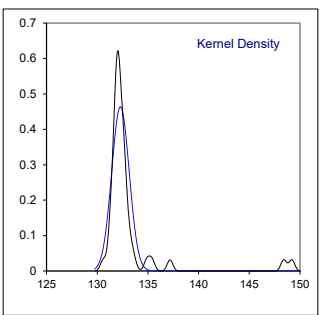
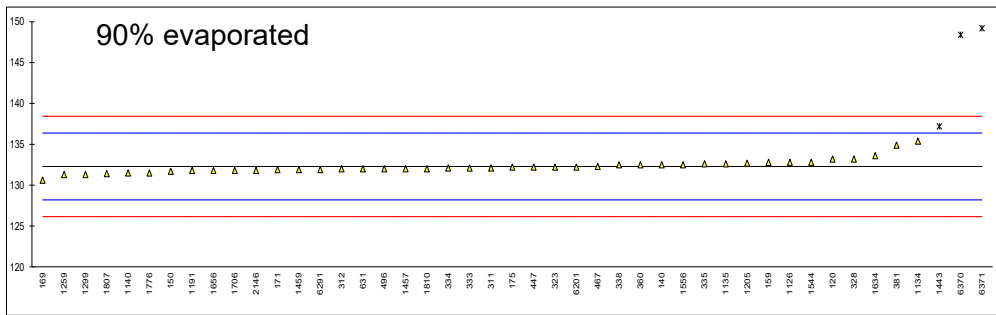
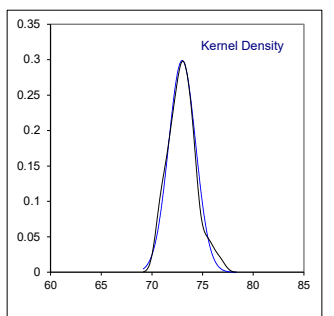
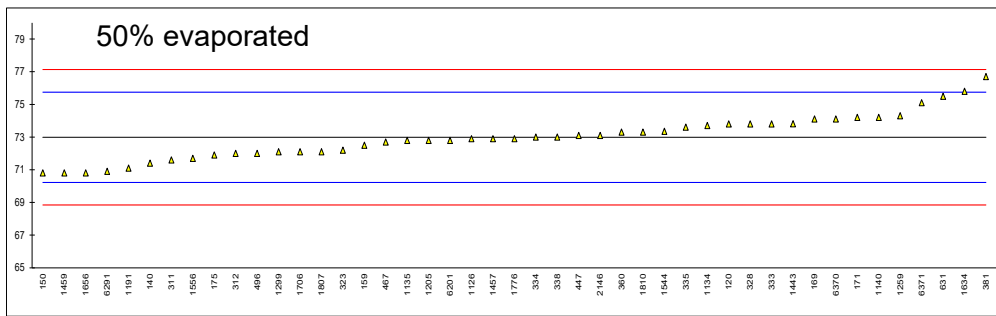
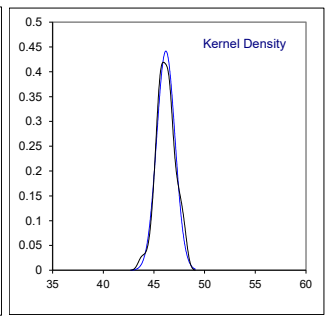
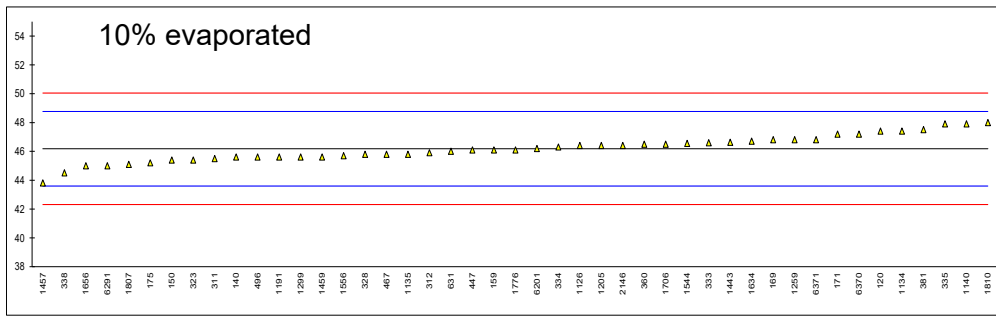
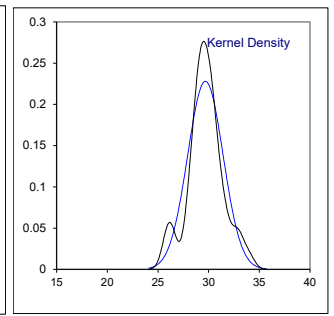
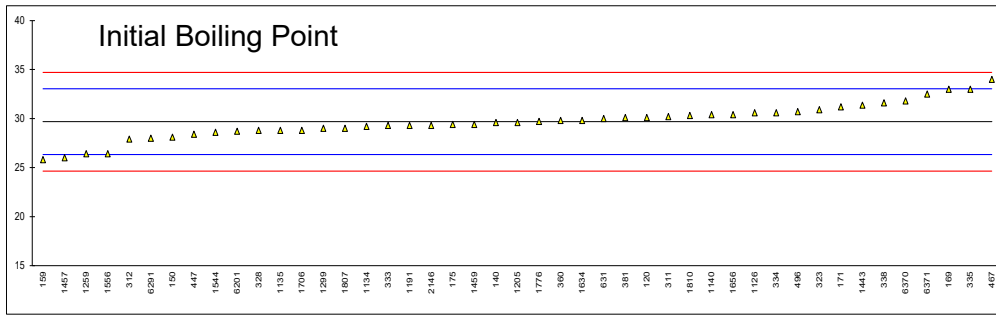
Lab 1134 first reported 77.9 at 50% eva

Lab 1140 first reported 49.2 at 10% eva, 79.7 at 50% eva and 134.9 at 90% eva

Lab 1776 first reported 36.6 at IBP, 53.9 at 10% eva, 92.4 at 50% eva, 145.1 at 90% eva and 183.5 at FBP

Lab 6370 first reported 145.3 at 90% eva

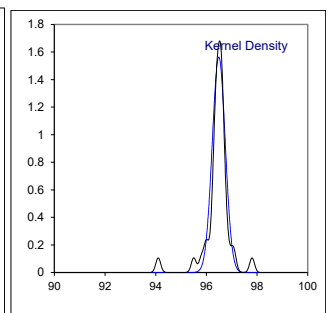
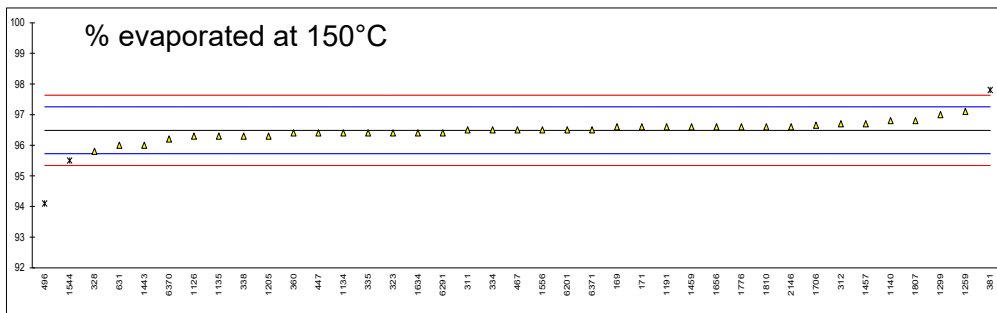
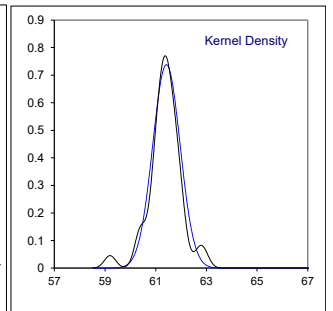
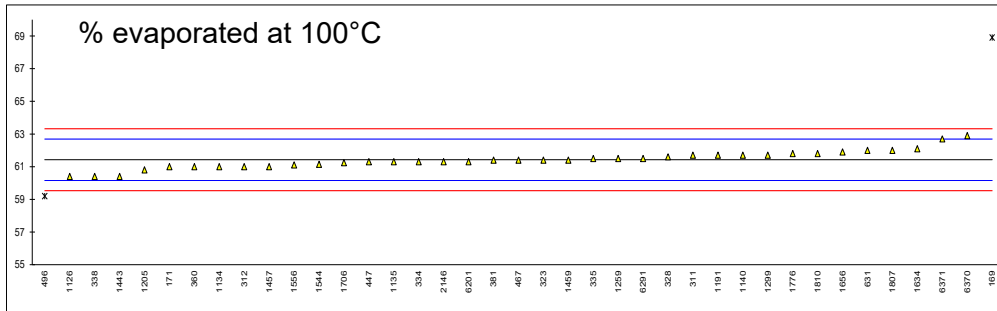
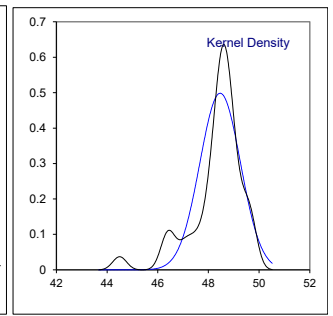
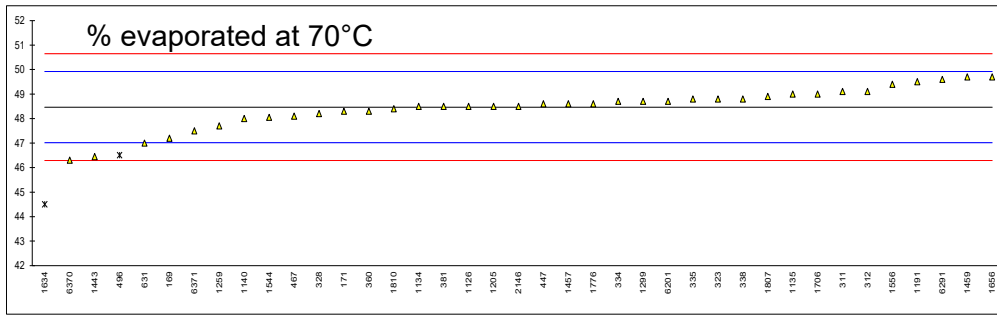
Lab 6371 first reported 145.9 at 90% eva



