Results of Proficiency Test
Gasoline (premium)
April 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Over the past years more and more gasoline fuels are marketed with higher octane numbers and additional cleaning agents and some synthetic content. These fuels are called premium gasoline. The demand for these premium gasoline fuels is increasing. Therefore, the Institute for Interlaboratory Studies (iis) decided to start with a proficiency test for Gasoline (premium) in 2020. During the annual proficiency testing program of 2020/2021 it was decided to continue the round robin for the analysis of Gasoline (premium) in accordance with EN228. The interlaboratory study on Gasoline (premium) contains also round robins for the determination of Dry Vapour Pressure Equivalent (DVPE) and RON/MON.

In this interlaboratory study registered for participation:
- 24 laboratories in 21 countries on Gasoline (premium) iis21B02
- 18 laboratories in 16 countries on Gasoline (premium) DVPE iis21B02DVPE
- 17 laboratories in 15 countries on Gasoline (premium) RON & MON iis21B02RON

In total 24 laboratories in 21 different countries registered for participation. See appendix 4 for the number of participants per country. In this report the results of the three Gasoline (premium) proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). 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 Gasoline, see table below.

Sample	Amount	Purpose
#21060	1x 1L	Regular analyzes
#21061	1x 1L (75% filled)	DVPE
#21062	2x 1L	RON/MON analyzes

Table 1: Gasoline samples

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

For the preparation of the samples for the PT Gasoline (premium) and PT Gasoline (premium) RON & MON a batch of approximately 200 liters of Gasoline (premium quality) was obtained from the local market. After homogenisation 54 and 64 amber glass bottles of 1L were filled and labelled #21060 and #21062 respectively.
The homogeneity of the subsamples of #21060 and # 21062 was checked by determination of Density at 15°C in accordance with ASTM D4052 on 8 stratified randomly selected subsamples.

	Density at 15°C in kg/m^3
Sample 1	735.00
Sample 2	734.98
Sample 3	734.89
Sample 4	734.89
Sample 5	735.00
Sample 6	734.96
Sample 7	735.02
Sample 8	734.88

Table 2: homogeneity test results of subsamples #21060 and #21062

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)	0.16
reference test method	ISO12185:96
0.3 x R (reference test method)	0.45

Table 3: evaluation of the repeatability of subsamples #21060 and #21062

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples #21060 and #21062 was assumed.

For the preparation of the sample for the PT Gasoline (premium) DVPE the remaining bulk material of the round for regular analyzes and the round for RON/MON was homogenized and 58 glass bottles of 1L were filled with approximately 750 mL Gasoline (premium) for the DVPE round and labelled #21061.
The homogeneity of the subsamples was checked by the determination of DVPE in accordance with ASTM D5191 on 8 stratified randomly selected subsamples.

	DVPE in psi
Sample #21061-1	12.89
Sample #21061-2	12.88
Sample #21061-3	13.01
Sample #21061-4	12.91
Sample #21061-5	12.97
Sample #21061-6	12.89
Sample #21061-7	12.97
Sample #21061-8	12.92

Table 4: homogeneity test results of subsamples #21061

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)	0.1
reference test method	D5191:19
0.3 x R (reference test method)	0.1

Table 5: evaluation of repeatability of subsamples #21061

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 April 7, 2021. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Gasoline 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 #21060: API Gravity, Appearance, Aromatics by FIA (without oxygenates correction), Aromatics by GC (%V/V and %M/M), Benzene, Copper Corrosion 3hrs at 50°C, Density at 15°C, Distillation at 760 mmHg (IBP, Temparature at 10%, 50%, 90% evaporated, FBP, % evap. at 70°C (E70), % evap. at 100°C (E100), % evap. at 150°C (E150), Distillation Residue, Distillation Loss), Doctor Test, Gum (solvent washed), Lead as Pb, Manganese as Mn, Olefins by FIA (without oxygenates correction), Olefins by GC (%V/V and %M/M), Oxidation Stability, Oxygenates (Methanol, Ethanol, iso-Propyl alcohol, iso-Butyl alcohol, tert-Butyl alcohol, Ethers (C5 or more C atoms), DIPE, ETBE, MTBE, TAME, Sum of Other Oxygenates, Oxygen content) and Total Sulfur.
On sample #21061 it was requested to determine Air Saturated Vapour Pressure (ASVP) and Dry Vapour Pressure Equivalent (DVPE).
On sample #21062 it was requested to determine RON and MON.

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

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis/. The reported test results are tabulated per determination in appendix 1 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 test result tables in appendix 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, e.g. EN or ISO reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation of this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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

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

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

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

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

4 EVALUATION

In this proficiency test no problems were encountered with the dispatch of the samples.
For the round with the regular analyzes two participants reported test results after the final reporting date. For the PT on DVPE one participant reported test results after the final reporting date and two participants were not able to report any test results. For the PT on RON/MON one participant reported test results after the final reporting date and one participant was not able to report any test results. Not all participants were able to report all tests requested.
In total 24 participants reported in total 467 numerical test results. Observed were 25 outlying test results, which is 5.4% of the numerical test results. 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 in appendix 1 together with the original data. The abbreviations, used in these tables, are explained in appendix 5.

Sample #21060

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.

Appearance: This determination was not problematic. Seventeen participants agreed on the appearance as Clear and Bright.

Aromatics by FIA (without oxygenates correction): This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN15553:07.
To improve the reproducibility close attention should be paid to the identification of the chromatographic boundaries. EN15553 mentions in §9.4: “With some oxygenate blended fuels another red band may appear several centimetres above the reddish or brown alcohol/aromatic boundary and this shall be ignored.”

Aromatics by GC: 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 ISO22854-A:16.
Regretfully, no precision data is available for the determination in %M/M. Therefore, no z-scores were calculated. Two statistical outliers were

observed in the test results reported in %M/M. The calculated reproducibility is slightly higher than in last year's PT.

Benzene: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is in not in agreement with the requirements of ISO22854-A:16.

Copper Corrosion: This determination was not problematic. All reporting participants agreed on classification 1 (1a).

Density at 15°C: 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 ISO12185:96.

Distillation: The distillation was not problematic for all reported distillation parameters. In total nine statistical outliers were observed, and two other test results were excluded. All calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ISO3405:19 automatic mode.

Doctor Test: This determination was not problematic. All reporting participants agreed on the absence of Mercaptans and reported Negative.

Gum (solvent washed): This determination may not be problematic. Half the number of participants reported a concentration lower than 0.5 mg/100mL. Therefore, no z-scores were calculated.

Lead as Pb: This determination may not be problematic. Fourteen reporting participants agreed on a level of <2.5 mg/L. Therefore, no z-scores were calculated.

Manganese as Mn: This determination may not be problematic. Thirteen reporting participants agreed on a level of <2.0 mg/L. Therefore, no z-scores were calculated.

Olefins by FIA (without oxygenates correction): This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN15553:07.

Olefins by GC: The determination in %V/V 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:16. Regretfully, no precision data is available for the determination in %M/M. Therefore, no z-scores were calculated. One statistical outlier was observed in the test results reported in %M/M. The calculated reproducibility is slightly higher than in last year's PT.

Oxidation Stability: This determination was not problematic. Twelve reporting participants agreed on an Oxidation Stability of >240 minutes. Therefore, no z-scores were calculated.

Ethanol: 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:16.

Ethers (C5 or more): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ISO22854-A:16.

ETBE: 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:16.

MTBE: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is in not in agreement with the requirements of ISO22854-A:16.

Other Oxygenates: All other Oxygenates are below the detection limit and therefore not further evaluated. The reported test results are listed in appendix 2.

Oxygen content: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO22854-A:16.

Total Sulfur: 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 ISO20846:19.

Sample #21061

Air Saturated Vapour Pressure (ASVP): This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of EN13016-1:18.

DVPE (acc. to EN13016-1): The Air Saturated Vapour Pressure (ASVP) can be converted to Dry Vapour Pressure Equivalent (DVPE) according to EN13016-1. This conversion was also problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN13016-1:18.

Sample #21062

RON: The 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 ISO5164:14.

MON: The determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of 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 literature reference test methods (in casu EN and ISO reference test methods) are presented in the next tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
API Gravity		16	60.92	0.21	0.63
Appearance		17	C&B	n.a.	n.a.
Aromatics by FIA *)	%V/V	13	32.4	5.9	3.7
Aromatics by GC in %V/V	%V/V	15	28.8	2.7	1.4
Aromatics by GC in %M/M	%M/M	12	34.9	1.6	n.a.
Benzene	%V/V	18	0.39	0.06	0.04
Copper Corrosion 3hrs at 50°C		20	1 (1a)	n.a.	n.a.
Density at 15°C	kg/m^3	20	735.1	0.4	1.5
Initial Boiling Point	°C	21	26.7	5.1	4.7
Temp. at 10% evaporated	°C	21	40.5	2.0	3.7
Temp. at 50% evaporated	°C	21	72.9	1.9	4.3
Temp. at 90% evaporated	°C	21	154.3	1.8	6.4
Final Boiling Point	°C	21	195.9	3.9	7.1
% evap.at 70°C, E70	%V/V	20	46.9	2.1	2.7
% evap at 100°C, E100	%V/V	21	66.1	1.0	2.2
% evap.at 150°C, E150	%V/V	18	87.9	0.7	1.3
Doctor Test		14	Negative	n.a.	n.a.
Gum (solvent washed)	mg/100mL	14	<0.5	n.e.	n.e.
Lead as Pb	mg/L	14	<2.5	n.e.	n.e.
Manganese as Mn	mg/L	13	<2.0	n.e.	n.e.
Olefins by FIA *)	%V/V	14	3.8	1.9	1.8
Olefins by GC in %V/V	%V/V	11	3.8	0.6	1.0
Olefins by GC in %M/M	%M/M	9	3.5	0.6	n.a.
Oxidation Stability	minutes	12	>240	n.e.	n.e.
Ethanol	%V/V	11	0.12	0.07	0.35
Ethers (C5 or more C atoms)	%V/V	12	13.8	0.7	0.7
ETBE	%V/V	10	0.17	0.12	0.36
MTBE	%V/V	15	13.6	1.0	0.7
Oxygen content	%M/M	12	2.6	0.1	0.3

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Sulfur	mg/kg	21	4.9	2.7	1.8

Table 6: reproducibilities of tests on sample #21060

*) without oxygenates correction

Parameter	unit	n	average	2.8 * sd	R(lit)
ASVP	kPa	12	95.84	3.14	1.58
DVPE acc. to EN13016-1	kPa	15	88.35	1.94	1.58

Table 7: reproducibilities of tests on sample #21061

Parameter	unit	n	average	2.8 * sd	R(lit)
RON		14	98.2	0.8	0.7
MON		12	88.0	1.3	0.9

Table 8: reproducibilities of tests on sample #21062

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF APRIL 2021 WITH PREVIOUS PT

	April 2021	April 2020
Number of reporting laboratories	24	20
Number of test results	467	439
Number of statistical outliers	25	19
Percentage of statistical outliers	5.4%	4.3%

Table 9: comparison with previous proficiency test

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency tests was compared against the requirements of the reference test methods. The conclusions are given in the following table.

