Results of Proficiency Test
Biogasoline E10
May 2019

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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CONTENTS

1 INTRODUCTION

Since 2009 every year the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Biogasoline E10, in accordance with the latest applicable version of the EN228 and the ASTM D4814 specification. During the annual proficiency testing program of 2018/2019, it was decided to continue the round robin for the analysis of Biogasoline E10.

In this interlaboratory study, 51 laboratories in 21 different countries registered for participation in the regular round robin. For the DVPE round robin 47 participants registered and for the RON/MON round, 28 participants registered for participation. See appendix 4 for the number of participants per country. In this report, the results of the 2019 Biogasoline E10 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 analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. In this proficiency test, the participants received, depending on their registration, 1x 1L of Biogasoline E10 labelled #19075 and/or 1x 1L bottle ± 75% filled Biogasoline E10 labelled #19076 for DVPE only and/or 2x 1L bottle Biogasoline E10 labelled #19077 for RON/MON only. 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/IEC 17043:2010 (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

The necessary batch material of about 200 litres of Biogasoline E10 was purchased from a local petrol supplier. After homogenisation 133 amber glass bottles of 1L were filled. For the main round 60 bottles were labelled #19075 and 75 bottles were labelled #19077 for the RON/MON round.
The remainder of the 200L was again homogenised and 70 amber glass bottles of 1L were filled with approx. 750 mL especially for Dry Vapour Pressure Equivalent and labelled #19076.
The homogeneity of the subsamples #19075 and #19077 was checked by determination of Density at 15°C in accordance with ISO 12185 on 8 stratified randomly selected samples in total. The homogeneity of the subsamples #19076 was checked by determination of Dry Vapour Pressure Equivalent in accordance with ASTM D5191 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample 1	740.27
Sample 2	740.36
Sample 3	740.32
Sample 4	740.26
Sample 5	740.11
Sample 6	740.24
Sample 7	740.13
Sample 8	740.13

Table 1: homogeneity test results of subsamples #19075 and #19077

	DVPE in psi
Sample #19076-1	12.71
Sample #19076-2	12.71
Sample #19076-3	12.72
Sample #19076-4	12.71
Sample #19076-5	12.65
Sample #19076-6	12.76
Sample #19076-7	12.72
Sample #19076-8	12.72

Table 2: homogeneity test results of subsamples #19076

From the test results of tables 1 and 3 the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the reference test methods in agreement with the procedure of ISO 13528, Annex B2 in the next table.

	Density at 15°C in kg/m^3	DVPE in psi
r (sample #19075/#19077)	0.26	--
r (sample #19076)	--	0.08
reference test method	ISO12185:96	D5191:19
0.3 x R (reference test method)	0.45	0.11

Table 3: evaluation of the repeatabilities of the subsamples #19075, #19076 and #19077

The calculated repeatabilities were in agreement with 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples #19075, #19076 and #19077 was assumed.

To each of the participating laboratories, depending on their registration, 1 liter of sample #19075, 1 liter (± 750 mL filled) of sample #19076 and/or 2 liters of sample #19077 were sent on April 24, 2019. 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 ANALYSES

The participants were requested to determine on sample #19075: API Gravity, Aromatics (by FIA and by GC), Benzene, Copper Corrosion 3hrs at 50°C, Density at 15°C, Distillation at 760 mm Hg, Doctor test, Existent Gum (solvent washed), Lead as Pb, Manganese as Mn, Mercaptan Sulfur as S, Olefins (by FIA and by GC), Oxidation Stability, Oxygenates, Oxygen content and Sulfur.
Also, some extra questions were asked about distillation and FIA determination.

On sample #19076 the participants were requested to determine TVP and to calculate DVPE only (in accordance with ASTM D5191 and EPA requirements). The formulas were given in the Letter of Instruction. The participants were requested to determine RON and MON on sample #19077 (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 that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment.

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

3.1 STATISTICS

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

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as ‘<…’ or ‘>…’ were not used in the statistical evaluation.

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

According to ISO 5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of 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 was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM, 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. In some cases, a reproducibility based on former iis proficiency tests could be used.

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

The z-scores were calculated according to:

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

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

Absolute values for z<2 are very common and absolute values for z>3 are very rare.

The usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this proficiency test no problems were encountered during the dispatch of the samples. For the regular Biogasoline E10 round (#19075) three participants reported test results after the final reporting date and five other participants did not report any test results at all. For the DVPE PT (#19076): four participants reported test results after the final reporting date and four other participants did not report any test results at all. For the RON/MON PT (#19077) three participants reported test results after the final reporting date and four other participants did not report any test results at all.
Finally, in total 918 numerical test results were reported by 50 participants. Observed were 31 outlying results, which is 3.4%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

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

In the iis PT reports, ASTM test methods are referred to with a number e.g. D381 and an added designation for the year that the test method was adopted or revised e.g. D381:12. If applicable, a designation in the parentheses is added to designate the year of reapproval e.g. D381:12(2017). In the test results tables of appendix 1 only the test method number and year of adoption will be used.

Sample #19075

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

Aromatics by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1319:18.
The laboratories were requested to report the lotnumber Fluorescent Indicator Dyed Gel, which was used for the test. Only four reporting participants shared the lotnumber of the batch used. In this PT the precision on the test results is well within the precision of the method.

Aromatics by GC: This determination was problematic dependent on test method used. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ISO22854:16 but well within the requirements of ASTM D5769.
When the ISO22854 test results were evaluated separately, the calculated reproducibility is better but still not in agreement with the requirements of ISO22854:16.

Benzene: 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 ISO22854:16.
When the ISO22854:16 test results were evaluated separately, the calculated reproducibility is in full agreement with the requirements of ISO22854:16.

Copper strip corrosion: No problems have been observed, all reporting participants agreed on a test result of 1 (1a, 1b).

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

Distillation: This determination was not problematic. In total nine statistical outliers were observed. However, all calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of the automated mode of ASTM D86:18, except for Initial Boiling Point and %evaporation at 70°C. All parameters with known requirements are in agreement the manual mode of ASTM D86:18.
In this proficiency test details were asked about the distillation equipment, see appendix 3 for the reported analytical details. However, it was not useful to perform any sub analysis because the test results between the participants were consistent.

Doctor test: No problems have been observed, all reporting participants agreed on a test result of “negative”.

Existent Gum: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with requirements of ASTM D381:12 (2017).

Lead: The lead concentration was below the application range of ASTM D3237:17. Therefore, no z-scores were calculated.

Manganese: The manganese concentration was below the application range of the test methods used by the participants. Therefore, no z-scores were calculated.

Mercaptans: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with requirements of ASTM D3227:16

Olefins by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1319:18.

Olefins by GC: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO22854:16.

Oxidation Stability: No problems have been observed, all reporting participants agreed that the Oxidation Stability is >240 minutes.

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

MTBE: 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 ISO22854:16.

Ethers (C5) only: 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 ISO22854:16.

Ethers (C5 or more C): 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 ISO22854:16.

Ethers (C6 and more C): The concentration of the ethers “C6 or more atoms” was near the application range of ISO22854:16. Therefore, no z-scores were calculated.

Other oxygenates: The concentration of the other oxygenates were near or below the application range of ISO22854:16. Therefore, no significant conclusions were drawn.

Oxygen: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO22854:16.

Sulfur: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO20846:11.

Sample #19076

TVP: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5191:15 and EN13016-1:07.

DVPE (ASTM D5191): The conversion of the measured Total Vapour Pressure (TVP) to the corresponding Dry Vapour Pressure Equivalent (DVPE) as described in the ASTM D5191 showed no calculating errors. One statistical outlier was observed over the reported test values. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5191:19 and EN13016-1:07.

DVPE (EPA calculation): The conversion of the measured Total Vapour Pressure (TVP) to the corresponding U.S. EPA guidelines (40 CFR Part 80, App. E, Method 3) showed no calculating errors. One statistical outlier was observed over the reported test values. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5191:19 and EN13016-1:07.

Sample #19077

RON: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D2699:18a.

MON: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D2700:18a.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R (lit)
API gravity		18	59.49	0.46	0.58
Aromatics by FIA	%V/V	12	28.8	3.2	3.7
Aromatics by GC	%V/V	25	23.3	1.9	1.2
Benzene	%V/V	33	0.38	0.05	0.04
Copper Corrosion 3 hrs at 50°C		31	1	n.a.	n.a.
Density at 15°C	kg/m^3	40	740.4	0.8	1.5
Initial Boiling Point	°C	41	28.5	5.4	4.7
10% evaporated	°C	40	45.4	3.1	3.6
50% evaporated	°C	40	70.3	3.2	4.2
90% evaporated	°C	36	155.5	3.2	6.4
Final Boiling Point	°C	41	192.7	4.9	7.1
%Volume at 70°C	%V/V	35	49.8	2.7	2.0
%Volume at 100°C	%V/V	36	63.2	1.5	1.7
%Volume at 150°C	%V/V	35	88.8	0.9	1.2
Doctor test		18	Negative	n.a.	n.a.
Existent Gum (washed)	mg/100mL	18	0.4	1.2	1.9
Lead as Pb	mg/L	19	<2.5	n.a.	n.a.
Manganese as Mn	mg/L	19	<2	n.a.	n.a.
Mercaptans Sulfur as S	%M/M	9	0.0001	0.0003	0.0003
Olefins by FIA	%V/V	11	7.5	2.7	2.7
Olefins by GC	%V/V	19	7.4	0.3	1.4
Oxidation Stability	minutes	18	>240	n.a.	n.a.
Ethanol	%V/V	36	9.9	0.6	0.6
MTBE	%V/V	31	10.7	0.8	0.6
Ethers C5	%V/V	14	10.8	0.4	0.6
Ethers C5 or more C atoms	%V/V	15	10.8	0.6	0.6
Oxygen content	%M/M	31	5.7	0.3	0.3
Sulfur	mg/kg	41	4.5	1.4	1.6

Table 4 reproducibilities of tests on sample #19075

Parameter	unit	n	average	2.8 * sd	R (lit)
TVP acc.to ASTM D5191	psi	34	13.65	0.37	0.37
DVPE acc.to ASTM D5191	psi	34	12.61	0.35	0.36
DVPE acc.to EPA	psi	20	12.68	0.34	0.36

Table 5: reproducibilities of tests on sample #19076

Parameter	unit	n	average	2.8 * sd	R (lit)
RON		22	101.2	1.3	0.7
MON		22	89.3	1.8	0.9

Table 6: reproducibilities of tests on sample #19077

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF MAY 2019 WITH PREVIOUS PTS

	May 2019	May 2018	May 2017	May 2016	May 2015
Number of reporting labs	50	53	52	54	41
Number of results reported	918	1032	967	1073	713
Number of statistical outliers	31	45	51	31	20
Percentage outliers	3.4%	4.4%	5.3%	2.9%	2.8%

Table 7: comparison with previous proficiency tests

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

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

Parameter	May 2019	May 2018	May 2017	May 2016	May 2015
API gravity	+	++	++	++	++
Aromatics by FIA	+	-	-	+/-	-
Aromatics by GC	-	-	-	+/-	+
Benzene	-	+/-	-	-	-
Density at 15°C	+	+	++	++	++
Distillation	+	+/-	+/-	+/-	++
Existent Gum (washed)	+	+	+	+	++
Mercaptans as S	+/-	+/-	+/-	n.e.	n.e.
Olefins by FIA	+/-	+/-	-	+/-	+
Olefins by GC	++	+	++	+	++
Ethanol	+/-	-	+/-	+/-	-

Parameter	May 2019	May 2018	May 2017	May 2016	May 2015
MTBE	-	++	+/-	+/-	n.e.
Ethers	+	+/-	-	n.e.	n.e.
Oxygen content	+/-	+/-	+/-	+/-	-
Sulfur	+	+/-	+/-	+/-	+/-
TVP acc.to ASTM D5191	+/-	+	+	+	++
DVPE acc.to ASTM D5191	+/-	+	+	+	+
DVPE acc.to EPA	+/-	+	+	+	++
RON	-	+/-	-	+/-	+/-
MON	-	+/-	+	+/-	+/-

Table 8: comparison determinations against the reference test methods.

