**Institute for
Interlaboratory Studies**

Results of Proficiency Test
Biogasoline E10
June 2023

CONTENTS

1 INTRODUCTION

Since 2009 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Biogasoline E10 based on the latest version of EN228 and ASTM D4814 every year. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of Biogasoline E10.

In this interlaboratory study registered for participation:
- 46 participants in 20 countries for the regular analyzes in Biogasoline E10 iis23B04
- 36 participants in 16 countries for the TVP/DVPE analyzes in E10 iis23B04DVPE
- 27 participants in 15 countries for the RON/MON analyzes in E10 iis23B04RON

In total 47 laboratories in 20 countries registered for participation in one or more proficiency tests, 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.

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.
In this proficiency test the participants received, depending on the registration, from one up to three different samples of Biogasoline E10, see table below.

Sample ID	PT ID	Quantity	Purpose
#23090	iis23B04	1x 1 L	Regular analyzes
#23091	iis23B04DVPE	1x 1 L 75% filled	TVP/DVPE
#23092	iis23B04RON	2x 1 L	RON/MON

Table 1: Biogasoline E10 samples used in PT iis23B04

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, 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 300 liters of Biogasoline E10 was obtained from a local petrol supplier. After homogenization 160 amber glass bottles of 1 L were filled. For the regular round 70 bottles were labelled #23090 and for the RON/MON round 90 bottles were labelled #23092.
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^3
sample 1	748.20
sample 2	748.23
sample 3	748.24
sample 4	748.24
sample 5	748.15
sample 6	748.25
sample 7	748.19
sample 8	748.24

Table 2: homogeneity test results of subsamples #23090 and #23092

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^3
r (observed)	0.10
reference test method	ISO12185:96
0.3 x R (reference test method)	0.45

Table 3: evaluation of the repeatability of subsamples #23090 and #23092

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 preparation of the sample for the analyzes of TVP/DVPE in Biogasoline E10 the remaining part of the batch for the samples for the regular round was used. After homogenization 65 amber bottles of 1 L were 75% filled and labelled #23091.
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 #23091-1	13.04
sample #23091-2	13.02
sample #23091-3	13.04
sample #23091-4	13.07
sample #23091-5	13.04
sample #23091-6	13.05
sample #23091-7	13.02
sample #23091-8	13.05

Table 4: homogeneity test results of subsamples #23091

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)	0.05
reference test method	D5191:22
0.3 x R (reference test method)	0.11

Table 5: evaluation of the repeatability of subsamples #23091

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 participants the appropriate set of PT samples was sent on May 24, 2023. 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 #23090: API Gravity, Appearance, Aromatics (by FIA and GC), Benzene, Copper Corrosion 3 hrs at 50 °C, Density at 15 °C, Distillation at 760 mmHg (IBP, 10%, 50% and 90% recovered, FBP, % evaporated at 70 °C, 100 °C and 150 °C), Doctor test, Gum (solvent washed), Lead as Pb, Manganese as Mn, Mercaptan Sulfur as S, Olefins (by FIA and GC), Oxidation Stability, Oxygenates (DIPE, ETBE, Ethanol, Ethers (C5 only), Ethers (C5 or more C atoms), Ethers (C6 or more C atoms), Isobutanol, Isopropanol, Methanol, MTBE, TAME, tert. Butanol and other Oxygenates), Oxygen content and Sulfur.
On sample #23091 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 #23092 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/. 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 appendices 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 appendices 1 and 2. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

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

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

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

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

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

3.2 GRAPHICS

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

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

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements (derived from e.g. ISO or ASTM test methods), 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:

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

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

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

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples.
For the regular Biogasoline E10 round two participants reported test results after the final reporting date and three other participants did not report any test results.
For the TVP/DVPE analyzes in Biogasoline E10 one participant reported test results after the final reporting date and three other participants did not report any test results.
For the RON/MON analyzes in Biogasoline E10 one participant reported test results after the final reporting date and four other participants did not report any test results.
Not all participants were able to report all tests requested.

In total 45 participants reported 683 numerical test results. Observed were 32 outlying test results, which is 4.7%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1   EVALUATION PER 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 in appendix 1. 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. D525) and an added designation for the year that the test method was adopted or revised (e.g. D525:12a). When a method has been reapproved an "R" will be added and the year of approval (e.g. D525:12aR19).

sample #23090

API Gravity: 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 D4052:22.

Appearance: This determination was not problematic. All reporting participants agreed about the appearance as Pass (Clear and Bright).

Aromatics by FIA: This determination was problematic. No statistical outliers were observed. The calculated reproducibility 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-A:21.

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

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

Density at 15 °C: 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 ISO12185:96 and ASTM D4052:22.

Distillation at 760 mmHg: This determination may be problematic depending on the distillation parameter. Over eight distillation parameters twenty statistical outliers were observed and seven other test results were excluded. The calculated reproducibilities after rejection of the suspect data are in agreement with ASTM D86:23 automated mode for 10% evaporated, 90% evaporated, FBP and % evaporated at 150 °C. When evaluated against the manual mode requirements of ASTM D86:23 the calculated reproducibilities for IBP, 10% evaporated, 90% evaporated and FBP are in agreement.

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. Almost all reporting participants agreed on a test result of <0.5 mg/100 mL. Therefore, no z-scores are calculated.

Lead as Pb: This determination was not problematic. All reporting participants agreed on a test result near or below the application range of ASTM D3237:22. Therefore, no z-scores are calculated.

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

Mercaptan Sulfur as S: This determination was not problematic. Almost all reporting participants agreed on a test result near or below the application range of ASTM D3227:23. Therefore, no z-scores are calculated.

Olefins by FIA: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D1319:20a.

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

Oxidation Stability: This determination was not problematic. All reporting participants agreed on a test result >240 minutes.

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

The participants agreed on test result near or below the application range of ISO22854-A:21 for all other oxygenates listed in paragraph 2.6. Therefore, no z-scores are calculated for these oxygenates. 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-A:21.

Sulfur: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO20846:19.

sample #23091

TVP: This determination may be problematic depending on the test method used. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5191:22 but not with the 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 ASTM D5191 may be problematic depending on the test method used. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5191:22 but not with the requirements of EN13016-1:18.

DVPE (EPA calculation): The conversion of the measured Total Vapor Pressure (TVP) to the corresponding U.S. EPA guidelines (CFR 2021 title 40, vol. 19, part 80, §80.46) may be problematic depending on the test method used. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5191:22 but not with the requirements of EN13016-1:18.

sample #23092

RON: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D2699-A:23, ASTM D2699-C:23 and ISO5164:14.

MON: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D2700-A:23, ASTM D2700-C:23 and ISO5163:14.

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 * standard deviation) and the target reproducibility derived from reference methods are presented in the next tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
API Gravity		14	57.54	0.11	0.51
Appearance		20	Cl&Br	n.a.	n.a.
Aromatics by FIA	%V/V	12	35.1	6.7	3.7
Aromatics by GC	%V/V	22	32.3	1.2	1.6
Benzene	%V/V	26	0.79	0.06	0.03
Copper Corrosion 3 hrs at 50 °C		28	1 (1a/b)	n.a.	n.a.
Density at 15 °C	kg/m^3	36	748.4	0.7	1.5
Initial Boiling Point	°C	37	28.1	5.3	4.7
10% evaporated	°C	36	46.4	3.7	4.2
50% evaporated	°C	35	96.7	4.3	3.9
90% evaporated	°C	36	132.7	1.5	5.0
Final Boiling Point	°C	38	158.4	5.8	7.1
% evaporated at 70 °C	%V/V	32	37.9	3.8	2.2
% evaporated at 100 °C	%V/V	31	51.7	2.4	2.0
% evaporated at 150 °C	%V/V	29	97.7	1.0	1.0
Doctor test		18	Negative	n.a.	n.a.
Gum (solvent washed)	mg/100 mL	21	<0.5	n.e.	n.e.
Lead as Pb	mg/L	19	<2.5	n.e.	n.e.
Manganese as Mn	mg/L	17	<2	n.e.	n.e.
Mercaptan Sulfur as S	%M/M	12	<0.0003	n.e.	n.e.
Olefins by FIA	%V/V	12	11.7	6.5	3.6
Olefins by GC	%V/V	23	11.5	0.9	1.9
Oxidation Stability	minutes	20	>240	n.e.	n.e.
Ethanol	%V/V	31	9.5	0.7	0.4
Oxygen content	%M/M	29	3.5	0.3	0.2
Sulfur	mg/kg	29	2.1	1.3	1.3

Table 6: reproducibilities of tests on sample #23090

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Vapor Pressure	psi	25	13.94	0.29	0.38
DVPE acc.to ASTM D5191	psi	31	12.89	0.32	0.37
DVPE acc.to EPA	psi	15	12.98	0.26	0.37

Table 7: reproducibilities of tests on sample #23091

Parameter	unit	n	average	2.8 * sd	R(lit)
RON		23	96.4	0.6	0.7
MON		22	85.4	1.0	0.9

Table 8: reproducibilities of tests on sample #23092

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 2023 WITH PREVIOUS PTS

	June 2023	June 2022	June 2021	June 2020	May 2019
Number of reporting laboratories	45	48	52	54	50
Number of test results	683	831	940	960	918
Number of statistical outliers	32	43	40	53	31
Percentage of statistical outliers	4.7%	5.2%	4.3%	5.5%	3.4%

Table 9: 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 2023	June 2022	June 2021	June 2020	May 2019
API Gravity	++	++	++	++	+
Aromatics by FIA	-	-	-	+	+
Aromatics by GC	+	+/-	+	+/-	-
Benzene	-	-	-	+/-	-
Density at 15 °C	++	++	++	+	+
Distillation at 760 mmHg	+/-	+	+	+	+
Gum (solvent washed)	n.e.	+	++	+	+
Mercaptan Sulfur as S	n.e.	n.e.	n.e.	++	+/-
Olefins by FIA	-	-	+	+	+/-
Olefins by GC	++	+	+	++	++
Ethanol	-	-	-	+/-	+/-
Ethers	n.e.	++	++	++	+
MTBE	n.e.	(--)	++	++	-
Oxygen content	-	-	-	+	+/-
Sulfur	+/-	+/-	+	+	+
Total Vapor Pressure	+	+	+	+	+/-
DVPE acc.to ASTM D5191	+	++	+	+	+/-
DVPE acc.to EPA	+	+	+	+	+/-
RON	+/-	+/-	-	-	-
MON	-	+/-	+	+/-	-