Determination	April 2021	April 2020
API Gravity	++	++
Aromatics by FIA *)	-	-
Aromatics by GC	-	+/-
Benzene	-	+
Density at 15°C	++	+
Distillation	+	+
Gum (solvent washed)	n.e.	+
Olefins by FIA *)	+/-	-

Determination	April 2021	April 2020
Olefins by GC	+	+
Ethanol	++	+
Ethers (C5 or more C atoms)	+/-	+/-
ETBE	++	n.e.
MTBE	-	+/-
Oxygen content	++	+
Total Sulfur	-	-
ASVP	--	-
DVPE (acc. to EN13016-1)	-	-
RON	-	-
MON	-	-

Table 10: comparison determinations against the reference test methods

*) without oxygenates correction

The following performance categories were used:

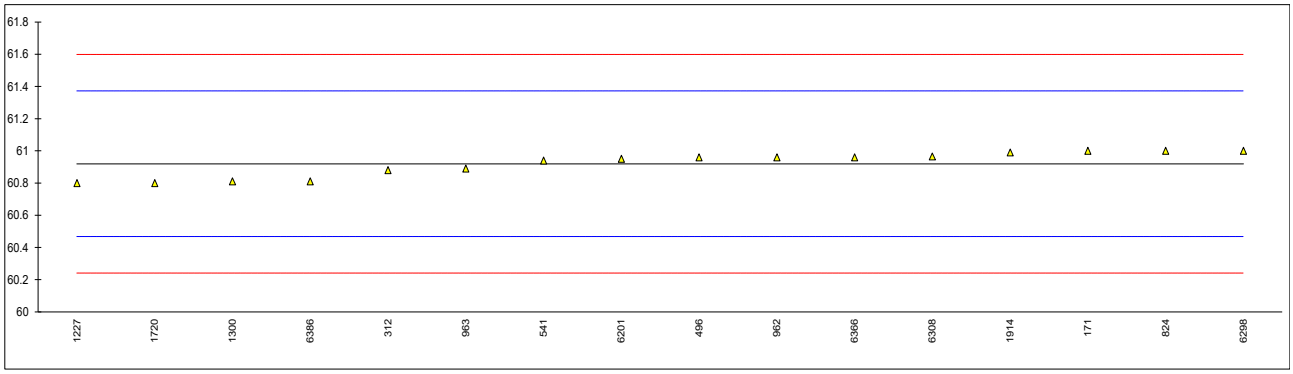
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test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

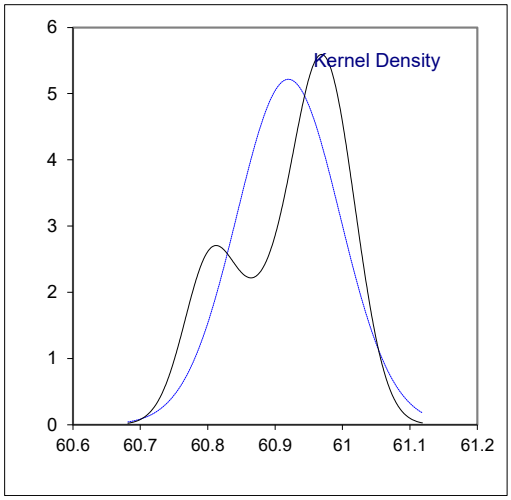
APPENDIX 1

Determination of API Gravity on sample #21060;

lab	method	value	mark	z(targ)	remarks
171	D1298	61.0		0.35	
312	D4052	60.88		-0.18	
496	D4052	60.96		0.18	
541	D4052	60.94		0.09	
824	ISO12185	61.0		0.35	
962	D4052	60.96		0.18	
963	D4052	60.89		-0.13	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227	D4052	60.8		-0.53	
1272		-----		-----	
1300	D4052	60.81		-0.48	
1399		-----		-----	
1521		-----		-----	
1720	D4052	60.8		-0.53	
1914	D4052	60.99		0.31	
6075		-----		-----	
6201	D4052	60.95		0.13	
6298	D4052	61.0		0.35	
6308	D4052	60.965		0.20	
6366	D4052	60.96		0.18	
6378		-----		-----	
6386	D4052	60.81		-0.48	

normality	OK
n	16
outliers	0
mean (n)	60.920
st.dev. (n)	0.0765
R(calc.)	0.214
st.dev.(D4052:18a)	0.2264
R(D4052:18a)	0.634





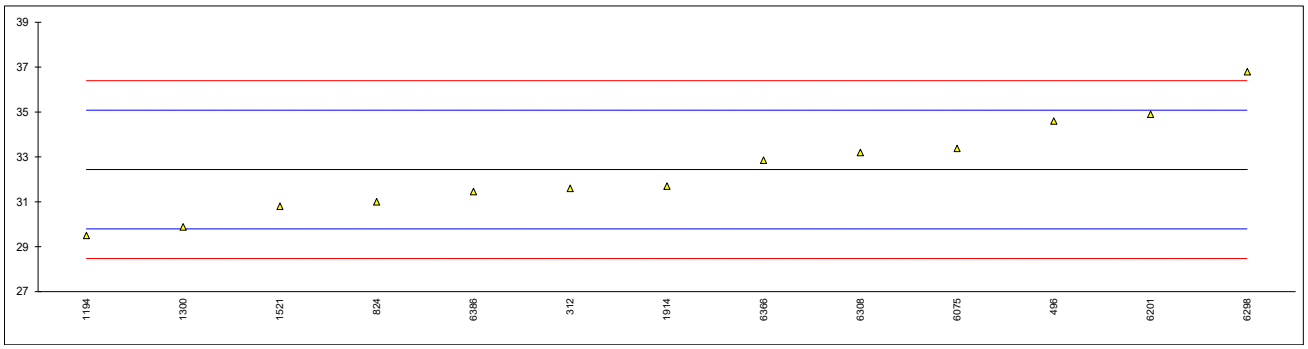
Determination of Appearance on sample #21060;

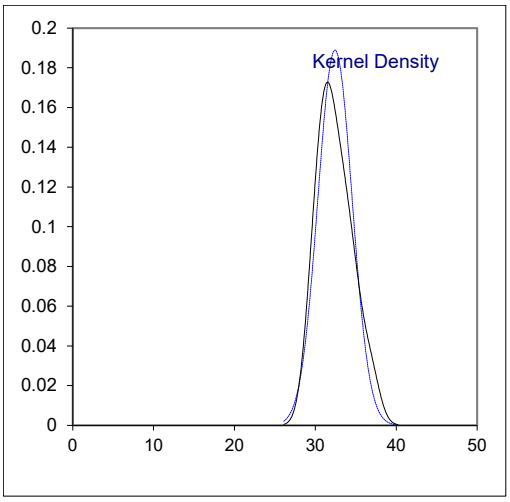
lab	method	value	mark	z(targ)	remarks
171	Visual	C & B		-----	
312	Visual	br&cl		-----	
496	Visual	clear&bright		-----	
541	D4176	C&B		-----	
824	Visual	clear & bright		-----	
962	Visual	Clear & Bright		-----	
963	Visual	Clear & Bright		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272	Visual	clear, bright		-----	
1300	D4176	C&B		-----	
1399		-----		-----	
1521	D4176	clear, bright and visually free from solid matter		-----	
1720		-----		-----	
1914	D4176	Clear and Bright		-----	
6075	Visual	Clear & Bright		-----	
6201	Visual	Br and Cl		-----	
6298	Visual	Clear & Bright		-----	
6308	Visual	C&B		-----	
6366	Visual	bright and clear		-----	
6378		-----		-----	
6386	Visual	Clear and Bright		-----	
	n	17			
	mean (n)	Clear and Bright			

Determination of Aromatics by FIA (without oxygenates correction) on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	EN15553	31.6		-0.63	
496	D1319	34.6		1.64	
541		-----		-----	
824	D1319	31.0		-1.09	
962		-----		-----	
963		-----		-----	
1126		-----		-----	
1194	D1319	29.5		-2.22	
1205		-----		-----	
1227		-----		-----	
1272		-----		-----	
1300	EN15553	29.88		-1.93	
1399		-----		-----	
1521	EN15553	30.8		-1.24	
1720		-----		-----	
1914	D1319	31.7		-0.56	
6075	EN15553	33.38		0.71	
6201	D1319	34.9		1.86	
6298	D1319	36.8		3.30	
6308	D1319	33.2		0.58	
6366	D1319	32.85		0.31	
6378		-----		-----	
6386	D1319	31.46		-0.74	

normality	OK
n	13
outliers	0
mean (n)	32.436
st.dev. (n)	2.1121
R(calc.)	5.914
st.dev.(EN15553:07)	1.3214
R(EN15553:07)	3.7

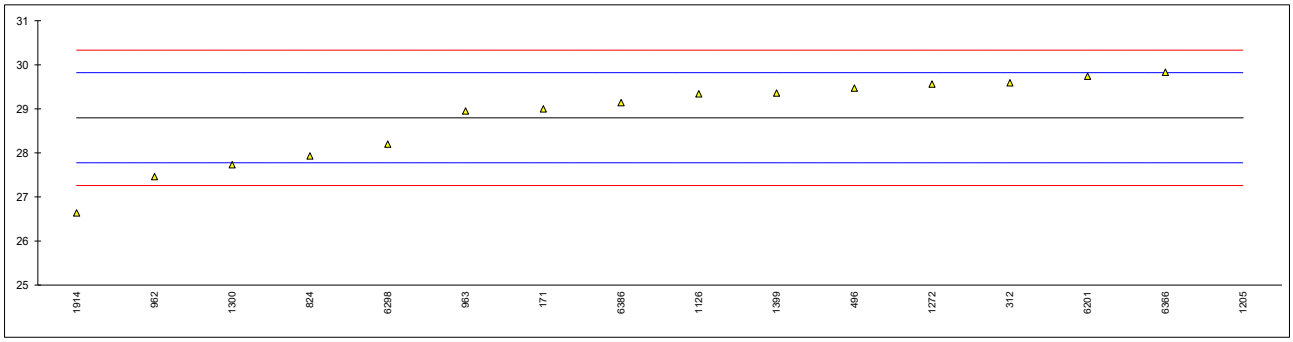


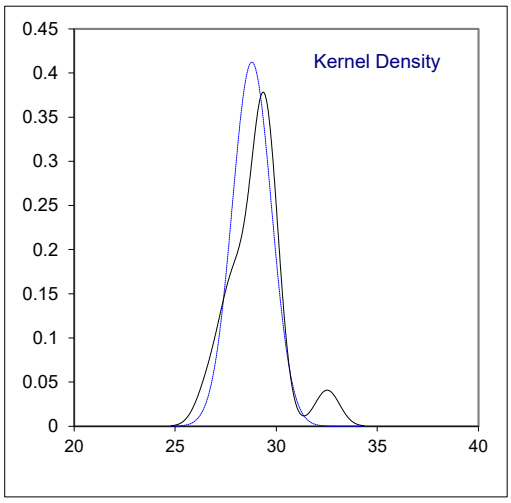


Determination of Aromatics by GC on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171	ISO22854-A	29.0		0.40	
312	ISO22854-A	29.59		1.55	
496	ISO22854-A	29.47		1.32	
541		-----		-----	
824	D5580	27.93		-1.69	
962	D5580	27.46		-2.61	
963	D6730	28.95		0.30	
1126	ISO22854-A	29.34		1.06	
1194		-----		-----	
1205	D8071	32.525	G(0.05)	7.28	
1227		-----		-----	
1272	ISO22854-A	29.56		1.49	
1300	ISO22854-A	27.73		-2.08	
1399	D6839	29.36		1.10	
1521		-----		-----	
1720		-----		-----	
1914	D6729	26.638		-4.21	
6075		-----		-----	
6201	ISO22854	29.74		1.84	
6298	D6730	28.20		-1.16	
6308		-----		-----	
6366	D5580	29.83		2.02	
6378		-----		-----	
6386	D5580	29.1399		0.67	

normality	OK
n	15
outliers	1
mean (n)	28.796
st.dev. (n)	0.9677
R(calc.)	2.710
st.dev.(ISO22854-A:16)	0.5122
R(ISO22854-A:16)	1.434

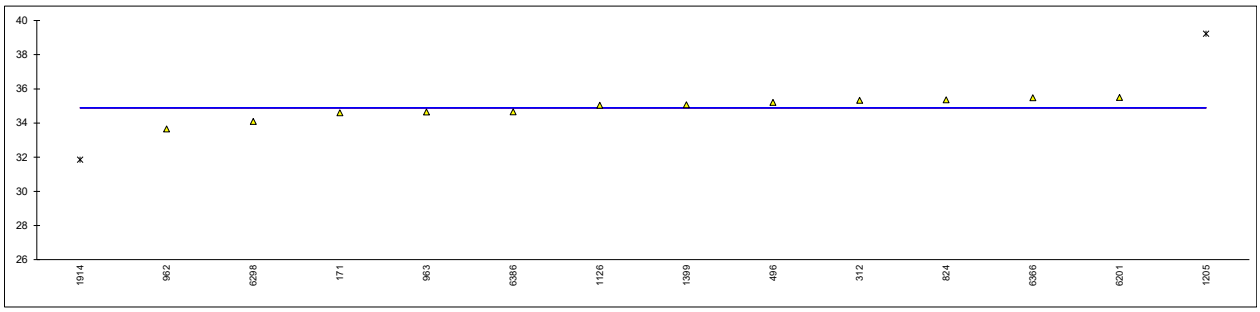


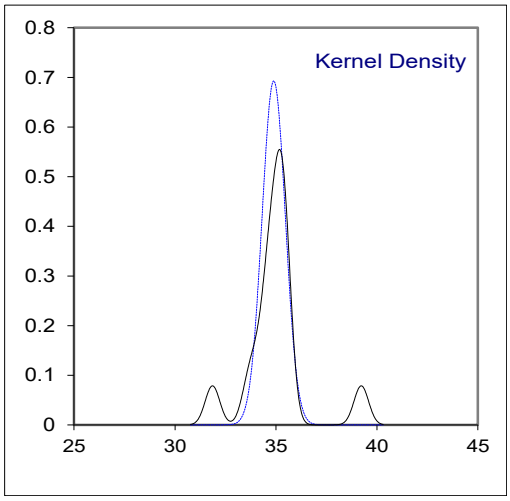


Determination of Aromatics by GC on sample #21060; results in %M/M

lab	method	value	mark	z(targ)	remarks
171	ISO22854-A	34.6		-----	
312	ISO22854-A	35.33		-----	
496	ISO22854-A	35.21		-----	
541		-----		-----	
824	D5580	35.36		-----	
962	D5580	33.65	C	-----	First reported 32.65
963	D6730	34.65		-----	
1126	ISO22854-A	35.04		-----	
1194		-----		-----	
1205	D8071	39.225	G(0.05)	-----	
1227		-----		-----	
1272		-----		-----	
1300		-----		-----	
1399	D6839	35.07		-----	
1521		-----		-----	
1720		-----		-----	
1914	D6729	31.853	G(0.01)	-----	
6075		-----		-----	
6201	ISO22854	35.50		-----	
6298	D6730	34.10		-----	
6308		-----		-----	
6366	D5580	35.48		-----	
6378		-----		-----	
6386	D5580	34.6599		-----	

	normality	OK
	n	12
	outliers	2
	mean (n)	34.887
	st.dev. (n)	0.5759
	R(calc.)	1.613
	st.dev.(lit)	n.a.
	R(lit)	n.a.
compare		
	R(iis20B03)	1.273