Determination of Distillation at 760 mmHg on sample #21080; results in %V/V

lab	method	%evap. 70°C	mark	%evap. 100°C	mark	%evap. 150°C	mark	residue	mark
62		----		----		----		----	
120		----		----		----		----	
140		----		----		----		1.0	
150		----		----		----		----	
158		----		----		----		----	
159		----		----		----		1.0	
169	D86-A	47.2	C	68.9	C,R(0.01)	96.6		1.0	
171	D86-A	48.3		61.0		96.6		1.0	
175		----		----		----		0.8	
311	D86-A	49.1		61.7		96.5		1.0	
312	D86-A	49.1		61.0		96.7		1.0	
323	D86-A	48.8		61.4		96.4		1.0	
328	D86-A	48.2		61.6		95.8		1.8	
333		----		----		----		----	
334	D86-A	48.7		61.3		96.5		1.0	
335	D86	48.8		61.5		96.4		0.8	
337		----		----		----		----	
338	ISO3405-A	48.8		60.4		96.3		0.9	
360	D86-A	48.3		61.0		96.4		1.0	
381	D86-A	48.5		61.4		97.8	R(0.01)	1.1	
447	D86-A	48.6		61.3		96.4		1.0	
467	ISO3405-A	48.1		61.4		96.5		0.9	
496	D86-A	46.5	ex	59.2	R(0.01)	94.1	R(0.01)	1.0	
511		----		----		----		----	
631	D86-M	47		62		96		1.0	
1033		----		----		----		----	
1126		48.5		60.4		96.3		1.0	
1134	D86-A	48.5		61.0		96.4		1.0	
1135	D86-A	49.0		61.3		96.3		1.2	
1140	IP123-A	48.0		61.7		96.8		1.0	
1191	ISO3405-A	49.5		61.7		96.6		0.9	
1205	D86-A	48.5		60.8		96.3		----	
1259	D86-A	47.7		61.5		97.1		1.0	
1299		48.7		61.7		97.0		1.0	
1320		----		----		----		----	
1443	ISO3405-A	46.45		60.40		96.00		0.8	
1457	D86-A	48.6		61.0		96.7		1.0	
1459	ISO3405-A	49.7		61.4		96.6		1.0	
1544	ISO3405-A	48.05	C	61.15		95.50	R(0.05)	0.90	
1556	ISO3405-A	49.4		61.1		96.5		1.0	
1634	D86-A	44.5	R(0.01)	62.1		96.4		1.0	
1656	ISO3405-A	49.7		61.9		96.6		1.0	
1706	ISO3405-A	49.0		61.25		96.65		----	
1776	ISO3405-A	48.6	C	61.8	C	96.6	C	1.0	
1807	D86-A	48.9		62.0		96.8		0.9	
1810	D86-A	48.4		61.8		96.6		1.0	
2146	ISO3405-A	48.5		61.3		96.6		1.0	
6142		----		----		----		----	
6201	D86-A	48.7		61.3		96.5		1	
6291		49.6		61.5		96.4		1.0	
6370	ISO3405-A	46.3		62.9		96.2		1.1	
6371	ISO3405-A	47.5		62.7	C	96.5	C	1.1	
	normality	suspect		suspect		suspect			
	n	37		37		36			
	outliers	1 +1ex		2		3			
	mean (n)	48.47		61.42		96.49			
	st.dev. (n)	0.801		0.540		0.255			
	R(calc.)	2.24		1.51		0.71			
	st.dev.(D86-A:20b)	0.725		0.633		0.382			
	R(D86-A:20b)	2.03		1.77		1.07			
Compare									
	R(D86-M:20b)	unknown		unknown		unknown			

Lab 169 first reported 39.2 at %evap. 70°C and 67.2 at %evap. 100°C  
 Lab 496 test result excluded at %evap. 70°C because of statistical outliers at related distillation parameters  
 Lab 1544 first reported 46.05 at %evap. 70°C  
 Lab 1776 first reported 41.2 at %evap. 70°C, 53.6 at %evap. 100°C and 92.4 at %evap. 150°C  
 Lab 6371 first reported 65.1 at %evap. 100°C and 92.5 at %evap. 150°C

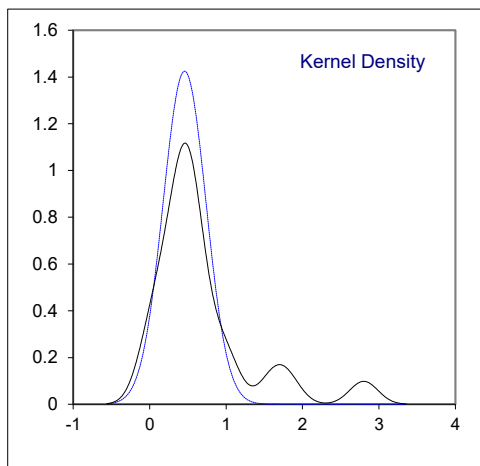
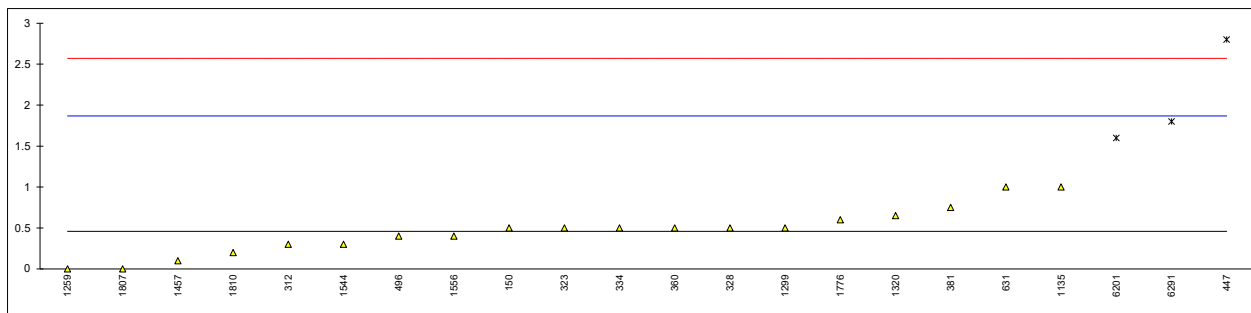


Determination of Doctor test on sample #21080

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140	D4952	Negative		----	
150	D4952	Neg		----	
158	D4952	Negative		----	
159		----		----	
169		----		----	
171	D4952	Negative		----	
175		----		----	
311		----		----	
312	IP30	negative		----	
323	IP30	negative		----	
328	D4952	NEGATIVE		----	
333		----		----	
334	D4952	negative		----	
335		----		----	
337		----		----	
338		----		----	
360	D4952	Negative		----	
381		----		----	
447	D4952	Negative [Sweet]		----	
467	IP30	doctor negative, thiols absent		----	
496	D4952	negative		----	
511		----		----	
631		----		----	
1033		----		----	
1126		----		----	
1134	IP30	Negative		----	
1135	IP30	Negative		----	
1140	IP30	Negative		----	
1191		----		----	
1205		----		----	
1259		----		----	
1299		----		----	
1320	D4952	negative		----	
1443		----		----	
1457	IP30	Negative		----	
1459		----		----	
1544	D4952	Negative		----	
1556	IP30	Negative		----	
1634		----		----	
1656		----		----	
1706		----		----	
1776		----		----	
1807	D4952	NEGATIVE		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D4952	negative		----	
6291	IP30	negative		----	
6370		----		----	
6371		----		----	
	n	22			
	mean (n)	Negative			

## Determination of Gum (solvent washed) on sample #21080; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150	D381	0.5		0.06	
158	D381	<0.5		----	
159		----		----	
169	D381	<0.5		----	
171	D381	<0.5		----	
175		----		----	
311	D381	<1.0		----	
312	D381	0.3		-0.22	
323	D381	0.5		0.06	
328	D381	0.5		0.06	
333		----		----	
334	D381	0.5		0.06	
335		----		----	
337		----		----	
338		----		----	
360	D381	0.5		0.06	
381	ISO6246	0.75		0.41	
447	D381	2.8	R(0.01)	3.32	
467		----		----	
496	D381	0.4		-0.08	
511		----		----	
631	D381	1.0		0.77	
1033		----		----	
1126		----		----	
1134		----		----	
1135	D381	1.0		0.77	
1140	IP131	<1		----	
1191		----		----	
1205		----		----	
1259	D381	0		-0.65	
1299	D381	0.5		0.06	
1320	D381	0.65		0.27	
1443		----		----	
1457	D381	0.1		-0.51	
1459		----		----	
1544	ISO6246	0.30		-0.22	
1556	ISO6246	0.4		-0.08	
1634		----		----	
1656	ISO6246	<1		----	
1706		----		----	
1776	ISO6246	0.60		0.20	
1807	D381	0		-0.65	
1810	D381	0.2		-0.37	
2146		----		----	
6142		----		----	
6201	D381	1.6	R(0.05)	1.62	
6291	D381	1.8	R(0.05)	1.90	
6370		----		----	
6371		----		----	
	normality	OK			
	n	19			
	outliers	3			
	mean (n)	0.46			
	st.dev. (n)	0.280			
	R(calc.)	0.78			
	st.dev.(D381:19)	0.705			
	R(D381:19)	1.97			





## Determination of Lead as Pb on sample #21080; results in mg/L

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140	D3237	<2.5		----	
150	D3237	<2.5		----	
158	D3237	<2.5		----	
159		----		----	
169		----		----	
171	D3237	<2.5		----	
175		----		----	
311		----		----	
312	EN237	<2.5		----	
323	D3237	<2.5		----	
328		----		----	
333		----		----	
334		----		----	
335		----		----	
337		----		----	
338		----		----	
360	INH-12	< 2.5		----	
381	EN237	<2.5		----	
447	IP428	<2.5		----	
467		----		----	
496	D3237	0		----	
511	D3237	<2.5		----	
631	D3237	<2.5		----	
1033		----		----	
1126		----		----	
1134		----		----	
1135		----		----	
1140		----		----	
1191	In house	0.316		----	
1205		----		----	
1259		----		----	
1299		<2.5		----	
1320		----		----	
1443	EN237	<2,5		----	
1457	D3237	0		----	
1459	In house	1.14		----	
1544	EN237	0.00		----	
1556		----		----	
1634		----		----	
1656	EN237	<2.5		----	
1706		----		----	
1776		----		----	
1807	EN237	0		----	
1810		----		----	
2146	In house	<2		----	
6142		----		----	
6201	EN237	<2,5		----	
6291	EN237	<2.5		----	
6370		----		----	
6371		----		----	
n		23			
mean (n)		<2.5			Application range D3237:17: 2.5 – 25 mg/L