Table 10: comparison of determinations to the reference test methods

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

APPENDIX 1

Determination of API Gravity on sample #23090;

lab	method	value	mark	z(targ)	remarks
62	D4052	57.5		-0.21	
120	D4052	57.54		0.01	
140	D4052	57.6		0.34	
150	D4052	57.6		0.34	
158		-----		-----	
159		-----		-----	
169	D4052	57.5		-0.21	
171	D4052	57.5		-0.21	
311	D4052	57.53		-0.04	
312	D4052	57.56		0.12	
323	D4052	57.49		-0.26	
328		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D4052	57.38	G(0.05)	-0.87	
447	D4052	57.5		-0.21	
467	ISO12185	57.54		0.01	
496	D4052	57.53		-0.04	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134	D4052	57.54		0.01	
1191		-----		-----	
1205		-----		-----	
1259		-----	W	-----	test result withdrawn, reported 56.09
1299		-----		-----	
1399		-----		-----	
1443		-----		-----	
1544		-----		-----	
1556		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168	D4052	57.6		0.34	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	

normality	OK
n	14
outliers	1
mean (n)	57.538
st.dev. (n)	0.0395
R(calc.)	0.110
st.dev.(D4052:22)	0.1818
R(D4052:22)	0.509
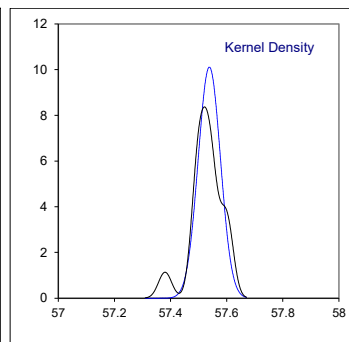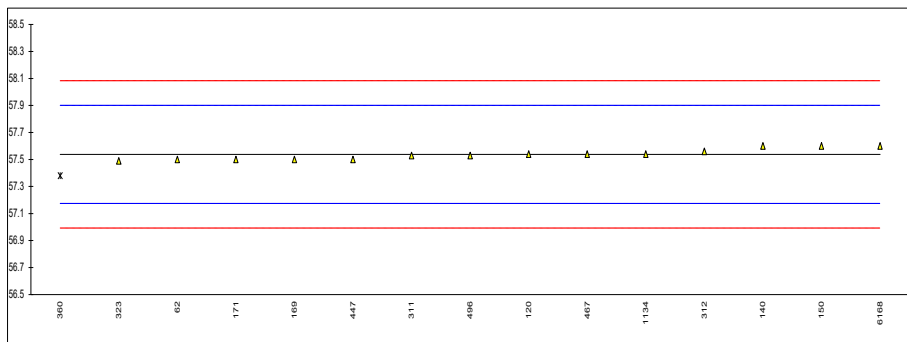
Determination of Appearance on sample #23090;

lab	method	value	mark	z(targ)	remarks
62	D4176	pass		-----	
120	D4176	C&B		-----	
140	D4176	C&B		-----	
150		-----		-----	
158	D4176	Pass		-----	
159		-----		-----	
169		-----		-----	
171	D4176	Clear and Bright		-----	
311	D4176	pass		-----	
312	D4176	br&cl		-----	
323	D4176	C&B		-----	
328	Visual	C&B		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	EN228	Clear and Bright		-----	
447	Visual	Clear & Bright		-----	
467	D4176	Pass		-----	
496	Visual	Clear & Bright		-----	
511		-----		-----	
631	D4176	Pass [Clear & bright]		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134	D4176	Clear & Bright		-----	
1191		-----		-----	
1205		-----		-----	
1259		-----		-----	
1299	Visual	CL&BR		-----	
1399	Visual	Clear and Bright		-----	
1443		-----		-----	
1544		clear& bright		-----	
1556	Visual	C&B		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168	D4176	CB		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	

	n	20
	mean (n)	Pass (Clear & Bright)

Determination of Aromatics by FIA (without oxygenates correction) on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	D1319	33.4		-1.26	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171		-----		-----	
311		-----		-----	
312		-----		-----	
323	D1319	36.7		1.24	
328		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	EN15553	35.3		0.18	
447	D1319	35.9		0.64	
467	D1319	34.48		-0.44	
496		-----		-----	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134	D1319	34.95		-0.08	
1191		-----		-----	
1205	D1319	31.3387		-2.82	
1259		-----		-----	
1299	D1319	37.8		2.07	
1399	D1319	30.35		-3.56	
1443		-----		-----	
1544	D1319	35.33		0.21	
1556		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370	In house	37.2		1.62	
6371	In house	37.96		2.20	
6404		-----		-----	

normality	OK	
n	12	
outliers	0	
mean (n)	35.059	
st.dev. (n)	2.3962	
R(calc.)	6.709	
st.dev.(D1319:20a)	1.3214	
R(D1319:20a)	3.7	
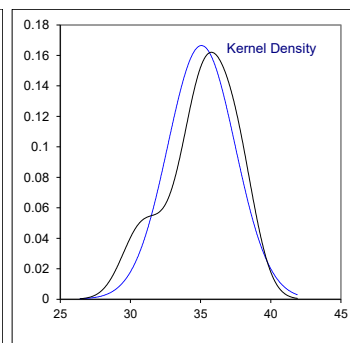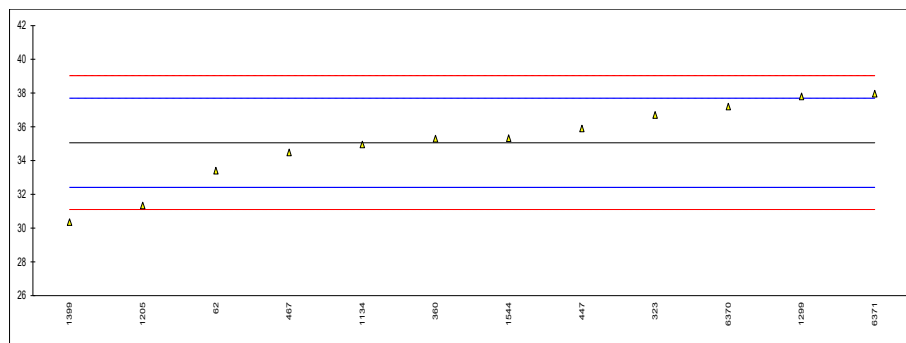
Determination of Aromatics by GC on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	CGSB 3.0 No14.3	31.8		-0.96	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	ISO22854-A	32.4		0.09	
311	ISO22854-A	32.6		0.44	
312	ISO22854-A	31.27		-1.89	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	ISO22854-A	31.43		-1.61	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D6839	32.42		0.13	
447		-----		-----	
467		-----		-----	
496	ISO22854-A	32.87		0.92	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO22854-A	32.31		-0.07	
1131	ISO22854-A	32.94		1.04	
1134	ISO22854-A	32.325		-0.04	
1191	ISO22854-A	32.38		0.06	
1205	D8071	32.170		-0.31	
1259	ISO22854-A	32.6		0.44	
1299	ISO22854-A	32.2		-0.26	
1399	In house	29.3	D(0.01)	-5.35	
1443	ISO22854-A	32.60		0.44	
1544	ISO22854-A	32.31		-0.07	
1556	ISO22854-A	32.17		-0.31	
1656		-----		-----	
1706		-----		-----	
1776	ISO22854-A	32.20		-0.26	
1807	ISO22854-A	32.9		0.97	
1810	ISO22854-A	32.5		0.27	
2146	ISO22854-A	32.7		0.62	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404	ISO22854-A	32.54		0.34	

normality	suspect
n	22
outliers	1
mean (n)	32.347
st.dev. (n)	0.4213
R(calc.)	1.180
st.dev.(ISO22854-A:21)	0.5693
R(ISO22854-A:21)	1.594
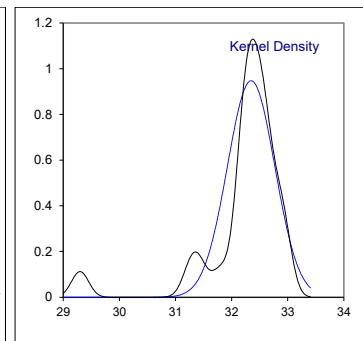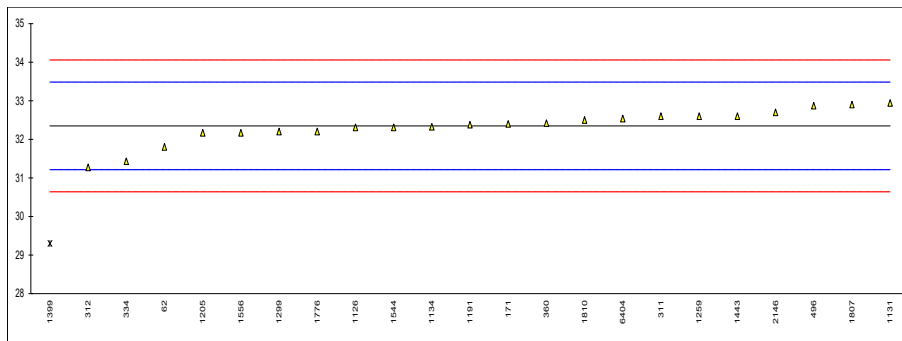
Determination of Benzene on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	CGSB 3.0 No14.3	0.795		0.07	
120	D3606	0.76		-2.78	
140	D3606	0.75		-3.60	
150		-----		-----	
158	D3606	0.78		-1.15	
159		-----		-----	
169		-----		-----	
171	ISO22854-A	0.79		-0.34	
311	ISO22854-A	0.81		1.30	
312	ISO22854-A	0.78		-1.15	
323		-----		-----	
328	EN238	0.9	R(0.01)	8.64	
333	EN238	0.9	R(0.01)	8.64	
334	ISO22854-A	0.79		-0.34	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D6839	0.81		1.30	
447	IP429	0.65	R(0.01)	-11.76	
467		-----		-----	
496	ISO22854-A	0.79		-0.34	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO22854-A	0.79		-0.34	
1131	ISO22854-A	0.793		-0.09	
1134	ISO22854-A	0.80		0.48	
1191	ISO22854-A	0.78		-1.15	
1205	D8071	0.848		4.40	
1259	ISO22854-A	0.79		-0.34	
1299	ISO22854-A	0.79		-0.34	
1399	D5580	0.83		2.93	
1443	ISO22854-A	0.80		0.48	
1544	ISO22854-A	0.781		-1.07	
1556	ISO22854-A	0.79		-0.34	
1656		-----		-----	
1706		-----		-----	
1776	ISO22854-A	0.80		0.48	
1807	ISO22854-A	0.82		2.11	
1810		0.77		-1.97	
2146	ISO22854-A	0.80		0.48	
6142		-----		-----	
6168		-----		-----	
6370	D6277	0.98	R(0.01)	15.17	
6371	D6277	0.98	R(0.01)	15.17	
6404	ISO22854-A	0.81		1.30	

	normality	suspect
	n	26
	outliers	5
	mean (n)	0.794
	st.dev. (n)	0.0203
	R(calc.)	0.057
	st.dev.(ISO22854-A:21)	0.0123
	R(ISO22854-A:21)	0.034
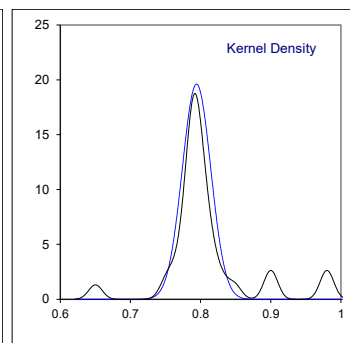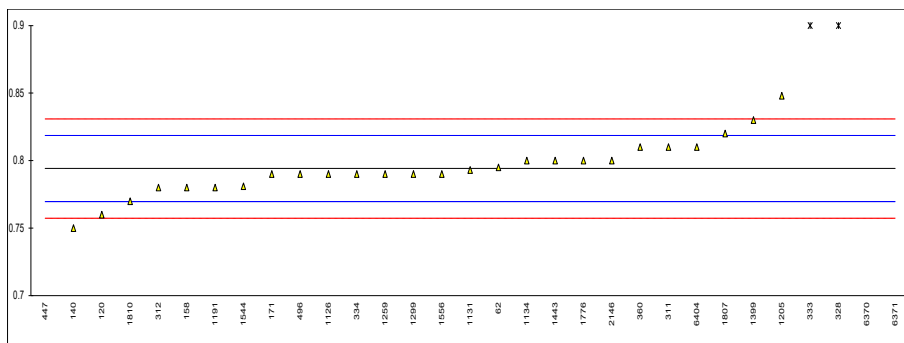
Determination of Copper Corrosion 3 hrs at 50 °C on sample #23090

lab	method	value	mark	z(targ)	remarks
62	D130	1a		-----	
120	D130	1A		-----	
140	D130	1A		-----	
150	D130	1A		-----	
158	D130	1a		-----	
159		-----		-----	
169	D130	1a		-----	
171	D130	1a		-----	
311	D130	1A		-----	
312	ISO2160	1a		-----	
323	D130	1A		-----	
328	ISO2160	1		-----	
333		-----		-----	
334	ISO2160	1		-----	
335	ISO2160	1b		-----	
337		-----		-----	
338		-----		-----	
360	D130	1A		-----	
447	D130	1A		-----	
467	ISO2160	1a		-----	
496	D130	1a		-----	
511	D130	1a		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131	ISO2160	1a		-----	
1134	D130	1a		-----	
1191		-----		-----	
1205		-----		-----	
1259		-----		-----	
1299	D130	1A		-----	
1399	D130	1		-----	
1443	ISO2160	1a		-----	
1544	ISO2160	1a		-----	
1556	ISO2160	Class 1a		-----	
1656	ISO2160	1		-----	
1706		-----		-----	
1776		-----		-----	
1807	D130	1a		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168	D130	1a		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	
	n	28			
	mean (n)	1 (1a/b)			