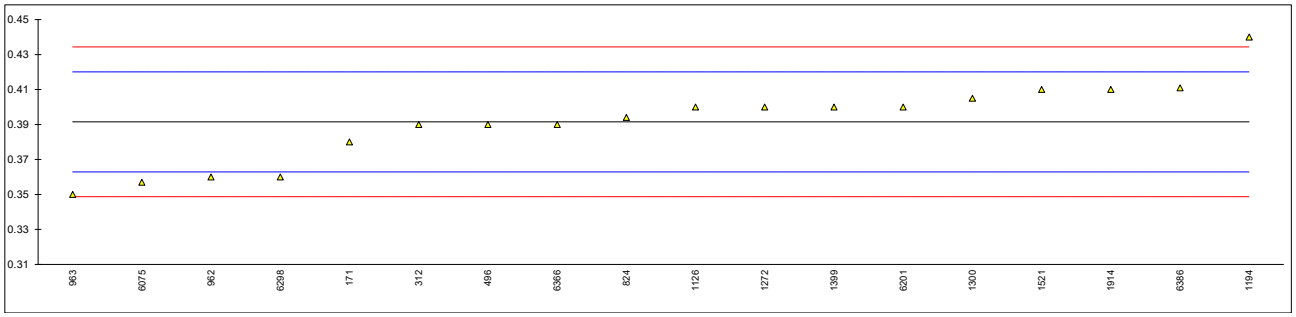


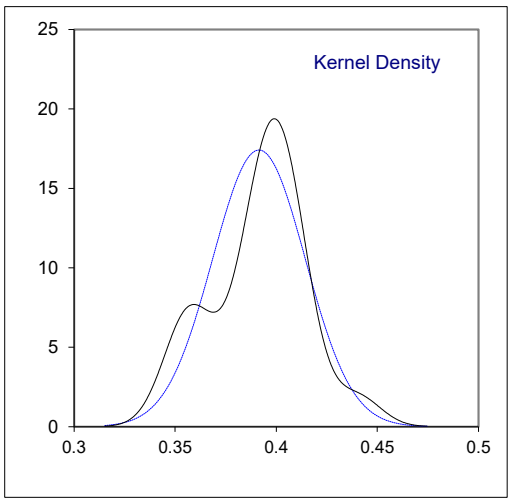


Determination of Benzene on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171	ISO22854-A	0.38		-0.81	
312	ISO22854-A	0.39		-0.11	
496	ISO22854-A	0.390		-0.11	
541		-----		-----	
824	D5580	0.394		0.17	
962	D5580	0.36		-2.21	
963	D5580	0.35		-2.91	
1126	ISO22854-A	0.40		0.59	
1194	D6277	0.44		3.39	
1205		-----		-----	
1227		-----		-----	
1272	ISO22854-A	0.40		0.59	
1300	ISO22854-A	0.405		0.94	
1399	D6839	0.40		0.59	
1521	D4815	0.41		1.29	
1720		-----		-----	
1914	D5580	0.41		1.29	
6075	EN238	0.357		-2.42	
6201	ISO22854	0.40		0.59	
6298	D5580	0.36		-2.21	
6308		-----		-----	
6366	D5580	0.39		-0.11	
6378		-----		-----	
6386	D5580	0.411		1.36	

normality	OK
n	18
outliers	0
mean (n)	0.392
st.dev. (n)	0.0229
R(calc.)	0.064
st.dev.(ISO22854-A:16)	0.0143
R(ISO22854-A:16)	0.04





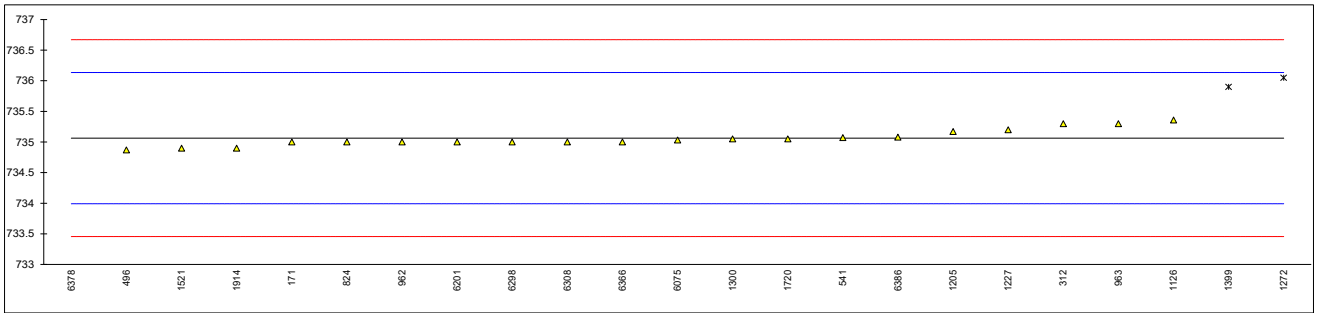
Determination of Copper Corrosion 3hrs at 50°C on sample #21060;

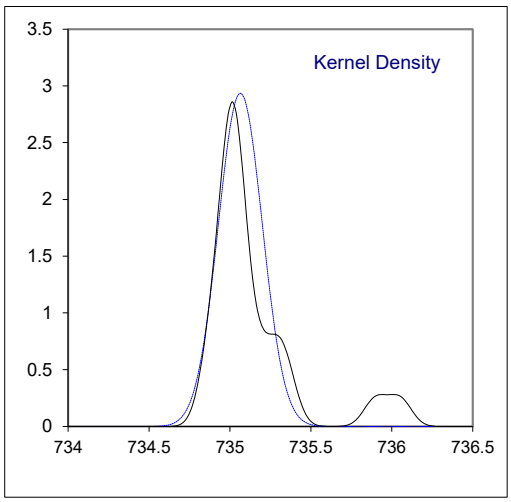
lab	method	value	mark	z(targ)	remarks
171	D130	1a		-----	
312	D130	1a		-----	
496	ISO2160	1a		-----	
541	D130	1a		-----	
824	D130	1a		-----	
962	D130	1A		-----	
963	D130	1a		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227	D130	1A		-----	
1272	ISO2160	1a		-----	
1300	ISO2160	1[1a]		-----	
1399	D130	1		-----	
1521	ISO2160	1		-----	
1720	D130	1a		-----	
1914	D130	1A		-----	
6075	ISO2160	1a		-----	
6201	D130	1A		-----	
6298	D130	1a		-----	
6308	D130	1a		-----	
6366	D130	1A		-----	
6378		-----		-----	
6386	D130	1a		-----	
	n	20			
	mean (n)	1 (1a)			

Determination of Density at 15°C on sample #21060; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
171	ISO12185	735.0		-0.12	
312	ISO12185	735.3		0.44	
496	ISO12185	734.87		-0.36	
541	D4052	735.07		0.01	
824	ISO12185	735.0		-0.12	
962	D4052	735.0		-0.12	
963	D4052	735.3		0.44	
1126	ISO12185	735.36		0.55	
1194		-----		-----	
1205	ISO12185	735.17		0.20	
1227	D4052	735.2		0.25	
1272	ISO12185	736.05	R(0.01)	1.84	
1300	ISO12185	735.05		-0.03	
1399	D4052	735.9	R(0.01)	1.56	
1521	ISO12185	734.9		-0.31	
1720	D4052	735.05		-0.03	
1914	D4052	734.9		-0.31	
6075	ISO12185	735.03		-0.06	
6201	D4052	735.0		-0.12	
6298	D4052	735.0		-0.12	
6308	D4052	735.0		-0.12	
6366	D4052	735.0		-0.12	
6378	D1298	730.1	C,R(0.01)	-9.27	First reported 737.9
6386	D4052	735.08		0.03	

normality	OK
n	20
outliers	3
mean (n)	735.064
st.dev. (n)	0.1358
R(calc.)	0.380
st.dev.(ISO12185:96)	0.5357
R(ISO12185:96)	1.5

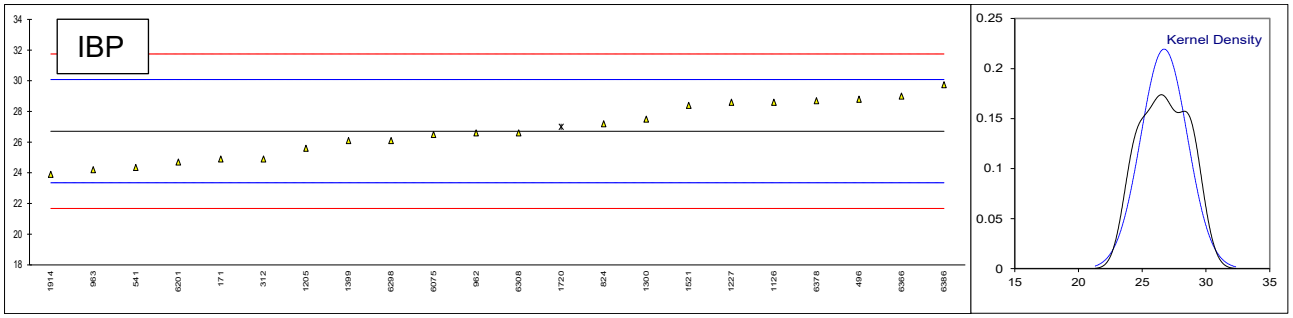


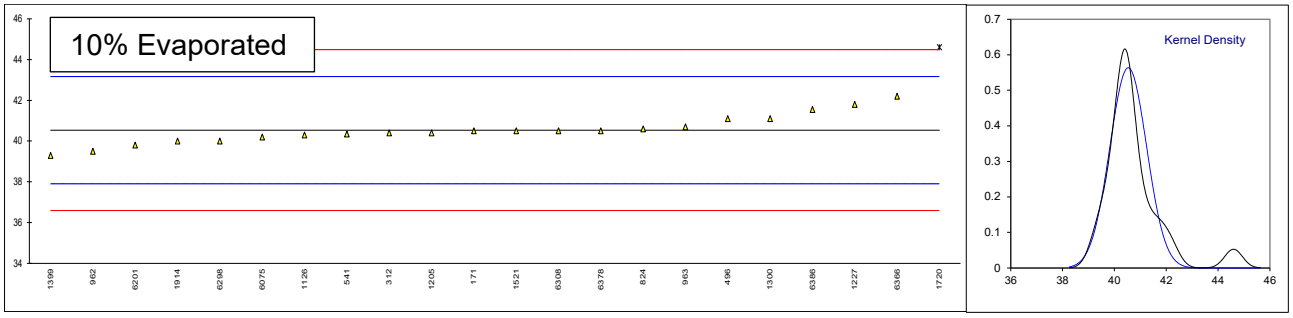


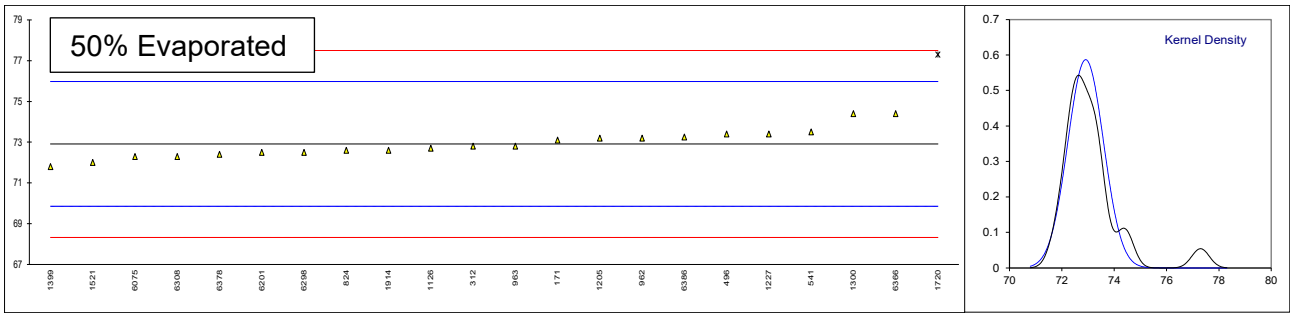
Determination of Distillation at 760 mmHg on sample #21060; results in °C