The performance of the determinations against the requirements of the respective reference test methods is listed in the above table. The following performance categories were used:

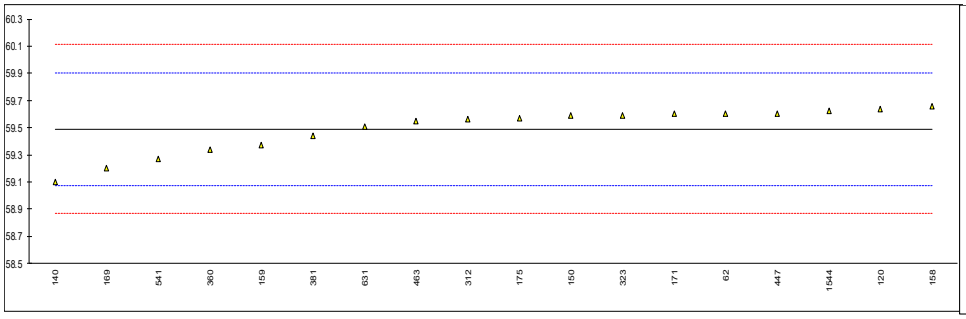
++: group performed much better than the reference test method
+ : group performed better than the reference test method
+/-: group performance equals the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method
n.e.: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

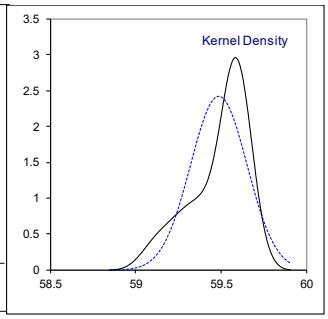
APPENDIX 1

Determination of API gravity on sample #19075;

lab	method	value	mark	z(targ)	remarks
62	D4052	59.6		0.53	
120	D4052	59.64		0.73	
140	D4052	59.1		-1.88	
150	D4052	59.5871		0.47	
158	D4052	59.66		0.82	
159	D4052	59.37		-0.57	
169	D4052	59.2		-1.39	
171	D4052	59.6		0.53	
175	D4052	59.57		0.39	
194		-----		-----	
311		-----		-----	
312	D4052	59.56		0.34	
323	D4052	59.59		0.49	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	D4052	59.34		-0.72	
381	ISO12185	59.44		-0.24	
447	D4052	59.6		0.53	
463	D4052	59.55		0.29	
496		-----		-----	
511		-----		-----	
541	D4052	59.27		-1.06	
631	D4052	59.51		0.10	
1026		-----		-----	
1033		-----		-----	
1047		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299		-----		-----	
1397		-----		-----	
1459		-----		-----	
1544	D4052	59.620		0.63	
1554		-----		-----	
1634		-----		-----	
1635		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	

normality	OK
n	18
outliers	0
mean (n)	59.489
st.dev. (n)	0.1651
R(calc.)	0.462
st.dev.(D4052:18a)	0.2075
R(D4052:18a)	0.581

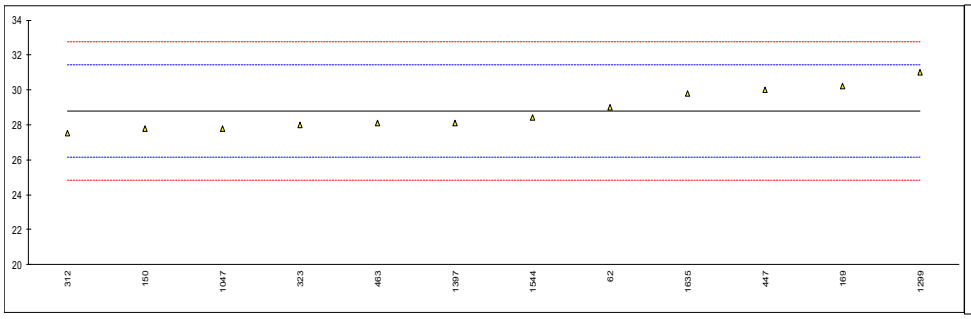


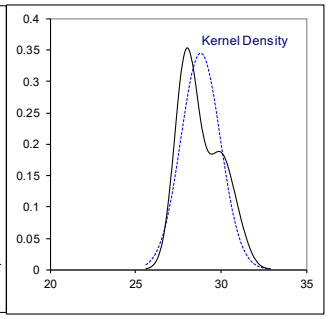


Determination of Aromatics by FIA on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	D1319	29	C	0.14	first reported 25
120		-----		-----	
140		-----		-----	
150	D1319	27.8		-0.76	
158		-----		-----	
159		-----		-----	
169	D1319	30.2		1.05	
171		-----		-----	
175		-----		-----	
194		-----		-----	
311		-----		-----	
312	D1319	27.5		-0.99	
323	D1319	28.0		-0.61	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360		-----		-----	
381		-----		-----	
447	D1319	30.0		0.90	
463	D1319	28.10		-0.54	
496		-----		-----	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033		-----		-----	
1047	D1319	27.8		-0.76	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	D1319	31.0		1.66	
1397	D1319	28.1		-0.54	
1459		-----		-----	
1544	D1319	28.43		-0.29	
1554		-----		-----	
1634		-----		-----	
1635	D1319	29.8		0.75	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	

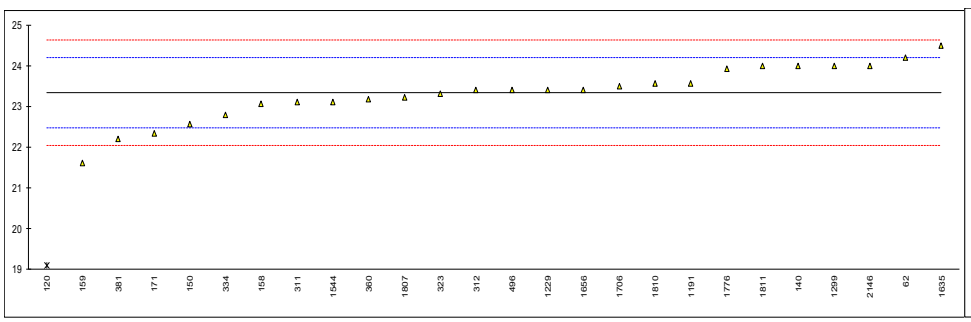
normality	OK
n	12
outliers	0
mean (n)	28.811
st.dev. (n)	1.1570
R(calc.)	3.240
st.dev.(D1319:18)	1.3214
R(D1319:18)	3.7

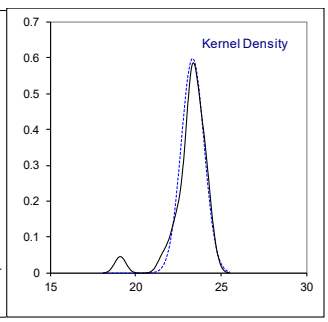




Determination of Aromatics by GC on sample #19075; results in %V/V

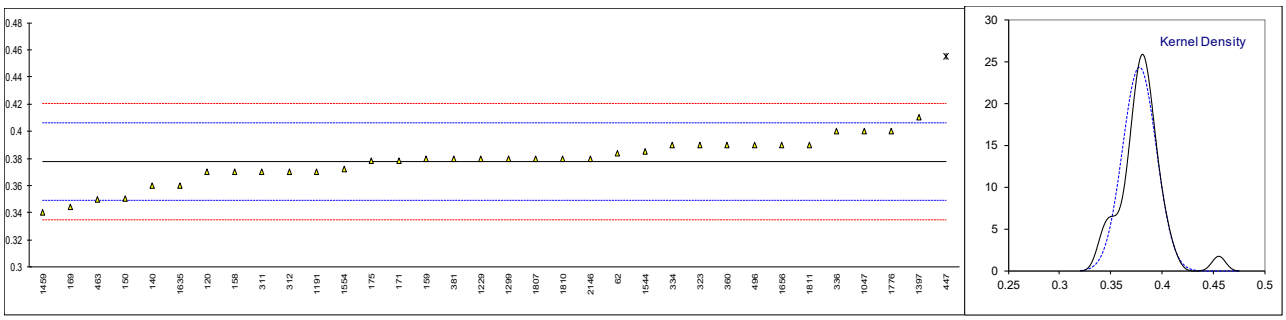
lab	method	value	mark	z(targ)	remarks
62	CAN/CGSB 3.0 No.14.3	24.2		2.03	
120	D5769	19.09	R(0.01)	-9.92	
140	D5769	24.0		1.56	
150	D5769	22.57		-1.78	
158	D5769	23.06		-0.64	
159	D5769	21.61		-4.03	
169		-----		-----	
171	D5769	22.34		-2.32	
175		-----		-----	
194		-----		-----	
311	ISO22854-A	23.1		-0.54	
312	ISO22854-A	23.4		0.16	
323	ISO22854-A	23.3		-0.07	
333		-----		-----	
334	ISO22854-A	22.78		-1.29	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	ISO22854-A	23.18		-0.35	
381	ISO22854-A	22.2		-2.65	
447		-----		-----	
463		-----		-----	
496	ISO22854-A	23.40		0.16	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033		-----		-----	
1047		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	23.56		0.53	
1205		-----		-----	
1229	ISO22854-A	23.4		0.16	
1299	ISO22854-A	24.0		1.56	
1397		-----		-----	
1459		-----		-----	
1544	ISO22854-A	23.10		-0.54	
1554		-----		-----	
1634		-----		-----	
1635	ISO22854-A	24.50		2.73	
1656	ISO22854-B	23.4		0.16	
1706	ISO22854-A	23.495		0.38	
1776	ISO22854-A	23.93		1.40	
1807	ISO22854-A	23.23		-0.24	
1810	ISO22854-A	23.55		0.51	
1811	ISO22854-A	23.99		1.54	
2146	ISO22854-A	24.0		1.56	
6168		-----		-----	
					Only ISO22854
	normality	OK			suspect
	n	25			18
	outliers	1			0
	mean (n)	23.332			23.442
	st.dev. (n)	0.6684			0.5230
	R(calc.)	1.872			1.4645
	st.dev.(ISO22854:16)	0.4277			0.4295
	R(ISO22854:16)	1.198			1.2027
	Compare				
	R(D5769:15)	2.590			