Determination of Density at 15 °C on sample #23090; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
62	D4052	748.4		-0.05	
120	D4052	748.24		-0.35	
140	D4052	748.1		-0.61	
150	D4052	748.2	C	-0.42	first reported 0.7482 kg/m^3
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D4052	748.3		-0.24	
311	D4052	748.2		-0.42	
312	D4052	748.2		-0.42	
323	ISO12185	748.4		-0.05	
328	ISO12185	748.3		-0.24	
333	ISO12185	748.6		0.32	
334	ISO12185	748.3		-0.24	
335	ISO12185	748.2		-0.42	
337	ISO12185	748.8		0.70	
338	ISO12185	748.2		-0.42	
360	D4052	748.4		-0.05	
447	D4052	748.4		-0.05	
467	ISO12185	748.28		-0.28	
496	ISO12185	748.4		-0.05	
511		-----		-----	
631		-----		-----	
1082	ISO12185	748.4		-0.05	
1126	ISO12185	748.77		0.64	
1131	ISO12185	748.52		0.17	
1134	IP365	748.3		-0.24	
1191	ISO12185	748.2		-0.42	
1205		-----		-----	
1259		-----	W	-----	test result withdrawn, reported 754.1
1299	D4052	748.8		0.70	
1399	D4052	749.4	R(0.05)	1.82	
1443	ISO12185	748.45		0.04	
1544	ISO12185	748.35		-0.14	
1556	ISO12185	748.34		-0.16	
1656	ISO12185	748.1		-0.61	
1706	ISO12185	748.9		0.88	
1776	ISO12185	750.0	R(0.01)	2.94	
1807	ISO12185	749.10	C	1.26	first reported 775.9
1810	ISO12185	748.5		0.14	
2146	ISO12185	748.8		0.70	
6142		-----		-----	
6168	D4052	748.2		-0.42	
6370	ISO12185	748.76		0.62	
6371	D7042	748.78		0.66	
6404	ISO12185	748.2		-0.42	

normality	OK	
n	36	
outliers	2	
mean (n)	748.427	
st.dev. (n)	0.2539	
R(calc.)	0.711	
st.dev.(ISO12185:96)	0.5357	
R(ISO12185:96)	1.5	
compare		
R(D4052:22)	1.9995	
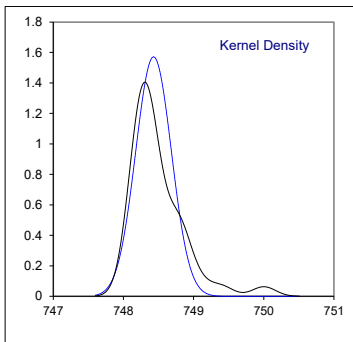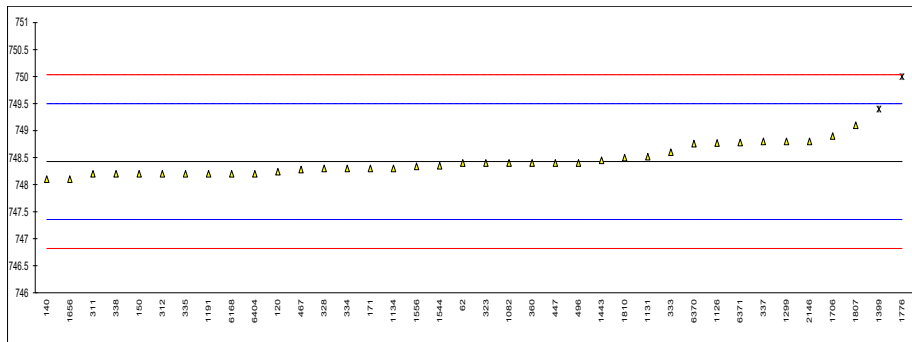
Determination of Distillation at 760 mmHg on sample #23090; results in °C

lab	method	IBP	mark	10% eva	mark	50% eva	mark	90% eva	mark	FBP	mark
62	D86-automated	26.9		45.4		96.0		132.9		160.1	
120		-----		45.9		96.1	C	132.5		158.3	
140	D86-automated	26.4		44.6		94.9		132.3		158.0	
150	D86-automated	29.6		47.5		95.7		132.4		159.7	
158		-----		-----		-----		-----		-----	
159		-----		-----		-----		-----		-----	
169	D86-automated	28.2		46.7		97.6		132.2		159.2	
171	D86-automated	25.3		45.7		96.9		132.7		157.7	
311	D86-automated	28.1		44.8		95.1		132.1		157.8	
312	ISO3405-automated	28.3		45.6		96.2		132.8		155.9	
323	D86-automated	28.2		45.9	C	96.0	C	132.8	C	158.3	
328	D86-automated	27.3		47.5		99.5		133.6		158.4	
333	D86-automated	29.9	ex	52.1	R5	103.0	R5	138.4	R1	160.4	ex
334		29.0		48.4		100.0		133.9		155.4	
335	D86-automated	30.7		47.0		99.0		133.5		154.3	
337		-----		-----		-----		-----		-----	
338	ISO3405-automated	28.8		46.9		97.0		132.1		156.0	
360	D86-automated	29.4		46.2		96.4		132.4		158.4	
447	D86-automated	26.8		44.2		94.7		132.2		160.2	
467	D86-automated	30.9		46.1		96.9		132.7		163.3	
496	D86-automated	30.1		48.2		99.1		132.8		159.5	
511		-----		-----		-----		-----		-----	
631		-----		-----		-----		-----		-----	
1082	ISO3405-automated	25.5		46.0		95.5		132.6		161.2	
1126	D86-automated	29.0		45.6		96.8		132.6		160.3	
1131	ISO3405-automated	28.4		45.6		95.7		132.5		159.3	
1134	IP123-automated	29.4		44.7		94.7		132.2		158.1	
1191	ISO3405-automated	28.2		46.3		94.8		132.1		156.7	
1205	D86-automated	27.3		45.9		97.0		132.9		159.8	
1259	D86-automated	23.7		48.5		99.5		132.5		159.1	
1299	D86-automated	30.5		48.8		99.5		135.4	R1	161.5	
1399	D86	29.9		46.9		96.5		132.9		160.8	
1443	ISO3405-automated	29.81		48.06		97.74		134.00	C	158.55	
1544	D86-automated	27.10		46.30		96.80		132.50		156.50	
1556	ISO3405-automated	26.1		45.0		95.2		132.3		157.8	
1656	ISO3405-automated	30.3		44.8		95.0		132.3		157.9	
1706	D86-automated	27.5		45.8		95.8		132.3		156.1	
1776	ISO3405-automated	27.4		44.6		94.8		132.1		157.4	
1807	ISO3405-automated	29.3		46.1		95.8		132.2		157.0	
1810	D86-automated	28.3		47.3		97.7		133.0		160.6	
2146	ISO3405-automated	31.6		46.7		97.0		132.8		160.9	
6142		-----		-----		-----		-----		-----	
6168	D86-automated	25.0		49.7		103.0	R5	139.8	R1	160.0	
6370	ISO3405-automated	25.9		38.5	R5	83.7	R1	134.0		155.4	
6371	ISO3405-automated	24.65		39.57	R5	85.40	R1	132.80		154.30	
6404		28.7	ex	50.7	ex	103.6	R5	137.9	R1	160.9	ex
	normality	OK		OK		OK		not OK		OK	
	n	37		36		35		36		38	
	outliers	0 + 2ex		3 + 1ex		5		4		0 + 2ex	
	mean (n)	28.08		46.37		96.66		132.68		158.41	
	st.dev. (n)	1.903		1.326		1.549		0.533		2.063	
	R(calc.)	5.33		3.71		4.34		1.49		5.78	
	st.dev.(D86-A:23)	1.679		1.508		1.382		1.771		2.536	
	R(D86-A:23)	4.7		4.22		3.87		4.96		7.1	
	compare										
	R(D86-M:23)	5.6		4.39		3.88		2.95		7.2	

Lab 120 first reported 961
Lab 323 first reported 50.5, 103.0 and 138.1 respectively
Lab 333 test results for IBP and FBP excluded as statistical outliers in related distillation parameters
Lab 1443 first reported 136.00
Lab 6404 test results for IBP, 10% evaporated and FBP excluded as statistical outliers in related distillation parameters