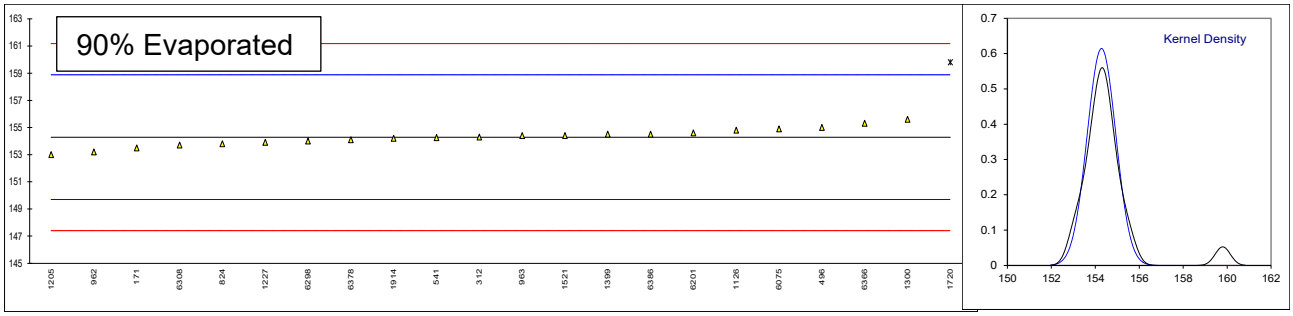
lab	method	IBP	mark	10% eva	mark	50% eva	mark	90% eva	mark	FBP	mark
171	D86-automated	24.9		40.5		73.1		153.5		196.1	
312	D86-automated	24.9		40.4		72.8		154.3		195.4	
496	D86-automated	28.8		41.1		73.4		155.0		194.8	
541	D86-automated	24.35		40.35		73.50		154.25		195.80	
824	D86-automated	27.2		40.6		72.6		153.8		196.0	
962	D86-automated	26.6		39.5		73.2		153.2		195.0	
963	ISO3405-automated	24.2		40.7		72.8		154.4		197.7	
1126	ISO3405-automated	28.6		40.3		72.7		154.8		205.1	R(0.01)
1194		-----		-----		-----		-----		-----	
1205	D86-automated	25.6		40.4		73.2		153.0		193.9	
1227		28.6		41.8	C	73.4	C	153.9	C	194.3	
1272		-----		-----		-----		-----		195.6	
1300	ISO3405-automated	27.5		41.1		74.4		155.6		198.8	
1399	D86-automated	26.1		39.3		71.8		154.5		197.1	
1521	ISO3405-automated	28.4		40.5		72.0		154.4		193.7	
1720	D86-automated	27.0	ex	44.6	R(0.01)	77.3	R(0.01)	159.8	R(0.01)	193.6	ex
1914	D86-automated	23.9		40.0		72.6		154.2		195.4	
6075		26.5		40.2		72.3		154.9		194.1	
6201	ISO3405-automated	24.7		39.8		72.5		154.6		197.7	
6298	D86-automated	26.1		40.0		72.5		154.0		196.0	
6308	D86-automated	26.6		40.5		72.3		153.7		194.8	
6366	D86-automated	29.0		42.2		74.4		155.3		196.3	
6378	D86-manual	28.7		40.5		72.4		154.1		196.9	
6386	D86-automated	29.75		41.55		73.25		154.50		197.70	
	normality	OK		OK		OK		OK		OK	
	n	21		21		21		21		21	
	outliers	0+1ex		1		1		1		1+1ex	
	mean (n)	26.714		40.538		72.912		154.283		195.862	
	st.dev. (n)	1.8177		0.7080		0.6801		0.6491		1.4005	
	R(calc.)	5.090		1.982		1.904		1.817		3.921	
	st.dev.(ISO3405-A:19)	1.6786		1.3158		1.5300		2.2965		2.5357	
	R(ISO3405-A:19)	4.7		3.684		4.284		6.430		7.1	

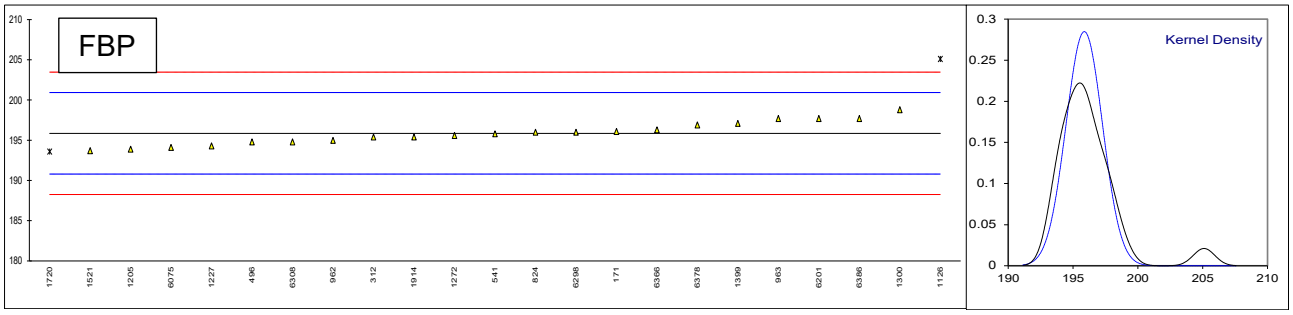
Lab 1227 first reported for Temp at 10% evaporated: 43.4, for Temp at 50% evaporated: 75.4 and for Temp at 90% evaporated: 157.8


IBP
Kernel Density


10% Evaporated
Kernel Density


50% Evaporated
Kernel Density

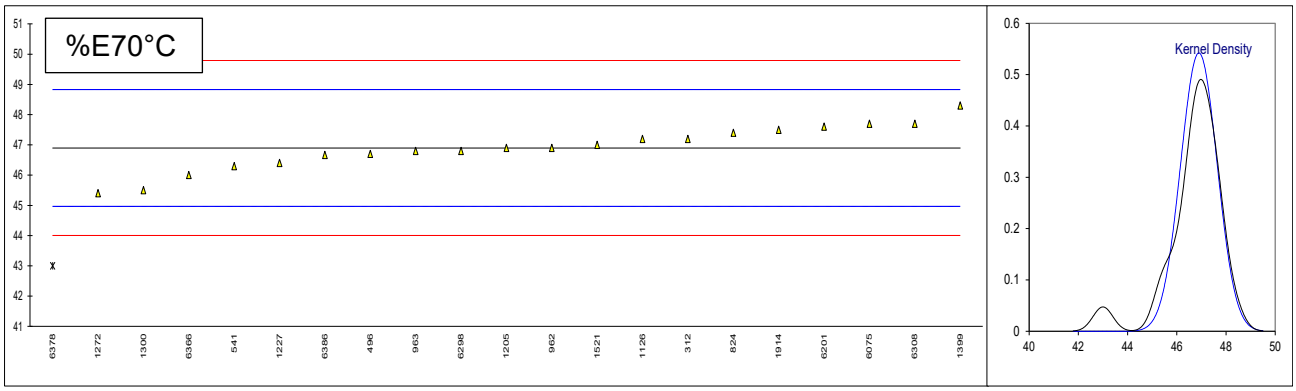

90% Evaporated
Kernel Density

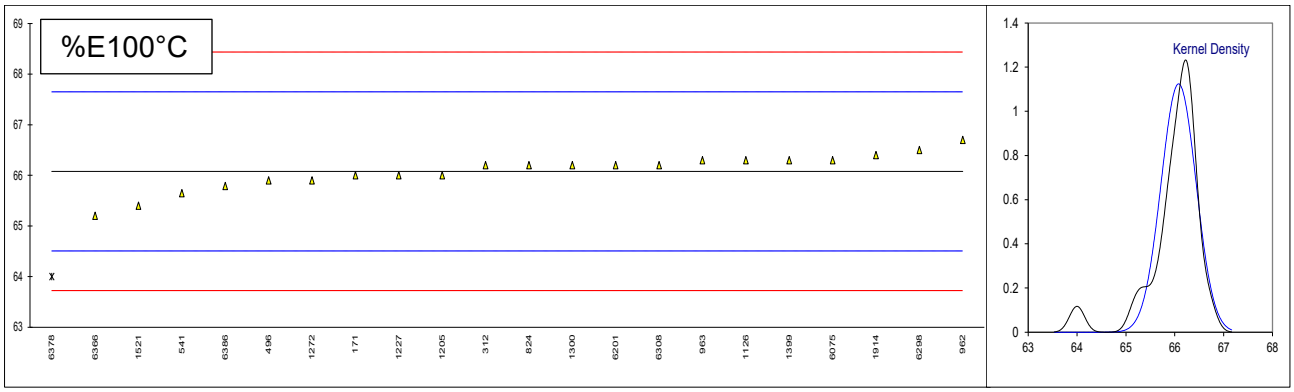

FBP
Kernel Density

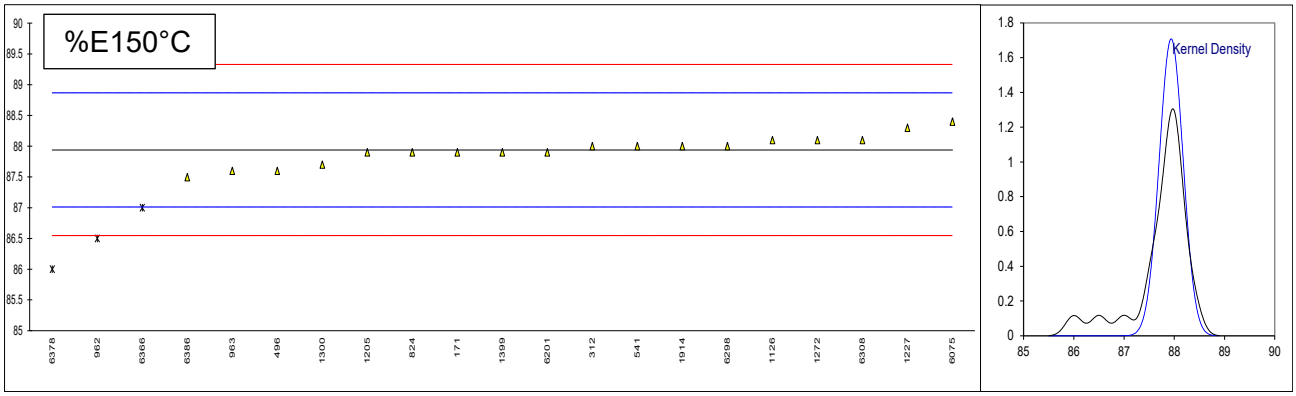
Determination of Distillation at 760 mmHg on sample #21060; results in %V/V ---continued---

lab	method	%E70°C	mark	%E100°C	mark	%E150°C	mark	%residue	mark	%loss	mark
171	D86-automated	-----		66.0		87.9		1.2		1.7	
312	D86-automated	47.2		66.2		88.0		1.0		2.4	
496	D86-automated	46.7		65.9		87.6		1.2		2.0	
541	D86-automated	46.30		65.65		88.00		1.0		1.7	
824	D86-automated	47.4		66.2		87.9		1.0		1.5	
962	D86-automated	46.9		66.7		86.5	C,R1	1.0		2.1	
963	ISO3405-automated	46.8		66.3		87.6		1.0		1.7	
1126	ISO3405-automated	47.2		66.3		88.1		0.8		3.0	
1194		-----		-----		-----		-----		-----	
1205	D86-automated	46.9		66.0		87.9		1.0		1.9	
1227		46.4		66.0		88.3		0.7		1.9	
1272		45.4		65.9		88.1		0.8		1.6	
1300	ISO3405-automated	45.5		66.2	C	87.7		1.0		1.3	
1399	D86-automated	48.3		66.3		87.9		1.0		2.6	
1521	ISO3405-automated	47.0		65.4		-----	W	1.0		2.4	
1720	D86-automated	-----		-----		-----		1		2	
1914	D86-automated	47.5		66.4		88.0		1.0		0.5	
6075		47.7		66.3		88.4		1.1		2.7	
6201	ISO3405-automated	47.6		66.2		87.9		0.9		2.1	
6298	D86-automated	46.8		66.5		88.0		1.0		1.7	
6308	D86-automated	47.7		66.2		88.1		0.7		2.2	
6366	D86-automated	46.0		65.2		87.0	R5	1.3		1.0	
6378	D86-manual	43.0	C,R1	64.0	C,R1	86.0	C,R1	1.0		1.5	
6386	D86-automated	46.665		65.79		87.495		1.4		1.3	
	normality	OK		OK		OK					
	n	20		21		18					
	outliers	1		1		3					
	mean (n)	46.898		66.078		87.939					
	st.dev. (n)	0.7354		0.3549		0.2335					
	R(calc.)	2.059		0.994		0.654					
	st.dev.(ISO3405-A:19)	0.9643		0.7857		0.4643					
	R(ISO3405-A:19)	2.7		2.2		1.3					

Lab 962 first reported for %E150°C: 89
Lab 1300 first reported for %E100°C: 65
Lab 1521 withdraw result for %E150°C, reported 86.9
Lab 6378 first reported for %E70°C: 51.3, for %E100°C: 66.3 and for %E150°C: 90.7