Determination of Benzene on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	CAN/CGSB 3.0 No.14.3	0.384		0.45	
120	D3606	0.37		-0.53	
140	D3606	0.36		-1.23	
150	D3606	0.350326		-1.91	
158	D3606	0.37		-0.53	
159	D3606	0.38		0.17	
169	D3606	0.344		-2.35	
171	D3606	0.378		0.03	
175	D3606	0.378	C	0.03	first reported 0.426
194		-----		-----	
311	ISO22854-A	0.37		-0.53	
312	ISO22854-A	0.37		-0.53	
323	ISO22854-A	0.39	C	0.87	first reported 0.43
333		-----		-----	
334	ISO22854-A	0.39		0.87	
335		-----		-----	
336	EN238	0.4		1.57	
337		-----		-----	
338		-----		-----	
360	ISO22854-A	0.39		0.87	
381	EN12177	0.38		0.17	
447	IP429	0.455	R(0.01)	5.42	
463	EN238	0.35		-1.93	
496	ISO22854-A	0.390		0.87	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033		-----		-----	
1047	EN238	0.40		1.57	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	0.37		-0.53	
1205		-----		-----	
1229	ISO22854-A	0.38		0.17	
1299	ISO22854-A	0.38		0.17	
1397	EN238	0.41		2.27	
1459	ISO22854-A	0.34		-2.63	
1544	ISO22854-A	0.385		0.52	
1554	EN12177	0.3723		-0.37	
1634		-----		-----	
1635	ISO22854-A	0.36		-1.23	
1656	ISO22854-B	0.39		0.87	
1706		-----		-----	
1776	ISO22854-A	0.40		1.57	
1807	ISO22854-A	0.38		0.17	
1810	ISO22854-A	0.38		0.17	
1811	ISO22854-A	0.39		0.87	
2146	ISO22854-A	0.38		0.17	
6168		-----		-----	
					Only ISO22854
	normality	OK			not OK
	n	33			17
	outliers	1			0
	mean (n)	0.378			0.380
	st.dev. (n)	0.0164			0.0142
	R(calc.)	0.046			0.040
	st.dev.(ISO22854:16)	0.0143			0.0143
	R(ISO22854:16)	0.04			0.04



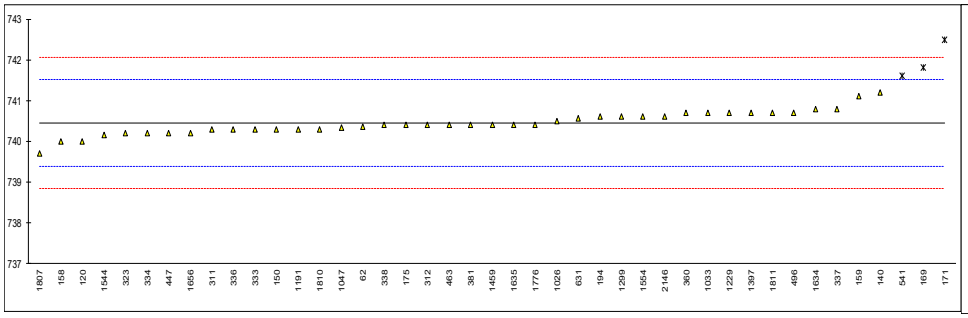
Determination of Copper strip corrosion 3hrs at 50°C on sample #19075

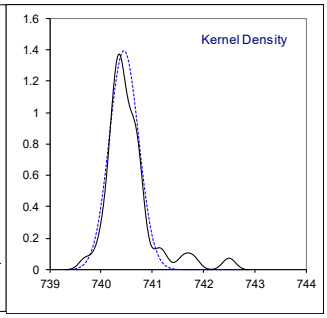
lab	method	value	mark	z(targ)	remarks
62	D130	1b		-----	
120	D130	1A		-----	
140	D130	1a		-----	
150	D130	1A		-----	
158	D130	1A		-----	
159	D130	1a		-----	
169	IP154	1A		-----	
171	D130	1a		-----	
175		-----		-----	
194	D130	1A		-----	
311	D130	1A		-----	
312	D130	1a		-----	
323	D130	1B		-----	
333		-----		-----	
334	ISO2160	1A		-----	
335		-----		-----	
336	D130	1		-----	
337		-----		-----	
338		-----		-----	
360	ISO2160	1A		-----	
381	ISO2160	1		-----	
447	D130	1a		-----	
463	D130	1A		-----	
496	D130	1a		-----	
511	D130	1a		-----	
541	D130	1a		-----	
631	D130	1A		-----	
1026	ISO2160	1A		-----	
1033		-----		-----	
1047	ISO2160	1		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	D130	1A		-----	
1397	ISO2160	1		-----	
1459		-----		-----	
1544	ISO2160	1A		-----	
1554	ISO2160	1a		-----	
1634	ISO2160	1a		-----	
1635	D130	1a		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D130	1A		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	
	n	31			
	mean (n)	1 (1a, 1b)			

Determination of Density at 15°C on sample #19075; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
62	D4052	740.35		-0.18	
120	D4052	740.0		-0.83	
140	D4052	741.2	C	1.41	first reported 742.1
150	D4052	740.3		-0.27	
158	D4052	740.0		-0.83	
159	D4052	741.1		1.22	
169	D4052	741.8	R(0.05)	2.53	
171	D4052	742.5	R(0.01)	3.83	
175	D4052	740.4		-0.09	
194	D4052	740.6		0.29	
311	D4052	740.3		-0.27	
312	ISO12185	740.4		-0.09	
323	ISO12185	740.2		-0.46	
333	ISO12185	740.3		-0.27	
334	ISO12185	740.2		-0.46	
335		-----		-----	
336	ISO12185	740.3		-0.27	
337	ISO12185	740.8		0.66	
338	ISO12185	740.4		-0.09	
360	ISO12185	740.7		0.47	
381	ISO12185	740.4		-0.09	
447	IP365	740.2		-0.46	
463	ISO12185	740.40		-0.09	
496	D4052	740.71		0.49	
511		-----		-----	
541	ISO12185	741.60	R(0.05)	2.15	
631	D4052	740.56		0.21	
1026	D4052	740.5		0.10	
1033	IP365	740.7		0.47	
1047	ISO12185	740.33		-0.22	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	ISO12185	740.3		-0.27	
1205		-----		-----	
1229	ISO12185	740.7		0.47	
1299	D4052	740.6		0.29	
1397	ISO12185	740.7		0.47	
1459	ISO12185	740.40		-0.09	
1544	ISO12185	740.15		-0.55	
1554	ISO3675	740.6		0.29	
1634	ISO12185	740.7815		0.62	
1635	ISO3675	740.4		-0.09	
1656	ISO12185	740.2		-0.46	
1706		-----		-----	
1776	ISO12185	740.4		-0.09	
1807	D1298	739.7		-1.39	
1810	ISO12185	740.3		-0.27	
1811	ISO12185	740.7		0.47	
2146	ISO12185	740.6		0.29	
6168		-----		-----	

normality	suspect
n	40
outliers	3
mean (n)	740.447
st.dev. (n)	0.2859
R(calc.)	0.801
st.dev.(ISO12185:96)	0.5357
R(ISO12185:96)	1.5

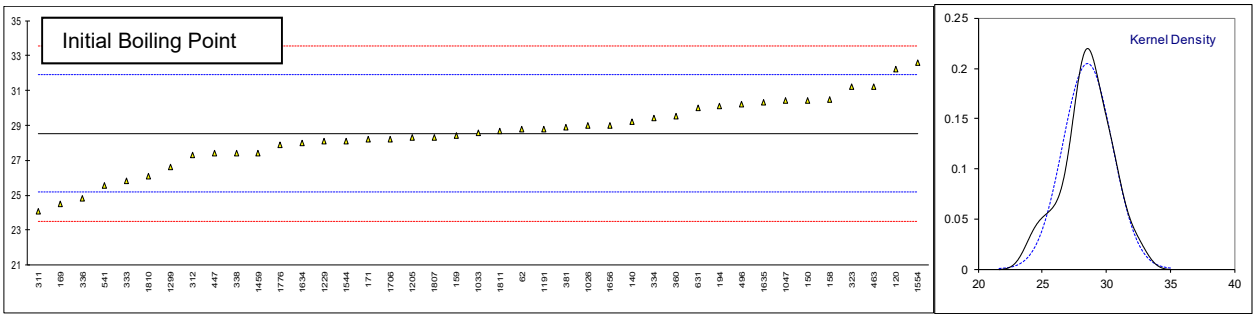


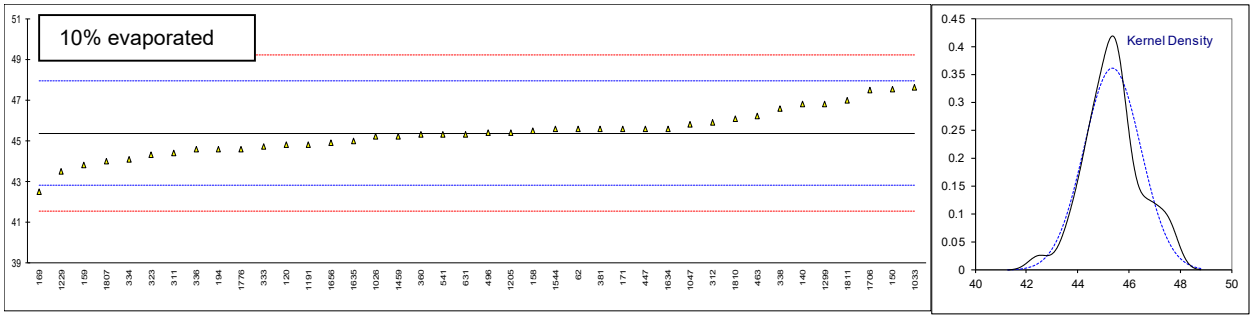


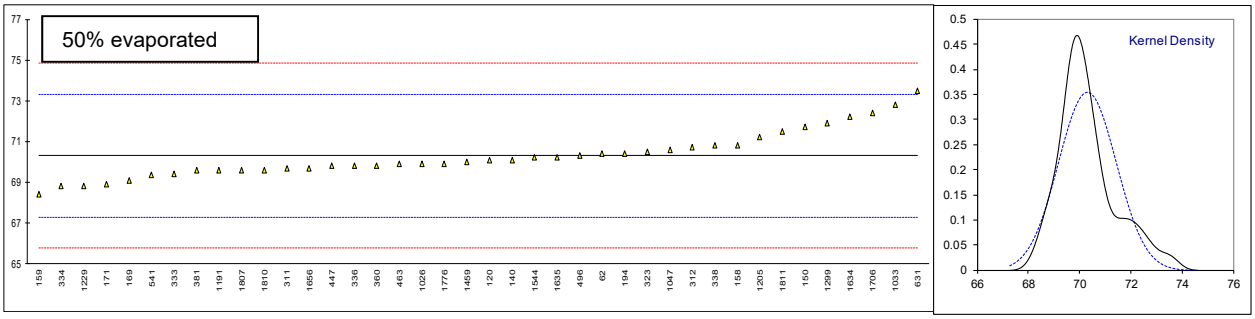
Determination of Distillation on sample #19075; results in °C