Initial Boiling Point

10% evaporated

50% evaporated

90% evaporated

Final Boiling Point
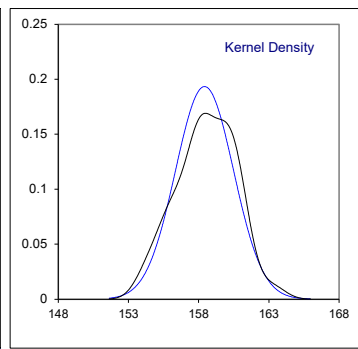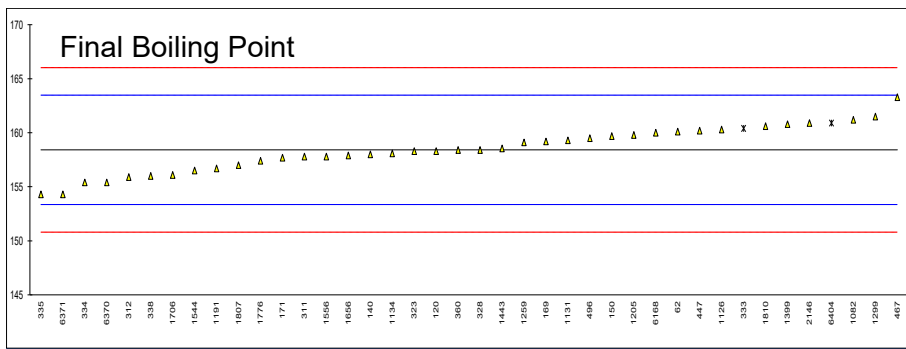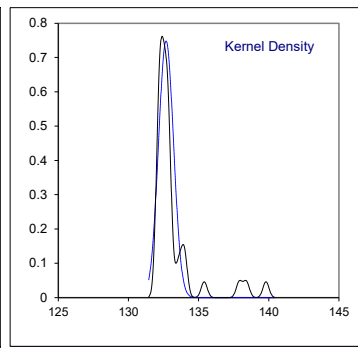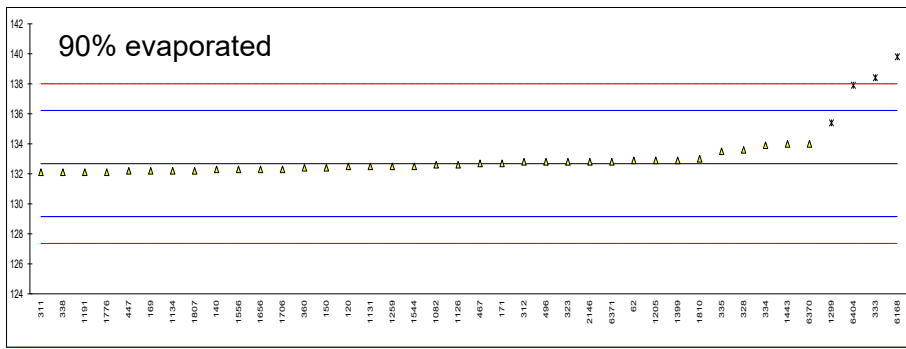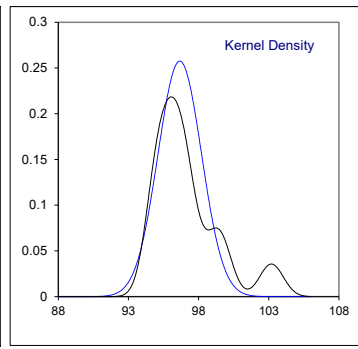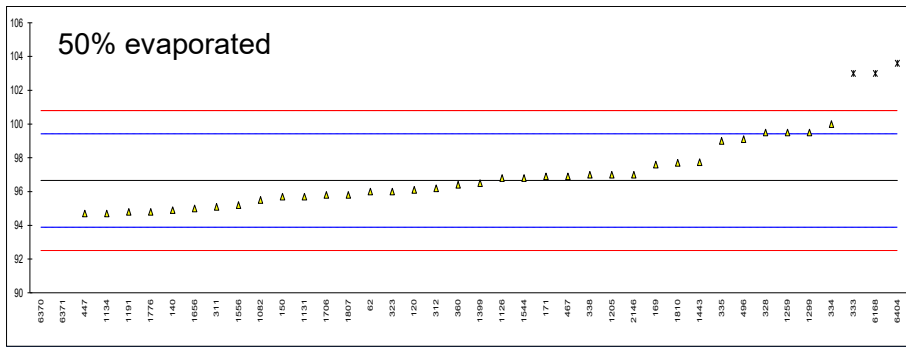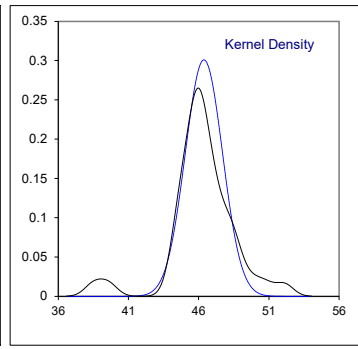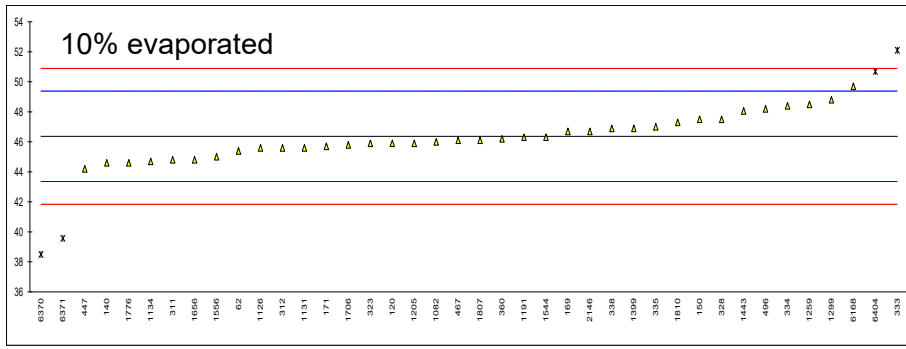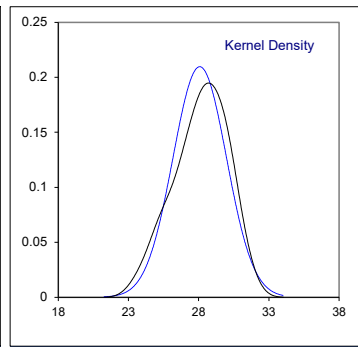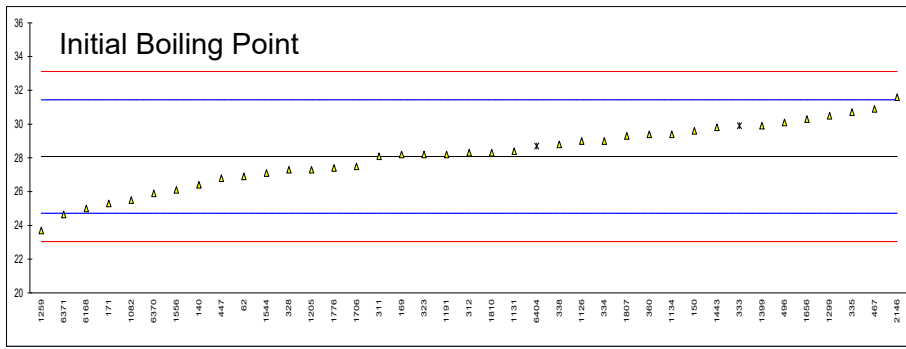
Determination of Distillation at 760 mmHg on sample #23090; results in %V/V

lab	method	%evap. 70 °C	mark	%evap. 100 °C	mark	%evap. 150 °C	mark	residue
62		-----		-----		-----		1.0
120		-----		-----		-----		-----
140		-----		-----		-----		1.0
150		-----		-----		-----		-----
158		-----		-----		-----		-----
159		-----		-----		-----		-----
169		-----		-----		-----		-----
171	D86-automated	38.6		52.6		95.5	R1	1.0
311	D86-automated	38.1		52.0		97.9		0.8
312	ISO3405-automated	38.3		51.6		97.9		0.9
323	D86-automated	38.0		51.9	C	97.6	C	1.0
328	D86-automated	36.9		50.3		96.9		1.9
333	D86-automated	35.0	ex	48.5	R5	92.5	R1	1.0
334		36.4		50.0		96.9		1.9
335	D86-automated	36.7		50.4		96.0	R1	1.6
337		-----		-----		-----		-----
338	ISO3405-automated	39.6		51.5		97.9		1.0
360	D86-automated	37.5		51.5		97.8		1.0
447	D86-automated	39.4		52.1		97.8		1.0
467	D86-automated	36.3		51.4		97.6		0.9
496	D86-automated	36.3		50.5		97.7		1.0
511		-----		-----		-----		-----
631		-----		-----		-----		-----
1082	ISO3405-automated	37.4		51.9		97.7		0.9
1126		-----		-----		-----		1.0
1131	ISO3405-automated	38.7		51.8		97.9		0.8
1134	IP123-automated	39.1		52.1		97.8		1.0
1191	ISO3405-automated	36.9		52.3		97.9		0.9
1205	D86-automated	37.5		51.3		97.5		-----
1259	D86-automated	35.3		50.2		96.6		1.0
1299	D86-automated	36.8		50.3		95.8	R1	1.7
1399	D86	36.0		51.5		97.6		1.0
1443	ISO3405-automated	37.80		53.10		98.10		1.0
1544	D86-automated	37.90		52.60		97.60	C	1.00
1556	ISO3405-automated	39.4		51.9		97.8		1.0
1656	ISO3405-automated	38.7		52.3		98.0		1.0
1706	D86-automated	38.1		51.9		98.0		-----
1776	ISO3405-automated	40.3		52.3		97.7		1.1
1807	ISO3405-automated	37.0		52.2		97.9		1.0
1810	D86-automated	36.8		51.2		97.8		1
2146	ISO3405-automated	38.0		51.4		97.5		1.0
6142		-----		-----		-----		-----
6168	D86-automated	41.3		52.4		97.6		1.0
6370	ISO3405-automated	39.8		54.8	R5	97.9		1.1
6371	ISO3405-automated	39.03		53.50		98.10		1.03
6404		33.9	ex	47.8	R5	94.4	R1	1.0
	normality	OK		OK		not OK		
	n	32		31		29		
	outliers	0 + 2ex		3		5		
	mean (n)	37.94		51.68		97.69		
	st.dev. (n)	1.368		0.859		0.351		
	R(calc.)	3.83		2.40		0.98		
	st.dev.(D86-A:23)	0.800		0.702		0.374		
	R(D86-A:23)	2.24		1.97		1.05		

Lab 323 first reported 50.0 and 94.0 respectively
Lab 333 test results for % evaporated at 70 °C excluded as statistical outliers in related distillation parameters
Lab 1544 first reported 95.60
Lab 6404 test results for % evaporated at 70 °C excluded as statistical outliers in related distillation parameters

% evaporated at 70 °C

Kernel Density

% evaporated at 100 °C

Kernel Density

% evaporated at 150 °C

Kernel Density
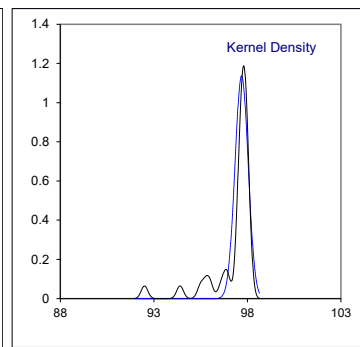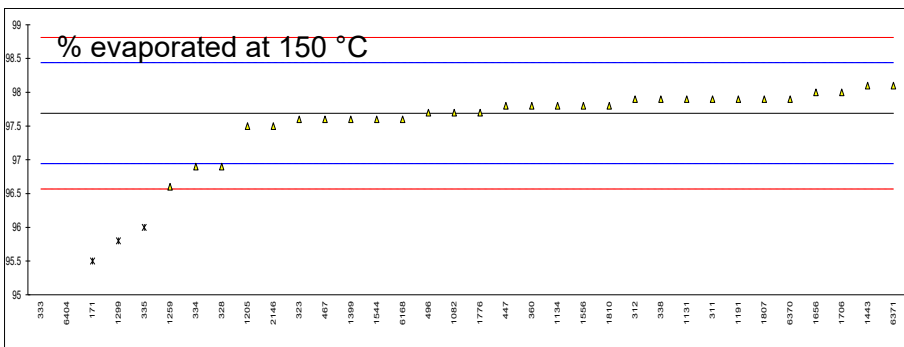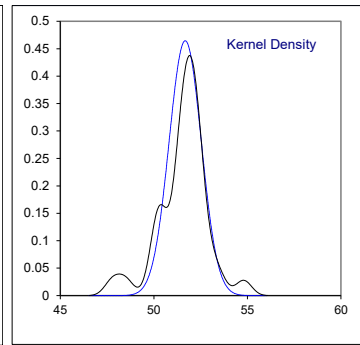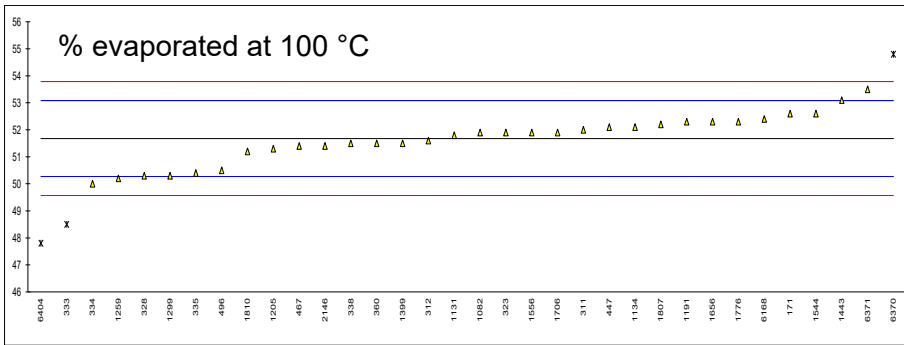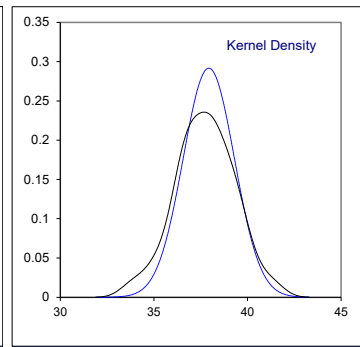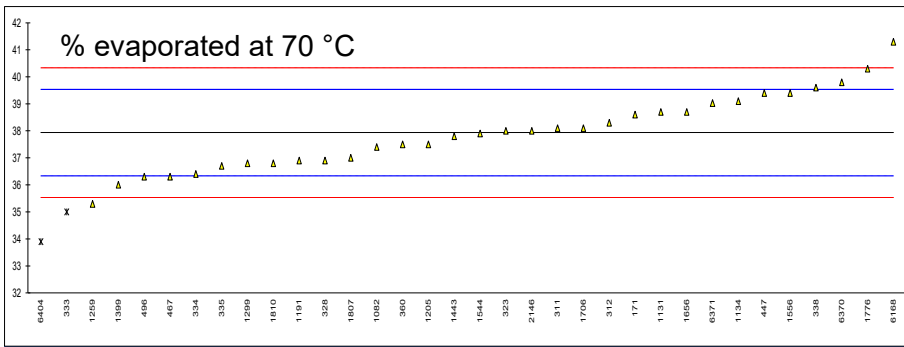
Determination of Doctor test on sample #23090;