%E70°C
Kernel Density


%E100°C
Kernel Density


%E150°C
Kernel Density

Determination of Doctor Test on sample #21060;

lab	method	value	mark	z(targ)	remarks
171	D4952	Negative		-----	
312	IP30	negative		-----	
496	ISO5275	negative		-----	
541		-----		-----	
824	D4952	Negative		-----	
962	D4952	Negative		-----	
963	D4952	Negative		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272		-----		-----	
1300	D4952	Negative		-----	
1399	IP30	Negative		-----	
1521		-----		-----	
1720	D4952	Negative		-----	
1914	D4952	Negative		-----	
6075		-----		-----	
6201	D4952	Negative		-----	
6298	IP30	Negative		-----	
6308	IP30	Negative		-----	
6366	IP30	Negative		-----	
6378		-----		-----	
6386		-----		-----	
	n	14			
	mean (n)	Negative			

Determination of Gum (solvent washed) on sample #21060; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
171	D381	<0.5		-----	
312	D381	1.0		-----	
496	ISO6246	0.8		-----	
541	D381	<0.5		-----	
824	ISO6246	<0.5		-----	
962	D381	<0.5		-----	
963	D381	<0.5		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272	ISO6246	1.1		-----	
1300	ISO6246	0.4		-----	
1399	D381	0.3		-----	
1521	ISO6246	0.4		-----	
1720	D381	41.5		-----	Possibly a false positive test result?
1914	D381	< 0.5		-----	
6075	ISO6246	0		-----	
6201	D381	<0.5		-----	
6298	D381	0.50		-----	
6308	D381	1		-----	
6366	D381	<0.5		-----	
6378		-----		-----	
6386	D381	<0.5		-----	
	n	14			
	mean (n)	<0.5			

Determination of Lead as Pb on sample #21060; results in mg/L

lab	method	value	mark	z(targ)	remarks
171	D3237	<2.5		-----	
312	EN237	<2.5		-----	
496	EN237	<2		-----	
541	D3237	<2.5		-----	
824	D3237	<2.5		-----	
962	D3237	<2.5		-----	
963		-----		-----	
1126		-----		-----	
1194		4.73		-----	Possibly a false positive test result?
1205		-----		-----	
1227		-----		-----	
1272	EN237	0.8		-----	
1300	EN237	<2.5		-----	
1399	In house	<1		-----	
1521	EN237	< 2,5		-----	
1720	D3237	4.4		-----	Possibly a false positive test result?
1914	D3237	< 2.5		-----	
6075		-----		-----	
6201	D3237	<2.5		-----	
6298	D3237	<2.5		-----	
6308		-----		-----	
6366		-----		-----	
6378		-----		-----	
6386	D3237	<2.5		-----	
	n	14			
	mean (n)	<2.5			

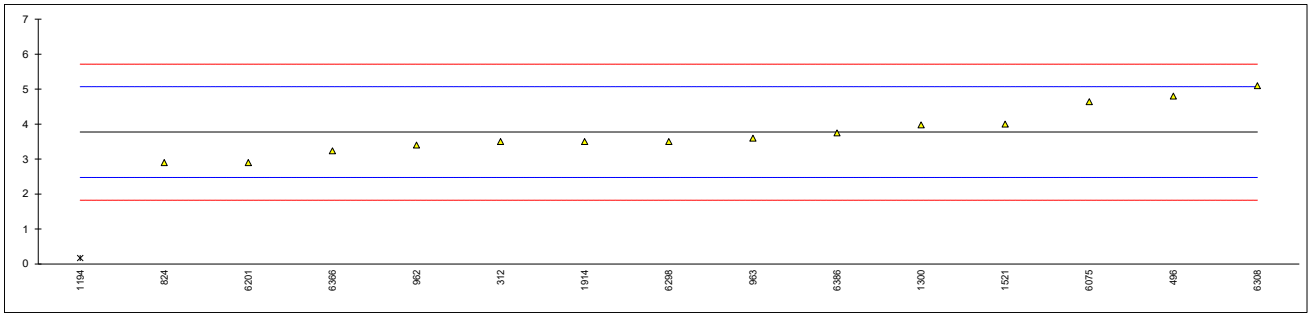
Determination of Manganese as Mn on sample #21060; results in mg/L

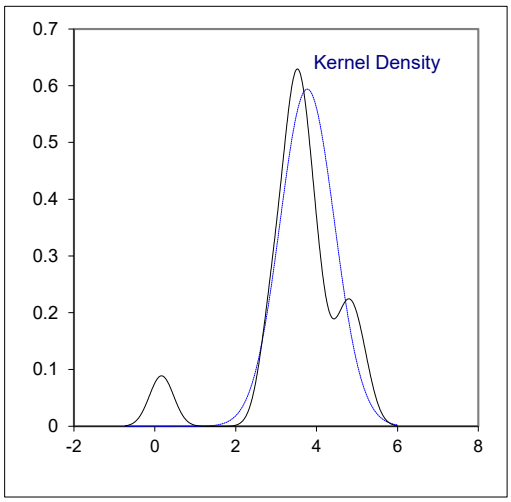
lab	method	value	mark	z(targ)	remarks
171	D3831	<0.25		-----	
312	EN16136	<0.5		-----	
496	EN16136	0.12		-----	
541	D3831	<0.25		-----	
824		-----		-----	
962	D3831	<0.25		-----	
963		-----		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272	EN16135	0.57		-----	
1300	EN16135	<0.5		-----	
1399	In house	<1		-----	
1521	EN16135	<0,5		-----	
1720		-----		-----	
1914	D3831	< 0.25		-----	
6075	EN16135	<2.0		-----	
6201	D3831	<0.25		-----	
6298	D3831	<0.25		-----	
6308		-----		-----	
6366		-----		-----	
6378		-----		-----	
6386		-----		-----	
	n	13			
	mean (n)	<2.0			

Determination of Olefins by FIA (without oxygenates correction) on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	EN15553	3.5		-0.42	
496	D1319	4.8		1.59	
541		-----		-----	
824	D1319	2.9		-1.34	
962	D1319	3.4		-0.57	
963	D1319	3.6		-0.26	
1126		-----		-----	
1194	D1319	0.17	G(0.01)	-5.56	
1205		-----		-----	
1227		-----		-----	
1272		-----		-----	
1300	EN15553	3.98		0.32	
1399		-----		-----	
1521	EN15553	4.0		0.35	
1720		-----		-----	
1914	D1319	3.5		-0.42	
6075	EN15553	4.64		1.34	
6201	D1319	2.9		-1.34	
6298	D1319	3.5		-0.42	
6308	D1319	5.1		2.05	
6366	D1319	3.235		-0.83	
6378		-----		-----	
6386	D1319	3.75		-0.03	

normality	OK
n	14
outliers	1
mean (n)	3.77
st.dev. (n)	0.672
R(calc.)	1.88
st.dev.(EN15553:07)	0.648
R(EN15553:07)	1.82

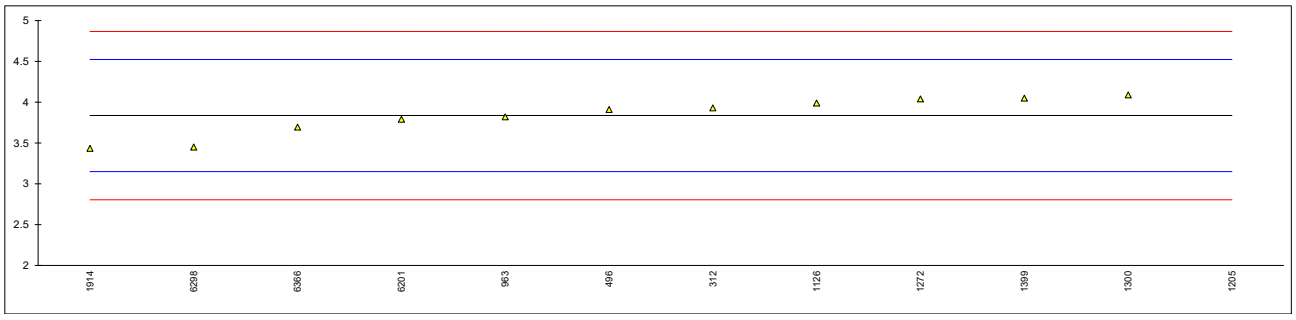


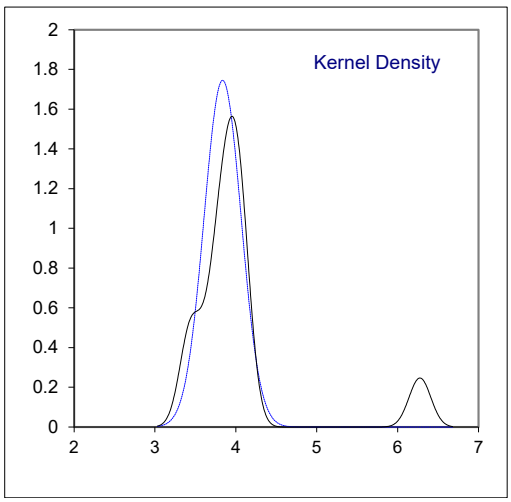


Determination of Olefins by GC on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	3.93		0.27	
496	ISO22854-A	3.91		0.21	
541		-----		-----	
824		-----		-----	
962		-----		-----	
963	D6730	3.82		-0.05	
1126	ISO22854-A	3.99		0.45	
1194		-----		-----	
1205	D8071	6.276	G(0.01)	7.09	
1227		-----		-----	
1272	ISO22854-A	4.04		0.59	
1300	ISO22854-A	4.09		0.74	
1399	D6839	4.05		0.62	
1521		-----		-----	
1720		-----		-----	
1914	D6729	3.434		-1.17	
6075		-----		-----	
6201	ISO22854	3.79		-0.13	
6298	D6730	3.45		-1.12	
6308		-----		-----	
6366	D6730	3.69435		-0.41	
6378		-----		-----	
6386		-----		-----	

normality	OK
n	11
outliers	1
mean (n)	3.836
st.dev. (n)	0.2287
R(calc.)	0.640
st.dev.(ISO22854-A:16)	0.3439
R(ISO22854-A:16)	0.963

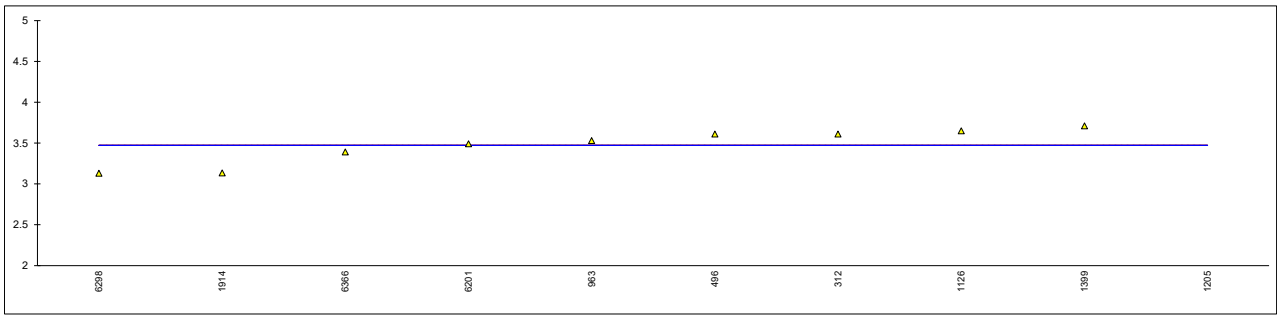


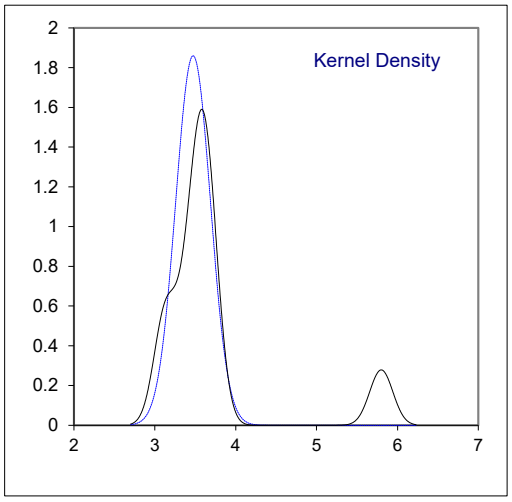


Determination of Olefins by GC on sample #21060; results in %M/M

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	3.61		-----	
496	ISO22854-A	3.61		-----	
541		-----		-----	
824		-----		-----	
962		-----		-----	
963	D6730	3.53		-----	
1126	ISO22854-A	3.65		-----	
1194		-----		-----	
1205	D8071	5.801	G(0.01)	-----	
1227		-----		-----	
1272		-----		-----	
1300		-----		-----	
1399	D6839	3.71		-----	
1521		-----		-----	
1720		-----		-----	
1914	D6729	3.133		-----	
6075		-----		-----	
6201	ISO22854	3.49		-----	
6298	D6730	3.13		-----	
6308		-----		-----	
6366	D6730	3.3922		-----	
6378		-----		-----	
6386		-----		-----	

	normality	OK
	n	9
	outliers	1
	mean (n)	3.473
	st.dev. (n)	0.2146
	R(calc.)	0.601
	st.dev.(lit)	n.a.
	R(lit)	n.a.
compare		
	R(iis20B03)	0.532