Determination of Manganese as Mn on sample #21080; results in mg/L

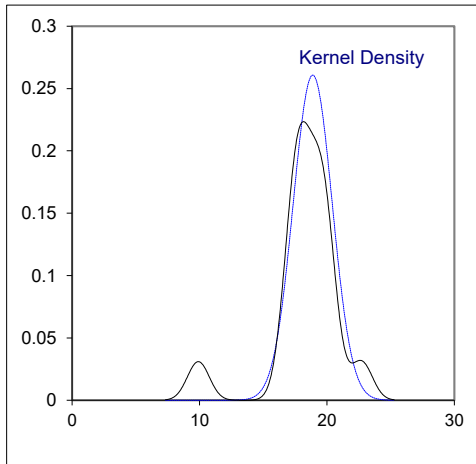
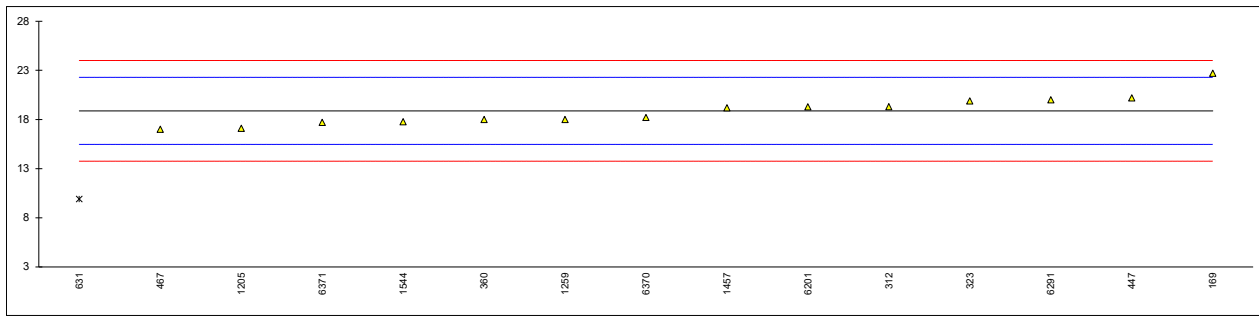
lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150	D3831	<0.25		----	
158		----		----	
159		----		----	
169		----		----	
171	D3831	<0.25		----	
175		----		----	
311		----		----	
312	EN16136	<0.5		----	
323	D3831	<0.50		----	
328		----		----	
333		----		----	
334		----		----	
335		----		----	
337		----		----	
338		----		----	
360	EN16136	< 0.50		----	
381	ISO16135	<2.0		----	
447	EN16135	<2.0		----	
467		----		----	
496		----		----	
511		----		----	
631	D3831	<2		----	
1033		----		----	
1126		----		----	
1134		----		----	
1135		----		----	
1140		----		----	
1191		----		----	
1205		----		----	
1259		----		----	
1299		----		----	
1320		----		----	
1443	EN16135	<2,0		----	
1457	EN16136	0		----	
1459		----		----	
1544	EN16135	0.00		----	
1556		----		----	
1634		----		----	
1656	EN16135	<2		----	
1706		----		----	
1776		----		----	
1807	EN16135	0		----	
1810		----		----	
2146	In house	<1		----	
6142		----		----	
6201	EN16135	<0,1		----	
6291	D3831	<0.1		----	
6370		----		----	
6371		----		----	
	n	16			
	mean (n)	<2			Application range D3831:12: 0.25 – 40 mg/L

## Determination of Mercaptans Sulfur as S on sample #21080; results in %M/M

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150	D3227	<0.0003		----	
158		----		----	
159		----		----	
169	D3227	0.0003		----	
171	D3227	<0.0003		----	
175		----		----	
311		----		----	
312	D3227	<0.0003		----	
323	D3227	<0.0003		----	
328		----		----	
333		----		----	
334	D3227	<0.0003		----	
335		----		----	
337		----		----	
338		----		----	
360	ISO3012	< 0.0003		----	
381		----		----	
447		----		----	
467		----		----	
496	D3227	0.00020		----	
511		----		----	
631		----		----	
1033		----		----	
1126		----		----	
1134		----		----	
1135	D3227	<0.0003		----	
1140	IP342	<0.0003		----	
1191	ISO3012	0.000154		----	
1205		----		----	
1259	D3227	0.00018		----	
1299		----		----	
1320		----		----	
1443		----		----	
1457	UOP163	0.00012		----	
1459		----		----	
1544	D3227	0.0002		----	
1556		----		----	
1634		----		----	
1656		----		----	
1706		----		----	
1776	UOP163	0.00021		----	
1807		----		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D3227	<0,0001		----	
6291		----		----	
6370		----		----	
6371		----		----	
	n	16			
	mean (n)	<0.0003			

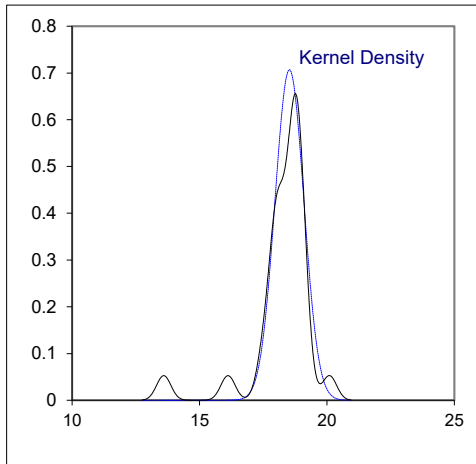
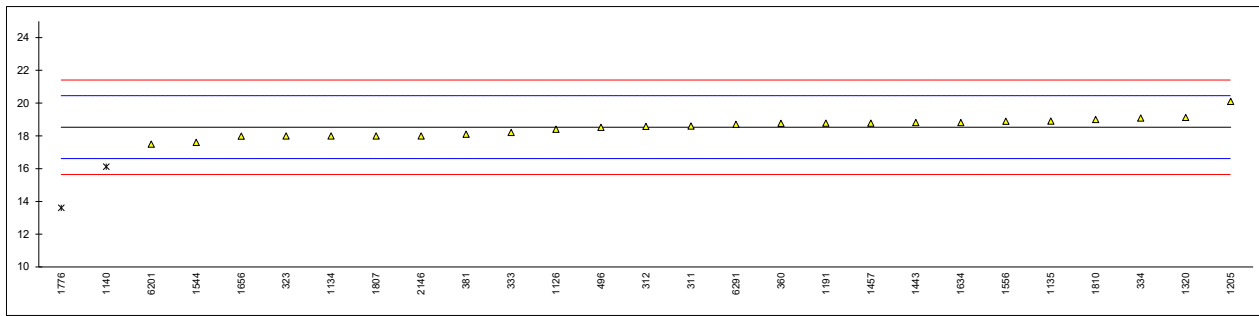
Determination of Olefins by FIA (without oxygenates correction) on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150		----		----	
158		----		----	
159		----		----	
169	D1319	22.7		2.24	
171		----		----	
175		----		----	
311		----		----	
312	EN15553	19.30		0.25	
323	D1319	19.9		0.60	
328		----		----	
333		----		----	
334		----		----	
335		----		----	
337		----		----	
338		----		----	
360	EN15553	18.0		-0.52	
381		----		----	
447	D1319	20.2		0.77	
467	D1319	17.0		-1.10	
496		----		----	
511		----		----	
631	D1319	9.90	C,G(0.01)	-5.26	first reported 12.24
1033		----		----	
1126		----		----	
1134		----		----	
1135		----		----	
1140		----		----	
1191		----		----	
1205	D1319	17.1		-1.04	
1259	D1319	18.0		-0.52	
1299		----		----	
1320		----		----	
1443		----		----	
1457	D1319	19.18		0.18	
1459		----		----	
1544	EN15553	17.76		-0.66	
1556		----		----	
1634		----		----	
1656		----		----	
1706		----		----	
1776		----		----	
1807		----		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D1319	19.29		0.24	
6291	D1319	20.0	C	0.66	first reported 25.08
6370	In house	18.2		-0.40	
6371	In house	17.7		-0.69	
	normality	not OK			
	n	14			
	outliers	1			
	mean (n)	18.88			
	st.dev. (n)	1.530			
	R(calc.)	4.28			
	st.dev.(D1319:20a)	1.707			
	R(D1319:20a)	4.78			



Determination of Olefins by GC on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120		----		----	
140		----		----	
150		----		----	
158		----		----	
159		----		----	
169		----		----	
171		----		----	
175		----		----	
311	ISO22854-A	18.59		0.06	
312	ISO22854-A	18.58		0.05	
323	ISO22854-A	18		-0.55	
328		----		----	
333	ISO22854-A	18.2		-0.34	
334	ISO22854-A	19.08		0.57	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	18.77		0.25	
381	ISO22854-A	18.1		-0.45	
447		----		----	
467		----		----	
496	ISO22854-A	18.52		-0.01	
511		----		----	
631		----		----	
1033		----		----	
1126	ISO22854-A	18.4		-0.13	
1134	ISO22854-A	18.00		-0.55	
1135	ISO22854-A	18.9		0.39	
1140	D6839	16.12	C,R(0.01)	-2.51	first reported 17.21
1191	ISO22854-A	18.78		0.26	
1205	D8071	20.097		1.63	
1259		----		----	
1299		----		----	
1320	ISO22854-A	19.12		0.62	
1443	ISO22854-A	18.81		0.29	
1457	ISO22854-A	18.78		0.26	
1459		----		----	
1544	ISO22854-A	17.60		-0.97	
1556	ISO22854-A	18.89		0.38	
1634	ISO22854-A	18.81		0.29	
1656	ISO22854-B	17.98		-0.57	
1706		----		----	
1776	ISO22854-A	13.6	C,R(0.01)	-5.13	first reported 13.44
1807	ISO22854-A	18.0		-0.55	
1810	ISO22854-A	19.0		0.49	
2146	ISO22854-A	18.0		-0.55	
6142		----		----	
6201	ISO22854-A	17.49		-1.08	
6291	ISO22854-A	18.7		0.18	
6370		----		----	
6371		----		----	
	normality	suspect			
	n	25			
	outliers	2			
	mean (n)	18.53			
	st.dev. (n)	0.565			
	R(calc.)	1.58			
	st.dev.(ISO22854:21)	0.961			
	R(ISO22854:21)	2.69			