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D4952	Neg.		-----	
140	D4952	Negative		-----	
150	D4952	Negative		-----	
158	D4952	Negative		-----	
159		-----		-----	
169		-----		-----	
171	D4952	negative		-----	
311	IP30	neg		-----	
312	IP30	neg		-----	
323	IP30	neg		-----	
328	D4952	negative		-----	
333		-----		-----	
334	D4952	negative		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D4952	Negative		-----	
447	D4952	Negative		-----	
467	IP30	negative, mercaptans absent		-----	
496	D4952	negative		-----	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134	IP30	Negative		-----	
1191		-----		-----	
1205		-----		-----	
1259		-----		-----	
1299		-----		-----	
1399	IP30	Negative		-----	
1443		-----		-----	
1544		-----		-----	
1556	D4952	Negative		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D4952	Negative		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	
	n	18			
	mean (n)	Negative			

Determination of Gum (solvent washed) on sample #23090; results in mg/100 mL

lab	method	value	mark	z(targ)	remarks
62	D381	<0.5		-----	
120		-----		-----	
140	D381	<0.5		-----	
150	D381	<0.5		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D381	<0.5		-----	
311	D381	<0.5		-----	
312		-----		-----	
323	D381	< 0.5		-----	
328		-----		-----	
333		-----		-----	
334	D381	0		-----	
335	D381	< 0.5		-----	
337		-----		-----	
338		-----		-----	
360	ISO6246	0.5		-----	
447	D381	<0.5		-----	
467	ISO6246	<1		-----	
496	D381	0.4		-----	
511		-----		-----	
631		-----		-----	
1082	ISO6246	0.2		-----	
1126		-----		-----	
1131	ISO6246	0.5		-----	
1134		-----		-----	
1191	ISO6246	0		-----	
1205		-----		-----	
1259	ISO6246	<0,5		-----	
1299	D381	<0.5		-----	
1399		-----		-----	
1443		-----		-----	
1544	D381	0.50		-----	
1556	ISO6246	0		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D381	<0,5		-----	
1810	ISO6246	0.4		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404	D381	0.0		-----	
	n	21			
	mean (n)	<0.5			

Determination of Lead as Pb on sample #23090; results in mg/L

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	D3237	<2.5		-----	
150		-----		-----	
158	D3237	<2.5		-----	
159		-----		-----	
169		-----		-----	
171	D3237	<2.5		-----	
311		-----		-----	
312	D3237	<2.5		-----	
323	D3237	< 2.5		-----	
328		-----		-----	
333		-----		-----	
334	D3237	<2.5		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	INH-01/2012	<2.5		-----	
447	IP428	<2.5		-----	
467	INH-16136	<1,4		-----	
496	D3237	<2.5		-----	
511	D3237	<2.5		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131	EN237	<2,5		-----	
1134		-----		-----	
1191	D8110	0.000299		-----	
1205		-----		-----	
1259		-----		-----	
1299	EN237	<2.5		-----	
1399	D5059-C	<0.80		-----	
1443	EN237	< 2,5		-----	
1544	D3237	0		-----	
1556		-----		-----	
1656	EN237	<2.5		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146	In house	<2		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	

n	19	
mean (n)	<2.5	application range D3237:22: 2.5 - 25 mg/L

## Determination of Manganese as Mn on sample #23090; results in mg/L

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D3831	<0.25		-----	
311		-----		-----	
312	D3831	<0.25		-----	
323	EN16136	< 0.50		-----	
328		-----		-----	
333	EN16135	<2.0		-----	
334	EN16135	<2.0		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	EN16136	<0.50		-----	
447	IP588	<2.0		-----	
467	EN16136	<0,5		-----	
496	EN16136	0.309		-----	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131	EN16135	<2,0		-----	
1134		-----		-----	
1191	D8110	0.00149		-----	
1205		-----		-----	
1259		-----		-----	
1299	EN16135	<2.0		-----	
1399	D5059-D	<0.28		-----	
1443	EN16135	< 2,0		-----	
1544	EN16136	0		-----	
1556		-----		-----	
1656	EN16135	<2		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146	In house	<1		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	
	n	17			
	mean (n)	<2			application range EN16135:11: 2 - 8 mg/L
					application range D3831:22: 0.25 - 40 mg/L

Determination of Mercaptan Sulfur as S on sample #23090; results in %M/M

lab	method	value	mark	z(targ)	remarks
62	D3227	0.0006		-----	
120		-----		-----	
140	D3227	<0.0003		-----	
150	D3227	<0.0003		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D3227	<0.0003		-----	
311		-----		-----	
312	D3227	<0.0003		-----	
323	D3227	< 0.00003		-----	
328		-----		-----	
333		-----		-----	
334	D3227	<0.0003		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	ISO3012	<0.0003		-----	
447	D3227	<0.0003		-----	
467	D3227	<0,0003		-----	
496	D3227	0.00011		-----	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134		-----		-----	
1191	ISO3012	0.000056		-----	
1205		-----		-----	
1259	D3227	0.00018		-----	
1299		-----		-----	
1399		-----		-----	
1443		-----		-----	
1544		-----		-----	
1556		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404		-----		-----	

| | n | 12 | | | |
| | mean (n) | <0.0003 | | | application range D3227:23: 0.0003 - 0.01 %M/M |

Determination of Olefins by FIA (without oxygenates correction) on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	D1319	11.6		-0.11	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171		-----		-----	
311		-----		-----	
312		-----		-----	
323	D1319	8.2		-2.76	
328		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	EN15553	13.3		1.22	
447	D1319	9.2		-1.98	
467	D1319	10.79		-0.74	
496		-----		-----	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126		-----		-----	
1131		-----		-----	
1134	D1319	14.00		1.76	
1191		-----		-----	
1205	D1319	10.4434		-1.01	
1259		-----		-----	
1299	D1319	9.1		-2.06	
1399	D1319	11.8		0.05	
1443		-----		-----	
1544	D1319	12.23		0.38	
1556		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370	In house	14.5		2.15	
6371	In house	15.7		3.09	
6404		-----		-----	

normality	OK	
n	12	
outliers	0	
mean (n)	11.74	
st.dev. (n)	2.328	
R(calc.)	6.52	
st.dev.(D1319:20a)	1.284	
R(D1319:20a)	3.59	
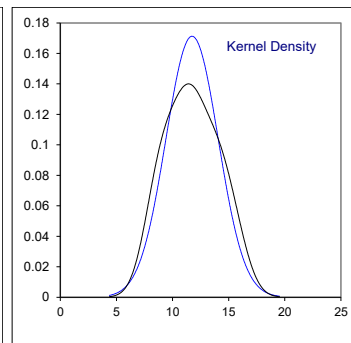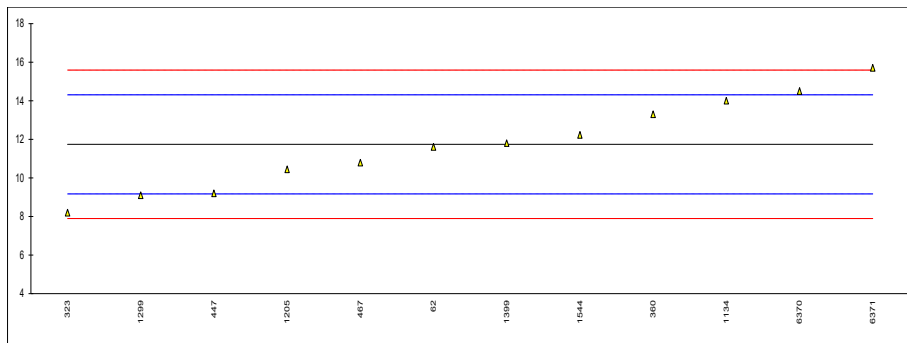
Determination of Olefins by GC on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	CGSB 3.0 No14.3	11.6		0.20	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	ISO22854-A	11.2		-0.41	
311	ISO22854-A	11.3		-0.25	
312	ISO22854-A	11.87		0.60	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	ISO22854-A	11.58		0.17	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D6839	11.48		0.02	
447		-----		-----	
467		-----		-----	
496	ISO22854-A	10.62		-1.28	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO22854-A	11.40		-0.10	
1131	ISO22854-A	11.38		-0.13	
1134	ISO22854-A	11.67		0.30	
1191	ISO22854-A	11.54		0.11	
1205	D8071	11.985		0.78	
1259	ISO22854-A	11.2		-0.41	
1299	ISO22854-A	11.5		0.05	
1399	In house	12.2		1.10	
1443	ISO22854-A	11.44		-0.04	
1544	ISO22854-A	11.31		-0.24	
1556	ISO22854-A	11.69		0.33	
1656		-----		-----	
1706		-----		-----	
1776	ISO22854-A	11.75		0.42	
1807	ISO22854-A	10.9		-0.86	
1810	ISO22854-A	11.36		-0.16	
2146	ISO22854-A	11.4		-0.10	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404	ISO22854-A	11.42		-0.07	

|	
normality	suspect
n	23
outliers	0
mean (n)	11.469
st.dev. (n)	0.3331
R(calc.)	0.933
st.dev.(ISO22854-A:21)	0.6645
R(ISO22854-A:21)	1.861
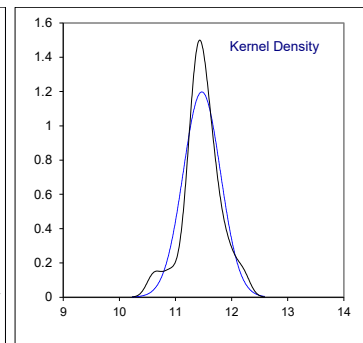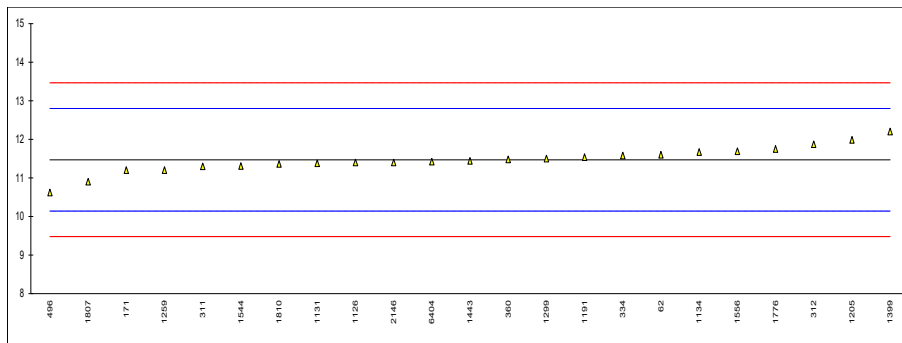
Determination of Oxidation Stability on sample #23090; results in minutes