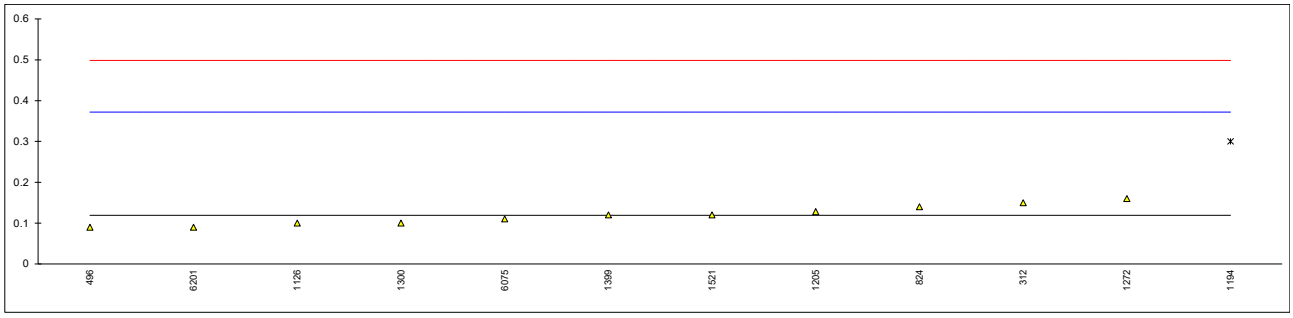
Determination of Oxidation Stability on sample #21060; results in minutes

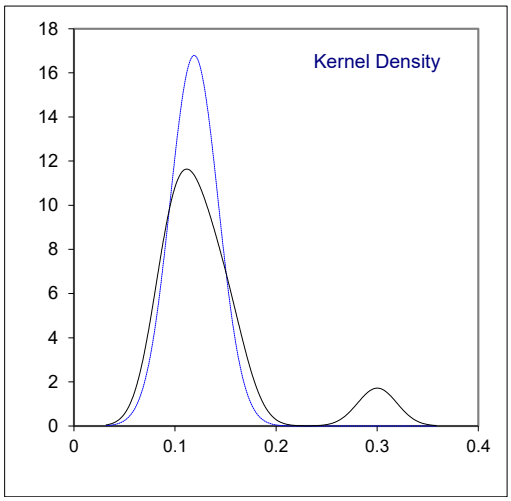
lab	method	value	mark	z(targ)	remarks
171	D525	241		-----	
312	D525	>900		-----	
496	D525	>1000		-----	
541		-----		-----	
824	D525	>900		-----	
962		-----		-----	
963	D525	>240		-----	
1126		-----		-----	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272	ISO7536	>900		-----	
1300	ISO7536	>900		-----	
1399		-----		-----	
1521	ISO7536	>1440		-----	
1720		-----		-----	
1914	D525	> 900		-----	
6075		-----		-----	
6201	D525	>900		-----	
6298	D525	>360		-----	
6308		-----		-----	
6366	D525	>900		-----	
6378		-----		-----	
6386		-----		-----	
	n	12			
	mean (n)	>240			

Determination of Ethanol on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	0.15		0.25	
496	ISO22854-A	0.090		-0.23	
541		-----		-----	
824	D4815	0.14		0.17	
962		-----		-----	
963	D4815	<0.20		-----	
1126		0.10		-0.15	
1194	D5845	0.3	G(0.01)	1.43	
1205		0.128		0.07	
1227		-----		-----	
1272	ISO22854-A	0.16		0.32	
1300	ISO22854-A	0.10		-0.15	
1399	D4815	0.12	C	0.01	First reported 0
1521	D4815	0.12		0.01	
1720		-----		-----	
1914	D4815	< 0.2		-----	
6075	EN13132	0.11		-0.07	
6201	ISO22854	0.09		-0.23	
6298	D4815	<0.20		-----	
6308		-----		-----	
6366	D4815	<0.20		-----	
6378		-----		-----	
6386	D4815	<0.20		-----	

normality	OK
n	11
outliers	1
mean (n)	0.119
st.dev. (n)	0.0238
R(calc.)	0.067
st.dev.(ISO22854-A:16)	0.1266
R(ISO22854-A:16)	0.354

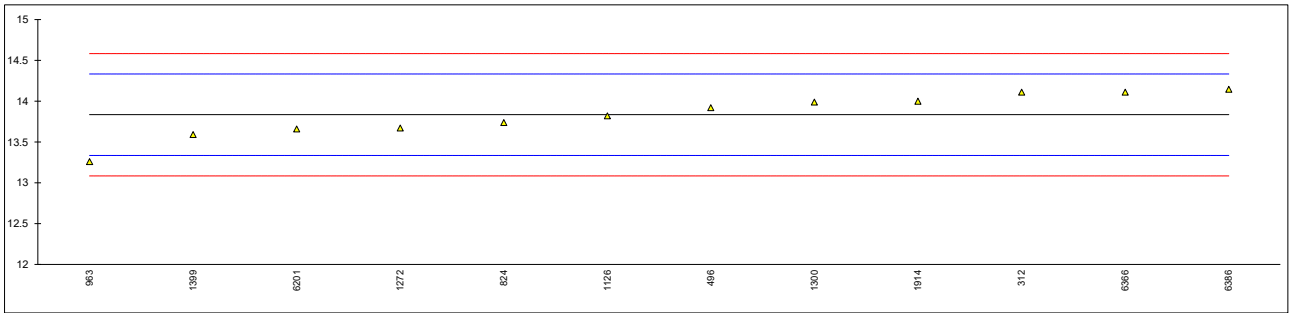


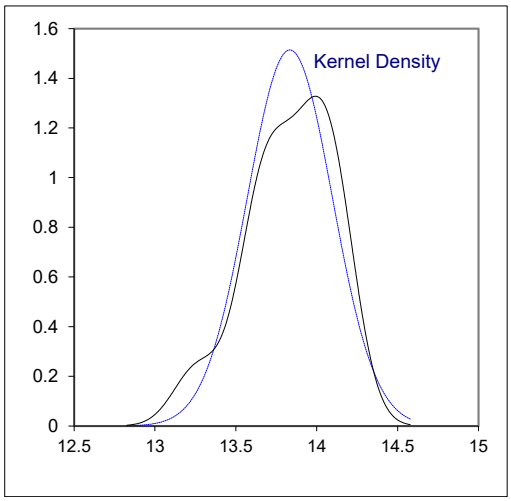


Determination of Ethers (C5 or more C atoms) on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	14.11		1.10	
496	ISO22854-A	13.920		0.34	
541		-----		-----	
824	D4815	13.738		-0.39	
962		-----		-----	
963	D4815	13.26	C	-2.30	First reported <0.20
1126		13.82		-0.06	
1194		-----		-----	
1205		-----		-----	
1227		-----		-----	
1272	ISO22854-A	13.67		-0.66	
1300	ISO22854-A	13.99		0.62	
1399	D4815	13.59	C	-0.98	First reported 11.15
1521		-----	W	-----	Test result withdrawn, reported 12.87
1720		-----		-----	
1914	D4815	14.00		0.66	
6075		-----		-----	
6201	ISO22854	13.66		-0.70	
6298		-----	W	-----	Test result withdrawn, reported <0.20
6308		-----		-----	
6366	D4815	14.11		1.10	
6378		-----		-----	
6386	D4815	14.145		1.24	

normality	OK
n	12
outliers	0
mean (n)	13.834
st.dev. (n)	0.2635
R(calc.)	0.738
st.dev.(ISO22854-A:16)	0.2496
R(ISO22854-A:16)	0.699

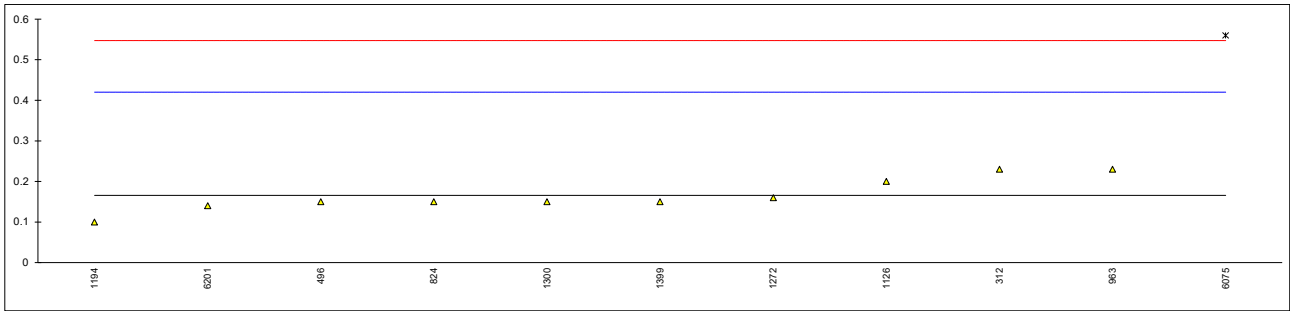


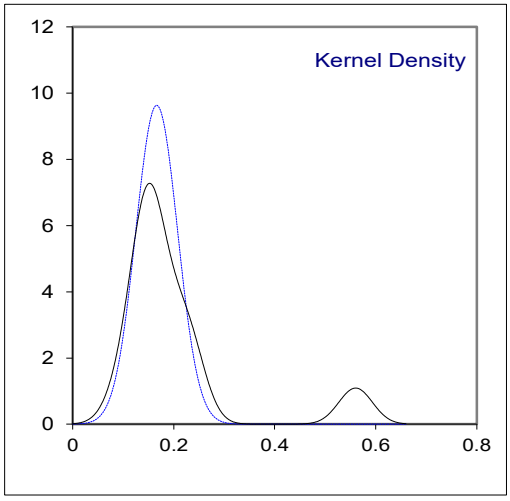


Determination of ETBE on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	0.23		0.50	
496	ISO22854-A	0.150		-0.13	
541		-----		-----	
824	D4815	0.15		-0.13	
962		-----		-----	
963	D4815	0.23		0.50	
1126		0.20		0.27	
1194	D5845	0.1		-0.52	
1205		-----		-----	
1227		-----		-----	
1272	ISO22854-A	0.16	C	-0.05	First reported 1.03
1300	ISO22854-A	0.15		-0.13	
1399	D4815	0.15	C	-0.13	First reported 0.24
1521	D4815	<0,1		-----	
1720		-----		-----	
1914	D4815	< 0.2		-----	
6075	EN13132	0.56	G(0.01)	3.10	
6201	ISO22854	0.14		-0.20	
6298	D4815	<0.20		-----	
6308		-----		-----	
6366	D4815	<0.20		-----	
6378		-----		-----	
6386	D4815	<0.20		-----	

normality	OK
n	10
outliers	1
mean (n)	0.166
st.dev. (n)	0.0414
R(calc.)	0.116
st.dev.(ISO22854-A:16)	0.1270
R(ISO22854-A:16)	0.356

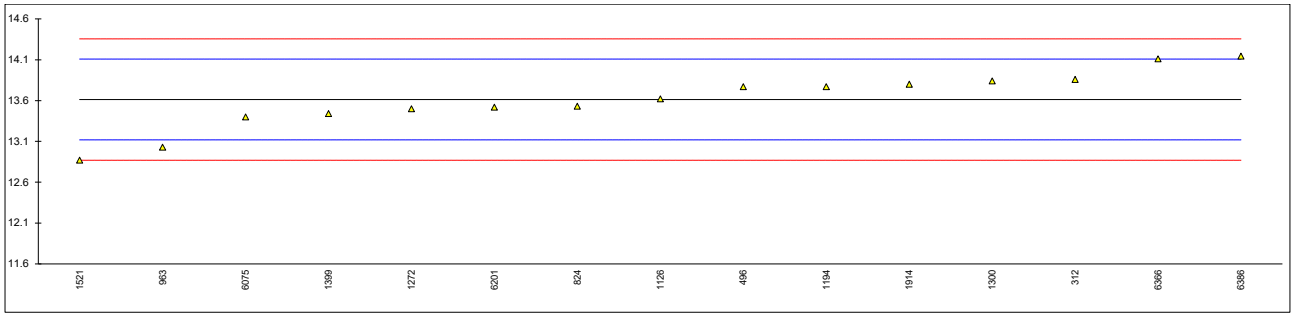


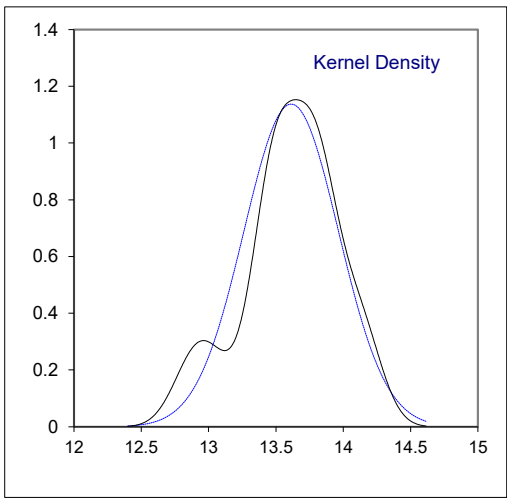


Determination of MTBE on sample #21060; results in %V/V

lab	method	value	mark	z(targ)	remarks
171		-----		-----	
312	ISO22854-A	13.86		0.99	
496	ISO22854-A	13.770		0.63	
541		-----		-----	
824	D4815	13.53		-0.34	
962		-----		-----	
963	D4815	13.03		-2.36	
1126		13.62		0.03	
1194	D5845	13.77		0.63	
1205		-----		-----	
1227		-----		-----	
1272	ISO22854-A	13.5	C	-0.46	First reported 12.51
1300	ISO22854-A	13.84		0.91	
1399	D4815	13.44	C	-0.70	First reported 13.50
1521	D4815	12.87		-3.00	
1720		-----		-----	
1914	D4815	13.80		0.75	
6075	EN13132	13.40		-0.86	
6201	ISO22854	13.52		-0.38	
6298		-----		-----	
6308		-----		-----	
6366	D4815	14.11		2.00	
6378		-----		-----	
6386	D4815	14.145		2.15	

normality	OK
n	15
outliers	0
mean (n)	13.614
st.dev. (n)	0.3508
R(calc.)	0.982
st.dev.(ISO22854-A:16)	0.2476
R(ISO22854-A:16)	0.693