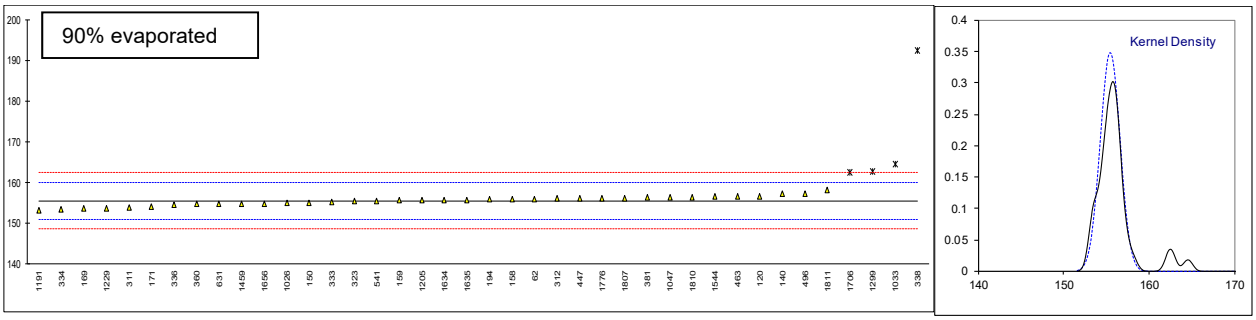
lab	method	IBP	mark	10%eva	mark	50%eva	mark	90%eva	mark	FBP	mark
62	D86-A	28.8		45.6		70.4		156.0		193.4	
120	D86-A	32.2		44.8		70.1		156.7		193.7	
140	D86-A	29.2		46.8		70.1		157.3		192.5	
150	D86-A	30.44		47.55		71.722		155.055		193.11	
158	D86-A	30.5		45.5		70.8		155.8		191.1	
159	D86-A	28.4		43.8		68.4		155.6		195.3	C
169		24.5		42.5		69.1		153.6		194.0	
171	D86-A	28.2		45.6		68.9		154.2		191.6	
175		-----		-----		-----		-----		-----	
194	D86-A	30.1		44.6		70.4		155.8		192.9	
311	D86-A	24.1		44.4		69.7		153.8		190.7	
312	D86-A	27.3		45.9		70.7		156.1		195.3	
323	D86-A	31.2		44.3		70.5		155.5		190.7	
333	D86-A	25.8		44.7		69.4		155.2		193.0	
334	D86-A	29.4		44.1		68.8		153.5		189.6	
335		-----		-----		-----		-----		-----	
336	D86-A	24.8		44.6		69.8		154.6		192.2	
337		-----		-----		-----		-----		-----	
338	D86	27.4		46.6		70.8		192.5	C,R(1)	191.9	
360	D86-A	29.5		45.3		69.8		154.8		191.1	
381	D86-A	28.9		45.6		69.6		156.3		193.3	
447	D86-A	27.4		45.6		69.8		156.2		193.8	
463	D86-A	31.2		46.2		69.9		156.7		196.0	
496	D86-A	30.2		45.4		70.3		157.3		191.8	
511		-----		-----		-----		-----		-----	
541	D86-A	25.55		45.30		69.35		155.50		191.45	
631	D86-M	30.0		45.3		73.5		154.8		197.0	
1026	ISO3405-A	29.0		45.2		69.9		155.0		193.5	
1033	IP123-A	28.6		47.6		72.8		164.6	R(1)	191.2	
1047	ISO3405-A	30.4		45.8		70.6		156.3		195.0	
1126		-----		-----		-----		-----		-----	
1134		-----		-----		-----		-----		-----	
1161		-----		-----		-----		-----		-----	
1191	ISO3405-A	28.8		44.8		69.6		153.3		192.3	
1205	D86-A	28.3		45.4		71.2		155.6		192.1	
1229	ISO3405-A	28.1		43.5		68.8		153.6		190.9	
1299	D86-A	26.6		46.8		71.9		162.7	R(1)	191.8	
1397		-----	W	-----	W	-----	W	-----	W	-----	W
1459	ISO3405-A	27.4		45.2		70.0		154.8		191.4	
1544	D86-A	28.10		45.57		70.20		156.53		191.30	
1554	ISO3405-A	32.6		-----		-----		-----		192.7	
1634	ISO3405-A	28.0		45.6		72.2		155.6		194.5	
1635		30.3		45.0		70.2		155.6		194.6	
1656	ISO3405-A	29.0		44.9		69.7		154.8		193.5	
1706		28.2		47.5		72.4		162.4	R(1)	188.8	
1776	ISO3405-A	27.9		44.6		69.9		156.2		191.4	
1807	ISO3405-A	28.3		44.0		69.6		156.2		192.8	
1810	D86-A	26.1		46.1		69.6		156.4		191.9	
1811		28.7		47.0		71.5		158.2		195.2	
2146		-----		-----		-----		-----		-----	
6168		-----		-----		-----		-----		-----	
	normality	OK		OK		OK		OK		OK	
	n	41		40		40		36		41	
	outliers	0		0		0		4		0	
	mean (n)	28.52		45.37		70.30		155.51		192.69	
	st.dev. (n)	1.944		1.105		1.126		1.147		1.753	
	R(calc.)	5.44		3.09		3.15		3.21		4.91	
	st.dev.(D86-A:18)	1.679		1.278		1.511		2.293		2.536	
	R(D86-A:18)	4.7		3.58		4.23		6.42		7.1	
	Compare R(D86-M:18)	5.6		3.45		4.40		5.06		7.2	

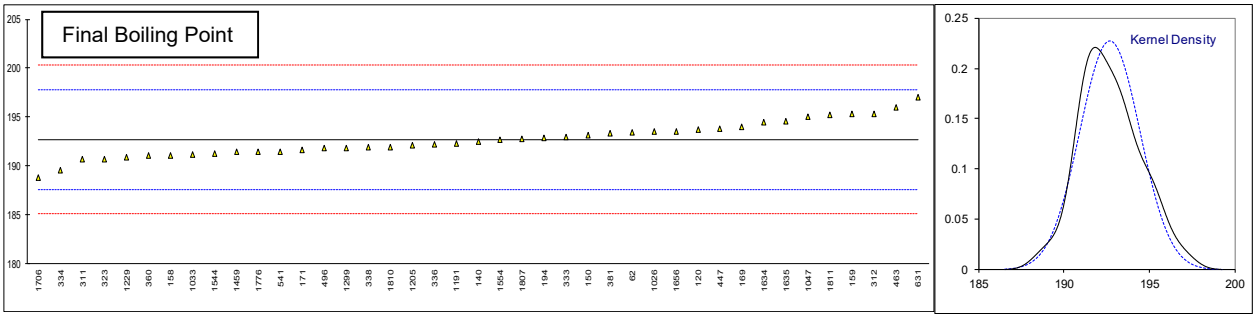
Lab 159 first reported 184.2
Lab 338 first reported 162.1
Lab 1397 test results withdrawn, first reported 29.9, 48.8, 73.6, 164.2 and 195.7