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D525	>900		-----	
140	D525	>240		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D525	>400		-----	
311	D525	>900		-----	
312		-----		-----	
323	D525	360		-----	
328	D525	>900		-----	
333		-----		-----	
334	D525	>900		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D525	>900		-----	
447	D525	>900		-----	
467		-----		-----	
496	D525	>900		-----	
511		-----		-----	
631		-----		-----	
1082	ISO7536	>1500		-----	
1126		-----		-----	
1131	ISO7536	>360		-----	
1134	D525	>900		-----	
1191	ISO7536	>1500		-----	
1205		-----		-----	
1259		-----		-----	
1299	D525	>900		-----	
1399		-----		-----	
1443	ISO7536	> 900		-----	
1544	D525	>900		-----	
1556	ISO7536	>900		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D525	>380		-----	
1810		-----		-----	
2146		-----		-----	
6142		-----		-----	
6168		-----		-----	
6370		-----		-----	
6371		-----		-----	
6404	D525	>985		-----	
	n	20			
	mean (n)	>240			

Determination of Ethanol on sample #23090; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		9.94		3.04	
120	D5599	9.60		0.90	
140	D5599	9.58	C	0.78	first reported 10.16 %M/M
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	ISO22854-A	9.68		1.41	
311	ISO22854-A	9.14		-1.99	
312	ISO22854-A	9.58		0.78	
323		-----		-----	
328	EN1601	9.5		0.27	
333		-----		-----	
334	ISO22854-A	9.17		-1.80	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D6839	9.50		0.27	
447	IP466	9.6		0.90	
467		-----		-----	
496	ISO22854-A	9.44		-0.10	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO22854	9.46		0.02	
1131	ISO22854-A	9.63		1.09	
1134	ISO22854-A	9.345		-0.70	
1191	ISO22854-A	9.17		-1.80	
1205	D8071	9.742		1.80	
1259	ISO22854-A	9.48		0.15	
1299	ISO22854-A	9.86		2.54	
1399	D4815	9.41		-0.29	
1443	ISO22854-A	9.31		-0.92	
1544	ISO22854-A	9.39		-0.42	
1556	ISO22854-A	9.14		-1.99	
1656		-----		-----	
1706	In house	9.44		-0.10	
1776	ISO22854-A	9.35		-0.67	
1807		9.7		1.53	
1810	ISO22854-A	9.66		1.28	
2146	ISO22854-A	9.36		-0.61	
6142		-----		-----	
6168	D5845	9.587		0.82	
6370	D5845	8.98		-3.00	
6371	D5845	8.95		-3.19	
6404	ISO22854-A	9.46		0.02	

normality	OK	
n	31	
outliers	0	
mean (n)	9.457	
st.dev. (n)	0.2354	
R(calc.)	0.659	
st.dev.(ISO22854-A:21)	0.1589	
R(ISO22854-A:21)	0.445	
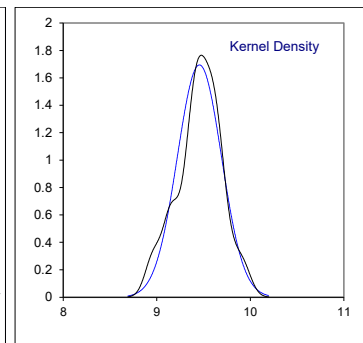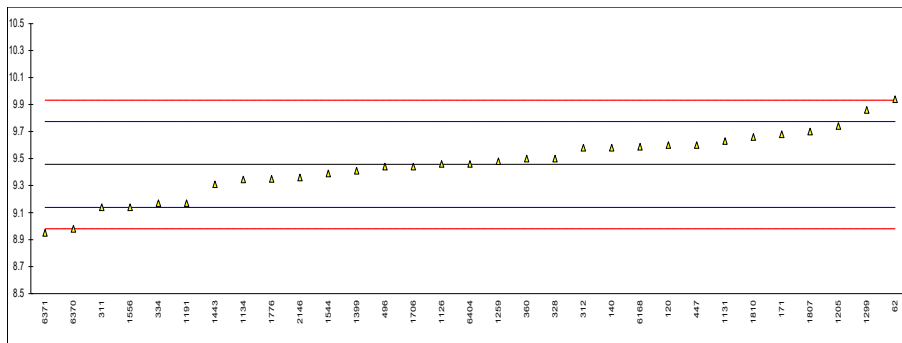
Determination of Oxygen content on sample #23090; results in %M/M

lab	method	value	mark	z(targ)	remarks
62	CGSB 3.0 No14.3	3.7		2.85	
120	D5599	3.54		0.65	
140	D5599	3.53		0.51	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	ISO22854-A	3.57		1.06	
311	ISO22854-A	3.37		-1.69	
312	ISO22854-A	3.53		0.51	
323		-----		-----	
328	EN1601	3.50		0.09	
333		-----		-----	
334	ISO22854-A	3.40		-1.28	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D6839	3.50		0.09	
447	IP466	3.54		0.65	
467		-----		-----	
496	ISO22854-A	3.48		-0.18	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO22854	3.51		0.23	
1131	ISO22854-A	3.54		0.65	
1134	ISO22854-A	3.46		-0.46	
1191	ISO22854-A	3.38		-1.56	
1205	D8071	3.620		1.75	
1259	ISO22854-A	3.50		0.09	
1299	ISO22854-A	3.65		2.16	
1399	In house	3.53		0.51	
1443	ISO22854-A	3.45		-0.59	
1544	ISO22854-A	3.46		-0.46	
1556	ISO22854-A	3.38		-1.56	
1656		-----		-----	
1706		-----		-----	
1776	ISO22854-A	3.47		-0.32	
1807	ISO22854-A	3.54		0.65	
1810	ISO22854-A	3.57		1.06	
2146	ISO22854-A	3.46		-0.46	
6142		-----		-----	
6168		-----		-----	
6370	D5845	3.30		-2.66	
6371	D5845	3.33		-2.24	
6404	ISO22854-A	3.49		-0.04	

normality	OK
n	29
outliers	0
mean (n)	3.493
st.dev. (n)	0.0902
R(calc.)	0.253
st.dev.(ISO22854-A:21)	0.0727
R(ISO22854-A:21)	0.203
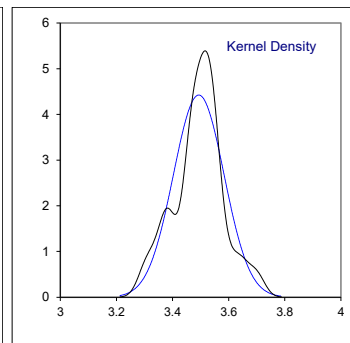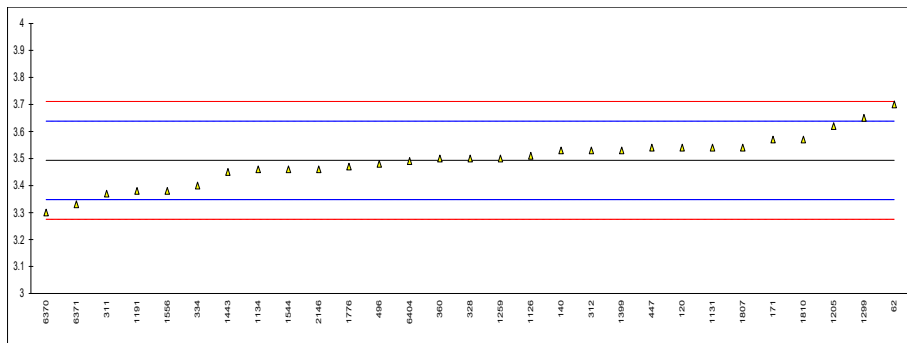
Determination of Sulfur on sample #23090; results in mg/kg

lab	method	value	mark	z(targ)	remarks
62	D5453	2.6		0.98	
120	D2622	2.305		0.36	
140	D5453	1.9		-0.49	
150	D5453	2.1		-0.07	
158	D2622	<3.0		-----	
159		-----		-----	
169	D5453	2.0		-0.28	
171	D5453	2.5		0.77	
311	ISO20846	<3.0		-----	
312	ISO20884	<5		-----	
323	D5453	1.9		-0.49	
328	ISO20846	<3		-----	
333	ISO20846	<3		-----	
334	ISO20846	1.6		-1.12	
335	ISO20846	2.3		0.35	
337	ISO20846	<3		-----	
338	ISO20846	1.849		-0.60	
360	D5453	2.32		0.39	
447	IP490	<3.0		-----	
467		-----		-----	
496	ISO20846	0.94		-2.51	
511		-----		-----	
631		-----		-----	
1082		-----		-----	
1126	ISO20846	2.5		0.77	
1131	ISO20846	2.09		-0.09	
1134	IP490	2.53		0.83	
1191	ISO20846	2.14		0.02	
1205	ISO20846	2.13		-0.01	
1259	ISO20846	2.21		0.16	
1299	ISO20884	2.8		1.40	
1399	D5453	1.66		-0.99	
1443	ISO20884	< 5,0		-----	
1544	ISO20846	2.12		-0.03	
1556	ISO20884	2.5		0.77	
1656	ISO20846	2.0		-0.28	
1706	D2622	2.9		1.61	
1776	ISO20846	<3,0		-----	
1807	ISO20846	<3		-----	
1810	D5453	2.0		-0.28	
2146	ISO20846	1.2		-1.96	
6142		-----		-----	
6168		-----		-----	
6370	ISO20884	1.88		-0.53	
6371	ISO20884	1.87		-0.55	
6404	ISO20846	3.0		1.82	

normality	OK	
n	29	
outliers	0	
mean (n)	2.133	
st.dev. (n)	0.4568	
R(calc.)	1.279	
st.dev.(ISO20846:19)	0.4761	
R(ISO20846:19)	1.333	
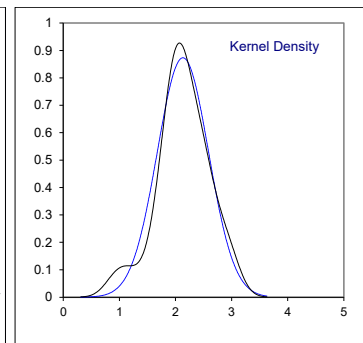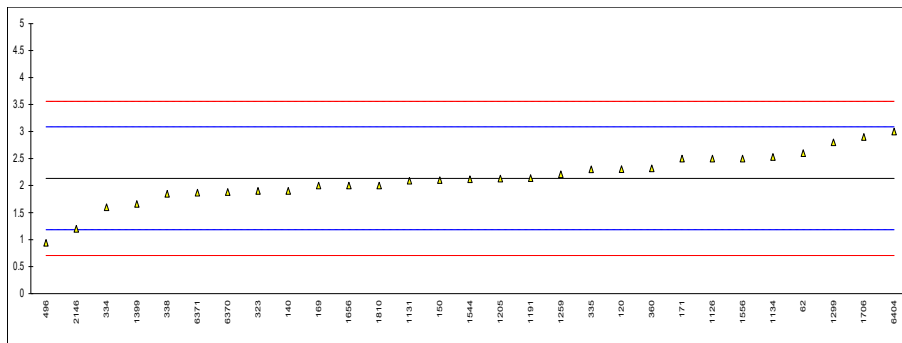
Determination of Total Vapor Pressure on sample #23091; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	14.34	R(0.05)	2.99	
120	D5191	14.07		0.98	
140	D5191	13.86		-0.58	
150	D5191	13.77		-1.25	
158	D5191	13.98		0.31	
159		-----		-----	
169		-----		-----	
171	D5191	14.07		0.98	
311		-----		-----	
312	D5191	14.03		0.68	
323	D5191	13.88		-0.43	
328	D5191	14.01		0.54	
333	EN13016-1	12.82	R(0.01)	-8.31	
334	D5191	13.79		-1.10	
335	D5191	14.03		0.68	
337	EN13016-1	12.86	R(0.01)	-8.02	
338		-----		-----	
360	D5191	13.84		-0.73	
447	D5191	13.97		0.24	
496	D5191	13.89		-0.36	
631	D5191	13.74		-1.47	
1082	EN13016-1	14.00		0.46	
1131	EN13016-1	13.97		0.24	
1134	D5191	14.04		0.76	
1191	EN13016-1	14.00		0.46	
1299	D5191	13.82		-0.88	
1399		-----		-----	
1544	D5191	13.97		0.24	
1556	EN13016-1	13.98		0.31	
1656		-----		-----	
1776		-----		-----	
1807	EN13016-1	13.74		-1.47	
2146	EN13016-1	13.959		0.16	
6142		-----		-----	
6370	EN13016-1	14.03		0.68	
6371	EN13016-1	14.01		0.54	