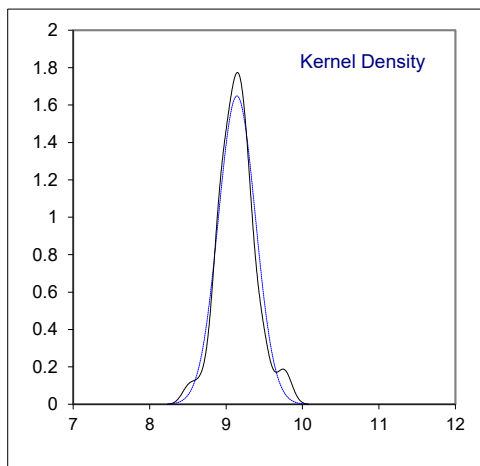
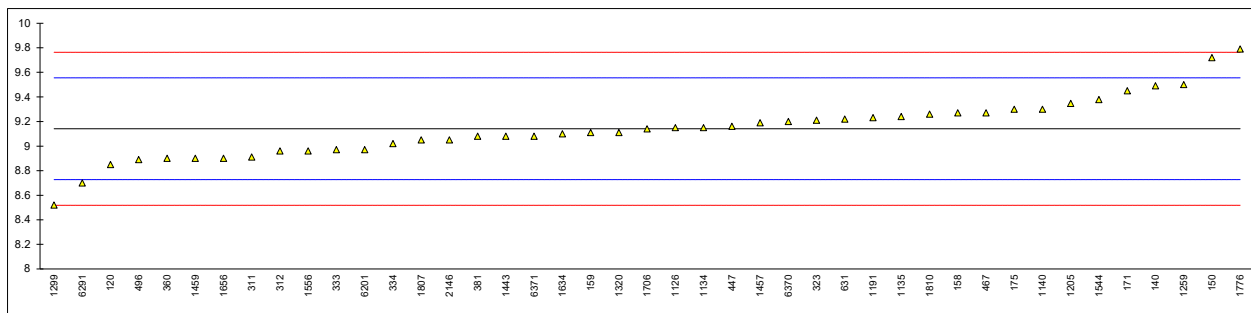
Determination of Oxidation Stability on sample #21080; results in minutes

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D525	>900		----	
140	D525	>900		----	
150	D525	>900		----	
158	D525	>900		----	
159		----		----	
169		----		----	
171		----		----	
175		----		----	
311	D525	>900		----	
312	D525	>900		----	
323	D525	690		----	
328	D525	>900		----	
333		----		----	
334	D525	>900		----	
335		----		----	
337		----		----	
338		----		----	
360	D525	> 900		----	
381		----		----	
447	D525	>900		----	
467		----		----	
496	ISO7536	>900		----	
511		----		----	
631		----		----	
1033		----		----	
1126		----		----	
1134	D525	>900		----	
1135	ISO7536	>900		----	
1140	D525	1244		----	
1191	ISO7536	1081		----	
1205		----		----	
1259		----		----	
1299		>960		----	
1320	D525	>900		----	
1443	ISO7536	>900		----	
1457	D525	>900		----	
1459		----		----	
1544	ISO7536	>900		----	
1556	ISO7536	>900		----	
1634		----		----	
1656	ISO7536	>360		----	
1706		----		----	
1776		----		----	
1807	D525	>380		----	
1810		----		----	
2146		----		----	
6142		----		----	
6201	D525	1439		----	
6291	D525	>900		----	
6370		----		----	
6371		----		----	
	n	26			
	mean (n)	>360			



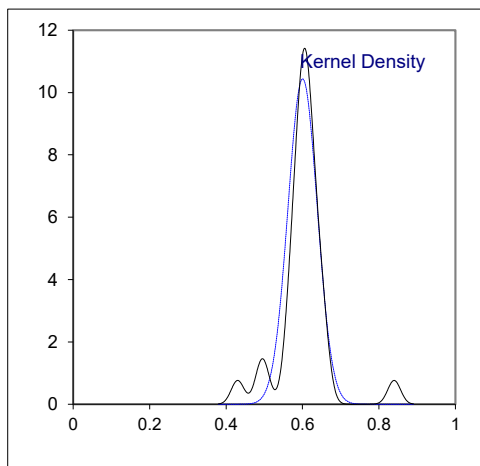
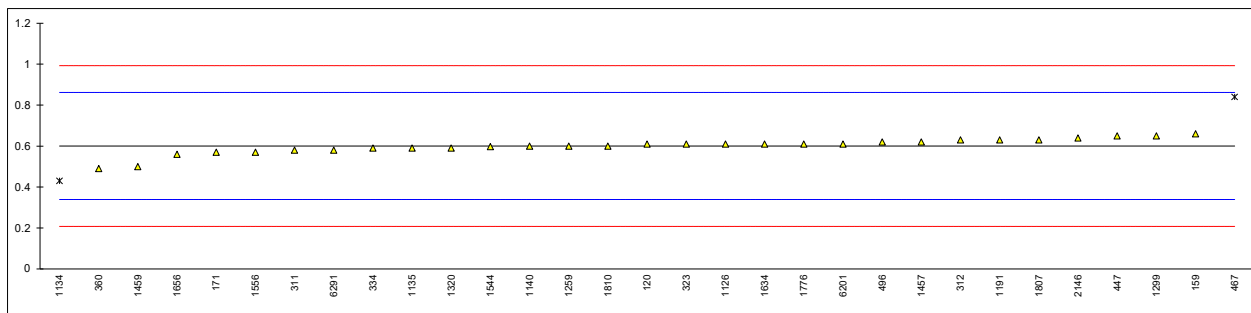
## Determination of Ethanol on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D5599	8.85		-1.40	
140	D5599	9.49		1.68	
150	D5599	9.72		2.79	
158	D4815	9.27		0.62	
159	D5599	9.11	C	-0.15	first reported 10.25
169		----		----	
171	D5599	9.45		1.49	
175	D5599	9.3		0.76	
311	ISO22854-A	8.91		-1.11	
312	ISO22854-A	8.96		-0.87	
323	ISO22854-A	9.21		0.33	
328		----		----	
333	ISO22854-A	8.97		-0.83	
334	ISO22854-A	9.02		-0.58	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	8.90		-1.16	
381	ISO22854-A	9.08		-0.30	
447	IP466	9.16		0.09	
467	EN13132	9.27		0.62	
496	ISO22854-A	8.89		-1.21	
511		----		----	
631	D5845	9.22	C	0.38	first reported 9.88
1033		----		----	
1126	ISO22854-A	9.15		0.04	
1134	ISO22854-A	9.15		0.04	
1135	ISO22854-A	9.24		0.48	
1140	D6839	9.30	C	0.76	first reported 3.28
1191		9.23		0.43	
1205		9.347		0.99	
1259		9.5		1.73	
1299	ISO22854-A	8.52		-2.99	
1320	ISO22854-A	9.11		-0.15	
1443	ISO22854-A	9.08		-0.30	
1457	ISO22854-A	9.19		0.23	
1459	D8071	8.9		-1.16	
1544	ISO22854-A	9.378		1.14	
1556	ISO22854-A	8.96		-0.87	
1634	ISO22854-A	9.10		-0.20	
1656	ISO22854-B	8.9		-1.16	
1706	ISO22854-A	9.14		-0.01	
1776	ISO22854-A	9.79		3.13	
1807	ISO22854-A	9.05		-0.44	
1810	ISO22854-A	9.26		0.57	
2146	ISO22854-A	9.05		-0.44	
6142		----		----	
6201	ISO22854-A	8.97		-0.83	
6291	ISO22854-A	8.7		-2.13	
6370	D5845	9.2		0.28	
6371	D5845	9.08		-0.30	
	normality	suspect			
	n	43			
	outliers	0			
	mean (n)	9.14			
	st.dev. (n)	0.242			
	R(calc.)	0.68			
	st.dev.(ISO22854:21)	0.207			
	R(ISO22854:21)	0.58			



## Determination of MTBE on sample #21080; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D5599	0.61	C	0.07	first reported 0.00
140		----		----	
150		----		----	
158		----		----	
159	D5599	0.66	C	0.46	first reported 0.0
169		----		----	
171	D5599	0.57		-0.23	
175		----		----	
311	ISO22854-A	0.58		-0.15	
312	ISO22854-A	0.63		0.23	
323	ISO22854-A	0.61		0.07	
328		----		----	
333	ISO22854-A	<0.80		----	
334	ISO22854-A	0.59		-0.08	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	0.49		-0.84	
381	ISO22854-A	<0.8		----	
447	IP466	0.65		0.38	
467	EN13132	0.84	R(0.01)	1.83	
496	ISO22854-A	0.62		0.15	
511		----		----	
631		----		----	
1033		----		----	
1126	ISO22854-A	0.61		0.07	
1134	ISO22854-A	0.43	C,R(0.01)	-1.30	first reported <0.01
1135	ISO22854-A	0.59		-0.08	
1140	D6839	0.60	C	0.00	first reported 4.77
1191		0.63		0.23	
1205		----		----	
1259		0.6		0.00	
1299	ISO22854-A	0.65		0.38	
1320	ISO22854-A	0.59		-0.08	
1443	ISO22854-A	<0,8		----	
1457	ISO22854-A	0.62		0.15	
1459	D8071	0.5		-0.77	
1544	ISO22854-A	0.597		-0.02	
1556	ISO22854-A	0.57		-0.23	
1634	ISO22854-A	0.61		0.07	
1656	ISO22854-B	0.56		-0.31	
1706		----		----	
1776	ISO22854-A	0.61	C	0.07	first reported <0.20
1807	ISO22854-A	0.63		0.23	
1810	ISO22854-A	0.60		0.00	
2146	ISO22854-A	0.64		0.30	
6142		----		----	
6201	ISO22854-A	0.61		0.07	
6291	ISO22854-A	0.58		-0.15	
6370		----		----	
6371		----		----	
	normality	not OK			
	n	29			
	outliers	2			
	mean (n)	0.60			
	st.dev. (n)	0.038			
	R(calc.)	0.11			
	st.dev.(ISO22854:21)	0.131			
	R(ISO22854:21)	0.37			