Initial Boiling Point
Kernel Density


10% evaporated
Kernel Density


50% evaporated
Kernel Density

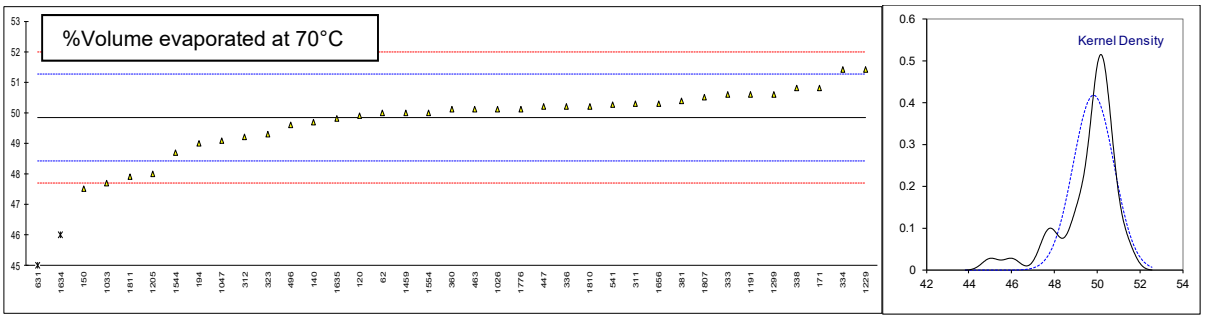

90% evaporated
Kernel Density

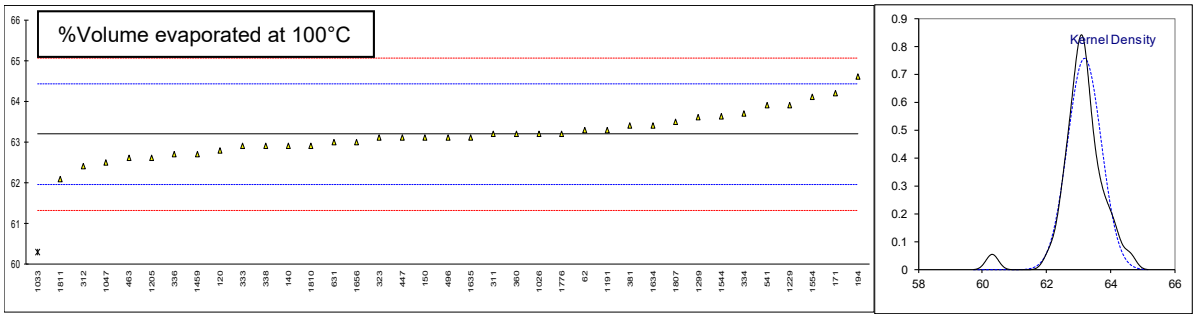

Final Boiling Point
Kernel Density

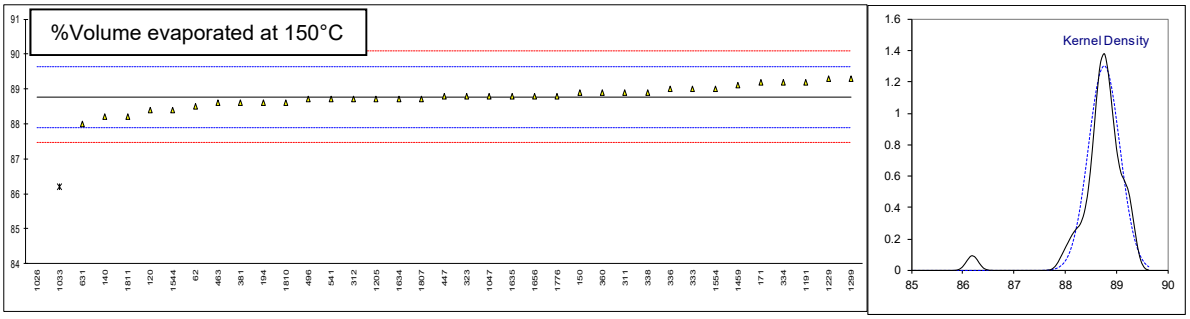
Determination of Distillation on sample #19075; results in %V/V

lab	method	%evap. at 70°C	mark	%evap. at 100°C	mark	%evap. at 150°C	mark	residue	mark
62	D86-A	50.0		63.3		88.5		1.0	
120	D86-A	49.9		62.8		88.4		1.2	
140	D86-A	49.7		62.9		88.2		1.1	
150	D86-A	47.5		63.1		88.9		1.1	
158	D86-A	-----		-----		-----		1.0	
159	D86-A	-----		-----		-----		1.1	
169		-----		-----		-----		1.1	
171	D86-A	50.8		64.2		89.2		0.9	
175		-----		-----		-----		-----	
194	D86-A	49.0		64.6		88.6		1.1	
311	D86-A	50.3		63.2		88.9		1.1	
312	D86-A	49.2		62.4		88.7		1.1	
323	D86-A	49.3		63.1		88.8		1.2	
333	D86-A	50.6		62.9		89.0		1.1	
334	D86-A	51.4		63.7		89.2		1.0	
335		-----		-----		-----		-----	
336	D86-A	50.2		62.7		89.0		1.1	
337		-----		-----		-----		-----	
338	D86	50.8		62.9		88.9		1.0	
360	D86-A	50.1		63.2		88.9		1.1	
381	D86-A	50.4		63.4		88.6		1.2	
447	D86-A	50.2		63.1		88.8		1.1	
463	D86-A	50.1		62.6		88.6		0.8	
496	D86-A	49.6		63.1		88.7		1.1	
511		-----		-----		-----		-----	
541	D86-A	50.25		63.90		88.7		1.10	
631	D86-M	45.0	C,R(1)	63.0		88.0		0.8	
1026	ISO3405-A	50.1		63.2		69.9	C,R(1)	1.0	
1033	IP123-A	47.7		60.3	R(1)	86.2	R(1)	1.1	
1047	ISO3405-A	49.1		62.5		88.8		1.0	
1126		-----		-----		-----		-----	
1134		-----		-----		-----		-----	
1161		-----		-----		-----		-----	
1191	ISO3405-A	50.6		63.3		89.2		1	
1205	D86-A	48.0		62.6		88.7		1.1	
1229	ISO3405-A	51.4		63.9		89.3		0.9	
1299	D86-A	50.6		63.6		89.3		1.1	
1397		-----	W	-----	W	-----	W	-----	W
1459	ISO3405-A	50.0		62.7		89.1		1.1	
1544	D86-A	48.70		63.63		88.40		1.15	
1554	ISO3405-A	50.0		64.1		89.0		0.8	
1634	ISO3405-A	46.0	R(5)	63.4		88.7		1.0	
1635		49.8		63.1		88.8		1.1	
1656	ISO3405-A	50.3		63.0		88.8		1.0	
1706		-----		-----		-----		-----	
1776	ISO3405-A	50.1		63.2		88.8		1.1	
1807	ISO3405-A	50.5		63.5		88.7		0.6	
1810	D86-A	50.2		62.9		88.6		1.1	
1811		47.9		62.1		88.2		1.0	
2146		-----		-----		-----		-----	
6168		-----		-----		-----		-----	
normality		OK		OK		OK			
n		35		36		35			
outliers		2		1		2			
mean (n)		49.84		63.19		88.77			
st.dev. (n)		0.956		0.528		0.306			
R(calc.)		2.68		1.48		0.86			
st.dev.(D86-A:18)		0.715		0.620		0.437			
R(D86-A:18)		2.00		1.74		1.22			
Compare									
R(D86-M:18)		unknown		unknown		unknown			

Lab 631 first reported 47.0
Lab 1026 first reported 97.0
Lab 1397 test results withdrawn, first reported 47.0, 60.5, 86.2 and 1.1


%Volume evaporated at 70°C
Kernel Density


%Volume evaporated at 100°C
Kernel Density


%Volume evaporated at 150°C
Kernel Density

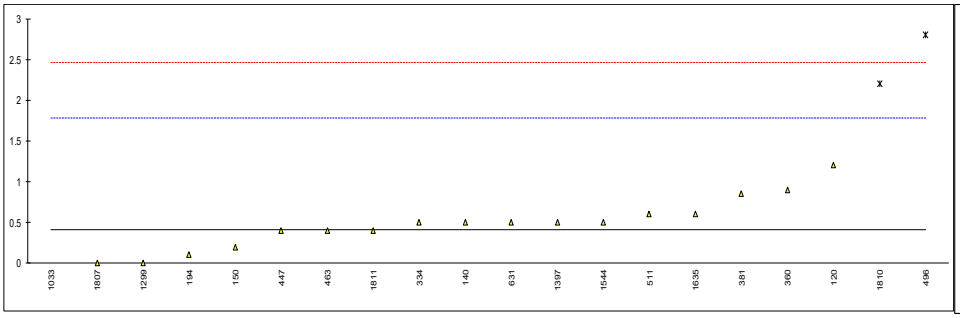
Determination of Doctor test on sample #19075

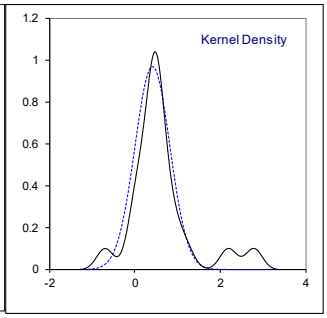
lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D4952	Negative		-----	
140	D4952	Negative		-----	
150	D4952	Negative		-----	
158	D4952	Negative		-----	
159	D4952	Negative		-----	
169		-----		-----	
171	D4952	Negative		-----	
175		-----		-----	
194		-----		-----	
311	IP30	neg		-----	
312	IP30	Negative		-----	
323	IP30	negative		-----	
333		-----		-----	
334	D4952	negative		-----	
335		-----		-----	
336	D4952	NEGATIVE		-----	
337		-----		-----	
338		-----		-----	
360	D4952	NEGATIVE		-----	
381		-----		-----	
447	D4952	Negative [Sweet]		-----	
463	IP30	Doctor negative mercaptans absent		-----	
496		-----		-----	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026	D4952	Negative		-----	
1033		-----		-----	
1047		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	IP30	NEGATIVO		-----	
1397		-----		-----	
1459		-----		-----	
1544	D4952	negative		-----	
1554		-----		-----	
1634		-----		-----	
1635		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D4952	NEGATIVE		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	
	n	18			
	mean (n)	Negative			

Determination of Existent Gum (solvent washed) on sample #19075; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D381	1.2		1.15	
140	D381	0.5		0.13	
150	D381	0.2		-0.31	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D381	<0.5		-----	
175		-----		-----	
194	D381	0.1		-0.46	
311	D381	<1.0		-----	
312	D381	<0.5		-----	
323	D381	< 0.5		-----	
333		-----		-----	
334	D381	0.5		0.13	
335		-----		-----	
336	D381	<0.5		-----	
337		-----		-----	
338		-----		-----	
360	D381	0.9		0.71	
381	ISO6246	0.85		0.64	
447	D381	0.4		-0.02	
463	D381	0.4		-0.02	
496	D381	2.8	R(0.05)	3.49	
511	D381	0.6		0.27	
541	D381	<0.5		-----	
631	IP540	0.5		0.13	
1026	ISO6246	<0.5	C	-----	first reported 40
1033	IP131	-0.7		-1.63	
1047	ISO6246	<0,5		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	D381	0.0001		-0.61	
1397	ISO6246	0.5		0.13	
1459		-----		-----	
1544	D381	0.50		0.13	
1554		-----		-----	
1634		-----		-----	
1635	D381	0.6		0.27	
1656	ISO6246	<1		-----	
1706		-----		-----	
1776		-----		-----	
1807	D381	0		-0.61	
1810	D381	2.2	R(0.05)	2.61	
1811	D381	0.4		-0.02	
2146		-----		-----	
6168		-----		-----	

normality	not OK
n	18
outliers	2
mean (n)	0.41
st.dev. (n)	0.412
R(calc.)	1.15
st.dev.(D381:12)	0.684
R(D381:12)	1.91





Determination of Lead as Pb on sample #19075; results in mg/L

lab	method	value	mark	z(targ)	remarks
62	D3237	<0.1		-----	
120		-----		-----	
140	D3237	0		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D3237	<2.5		-----	
175		-----		-----	
194		-----		-----	
311		-----		-----	
312	D3237	<2.5		-----	
323	D3237	< 2.5		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	In house	< 2.5		-----	
381	EN237	<2,5		-----	
447	IP428	<2.5		-----	
463	D3237	0.57		-----	
496		-----		-----	
511		-----		-----	
541	D3237	<2.5		-----	
631	D3237	3.67		-----	Possibly a false positive test result?
1026		-----		-----	
1033		-----		-----	
1047	EN237	<2,5		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	In house	0.32		-----	
1205		-----		-----	
1229		-----		-----	
1299	EN237	0.3		-----	
1397		-----		-----	
1459	EN237	<2.5		-----	
1544	EN237	0.00		-----	
1554		-----		-----	
1634		-----		-----	
1635	EN237	0.0		-----	
1656	EN237	<2.5		-----	
1706		-----		-----	
1776		-----		-----	
1807	D3237	0		-----	
1810		-----		-----	
1811		-----		-----	
2146	In house	<2		-----	
6168		-----		-----	
	n	19			
	mean (n)	<2.5			Application range D3237:17: 2.5 – 25 mg/L