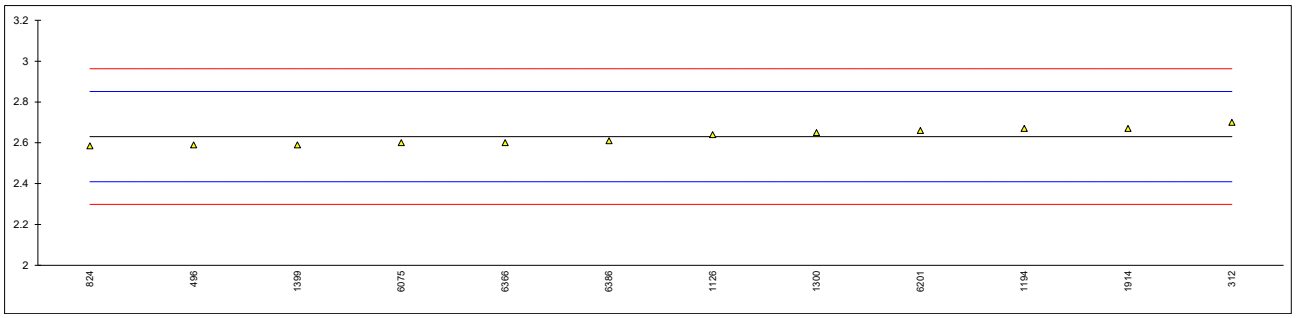


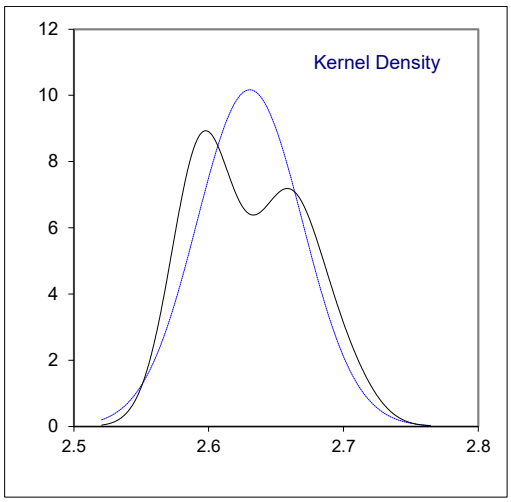


Determination of Oxygen content on sample #21060; results in %M/M

lab	method	value	mark	z(targ)	Remarks
171		-----		-----	
312	ISO22854-A	2.70		0.63	
496	ISO22854-A	2.590		-0.37	
541		-----		-----	
824	D4815	2.585		-0.41	
962		-----		-----	
963		-----		-----	
1126	ISO22854-A	2.64		0.09	
1194	D5845	2.67		0.36	
1205		-----		-----	
1227		-----		-----	
1272		-----		-----	
1300	ISO22854-A	2.65		0.18	
1399	D6839	2.59	C	-0.37	First reported 2.55
1521		-----	W	-----	Test result withdrawn, reported 2.41
1720		-----		-----	
1914	D4815	2.67		0.36	
6075	EN13132	2.60		-0.27	
6201	ISO22854	2.66		0.27	
6298		-----		-----	
6308		-----		-----	
6366	D4815	2.60		-0.27	
6378		-----		-----	
6386	D4815	2.61		-0.18	

normality	OK
n	12
outliers	0
mean (n)	2.630
st.dev. (n)	0.0392
R(calc.)	0.110
st.dev.(ISO22854-A:16)	0.1107
R(ISO22854-A:16)	0.31

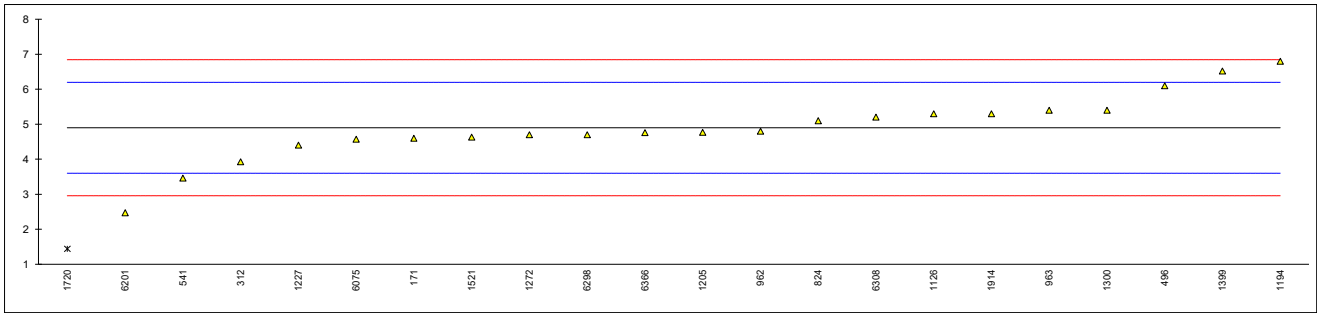


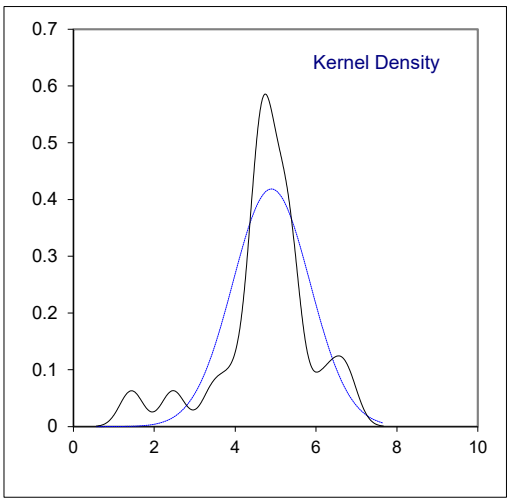


Determination of Total Sulfur on sample #21060; results in mg/kg

	method	value	mark	z(targ)	remarks
171	ISO20846	4.6		-0.46	
312	ISO20846	3.93		-1.50	
496	ISO20884	6.1		1.85	
541	D5453	3.46		-2.22	
824	D5453	5.1		0.31	
962	D5453	4.8		-0.15	
963	D5453	5.4		0.77	
1126	ISO20846	5.3		0.62	
1194	D7220/IP532	6.8		2.93	
1205	ISO20846	4.77		-0.20	
1227	D5453	4.4		-0.77	
1272	ISO20846	4.7		-0.31	
1300	ISO20846	5.4		0.77	
1399	D5453	6.52		2.50	
1521	ISO20846	4.63		-0.42	
1720	D5453	1.44	R(0.05)	-5.33	
1914	D5453	5.3		0.62	
6075	ISO20846	4.57		-0.51	
6201	D5453	2.47		-3.75	
6298	D5453	4.7		-0.31	
6308	D5453	5.2		0.46	
6366	D5453	4.76		-0.22	
6378		-----		-----	
6386		-----		-----	

normality	suspect
n	21
outliers	1
mean (n)	4.900
st.dev. (n)	0.9537
R(calc.)	2.670
st.dev.(ISO20846:19)	0.6490
R(ISO20846:19)	1.817

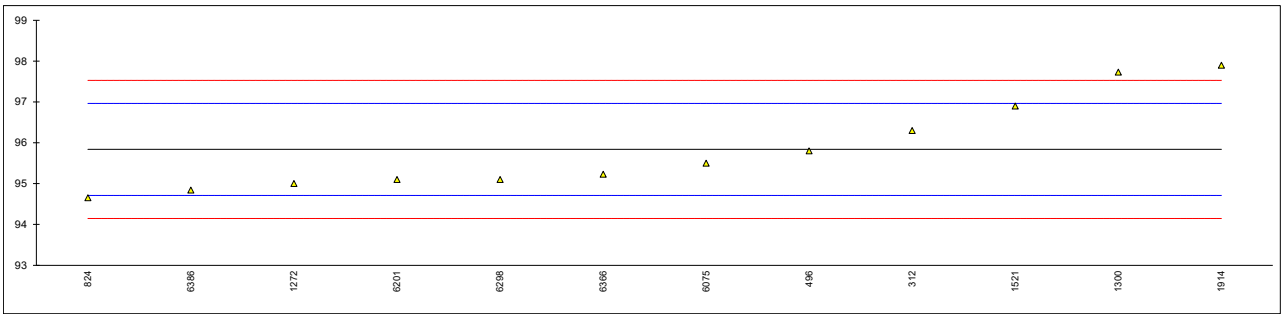


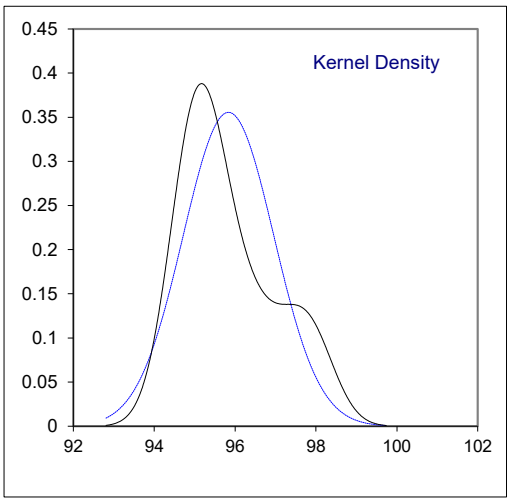


Determination of Air Saturated Vapour Pressure (ASVP) on sample #21061; results in kPa

lab	method	value	mark	z(targ)	remarks
312	D5191	96.3		0.82	
496	EN13016-1	95.8		-0.07	
541		-----		-----	
824	D5191	94.65		-2.10	
962		-----		-----	
963		-----		-----	
1194		-----		-----	
1272	EN13016-1	95.0		-1.48	
1300	EN13016-1	97.73		3.35	Only for DVPE a corrected test result was received.
1399		-----		-----	
1521	EN13016-1	96.9		1.88	
1914	EN13016-1	97.9		3.66	
6075	EN13016-1	95.5		-0.60	
6201	D5191	95.1		-1.31	
6298	D5191	95.1	C	-1.31	First reported 88
6308		-----		-----	
6366	D5191	95.23		-1.08	
6386	D6378	94.84		-1.77	

normality	OK
n	12
outliers	0
mean (n)	95.838
st.dev. (n)	1.1224
R(calc.)	3.143
st.dev.(EN13016-1:18)	0.5643
R(EN13016-1:18)	1.58