Determination of Ethers (C5 only, C5 or more C atoms and C6 or more C atoms) on sample #21080; results in %V/V

lab	method	C5	mark	z(targ)	C5 or more	mark	z(targ)	C6 or more	mark	z(targ)
62		----		----			----			----
120		----		----			----			----
140		----		----			----			----
150		----		----			----			----
158		----		----			----			----
159		----		----			----			----
169		----		----			----			----
171		----		----			----			----
175		----		----			----			----
311	ISO22854-A	0.58		-0.11	0.60		-0.07	0.02		----
312	ISO22854-A	0.63		0.27	0.63		0.16	<0.10		----
323	ISO22854-A	0.59		-0.04	0.59		-0.15	<0.10		----
328		----		----			----			----
333		----		----			----			----
334	ISO22854-A	0.59		-0.04	0.59		-0.15	<0.80		----
335		----		----			----			----
337		----		----			----			----
338		----		----			----			----
360	ISO22854-A	0.49		-0.80	0.49	G(0.01)	-0.91	< 0.80		----
381	ISO22854-A	<0.8		----	<0.8		----	<0.8		----
447	IP466	0.6		0.04	0.6		-0.07	----		----
467	EN13132	0.84	C,G(0.01)	1.87	0.84	C,G(0.01)	1.76	<0,2		----
496	ISO22854-A	0.62		0.19	0.62		0.08	<0,01		----
511		----		----			----			----
631		----		----			----			----
1033		----		----			----			----
1126	ISO22854-A	0.61		0.12	0.61	C	0.01	<0.1		----
1134	ISO22854-A	0.43	C,G(0.01)	-1.26	0.58		-0.22	0.58		----
1135	ISO22854-A	0.59		-0.04	0.60		-0.07	0.01		----
1140	D6839	0.60	C	0.04	0.60	C	-0.07	0.0		----
1191		----		----			----	0		----
1205		----		----			----	----		----
1259		----		----			----	----		----
1299		----		----	0.65		0.31	----		----
1320		----		----			----	----		----
1443		----		----	<0,8		----	----		----
1457	ISO22854-A	0.62		0.19	0.62		0.08	0		----
1459		----		----			----	----		----
1544	ISO22854-A	0.597		0.02	0.597		-0.09	0.00		----
1556	ISO22854-A	0.57		-0.19	0.57		-0.30	0		----
1634	ISO22854-A	0.61		0.12	0.61		0.01	< 0,01		----
1656		----		----			----	----		----
1706		----		----			----	----		----
1776	ISO22854-A	0.61	C	0.12	0.61	C	0.01	<0,20		----
1807		----		----			----	----		----
1810		----		----			----	----		----
2146		----		----	0.68		0.54	----		----
6142		----		----			----	----		----
6201	ISO22854-A	0.61		0.12	0.61		0.01	<0,01		----
6291		----		----			----	----		----
6370		----		----			----	----		----
6371		----		----			----	----		----
	normality	not OK			not OK			n.a.		
	n	16			18			19		
	outliers	2			2			0		
	mean (n)	0.59			0.61			<0.8		
	st.dev. (n)	0.032			0.025					
	R(calc.)	0.09			0.07					
	st.dev.(ISO22854:21)	0.131			0.131			application range:		
	R(ISO22854:21)	0.37			0.37			0.61 - 9.85 %V/V		

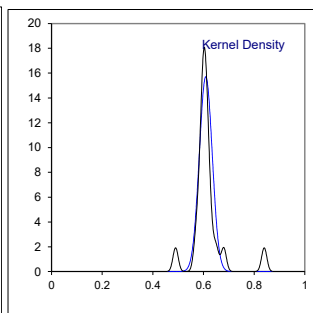
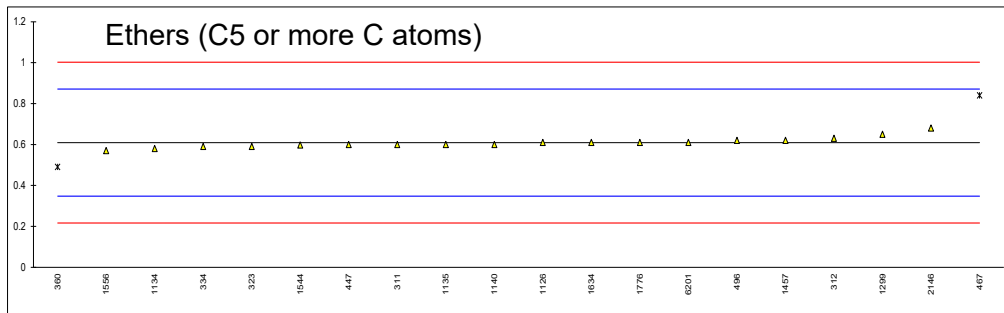
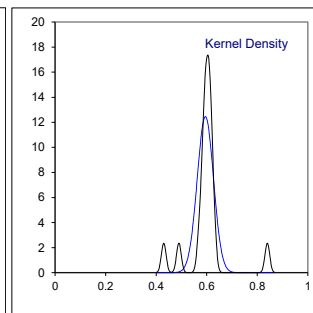
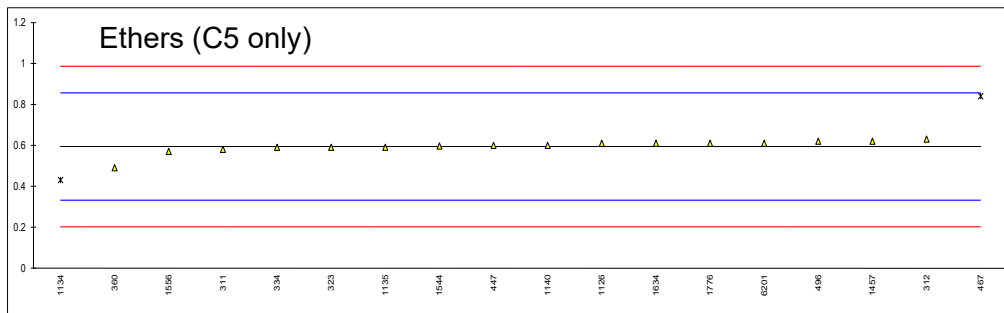
Lab 467 first reported <0.2 at C5 and at C5 or more

Lab 1126 first reported <0.1

Lab 1134 first reported <0.01

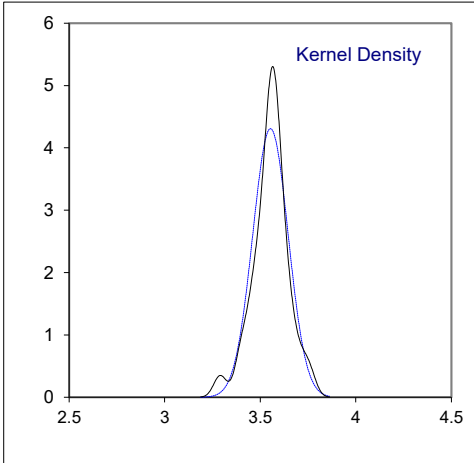
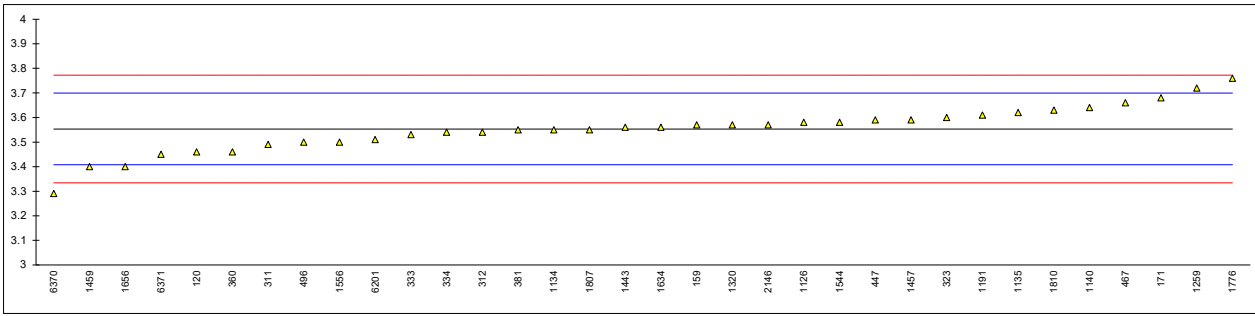
Lab 1140 first reported 0 at C5 and at C5 or more

Lab 1776 first reported <0.20 at C5 and at C5 or more



## Determination of Oxygen content on sample #21080; results in %M/M

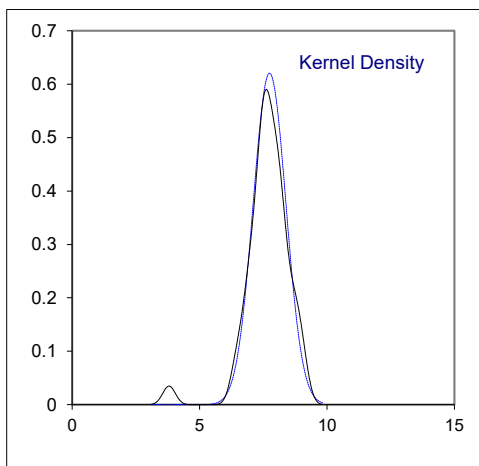
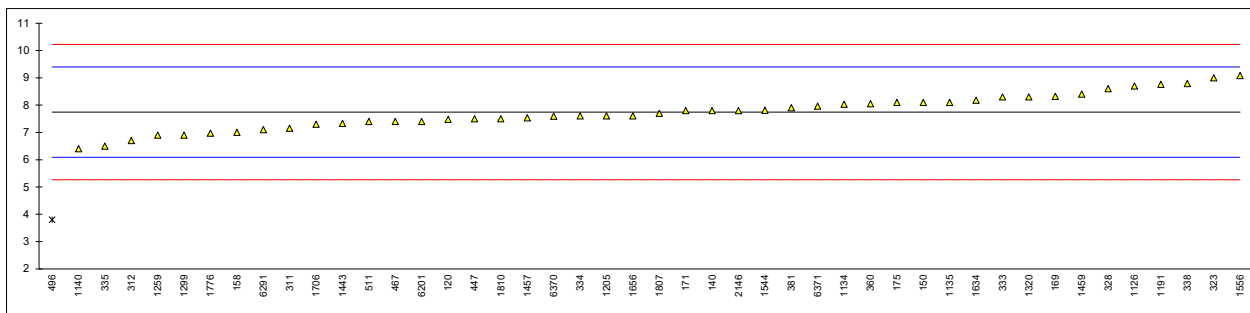
lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D5599	3.46	C	-1.28	first reported 3.35
140		----		----	
150		----		----	
158		----		----	
159	D5599	3.57	C	0.23	first reported 10.25
169		----		----	
171	D5599	3.68		1.73	
175		----		----	
311	ISO22854-A	3.49		-0.87	
312	ISO22854-A	3.54		-0.18	
323	ISO22854-A	3.6		0.64	
328		----		----	
333	ISO22854-A	3.53		-0.32	
334	ISO22854-A	3.54		-0.18	
335		----		----	
337		----		----	
338		----		----	
360	ISO22854-A	3.46		-1.28	
381	ISO22854-A	3.55		-0.04	
447	EN13132	3.59		0.50	
467	EN13132	3.66		1.46	
496	ISO22854-A	3.50		-0.73	
511		----		----	
631		----		----	
1033		----		----	
1126	ISO22854-A	3.58		0.37	
1134	ISO22854-A	3.55		-0.04	
1135	ISO22854-A	3.62		0.91	
1140		3.64	C	1.19	first reported 8.41
1191	ISO22854-A	3.61		0.78	
1205		----		----	
1259	EN13132	3.72		2.28	
1299		----		----	
1320	ISO22854-A	3.57		0.23	
1443	ISO22854-A	3.56		0.09	
1457	ISO22854-A	3.59		0.50	
1459	In house	3.4		-2.10	
1544	ISO22854-A	3.580		0.37	
1556	ISO22854-A	3.50		-0.73	
1634	ISO22854-A	3.56		0.09	
1656	ISO22854-B	3.4		-2.10	
1706		----		----	
1776	ISO22854-A	3.76		2.83	
1807	ISO22854-A	3.55		-0.04	
1810	ISO22854-A	3.63		1.05	
2146	ISO22854-A	3.57		0.23	
6142		----		----	
6201	ISO22854-A	3.51		-0.59	
6291		----		----	
6370	D5845	3.29		-3.60	
6371	D5845	3.45		-1.41	
	normality	suspect			
	n	34			
	outliers	0			
	mean (n)	3.553			
	st.dev. (n)	0.0926			
	R(calc.)	0.259			
	st.dev.(ISO22854:21)	0.0731			
	R(ISO22854:21)	0.205			