normality	OK	
n	25	
outliers	3	
mean (n)	13.938	
st.dev. (n)	0.1040	
R(calc.)	0.291	
st.dev.(D5191:22)	0.1345	
R(D5191:22)	0.377	
compare		
R(EN13016-1:18)	0.229	
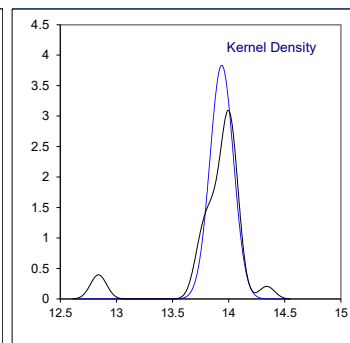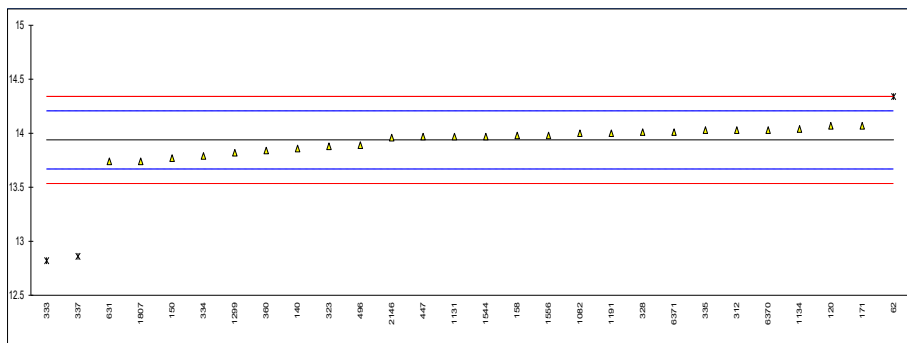
Determination of DVPE acc. to ASTM D5191 on sample #23091; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.87	E	-0.18	calculation difference, iis calculated 13.29
120	D5191	13.10	E	1.57	calc. difference, iis calc. 13.03, possibly reported DVPE acc to EPA?
140	D5191	12.827		-0.51	
150	D5191	12.74		-1.18	
158	D5191	12.94		0.35	
159		-----		-----	
169		-----		-----	
171	D5191	13.10	E	1.57	calc. difference, iis calc. 13.03, possibly reported DVPE acc to EPA?
311	D5191	13.01		0.89	
312	D5191	13.00		0.81	
323	D5191	12.84		-0.41	
328	D5191	12.97		0.58	
333		-----		-----	
334	D5191	12.76		-1.03	
335	D5191	12.98		0.66	
337		-----		-----	
338	EN13016-1	12.95		0.43	
360	D5191	12.81		-0.64	
447	D5191	12.93		0.27	
496	D5191	12.85		-0.34	
631	D5191	12.71		-1.41	
1082	EN13016-1	12.96		0.50	
1131	EN13016-1	12.94		0.35	
1134	D5191	13.00		0.81	
1191	EN13016-1	12.95		0.43	
1299	D5191	12.79		-0.80	
1399	D5191	12.63		-2.02	
1544	D5191	12.92		0.20	
1556	EN13016-1	12.94		0.35	
1656	EN13016-1	12.84		-0.41	
1776	EN13016-1	12.79		-0.80	
1807	EN13016-1	12.69		-1.56	
2146	EN13016-1	12.922		0.21	
6142		-----		-----	
6370	EN13016-1	12.99		0.73	
6371	EN13016-1	12.97		0.58	

normality	OK
n	31
outliers	0
mean (n)	12.894
st.dev. (n)	0.1150
R(calc.)	0.322
st.dev.(D5191:22)	0.1307
R(D5191:22)	0.366
compare	
R(EN13016-1:18)	0.229
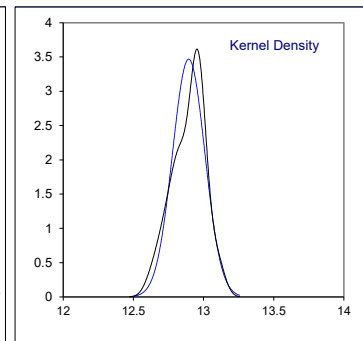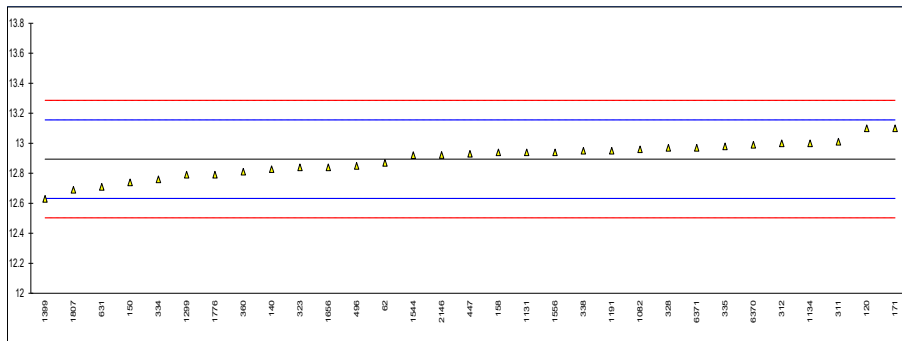
Determination of DVPE acc. to EPA on sample #23091; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.94	E	-0.30	calculation difference, iis calculated 13.36
120		-----		-----	
140	D5191	12.904		-0.57	
150		-----		-----	
158	D5191	13.02		0.31	
159		-----		-----	
169		-----		-----	
171	D5191	13.03	E	0.39	calc. difference, iis calc. 13.10, possibly reported DVPE acc to D5191?
311		-----		-----	
312	D5191	13.07		0.69	
323		-----		-----	
328	D5191	13.05		0.54	
333		-----		-----	
334	D5191	12.84		-1.06	
335		-----		-----	
337		-----		-----	
338		-----		-----	
360	D5191	12.88		-0.76	
447	D5191	13.01		0.24	
496	D5191	12.94		-0.30	
631	D5191	12.79		-1.44	
1082		-----		-----	
1131	EN13016-1	13.02		0.31	
1134	D5191	13.07		0.69	
1191		-----		-----	
1299		-----		-----	
1399		-----		-----	
1544	D5191	13.00		0.16	
1556		-----		-----	
1656		-----		-----	
1776		-----		-----	
1807		-----		-----	
2146	EN13016-1	13.123	E	1.10	calculation difference, iis calculated 12.998
6142		-----		-----	
6370		-----		-----	
6371		-----		-----	

normality	OK
n	15
outliers	0
mean (n)	12.979
st.dev. (n)	0.0938
R(calc.)	0.263
st.dev.(D5191:22)	0.1310
R(D5191:22)	0.367
compare	
R(EN13016-1:18)	0.229
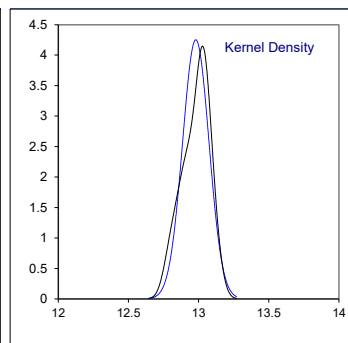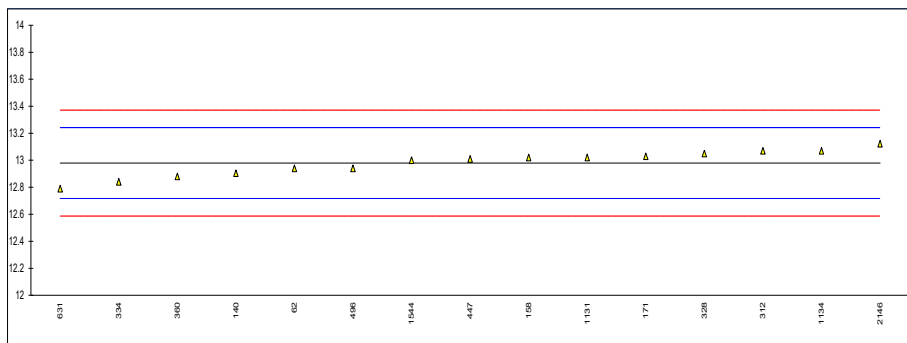
Determination of RON on sample #23092

lab	method	value	mark	z(targ)	remarks
62	D2699-A	96.4		0.06	
120	D2699-C	96.0		-1.54	
140	D2699-C	96.5		0.46	
150	D2699-A	96.6		0.86	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D2699-C	96.4		0.06	
312	D2699-A	96.7		1.26	
323	D2699-A	96.3		-0.34	
333	D2699-A	96.5		0.46	
334	ISO5164	96.0		-1.54	
360	D2699-A	96.34		-0.18	
447		96.6		0.86	
511	D2699-C	96.3		-0.34	
631	D2699-B	96.41		0.10	
1026	ISO5164	95.9		-1.94	
1082	ISO5164	96.6		0.86	
1131	ISO5164	96.37		-0.06	
1134	ISO5164	96.64		1.02	
1191	ISO5164	96.7		1.26	
1299	D2699-A	96.2		-0.74	
1399	D2699-C	96.1		-1.14	
1544	D2699-A	96.50		0.46	
1556	ISO5164	96.51		0.50	
1776	ISO5164	96.3		-0.34	
6142		-----		-----	

normality	OK
n	23
outliers	0
mean (n)	96.39
st.dev. (n)	0.227
R(calc.)	0.63
st.dev.(D2699-A:23)	0.250
R(D2699-A:23)	0.7
compare	
R(D2699-C:23)	0.7
R(ISO5164:14)	0.7
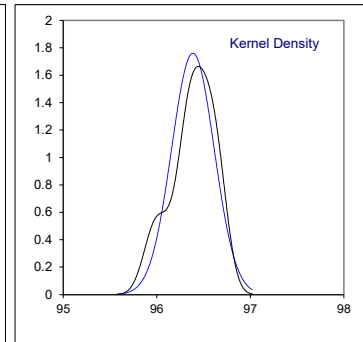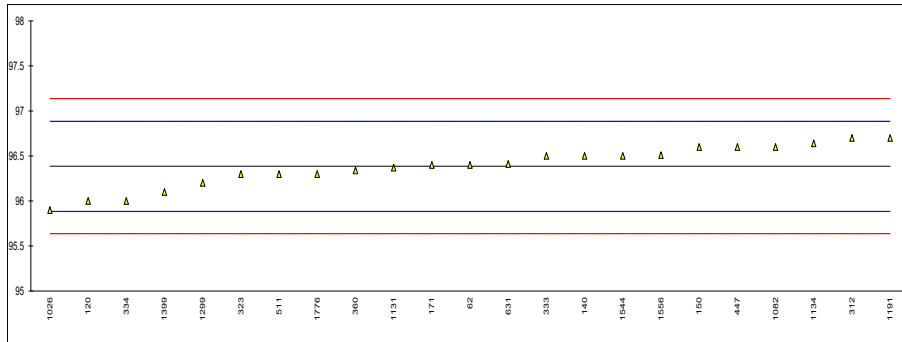
Determination of MON on sample #23092