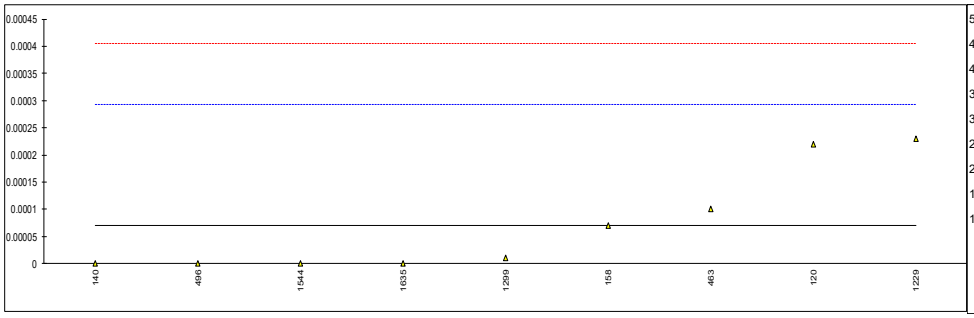
Determination of Manganese as Mn on sample #19075; results in mg/L

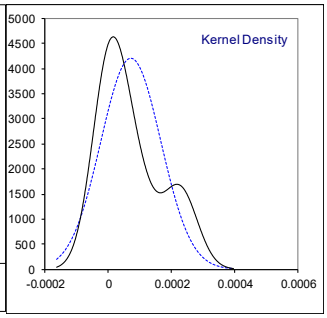
lab	method	value	mark	z(targ)	remarks
62	D3831	<0.3		-----	
120		-----		-----	
140	D3831	0		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D3831	0.7		-----	
175		-----		-----	
194		-----		-----	
311		-----		-----	
312	EN16136	<0.5		-----	
323	D3831	< 0.50		-----	
333		-----		-----	
334	EN16136	0		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	EN16136	< 0.50		-----	
381	EN16136	<2,0		-----	
447	EN16135	<2.0		-----	
463	EN16135	1.01		-----	
496		-----		-----	
511	D3831	0.30		-----	
541	D3831	<0.25		-----	
631	D3831	<2		-----	
1026		-----		-----	
1033		-----		-----	
1047	EN16136	<2,0		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	EN16135	0.007		-----	
1397		-----		-----	
1459		-----		-----	
1544	EN16136	0.000		-----	
1554		-----		-----	
1634		-----		-----	
1635		-----		-----	
1656	EN16135	<2		-----	
1706		-----		-----	
1776		-----		-----	
1807	EN16135	0		-----	
1810		-----		-----	
1811		-----		-----	
2146	In house	<1		-----	
6168		-----		-----	
	n	19			
	mean (n)	<2			Application range D3831:15: 0.25 – 40 mg/L

Determination of Mercaptans Sulfur as S on sample #19075; results in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D3227	0.00022		1.34	
140	D3227	0		-0.63	
150		-----		-----	
158	D3227	0.00007		0.00	
159		-----		-----	
169		-----		-----	
171	D3227	<0.0003		-----	
175		-----		-----	
194		-----		-----	
311	D3227	<0.0003		-----	
312	D3227	<0.0003		-----	
323	D3227	<0.0003		-----	
333		-----		-----	
334	D3227	<0.0001		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	D3227	< 0.0003		-----	
381		-----		-----	
447		-----		-----	
463	D3227	0.00010		0.27	
496	D3227	0.00000		-0.63	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033		-----		-----	
1047		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229	ISO3012	0.00023		1.43	
1299	D3227	0.00001		-0.54	
1397		-----		-----	
1459		-----		-----	
1544	D3227	0.0000		-0.63	
1554		-----		-----	
1634		-----		-----	
1635	D3227	0.0000		-0.63	
1656		-----		-----	
1706		-----		-----	
1776	UOP163	<0.00005		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	

normality	suspect
n	9
outliers	0
mean (n)	0.00007
st.dev. (n)	0.000095
R(calc.)	0.00027
st.dev.(D3227:16)	0.000112
R(D3227:16)	0.00031

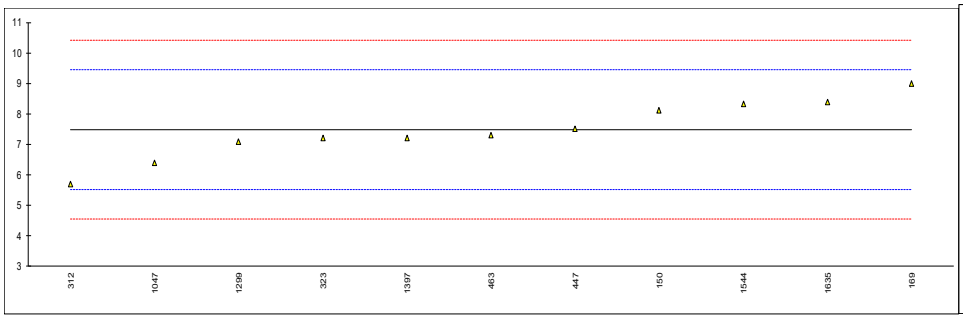


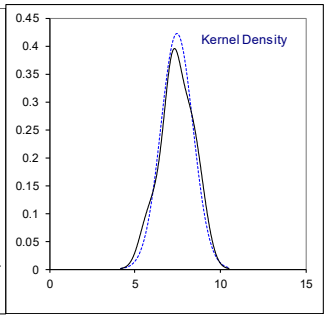


Determination of Olefins by FIA on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140		-----		-----	
150	D1319	8.1		0.64	
158		-----		-----	
159		-----		-----	
169	D1319	9.0		1.56	
171		-----		-----	
175		-----		-----	
194		-----		-----	
311		-----		-----	
312	D1319	5.7		-1.81	
323	D1319	7.2		-0.28	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360		-----		-----	
381		-----		-----	
447	D1319	7.5		0.03	
463	D1319	7.30		-0.18	
496		-----		-----	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033		-----		-----	
1047	D1319	6.4		-1.10	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	D1319	7.1		-0.38	
1397	D1319	7.2		-0.28	
1459		-----		-----	
1544	D1319	8.33		0.87	
1554		-----		-----	
1634		-----		-----	
1635	D1319	8.4		0.94	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	

normality	OK
n	11
outliers	0
mean (n)	7.48
st.dev. (n)	0.945
R(calc.)	2.65
st.dev.(D1319:18)	0.979
R(D1319:18)	2.74

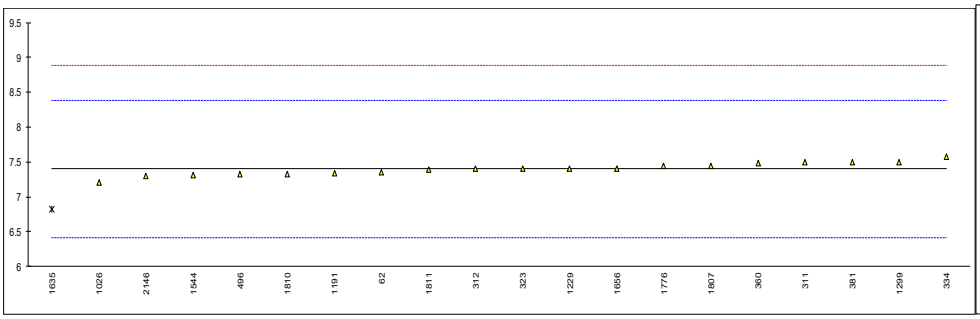


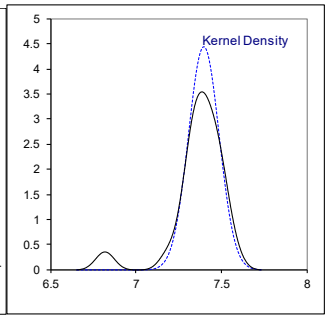


Determination of Olefins by GC on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62	CAN/CGSB 3.0 No.14.3	7.355		-0.09	
120		-----		-----	
140		-----		-----	
150		-----		-----	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
194		-----		-----	
311	ISO22854-A	7.5		0.20	
312	ISO22854-A	7.4		0.00	
323	ISO22854-A	7.4		0.00	
333		-----		-----	
334	ISO22854-A	7.57		0.34	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
360	ISO22854-A	7.48		0.16	
381	ISO22854-A	7.5		0.20	
447		-----		-----	
463		-----		-----	
496	ISO22854-A	7.32		-0.16	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026	ISO22854-A	7.2		-0.40	
1033		-----		-----	
1047		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	7.34		-0.12	
1205		-----		-----	
1229	ISO22854-A	7.4		0.00	
1299	ISO22854-A	7.5		0.20	
1397		-----		-----	
1459		-----		-----	
1544	ISO22854-A	7.31		-0.18	
1554		-----		-----	
1634		-----		-----	
1635	ISO22854-A	6.82	D(0.01)	-1.17	
1656	ISO22854-B	7.4		0.00	
1706		-----		-----	
1776	ISO22854-A	7.45		0.10	
1807	ISO22854-A	7.45		0.10	
1810	ISO22854-A	7.33		-0.14	
1811	ISO22854-A	7.39		-0.02	
2146	ISO22854-A	7.3		-0.20	
6168		-----		-----	

normality	OK
n	19
outliers	1
mean (n)	7.40
st.dev. (n)	0.090
R(calc.)	0.25
st.dev.(ISO22854:16)	0.494
R(ISO22854:16)	1.38





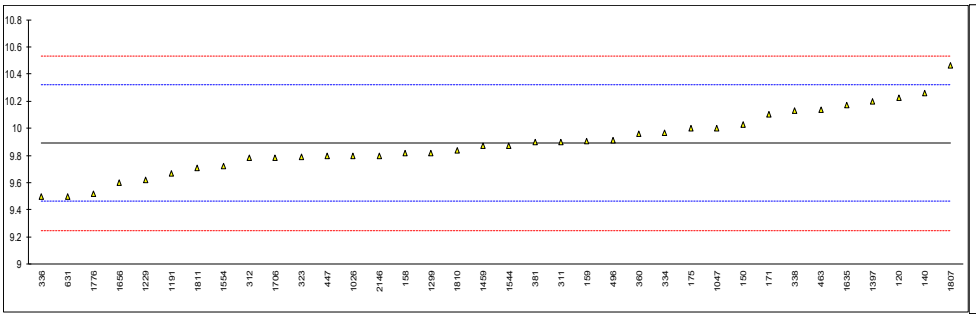
Determination of Oxidation Stability on sample #19075; results in minutes