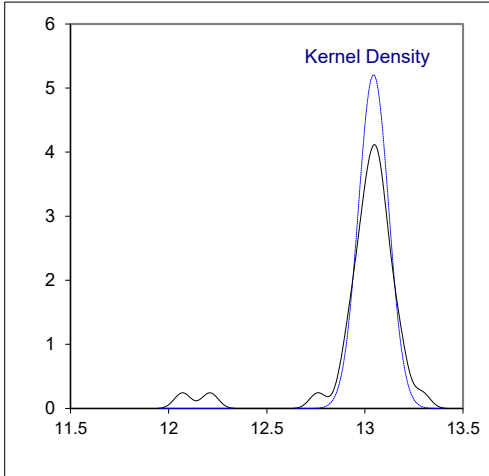
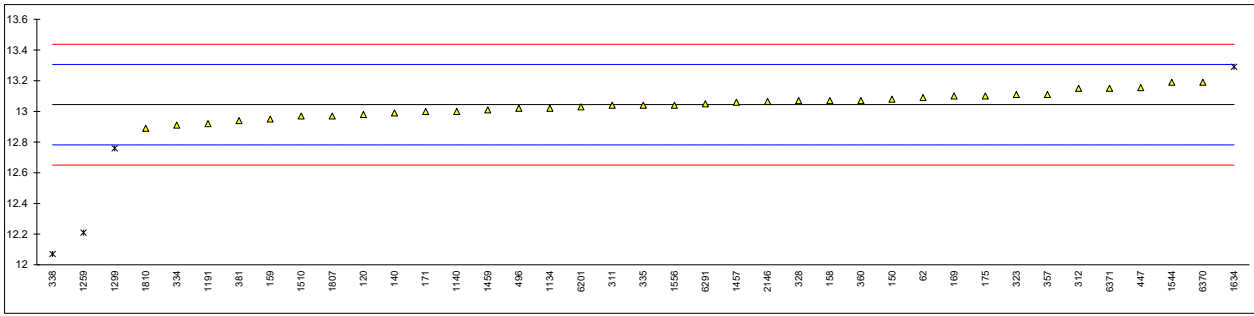
## Determination of Sulfur on sample #21080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D2622	7.475		-0.32	
140	D2622	7.8		0.07	
150	D5453	8.1		0.43	
158	D2622	7.0		-0.90	
159		----		----	
169	D5453	8.32		0.70	
171	D5453	7.8		0.07	
175	D5453	8.1		0.43	
311	ISO20846	7.15		-0.72	
312	ISO20846	6.7		-1.26	
323	ISO20846	9.0		1.52	
328	ISO20846	8.6		1.04	
333	ISO20846	8.3		0.67	
334	ISO20846	7.6		-0.17	
335	ISO20846	6.5		-1.50	
337		----		----	
338	ISO20846	8.79		1.27	
360	D5453	8.05		0.37	
381	ISO20846	7.9		0.19	
447	IP490	7.499		-0.29	
467	ISO20846	7.40		-0.41	
496	ISO20846	3.8	R(0.01)	-4.77	
511	D5453	7.40		-0.41	
631		----		----	
1033		----		----	
1126	ISO20846	8.7		1.16	
1134	IP490	8.03		0.35	
1135	ISO20846	8.1		0.43	
1140	D5453	6.4		-1.62	
1191	ISO20846	8.76		1.23	
1205	ISO20846	7.60		-0.17	
1259	ISO20846	6.9		-1.02	
1299	ISO20884	6.9		-1.02	
1320	ISO20846	8.30		0.67	
1443	ISO20884	7.33		-0.50	
1457	ISO20846	7.53		-0.26	
1459	ISO20884	8.4		0.80	
1544	ISO20884	7.81		0.08	
1556	ISO20846	9.08		1.62	
1634	ISO20846	8.18		0.53	
1656	ISO20846	7.6		-0.17	
1706	ISO20884	7.3		-0.54	
1776	ISO20846	6.97		-0.93	
1807	ISO20846	7.7		-0.05	
1810	ISO20846	7.5		-0.29	
2146	ISO20846	7.8		0.07	
6142		----		----	
6201	D5453	7.40		-0.41	
6291	D5453	7.1		-0.78	
6370	ISO20884	7.59		-0.18	
6371	ISO20884	7.96		0.26	
	normality	OK			
	n	45			
	outliers	1			
	mean (n)	7.743			
	st.dev. (n)	0.6429			
	R(calc.)	1.800			
	st.dev.(ISO20846:19)	0.8265			
	R(ISO20846:19)	2.314			



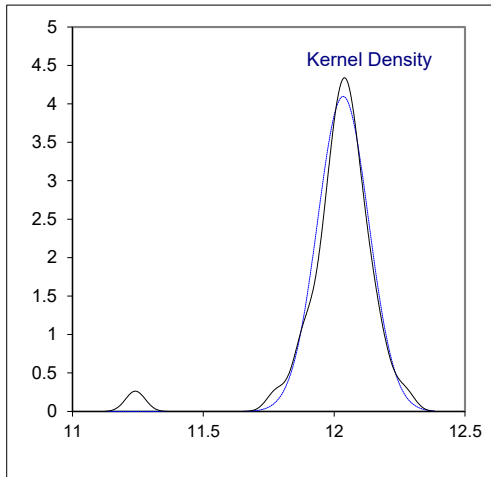
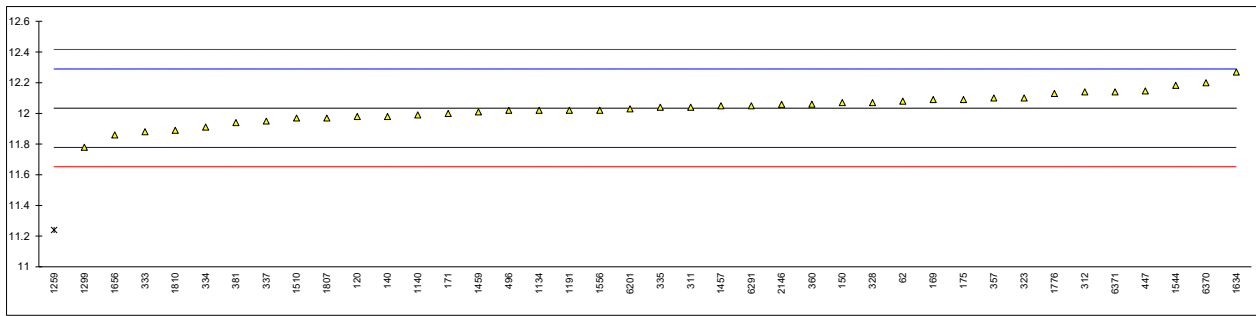
## Determination of Total Vapor Pressure on sample #21081; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	13.09		0.35	
120	D5191	12.98		-0.49	
140	D5191	12.99		-0.41	
150	D5191	13.08		0.28	
158	D5191	13.07		0.20	
159	D5191	12.95		-0.71	
169	D5191	13.10		0.43	
171	D5191	13.00		-0.33	
175	D5191	13.10		0.43	
311	D5191	13.04		-0.03	
312	D5191	13.15		0.81	
323	D5191	13.11		0.51	
328	D5191	13.07		0.20	
333		----		----	
334	D5191	12.91		-1.02	
335	D5191	13.04		-0.03	
337		----		----	
338	EN13016-1	12.07	R(0.01)	-7.42	
357	D5191	13.11		0.51	
360	D5191	13.07		0.20	
381	EN13016-1	12.94		-0.79	
447	D5191	13.15492		0.85	
496	D5191	13.02		-0.18	
631		----		----	
1033		----		----	
1134	EN13016-1	13.02		-0.18	
1140	D5191	13.00		-0.33	
1191	EN13016-1	12.92		-0.94	
1259	D5191	12.21	C,R(0.01)	-6.35	first reported 83.0 kPa
1299	D5191	12.76	R(0.05)	-2.16	
1457	D5191	13.06		0.12	
1459	EN13016-1	13.01		-0.26	
1510	D5191	12.97		-0.56	
1544	EN13016-1	13.190		1.11	
1556	EN13016-1	13.04		-0.03	
1634	EN13016-1	13.29	C,R(0.05)	1.88	first reported 84.6 kPa
1656		----		----	
1776		----		----	
1807	EN13016-1	12.97		-0.56	
1810	EN13016-1	12.89		-1.17	
2146	EN13016-1	13.065	C	0.16	first reported 12.063
6142		----		----	
6201	D5191	13.03		-0.10	
6291	D5191	13.05		0.05	
6370	EN13016-1	13.19		1.11	
6371	EN13016-1	13.15		0.81	
	normality	OK			
	n	35			
	outliers	4			
	mean (n)	13.044			
	st.dev. (n)	0.0766			
	R(calc.)	0.215			
	st.dev.(D5191:20)	0.1313			
	R(D5191:20)	0.368			
Compare					
	R(EN13016-1:18)	0.229			