lab	method	value	mark	z(targ)	remarks
62	D2700-A	85.6		0.68	
120	D2700-C	85.1	C	-0.88	first reported 84.0
140	D2700-C	85.3		-0.25	
150	D2700-A	85.6		0.68	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D2700-C	85.6		0.68	
312	D2700-A	85.2		-0.57	
323	D2700-A	85.0		-1.19	
333	D2700-A	85.3		-0.25	
334	ISO5163	85.3		-0.25	
360	D2700-A	85.27		-0.35	
447		85.3		-0.25	
511		-----		-----	
631	D2700-C	85.40		0.06	
1026	ISO5163	86.0		1.92	
1082	ISO5163	86.1		2.23	
1131	ISO5163	85.83		1.39	
1134	ISO5163	84.62		-2.37	
1191	ISO5163	85.8		1.30	
1299	D2700-A	85.0		-1.19	
1399	D2700-C	85.2		-0.57	
1544	D2700-A	85.03		-1.09	
1556	ISO5163	85.75		1.15	
1776	ISO5163	85.1		-0.88	
6142		-----		-----	

normality	OK	
n	22	
outliers	0	
mean (n)	85.38	
st.dev. (n)	0.366	
R(calc.)	1.02	
st.dev.(D2700-A:23)	0.321	
R(D2700-A:23)	0.9	
compare		
R(D2700-C:23)	0.9	
R(ISO5163:14)	0.9	
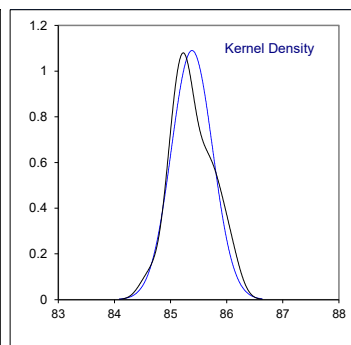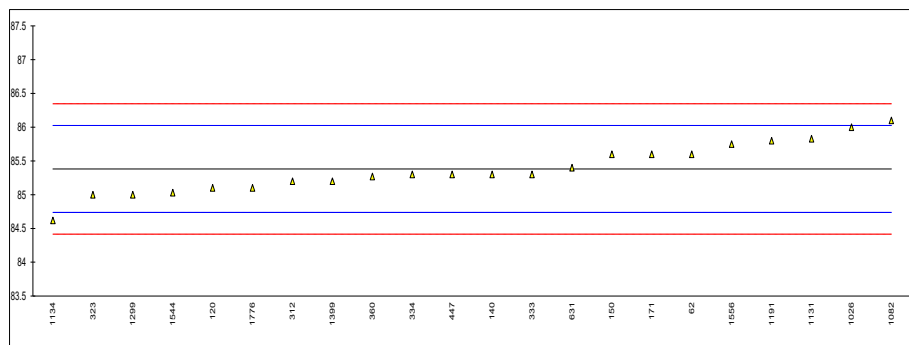
APPENDIX 2

Determination of other Oxygenates on sample #23090; results in %V/V

lab	DIPE	ETBE	Ethers (C5 only)	Ethers (C5 or more)	Ethers (C6 or more)	i-BuOH
62	-----	-----	-----	-----	-----	-----
120	0	0	0	0	0	0
140	<0.10	<0.10	-----	-----	-----	<0.10
150	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----
169	-----	-----	-----	-----	-----	-----
171	<0.01	<0.01	-----	-----	-----	<0.01
311	<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
323	-----	-----	-----	-----	-----	-----
328	<0.17	<0.17	<0.17 C	-----	-----	<0.17
333	-----	-----	-----	-----	-----	-----
334	0	0	0	0	0	0
335	-----	-----	-----	-----	-----	-----
337	-----	-----	-----	-----	-----	-----
338	-----	-----	-----	-----	-----	-----
360	<0.99	<0.99	<0.99	<0.99	<0.99	<0.61
447	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
467	-----	-----	-----	-----	-----	-----
496	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
511	-----	-----	-----	-----	-----	-----
631	-----	-----	-----	-----	-----	-----
1082	-----	-----	-----	-----	-----	-----
1126	-----	<0.05	<0.10	<0.10	<0.10	<0.05
1131	0.0	0.0	0.0	0.0	0.0	0.0
1134	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1191	-----	0	-----	-----	-----	0
1205	-----	-----	-----	-----	-----	-----
1259	-----	-----	-----	-----	-----	-----
1299	-----	<0.8	-----	<0.8	-----	<0.8
1399	<0.20	<0.20	<0.20	<0.20	<0.20	0.27
1443	< 0,61	< 0,99	< 0,99	< 0,99	-----	< 0,61
1544	0	0	0	0	0	0
1556	0	0	0	0	0	0
1656	-----	-----	-----	-----	-----	-----
1706	-----	0.0	-----	-----	-----	-----
1776	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
1807	0	0	-----	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----
2146	<0,10	<0,10	-----	<0,10	-----	<0,10
6142	-----	-----	-----	-----	-----	-----
6168	-----	-----	-----	-----	-----	-----
6370	-----	-----	-----	-----	-----	-----
6371	-----	-----	-----	-----	-----	-----
6404	0	0	0	0	0	0

Lab 328 first reported 9.5

Determination of other Oxygenates on sample #23090; results in %V/V – continued –

lab	IPA	MeOH	MTBE	TAME	t-BuOH	Other Oxygenates
62	-----	-----	-----	-----	-----	-----
120	0	0	0	0	0	0
140	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
150	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----
169	-----	-----	-----	-----	-----	-----
171	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
311	<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
323	-----	-----	-----	-----	-----	-----
328	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
333	-----	-----	-----	-----	-----	-----
334	0	0	0	0	0	0
335	-----	-----	-----	-----	-----	-----
337	-----	-----	-----	-----	-----	-----
338	-----	-----	-----	-----	-----	-----
360	<0.61	<1.05	<0.99	<0.99	<0.61	<0.61
447	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
467	-----	-----	-----	-----	-----	-----
496	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
511	-----	-----	-----	-----	-----	-----
631	-----	-----	-----	-----	-----	-----
1082	-----	-----	-----	-----	-----	-----
1126	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10
1131	0.0	0.0	0.0	0.0	0.0	0.0
1134	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1
1191	0	0	0.01	0	0	9.17
1205	-----	-----	0.085	-----	-----	-----
1259	-----	-----	-----	-----	-----	-----
1299	<0.8	<0.8	<0.8	-----	<0.8	<0.8
1399	<0.20	<0.20	<0.20	<0.20	<0.20	9.60
1443	< 0,61	< 1,05	< 0,99	< 0,99	< 0,61	< 0,61
1544	0	0	0	0	0	0
1556	0	0	0	0	0	0
1656	-----	-----	-----	-----	-----	-----
1706	-----	-----	-----	0.0	-----	-----
1776	<0,2	0.04	<0,2	<0,2	<0,2	<0,2
1807	-----	-----	0	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----
2146	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10
6142	-----	-----	-----	-----	-----	-----
6168	-----	-----	-----	-----	-----	-----
6370	-----	-----	-----	-----	-----	-----
6371	-----	-----	-----	-----	-----	-----
6404	0	0	0	0	0	0

APPENDIX 3

z-scores of Distillation at 760 mmHg on sample #23090

lab	IBP	10%eva	50%eva	90%eva	FBP	%evap.70 °C	%evap.100 °C	%evap.150 °C
62	-0.70	-0.64	-0.47	0.12	0.66	-----	-----	-----
120	-----	-0.31	-0.40	-0.10	-0.05	-----	-----	-----
140	-1.00	-1.17	-1.27	-0.21	-0.16	-----	-----	-----
150	0.91	0.75	-0.69	-0.16	0.51	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----	-----	-----
169	0.07	0.22	0.68	-0.27	0.31	-----	-----	-----
171	-1.65	-0.44	0.18	0.01	-0.28	0.83	1.31	-5.86
311	0.01	-1.04	-1.13	-0.33	-0.24	0.21	0.46	0.56
312	0.13	-0.51	-0.33	0.07	-0.99	0.46	-0.11	0.56
323	0.07	-0.31	-0.47	0.07	-0.05	0.08	0.32	-0.24
328	-0.46	0.75	2.06	0.52	-0.01	-1.29	-1.96	-2.11
333	1.09	3.80	4.59	3.23	0.78	-3.67	-4.52	-13.89
334	0.55	1.35	2.42	0.69	-1.19	-1.92	-2.39	-2.11
335	1.56	0.42	1.70	0.46	-1.62	-1.54	-1.82	-4.52
337	-----	-----	-----	-----	-----	-----	-----	-----
338	0.43	0.35	0.25	-0.33	-0.95	2.08	-0.25	0.56
360	0.79	-0.11	-0.18	-0.16	-0.01	-0.54	-0.25	0.30
447	-0.76	-1.44	-1.41	-0.27	0.70	1.83	0.60	0.30
467	1.68	-0.18	0.18	0.01	1.93	-2.04	-0.40	-0.24
496	1.21	1.21	1.77	0.07	0.43	-2.04	-1.68	0.03
511	-----	-----	-----	-----	-----	-----	-----	-----
631	-----	-----	-----	-----	-----	-----	-----	-----
1082	-1.54	-0.24	-0.84	-0.05	1.10	-0.67	0.32	0.03
1126	0.55	-0.51	0.10	-0.05	0.74	-----	-----	-----
1131	0.19	-0.51	-0.69	-0.10	0.35	0.96	0.17	0.56
1134	0.79	-1.11	-1.41	-0.27	-0.12	1.46	0.60	0.30
1191	0.07	-0.05	-1.34	-0.33	-0.68	-1.29	0.89	0.56
1205	-0.46	-0.31	0.25	0.12	0.55	-0.54	-0.54	-0.51
1259	-2.61	1.41	2.06	-0.10	0.27	-3.29	-2.10	-2.92
1299	1.44	1.61	2.06	1.53	1.22	-1.42	-1.96	-5.06
1399	1.09	0.35	-0.11	0.12	0.94	-2.42	-0.25	-0.24
1443	1.03	1.12	0.78	0.74	0.05	-0.17	2.03	1.10
1544	-0.58	-0.05	0.10	-0.10	-0.76	-0.04	1.31	-0.24
1556	-1.18	-0.91	-1.05	-0.21	-0.24	1.83	0.32	0.30
1656	1.32	-1.04	-1.20	-0.21	-0.20	0.96	0.89	0.83
1706	-0.34	-0.38	-0.62	-0.21	-0.91	0.21	0.32	0.83
1776	-0.40	-1.17	-1.34	-0.33	-0.40	2.95	0.89	0.03
1807	0.73	-0.18	-0.62	-0.27	-0.56	-1.17	0.74	0.56
1810	0.13	0.62	0.76	0.18	0.86	-1.42	-0.68	0.30
2146	2.10	0.22	0.25	0.07	0.98	0.08	-0.40	-0.51
6142	-----	-----	-----	-----	-----	-----	-----	-----
6168	-1.83	2.21	4.59	4.02	0.63	4.20	1.03	-0.24
6370	-1.30	-5.22	-9.37	0.74	-1.19	2.33	4.45	0.56
6371	-2.04	-4.51	-8.14	0.07	-1.62	1.37	2.60	1.10
6404	0.37	2.87	5.02	2.95	0.98	-5.04	-5.52	-8.80

APPENDIX 4

Number of participants per country

2 labs in AUSTRIA

2 labs in BELGIUM

3 labs in BULGARIA

1 lab in CANADA

1 lab in CROATIA

1 lab in CZECH REPUBLIC

3 labs in FINLAND

6 labs in FRANCE

1 lab in GERMANY

1 lab in IRELAND

1 lab in LITHUANIA

4 labs in NETHERLANDS

2 labs in PERU

1 lab in PHILIPPINES

2 labs in ROMANIA

1 lab in SOUTH AFRICA

2 labs in SPAIN

3 labs in SWEDEN

3 labs in UNITED KINGDOM

7 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), R1	= outlier in Rosner's outlier test
R(0.05), R5	= 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

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