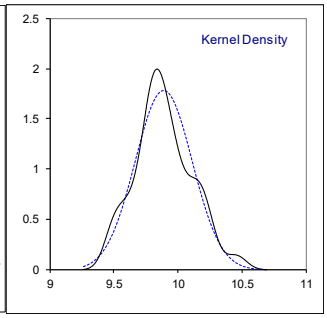
lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D525	>900		-----	
140	D525	>900		-----	
150		-----		-----	
158		-----		-----	
159	D525	>240		-----	
169		-----		-----	
171	D525	>900		-----	
175		-----		-----	
194		-----		-----	
311	D525	>900		-----	
312	D525	>900		-----	
323		-----		-----	
333		-----		-----	
334	D525	>960		-----	
335		-----		-----	
336	D525	>900		-----	
337		-----		-----	
338		-----		-----	
360	D525	> 900		-----	
381		-----		-----	
447	D525	>900		-----	
463	D525	>900		-----	
496	D525	>1000		-----	
511		-----		-----	
541		-----		-----	
631		-----		-----	
1026		-----		-----	
1033	IP40	>900		-----	
1047	ISO7536	>900		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1229		-----		-----	
1299	D525	>900		-----	
1397		-----		-----	
1459		-----		-----	
1544	D525	> 900		-----	
1554		-----		-----	
1634		-----		-----	
1635	D525	>900		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807	D525	>380		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
6168		-----		-----	
	n	18			
	mean (n)	>240			

Determination of Ethanol on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D5599	10.223		1.55	
140	D5599	10.26		1.72	
150	D5599	10.03		0.65	
158	D5599	9.82		-0.33	
159	D5599	9.906		0.07	
169		-----		-----	
171	D5599	10.10		0.98	
175	D5599	10.00		0.51	
194		-----		-----	
311	ISO22854-A	9.90		0.04	
312	ISO22854-A	9.78		-0.52	
323	ISO22854-A	9.79		-0.47	
333		-----		-----	
334	ISO22854-A	9.97		0.37	
335		-----		-----	
336	EN1601	9.5	C	-1.82	first reported 10.7
337		-----		-----	
338		10.13		1.12	
360	ISO22854-A	9.96		0.32	
381	ISO22854-A	9.9		0.04	
447	IP466	9.8		-0.42	
463	EN13132	10.14		1.16	
496	ISO22854-A	9.910		0.09	
511		-----		-----	
541		-----		-----	
631	D5845	9.5		-1.82	
1026	EN13132	9.8		-0.42	
1033		-----		-----	
1047	EN1601	10.0		0.51	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	9.67		-1.03	
1205		-----		-----	
1229	ISO22854-A	9.62		-1.26	
1299	ISO22854-A	9.82		-0.33	
1397	EN13132	10.2		1.44	
1459	ISO22854-A	9.87		-0.10	
1544	ISO22854-A	9.870		-0.10	
1554	EN13132	9.7213		-0.79	
1634		-----		-----	
1635		10.17		1.30	
1656	ISO22854-B	9.6		-1.36	
1706	ISO22854-A	9.78		-0.52	
1776	ISO22854-A	9.52		-1.73	
1807	ISO22854-A	10.46		2.66	
1810	D6839	9.84		-0.24	
1811		9.71		-0.84	
2146	ISO22854-A	9.80		-0.42	
6168		-----		-----	

normality	OK
n	36
outliers	0
mean (n)	9.89
st.dev. (n)	0.223
R(calc.)	0.63
st.dev.(ISO22854:16)	0.214
R(ISO22854:16)	0.60

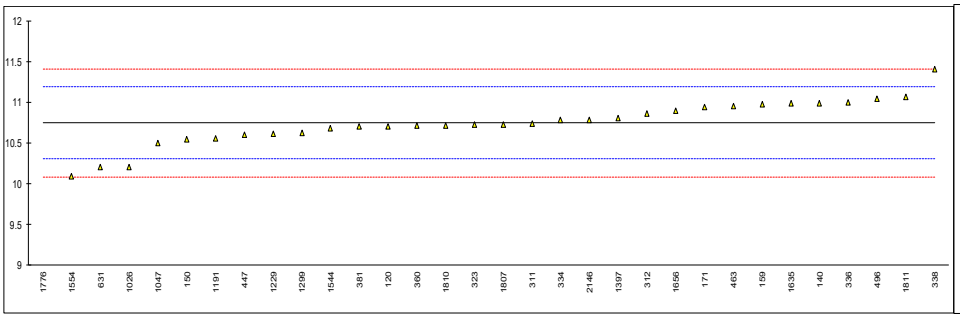


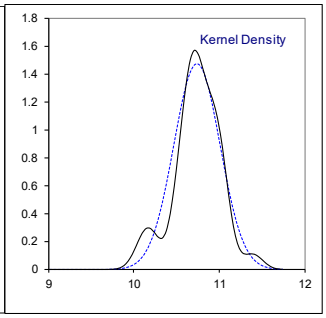


Determination of MTBE on sample #19075; results in %V/V

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D5599	10.704		-0.18	
140	D5599	10.99	C	1.11	first reported 9.96
150	D5599	10.54		-0.92	
158	D5599	<0.01		<-48.39	Possibly a false negative test result?
159	D5599	10.979		1.06	
169		-----		-----	
171	D5599	10.94		0.88	
175		-----		-----	
194		-----		-----	
311	ISO22854-A	10.74		-0.02	
312	ISO22854-A	10.86		0.52	
323	ISO22854-A	10.72		-0.11	
333		-----		-----	
334	ISO22854-A	10.78		0.16	
335		-----		-----	
336	EN1601	11.0		1.15	
337		-----		-----	
338		11.40		2.96	
360	ISO22854-A	10.71		-0.15	
381	ISO22854-A	10.7		-0.20	
447	IP466	10.6		-0.65	
463	EN13132	10.95		0.93	
496	ISO22854-A	11.040		1.33	
511		-----		-----	
541		-----		-----	
631	D5845	10.2		-2.45	
1026	EN13132	10.2		-2.45	
1033		-----		-----	
1047	EN1601	10.5		-1.10	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	10.56		-0.83	
1205		-----		-----	
1229	ISO22854-A	10.61		-0.61	
1299	ISO22854-A	10.62		-0.56	
1397	EN13132	10.8		0.25	
1459		-----		-----	
1544	ISO22854-A	10.677		-0.30	
1554	EN13132	10.0942		-2.93	
1634		-----		-----	
1635		10.98		1.06	
1656	ISO22854-B	10.9		0.70	
1706		-----		-----	
1776	ISO22854-A	0.11	R(0.01)	-47.93	
1807	ISO22854-A	10.72		-0.11	
1810	D6839	10.71		-0.15	
1811		11.07		1.47	
2146	ISO22854-A	10.78		0.16	
6168		-----		-----	

normality	suspect
n	31
outliers	1
mean (n)	10.74
st.dev. (n)	0.271
R(calc.)	0.76
st.dev.(ISO22854:16)	0.222
R(ISO22854:16)	0.62

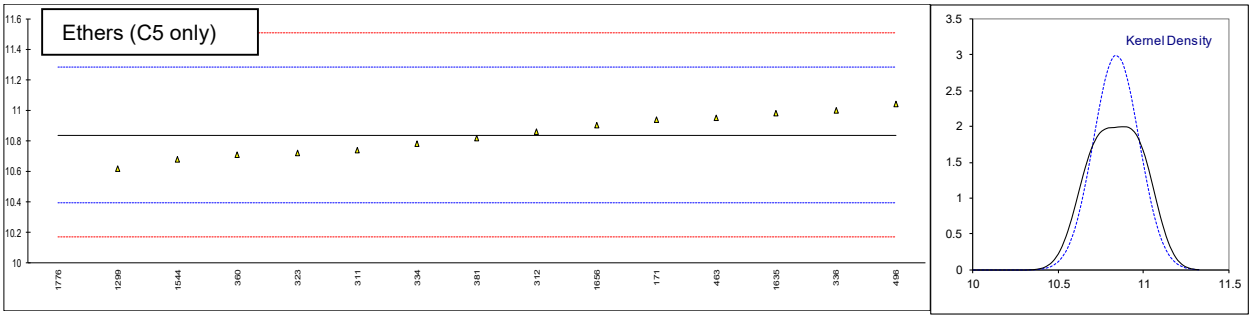


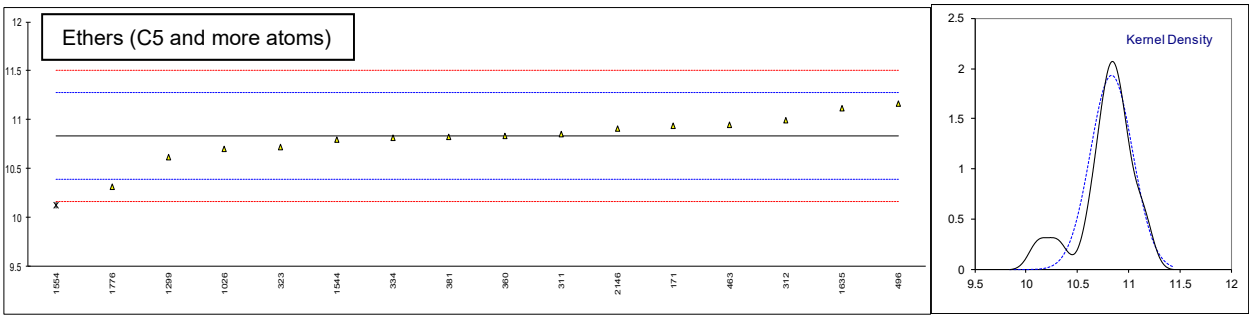


Determination of Ethers (C5, C5 or more C atoms and C6 and more c atoms) on sample #19075; results in %V/V