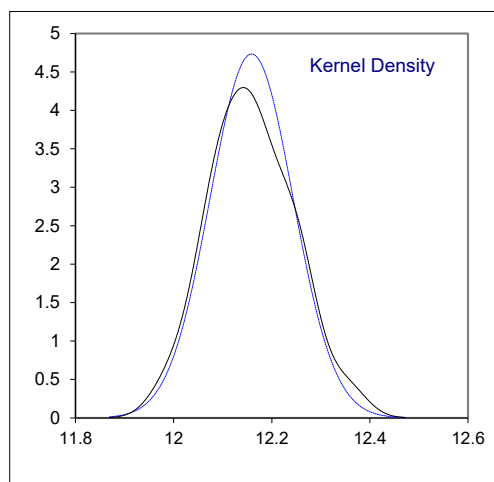
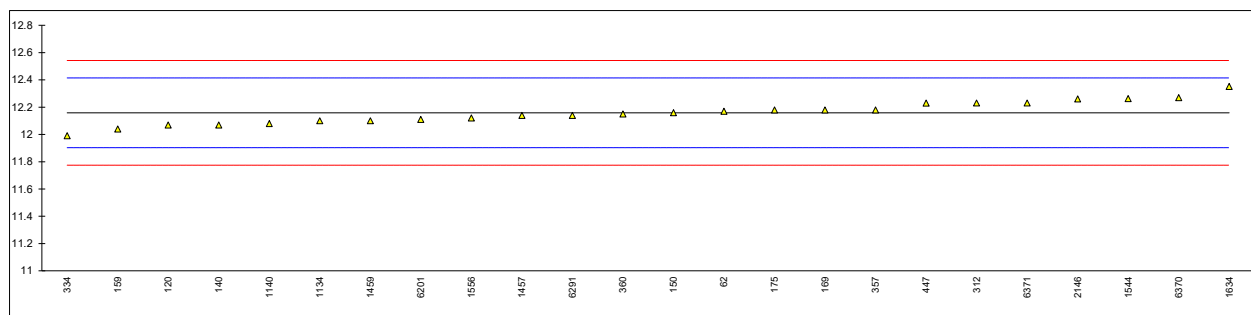
## Determination of DVPE acc. to ASTM D5191 on sample #21081; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.08		0.36	
120	D5191	11.98		-0.42	
140	D5191	11.98		-0.42	
150	D5191	12.07		0.28	
158		----		----	
159		----		----	
169	D5191	12.09		0.44	
171	D5191	12.00		-0.27	
175	D5191	12.09		0.44	
311	D5191	12.04		0.05	
312	D5191	12.14		0.83	
323	D5191	12.10		0.52	
328	D5191	12.07		0.28	
333	EN13016-1	11.88		-1.21	
334	D5191	11.91		-0.97	
335	D5191	12.04		0.05	
337	EN13016-1	11.95	C	-0.66	first reported 59.0 kPa
338		----		----	
357	D5191	12.10		0.52	
360	D5191	12.06		0.20	
381	EN13016-1	11.94		-0.74	
447	D5191	12.1464978		0.88	
496	D5191	12.02		-0.11	
631		----		----	
1033		----		----	
1134	EN13016-1	12.02		-0.11	
1140	D5191	11.99		-0.35	
1191	EN13016-1	12.02		-0.11	
1259	D5191	11.24	C,R(0.01)	-6.22	first reported 76.3 kPa
1299	D5191	11.78		-1.99	
1457	D5191	12.05		0.12	
1459	EN13016-1	12.01		-0.19	
1510	D5191	11.97		-0.50	
1544	EN13016-1	12.183		1.17	
1556	EN13016-1	12.02		-0.11	
1634	EN13016-1	12.27		1.85	
1656	EN13016-1	11.86		-1.36	
1776	EN13016-1	12.13		0.75	
1807	EN13016-1	11.97		-0.50	
1810	EN13016-1	11.89		-1.13	
2146	EN13016-1	12.059	C	0.20	first reported 11.093
6142		----		----	
6201	D5191	12.03		-0.03	
6291	D5191	12.05		0.12	
6370	EN13016-1	12.20		1.30	
6371	EN13016-1	12.14		0.83	
	normality	OK			
	n	39			
	outliers	1			
	mean (n)	12.034			
	st.dev. (n)	0.0974			
	R(calc.)	0.273			
	st.dev.(D5191:20)	0.1276			
	R(D5191:20)	0.357			
Compare	R(EN13016-1:18)	0.229			



## Determination of DVPE acc. to EPA on sample #21081; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.17		0.09	
120	D5191	12.07		-0.69	
140	D5191	12.07		-0.69	
150	D5191	12.16		0.01	
158		----		----	
159	D5191	12.04		-0.93	
169	D5191	12.18		0.16	
171		----		----	
175	D5191	12.18		0.16	
311		----		----	
312	D5191	12.23		0.56	
323		----		----	
328		----		----	
333		----		----	
334	D5191	11.99		-1.32	
335		----		----	
337		----		----	
338		----		----	
357	D5191	12.18		0.16	
360	D5191	12.15		-0.07	
381		----		----	
447	D5191	12.22910352		0.55	
496		----		----	
631		----		----	
1033		----		----	
1134	EN13016-1	12.10		-0.46	
1140	D5191	12.08		-0.62	
1191		----		----	
1259		----		----	
1299		----		----	
1457	D5191	12.14		-0.15	
1459	EN13016-1	12.10		-0.46	
1510		----		----	
1544	EN13016-1	12.263		0.81	
1556	EN13016-1	12.12		-0.30	
1634	EN13016-1	12.352		1.51	
1656		----		----	
1776		----		----	
1807		----		----	
1810		----		----	
2146	EN13016-1	12.260	C	0.79	first reported 11.294
6142		----		----	
6201	D5191	12.11		-0.38	
6291	D5191	12.14		-0.15	
6370	EN13016-1	12.27		0.87	
6371	EN13016-1	12.23		0.56	
	normality	OK			
	n	24			
	outliers	0			
	mean (n)	12.159			
	st.dev. (n)	0.0843			
	R(calc.)	0.236			
	st.dev.(D5191:20)	0.1280			
	R(D5191:20)	0.359			
Compare	R(EN13016-1:18)	0.229			

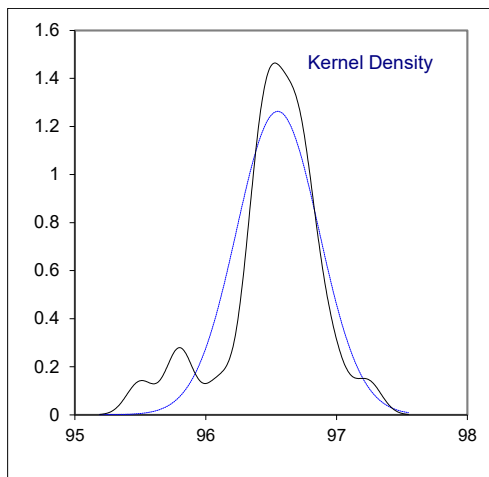
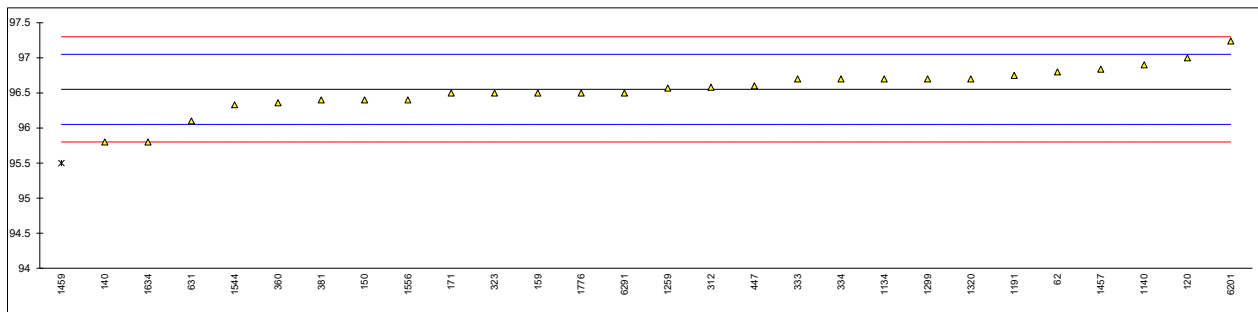




Determination of RON on sample #21082

lab	method	value	mark	z(targ)	remarks
62	D2699	96.8		1.00	
120	D2699	97.0		1.80	
140	D2699	95.8		-3.00	
150	D2699	96.4		-0.60	
159	D2699	96.5		-0.20	
169		-----		-----	
171	D2699	96.5		-0.20	
312	D2699	96.58		0.12	
323	D2699	96.5		-0.20	
333	D2699	96.7		0.60	
334	D2699	96.7		0.60	
360	D2699	96.36		-0.76	
381	D2699	96.4		-0.60	
447	D2699	96.6		0.20	
511		-----		-----	
631	D2699	96.10		-1.80	
1134	IP237	96.7		0.60	
1140	D2699	96.9		1.40	
1191	ISO5164	96.75		0.80	
1259	D2699	96.57		0.08	
1299	D2699	96.7		0.60	
1320	ISO5164	96.7		0.60	
1457	D2699	96.84		1.16	
1459	In house	95.5	R(0.05)	-4.20	
1544	ISO5164	96.33	C	-0.88	first reported 95.33
1556	ISO5164	96.4		-0.60	
1634		95.8		-3.00	
1776	ISO5164	96.5		-0.20	
6142		-----		-----	
6201	D2699	97.24	C	2.76	first reported 98.00
6291	D2699	96.5		-0.20	

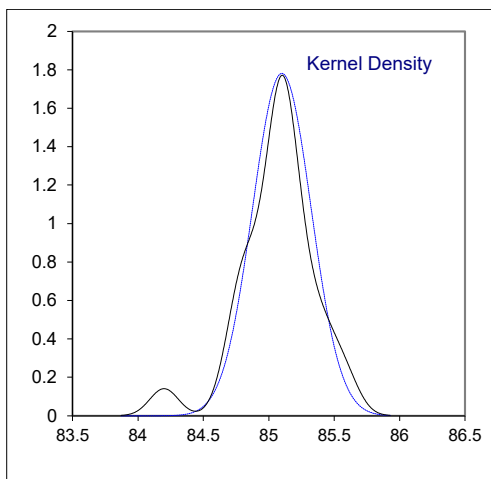
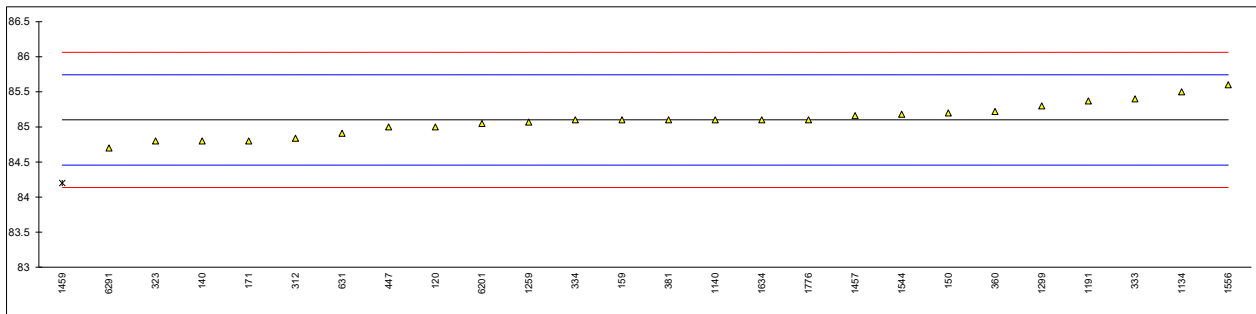
normality suspect  
n 27  
outliers 1  
mean (n) 96.55  
st.dev. (n) 0.316  
R(calc.) 0.88  
st.dev.(D2699:19e1) 0.250  
R(D2699:19e1) 0.7