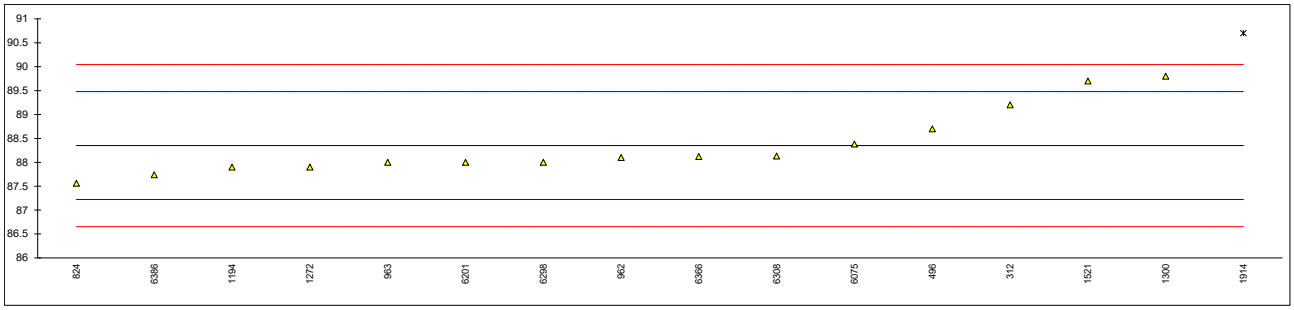


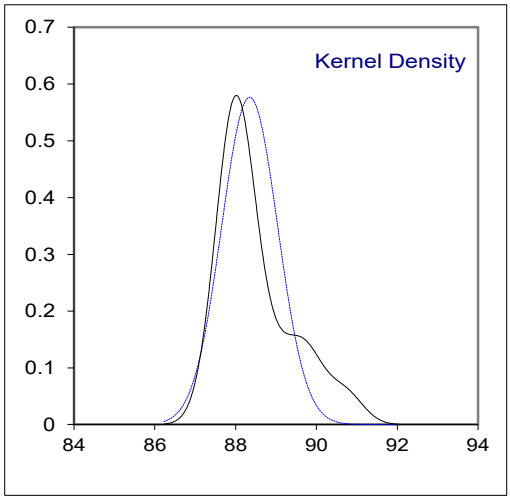


Determination of DVPE (acc. to EN13016-1) on sample #21061; results in kPa

lab	method	value	mark	z(targ)	remarks
312	D5191	89.2		1.51	
496	EN13016-1	88.7		0.62	
541		-----		-----	
824	D5191	87.56	C	-1.40	First reported 86.03
962	D5191	88.1		-0.44	
963	D5191	88.0		-0.62	
1194	EN13016-1	87.9		-0.80	
1272	EN13016-1	87.9		-0.80	
1300	EN13016-1	89.8	C	2.57	First reported 90.53
1399		-----	W	-----	Test result withdrawn, reported 90.6
1521	EN13016-1	89.7		2.39	
1914	EN13016-1	90.7	G(0.05)	4.17	
6075	EN13016-1	88.38		0.06	
6201	D5191	88.0		-0.62	
6298	D5191	88.0	C	-0.62	First reported 81.1
6308	D5191	88.13		-0.39	
6366	D5191	88.12		-0.41	
6386	D6378	87.74		-1.08	

normality	suspect
n	15
outliers	1
mean (n)	88.349
st.dev. (n)	0.6920
R(calc.)	1.937
st.dev.(EN13016-1:18)	0.5643
R(EN13016-1:18)	1.58

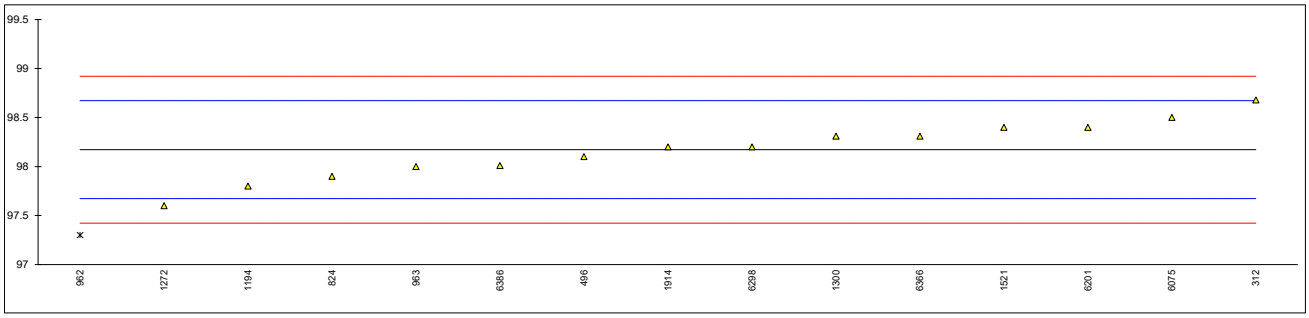


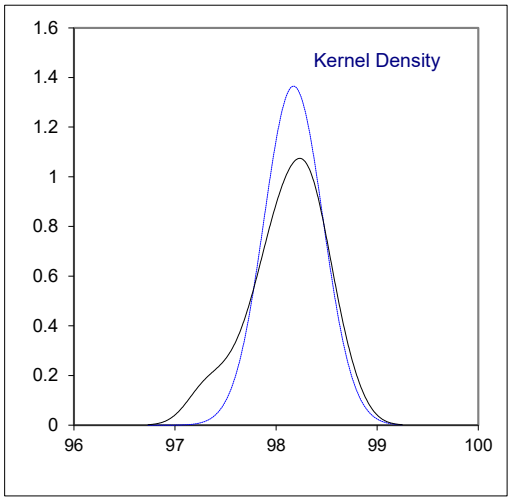


Determination of RON on sample #21062;

lab	method	value	mark	z(targ)	remarks
312	ISO5164	98.68		2.03	
496	ISO5164	98.1		-0.29	
541		-----		-----	
824	D2699	97.9		-1.09	
962	D2699	97.3	G(0.01)	-3.49	
963	D2699	98.0		-0.69	
1194	D2699	97.8		-1.49	
1272	JUP 041401-13	97.6		-2.29	
1300	ISO5164	98.31		0.55	
1399		-----		-----	
1521	ISO5164	98.4		0.91	
1914	D2699	98.2		0.11	
6075	ISO5164	98.50		1.31	
6201	D2699	98.4		0.91	
6298	D2699	98.2		0.11	
6366	D2699	98.31		0.55	
6386	D2699	98.01		-0.65	

normality	OK
n	14
outliers	1
mean (n)	98.17
st.dev. (n)	0.292
R(calc.)	0.82
st.dev.(ISO5164:14)	0.25
R(ISO5164:14)	0.7

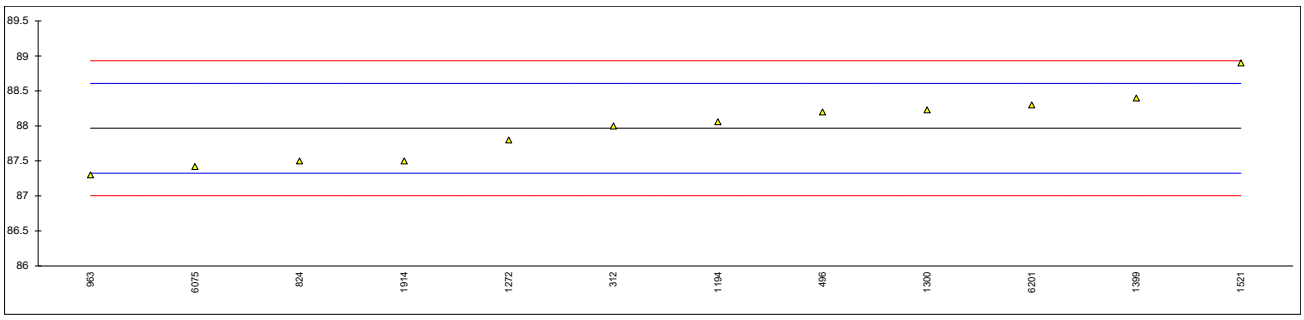


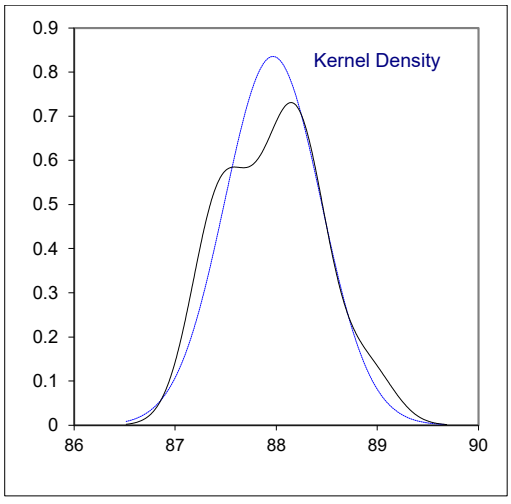


Determination of MON on sample #21062;

lab	method	value	mark	z(targ)	remarks
312	ISO5163	88.00		0.10	
496	ISO5163	88.2		0.72	
541		-----		-----	
824	D2700	87.5		-1.45	
962		-----		-----	
963	D2700	87.3		-2.08	
1194	D2700	88.06		0.29	
1272	JUP 041401-13	87.8		-0.52	
1300	ISO5163	88.23		0.82	
1399	D2700	88.4		1.35	
1521	ISO5163	88.9		2.90	
1914	D2700	87.5		-1.45	
6075	ISO5163	87.42		-1.70	
6201	D2700	88.3		1.03	
6298		-----		-----	
6366		-----		-----	
6386		-----		-----	

normality	OK
n	12
outliers	0
mean (n)	87.97
st.dev. (n)	0.478
R(calc.)	1.34
st.dev.(ISO5163:14)	0.321
R(ISO5163:14)	0.9





APPENDIX 2

Determination of Other Oxygenates on sample #21060; results in %V/V

lab	MeOH	i-PrOH	i-BuOH	t-buOH	DIPE	TAME	Sum of Other Oxygenates
171	-----	-----	-----	-----	-----	-----	-----
312	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
496	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
541	-----	-----	-----	-----	-----	-----	-----
824	0	0	0	0.03	0	0.058	-----
962	-----	-----	-----	-----	-----	-----	-----
963	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-----
1126	0.09	<0,05	<0,05	<0,05	<0,05	<0,05	<0,1
1194	0	0.23	-----	0	-----	0	-----
1205	-----	-----	-----	-----	-----	-----	-----
1227	-----	-----	-----	-----	-----	-----	-----
1272	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
1300	0.03	0.01	0.00	0.03	0.00	0.005	0.028
1399	0.00	0.07 C	0.00 C	0.00	0.00	0.00	0.00
1521	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
1720	-----	-----	-----	-----	-----	-----	-----
1914	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
6075	-----	-----	-----	-----	-----	-----	14.07
6201	0.08	0	0	0	0	0	14.05
6298	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-----
6308	-----	-----	-----	-----	-----	-----	-----
6366	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
6378	-----	-----	-----	-----	-----	-----	-----
6386	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Lab 1399 first reported for i-PrOH: 0.00 and for i-BuOH: 0.05

APPENDIX 3

z-scores Distillation at 760 mmHg

lab	IBP	10% eva	50% eva	90% eva	FBP	%E70°C	%E100°C	%E150°C
171	-1.08	-0.03	0.12	-0.34	0.09	-----	-0.10	-0.08
312	-1.08	-0.10	-0.07	0.01	-0.18	0.31	0.16	0.13
496	1.24	0.43	0.32	0.31	-0.42	-0.21	-0.23	-0.73
541	-1.41	-0.14	0.38	-0.01	-0.02	-0.62	-0.54	0.13
824	0.29	0.05	-0.20	-0.21	0.05	0.52	0.16	-0.08
962	-0.07	-0.79	0.19	-0.47	-0.34	0.00	0.79	-3.10
963	-1.50	0.12	-0.07	0.05	0.72	-0.10	0.28	-0.73
1126	1.12	-0.18	-0.14	0.22	3.64	0.31	0.28	0.35
1194	-----	-----	-----	-----	-----	-----	-----	-----
1205	-0.66	-0.10	0.19	-0.56	-0.77	0.00	-0.10	-0.08
1227	1.12	0.96	0.32	-0.17	-0.62	-0.52	-0.10	0.78
1272	-----	-----	-----	-----	-0.10	-1.55	-0.23	0.35
1300	0.47	0.43	0.97	0.57	1.16	-1.45	0.16	-0.51
1399	-0.37	-0.94	-0.73	0.09	0.49	1.45	0.28	-0.08
1521	1.00	-0.03	-0.60	0.05	-0.85	0.11	-0.86	-----
1720	0.17	3.09	2.87	2.40	-0.89	-----	-----	-----
1914	-1.68	-0.41	-0.20	-0.04	-0.18	0.62	0.41	0.13
6075	-0.13	-0.26	-0.40	0.27	-0.69	0.83	0.28	0.99
6201	-1.20	-0.56	-0.27	0.14	0.72	0.73	0.16	-0.08
6298	-0.37	-0.41	-0.27	-0.12	0.05	-0.10	0.54	0.13
6308	-0.07	-0.03	-0.40	-0.25	-0.42	0.83	0.16	0.35
6366	1.36	1.26	0.97	0.44	0.17	-0.93	-1.12	-2.02
6378	1.18	-0.03	-0.33	-0.08	0.41	-4.04	-2.64	-4.18
6386	1.81	0.77	0.22	0.09	0.72	-0.24	-0.37	-0.96

APPENDIX 4

Number of participants per country

1 lab in	ARGENTINA
1 lab in	BELGIUM
1 lab in	CYPRUS
1 lab in	ESTONIA
1 lab in	GERMANY
1 lab in	GREECE
1 lab in	LATVIA
1 lab in	MALAYSIA
1 lab in	MARTINIQUE
3 labs in	NETHERLANDS
1 lab in	PHILIPPINES
1 lab in	POLAND
2 labs in	SAUDI ARABIA
1 lab in	SERBIA
1 lab in	SOUTH AFRICA
1 lab in	SOUTH KOREA
1 lab in	SUDAN
1 lab in	UGANDA
1 lab in	UNITED ARAB EMIRATES
1 lab in	UNITED KINGDOM
1 lab 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) / G1	= outlier in Grubbs' outlier test
G(0.05) / G5	= straggler in Grubbs' outlier test
DG(0.01) / DG1	= outlier in Double Grubbs' outlier test
DG(0.05) / DG5	= 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
SDS	= Safety Data Sheet

Literature

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