Determination of MON on sample #21082

lab	method	value	mark	z(targ)	remarks
62		----		----	
120	D2700	85.0		-0.31	
140	D2700	84.8		-0.93	
150	D2700	85.2		0.31	
159	D2700	85.1		0.00	
169		----		----	
171	D2700	84.8		-0.93	
312	D2700	84.84		-0.81	
323	D2700	84.8		-0.93	
333	D2700	85.4		0.93	
334	D2700	85.1		0.00	
360	D2700	85.22		0.37	
381	D2700	85.1		0.00	
447	D2700	85.0		-0.31	
511		----		----	
631	D2700	84.91		-0.59	
1134	IP236	85.5		1.24	
1140	D2700	85.1	C	0.00	first reported 86.1
1191	ISO5163	85.37		0.84	
1259	D2700	85.07		-0.09	
1299	D2700	85.3		0.62	
1320		----		----	
1457	D2700	85.16		0.19	
1459	In house	84.2	R(0.05)	-2.80	
1544	ISO5163	85.18		0.25	
1556	ISO5163	85.6		1.56	
1634		85.1		0.00	
1776	ISO5163	85.1		0.00	
6142		----		----	
6201	D2700	85.05		-0.16	
6291	D2700	84.7		-1.24	

normality OK  
n 25  
outliers 1  
mean (n) 85.10  
st.dev. (n) 0.224  
R(calc.) 0.63  
st.dev.(D2700:19e1) 0.321  
R(D2700:19e1) 0.9



**APPENDIX 2** Determination of other Oxygenates on sample #21080; results in %V/V

lab	DIPE	ETBE	i-BuOH	IPA	MeOH	TAME	t-BuOH	Other Oxygenates
62	----	----	----	----	----	----	----	----
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	----
140	----	----	----	----	----	----	----	----
150	----	----	----	----	----	----	----	----
158	----	----	----	----	----	----	----	----
159	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----
169	----	----	----	----	----	----	----	----
171	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	----
175	----	----	----	----	----	----	----	----
311	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
312	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
323	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
328	----	----	----	----	----	----	----	----
333	----	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	----
334	<0,80	<0,80	<0,80	<0,80	<0,80	<0,80	<0,80	<0,10
335	----	----	----	----	----	----	----	----
337	----	----	----	----	----	----	----	----
338	----	----	----	----	----	----	----	----
360	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
381	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
447	----	----	----	----	----	----	----	----
467	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
496	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01
511	----	----	----	----	----	----	----	----
631	0	0	----	----	0	----	----	----
1033	----	----	----	----	----	----	----	----
1126	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1134	0.46	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	<0.01
1135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1140	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00 C
1191	----	0.01	0	0	0	0	0	----
1205	----	----	----	----	----	----	----	----
1259	----	----	----	----	----	----	----	----
1299	<0.8	<0.8	<0.8	<0.8	<0.01	<0.8	<0.01	<0.8
1320	----	----	----	----	----	----	----	----
1443	<0,8	<0,8	<0,8	<0,8	<0,8	<0,8	<0,8	----
1457	0	0	0	0	0	0	0	0
1459	----	0.0	----	----	----	----	----	----
1544	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1556	0	0	0	0	0	0	0	0
1634	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01
1656	----	<0.1	----	----	<0.1	<0.1	<0.1	<0.1
1706	----	0.00	----	----	----	----	----	----
1776	----	<0,20	----	----	----	----	----	0.37
1807	----	----	----	----	----	----	----	----
1810	----	----	----	----	----	----	----	----
2146	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
6142	----	----	----	----	----	----	----	----
6201	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01
6291	----	----	----	----	----	----	----	----
6370	----	----	----	----	----	----	----	----
6371	----	----	----	----	----	----	----	----

Lab 1140 first reported 7.95 at Other Oxygenates

## APPENDIX 3 z-scores of Distillation at 760 mmHg

lab	IBP	10%eva	50%eva	90%eva	FBP	%evap.70°C	%evap.100°C	%evap.150°C
62	----	----	----	----	----	----	----	----
120	0.25	0.94	0.59	0.44	0.19	----	----	----
140	-0.05	-0.45	-1.15	0.10	-0.32	----	----	----
150	-0.94	-0.61	-1.58	-0.29	-0.12	----	----	----
158	----	----	----	----	----	----	----	----
159	-2.32	-0.07	-0.35	0.25	1.22	----	----	----
169	1.97	0.48	0.80	-0.83	0.19	-1.75	11.82	0.29
171	0.90	0.79	0.88	-0.19	0.31	-0.23	-0.67	0.29
175	-0.17	-0.76	-0.79	-0.04	0.15	----	----	----
311	0.31	-0.53	-1.00	-0.09	0.07	0.87	0.44	0.03
312	-1.06	-0.22	-0.72	-0.14	-0.44	0.87	-0.67	0.56
323	0.72	-0.61	-0.57	-0.04	-0.36	0.46	-0.04	-0.23
328	-0.53	-0.30	0.59	0.44	-0.91	-0.37	0.28	-1.80
333	-0.23	0.32	0.59	-0.09	0.43	----	----	----
334	0.54	0.09	0.01	-0.09	-0.60	0.32	-0.20	0.03
335	1.97	1.33	0.44	0.15	-0.40	0.46	0.12	-0.23
337	----	----	----	----	----	----	----	----
338	1.14	-1.30	0.01	0.10	1.02	0.46	-1.62	-0.49
360	0.07	0.24	0.23	0.10	-1.03	-0.23	-0.67	-0.23
381	0.25	1.02	2.69	1.27	-2.10	0.04	-0.04	3.43
447	-0.77	-0.07	0.08	-0.04	0.15	0.18	-0.20	-0.23
467	2.57	-0.30	-0.21	0.00	0.66	-0.51	-0.04	0.03
496	0.60	-0.45	-0.72	-0.14	-0.01	-2.71	-3.52	-6.25
511	----	----	----	----	----	----	----	----
631	0.19	-0.14	1.82	-0.14	-0.12	-2.02	0.91	-1.28
1033	----	----	----	----	----	----	----	----
1126	0.54	0.17	-0.06	0.25	1.97	0.04	-1.62	-0.49
1134	-0.29	0.94	0.52	1.52	0.98	0.04	-0.67	-0.23
1135	-0.53	-0.30	-0.14	0.15	-0.48	0.73	-0.20	-0.49
1140	0.43	1.33	0.88	-0.39	-0.24	-0.64	0.44	0.82
1191	-0.23	-0.45	-1.37	-0.24	0.15	1.42	0.44	0.29
1205	-0.05	0.17	-0.14	0.20	1.02	0.04	-0.99	-0.49
1259	-1.96	0.48	0.95	-0.48	0.78	-1.06	0.12	1.60
1299	-0.41	-0.45	-0.64	-0.48	0.47	0.32	0.44	1.34
1320	----	----	----	----	----	----	----	----
1443	1.00	0.35	0.60	2.39	-0.44	-2.78	-1.62	-1.28
1457	-2.20	-1.85	-0.06	-0.14	-0.68	0.18	-0.67	0.56
1459	-0.17	-0.45	-1.58	-0.19	-0.83	1.70	-0.04	0.29
1544	-0.65	0.28	0.26	0.25	-0.30	-0.58	-0.43	-2.58
1556	-1.96	-0.37	-0.93	0.10	0.03	1.29	-0.51	0.03
1634	0.07	0.40	2.04	0.64	0.74	-5.47	1.07	-0.23
1656	0.43	-0.92	-1.58	-0.24	-1.07	1.70	0.75	0.29
1706	-0.53	0.24	-0.64	-0.24	-0.16	0.73	-0.28	0.43
1776	0.01	-0.07	-0.06	-0.39	-0.08	0.18	0.59	0.29
1807	-0.41	-0.84	-0.64	-0.44	-0.72	0.60	0.91	0.82
1810	0.37	1.41	0.23	-0.14	-0.52	-0.09	0.59	0.29
2146	-0.23	0.17	0.08	-0.24	0.07	0.04	-0.20	0.29
6142	----	----	----	----	----	----	----	----
6201	-0.59	0.01	-0.14	-0.04	-0.56	0.32	-0.20	0.03
6291	-1.00	-0.92	-1.51	-0.19	-0.40	1.56	0.12	-0.23
6370	1.26	0.79	0.80	7.87	0.90	-2.99	2.33	-0.75
6371	1.68	0.48	1.53	8.26	1.37	-1.33	2.02	0.03

## **APPENDIX 4**

### **Number of participants per country**

1 lab in AUSTRIA  
3 labs in BELGIUM  
3 labs in BULGARIA  
1 lab in CANADA  
1 lab in CROATIA  
1 lab in CZECH REPUBLIC  
3 labs in FINLAND  
7 labs in FRANCE  
1 lab in GERMANY  
1 lab in IRELAND  
6 labs in NETHERLANDS  
1 lab in PERU  
1 lab in PHILIPPINES  
1 lab in PORTUGAL  
2 labs in ROMANIA  
1 lab in SERBIA  
1 lab in SLOVAKIA  
2 labs in SPAIN  
3 labs in SWEDEN  
6 labs in UNITED KINGDOM  
8 labs in UNITED STATES OF AMERICA

## APPENDIX 5

### 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
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

### Literature

- 1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
- 2 ISO5725:86
- 3 ISO5725 parts 1-6:94
- 4 ISO13528:05
- 5 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
- 6 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
- 7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
- 8 J.N. Miller, Analyst, 118, 455, (1993)
- 9 Analytical Methods Committee, Technical Brief, No 4, January 2001
- 10 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
- 11 W. Horwitz and R. Albert, J. AOAC Int, 79.3, 589-621, (1996)
- 12 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)