lab	method	C5	mark	z(targ)	C5 or more	mark	z(targ)	C6 or more	mark	z(targ)
62		-----		-----	-----		-----	-----		-----
120		-----		-----	-----		-----	-----		-----
140		-----		-----	-----		-----	-----		-----
150		-----		-----	-----		-----	-----		-----
158	D5599	<0.01		-----	<0.01		<-48.62	<0.01		-----
159		-----		-----	-----		-----	-----		-----
169		-----		-----	-----		-----	-----		-----
171	D5599	10.94		0.46	10.94		0.47	<0.10		-----
175		-----		-----	-----		-----	-----		-----
194		-----		-----	-----		-----	-----		-----
311	ISO22854-A	10.74		-0.44	10.85		0.07	0.1		-----
312	ISO22854-A	10.86		0.10	10.99		0.70	0.13		-----
323	ISO22854-A	10.72		-0.53	10.72		-0.52	< 0.10		-----
333		-----		-----	-----		-----	-----		-----
334	ISO22854-A	10.78		-0.26	10.81		-0.11	0.03		-----
335		-----		-----	-----		-----	-----		-----
336	EN1601	11.0		0.73	-----		-----	-----		-----
337		-----		-----	-----		-----	-----		-----
338		-----		-----	-----		-----	-----		-----
360	ISO22854-A	10.71		-0.58	10.83		-0.02	0.12		-----
381	ISO22854-A	10.82		-0.08	10.82		-0.07	<0,8		-----
447		-----		-----	-----		-----	-----		-----
463	EN13132	10.95		0.50	10.95		0.52	<0,2		-----
496	ISO22854-A	11.040		0.91	11.160		1.46	0.120		-----
511		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
631		-----		-----	-----		-----	-----		-----
1026		-----		-----	10.7		-0.61	-----		-----
1033		-----		-----	-----		-----	-----		-----
1047		-----		-----	-----		-----	-----		-----
1126		-----		-----	-----		-----	-----		-----
1134		-----		-----	-----		-----	-----		-----
1161		-----		-----	-----		-----	-----		-----
1191		-----		-----	-----		-----	-----		-----
1205		-----		-----	-----		-----	-----		-----
1229		-----		-----	-----		-----	-----		-----
1299	ISO22854-A	10.62		-0.98	10.62		-0.97	<0.01		-----
1397		-----		-----	-----		-----	-----		-----
1459		-----		-----	-----		-----	-----		-----
1544	ISO22854-A	10.677		-0.72	10.797		-0.17	0.00		-----
1554		-----		-----	10.121	D(5)	-3.21	-----		-----
1634		-----		-----	-----		-----	-----		-----
1635		10.98		0.64	11.12		1.28	0.14		-----
1656	ISO22854-B	10.9		0.28	-----		-----	-----		-----
1706		-----		-----	-----		-----	-----		-----
1776	ISO22854-A	0.11	D(1)	-48.18	10.31		-2.36	10.20	f+?	-----
1807		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
2146		-----		-----	10.91		0.34	-----		-----
6168		-----		-----	-----		-----	-----		-----
	normality	OK			not OK			n.a.		
	n	14			15			13		
	outliers	1			1			1		
	mean (n)	10.84			10.84			<1		
	st.dev. (n)	0.133			0.206					
	R(calc.)	0.37			0.58					
	st.dev.(ISO22854:16)	0.223			0.223					
	R(ISO22854:16)	0.62			0.62					

F+? – possibly a false positive test result?


Ethers (C5 only)
Kernel Density


Ethers (C5 and more atoms)
Kernel Density

Determination of other Oxygenates on sample #19075; results in %V/V

lab	method	DIPE	mark	ETBE	mark	i-BuOH	mark	IPA	mark
62		-----		-----		-----		-----	
120	D5599	0.00		0.00		0.00		0.00	
140		-----		-----		-----		-----	
150	D5599	<0.10		<0.10		<0.10		<0.10	
158	D5599	<0.01		<0.01		<0.01		<0.01	
159		-----		-----		-----		-----	
169		-----		-----		-----		-----	
171	D5599	<0.10		<0.10		<0.10		<0.10	
175		-----		-----		-----		-----	
194		-----		-----		-----		-----	
311	ISO22854-A	<0.1		<0.1		<0.01		<0.01	
312	ISO22854-A	<0.1		<0.1		<0.1		<0.1	
323	ISO22854-A	< 0.10		< 0.10		< 0.10		< 0.10	
333		-----		-----		-----		-----	
334	ISO22854-A	0		0.03		0		0.09	
335		-----		-----		-----		-----	
336	EN1601	<0.17		<0.17		<0.17		<0.17	
337		-----		-----		-----		-----	
338		0		0		0		0	
360	ISO22854-A	< 0.80		< 0.80		< 0.80		< 0.80	
381	ISO22854-A	<0,8		<0,8		<0,8		<0,8	
447		-----		-----		-----		-----	
463	EN13132	<0,2		<0,2		<0,2		<0,2	
496	ISO22854-A	<0.010		<0.010		<0.010		<0.010	
511		-----		-----		-----		-----	
541		-----		-----		-----		-----	
631	D5845	0		0.46		-----		-----	
1026	EN13132	-----		0.5		0		0	
1033		-----		-----		-----		-----	
1047		-----		-----		-----		-----	
1126		-----		-----		-----		-----	
1134		-----		-----		-----		-----	
1161		-----		-----		-----		-----	
1191	EN22854	-----		0.02		-----		0.00	
1205		-----		-----		-----		-----	
1229		-----		0.10		<0,05		<0,05	
1299	ISO22854-A	<0.01		<0.01		0.13		<0.01	
1397	EN13132	-----		<0,2		-----		-----	
1459	ISO22854-A	-----		0.00		-----		-----	
1544	ISO22854-A	0.00		0.00		0.00		0.00	
1554	EN13132	-----		0		0		0	
1634		-----		-----		-----		-----	
1635		-----		0.14		-----		-----	
1656	ISO22854-B	<0.1		<0.1		<0.1		<0.1	
1706	ISO22854-A	-----		0.7		-----		-----	
1776		-----		-----		-----		0.09	
1807	ISO22854-A	0		0		0		0	
1810	D6839	-----		0.23		-----		-----	
1811		-----		-----		-----		-----	
2146	ISO22854-A	<0,1		<0,1		<0,1		<0,1	
6168		-----		-----		-----		-----	

Determination of other Oxygenates on sample #19075; results in %V/V -- continued --

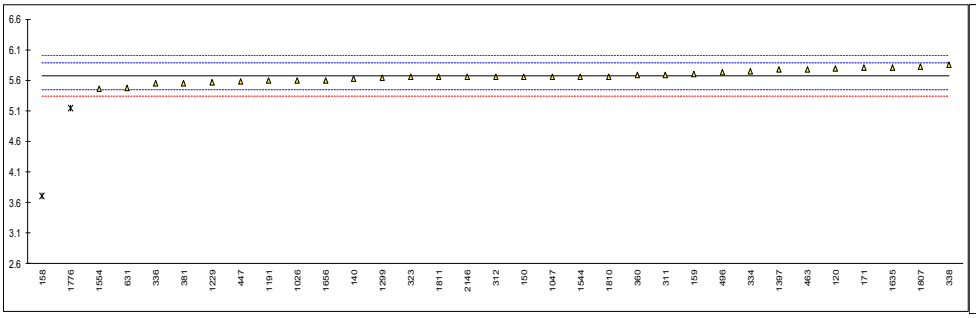
lab	method	MeOH	mark	TAME	mark	t-BuOH	mark	Other oxygenates	mark
62		-----		-----		-----		-----	
120	D5599	0.00		0.101		0.025		0.00	
140		-----		-----		-----		-----	
150	D5599	<0.10		<0.10		<0.10		<0.10	
158	D5599	<0.01		<0.01		<0.01		<0.01	
159		-----		-----		-----		-----	
169		-----		-----		-----		-----	
171	D5599	<0.10		<0.10		<0.10		<0.10	
175		-----		-----		-----		-----	
194		-----		-----		-----		-----	
311	ISO22854-A	<0.01		0.11		0.04		<0.01	
312	ISO22854-A	<0.1		0.13		<0.1		<0.1	
323	ISO22854-A	< 0.10		< 0.10		< 0.10		0.14	
333		-----		-----		-----		-----	
334	ISO22854-A	0		0		0		0.01	
335		-----		-----		-----		-----	
336	EN1601	<0.17		<0.17		<0.17		<0.17	
337		-----		-----		-----		-----	
338		0		0		0		-----	
360	ISO22854-A	< 0.80		0.12		< 0.80		< 0.80	
381	ISO22854-A	<0,8		<0,8		<0,8		<0,8	
447		-----		-----		-----		-----	
463	EN13132	<0,2		<0,2		<0,2		<0,2	
496	ISO22854-A	<0.010		0.120		<0.010		<0.010	
511		-----		-----		-----		-----	
541		-----		-----		-----		-----	
631	D5845	<0.1		0		-----		-----	
1026	EN13132	0		-----		-----		<0.1	C
1033		-----		-----		-----		-----	
1047		-----		-----		-----		-----	
1126		-----		-----		-----		-----	
1134		-----		-----		-----		-----	
1161		-----		-----		-----		-----	
1191	EN22854	0.00		0.12		0.02		-----	
1205		-----		-----		-----		-----	
1229	ISO22854-A	0		0.12		<0,05		-----	
1299	ISO22854-A	<0.01		<0.01		0.03		<0.01	
1397		-----		-----		-----		-----	
1459		-----		-----		-----		-----	
1544	ISO22854-A	0.00		0.120		0.00		0.00	
1554	EN13132	0		0.0270		0		-----	
1634		-----		-----		-----		-----	
1635		-----		-----		0.06		-----	
1656	ISO22854-B	<0.1		<0.1		<0.1		<0.1	
1706		-----		-----		-----		-----	
1776	ISO22854-A	<0,2		0.12		-----		-----	
1807	ISO22854-A	0		-----		0		-----	
1810		-----		-----		-----		-----	
1811		-----		-----		-----		-----	
2146	ISO22854-A	<0,1		0.13		<0,1		<0,1	
6168		-----		-----		-----		-----	

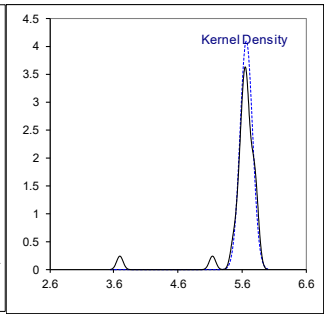
Lab 1026 first reported 20.7

Determination of Oxygen content on sample #19075; results in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D5599	5.79		1.12	
140	D5599	5.62		-0.42	
150	D5599	5.66		-0.05	
158	D5599	3.7	R(0.01)	-17.76	
159	D5599	5.70	C	0.31	first reported 3.68
169		-----		-----	
171		5.8		1.21	
175		-----		-----	
194		-----		-----	
311	ISO22854-A	5.69		0.22	
312	ISO22854-A	5.66		-0.05	
323	ISO22854-A	5.65		-0.14	
333		-----		-----	
334	ISO22854-A	5.74		0.67	
335		-----		-----	
336	EN1601	5.55	C	-1.05	first reported 5.98
337		-----		-----	
338	EN1601	5.85		1.66	
360	ISO22854-A	5.69		0.22	
381	ISO22854-A	5.55		-1.05	
447	EN13132	5.58		-0.78	
463	EN13132	5.78		1.03	
496	ISO22854-A	5.730		0.58	
511		-----		-----	
541		-----		-----	
631	D5845	5.47		-1.77	
1026	EN13132	5.6		-0.60	
1033		-----		-----	
1047	EN1601	5.66		-0.05	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN22854	5.59		-0.69	
1205		-----		-----	
1229	ISO22854-A	5.57		-0.87	
1299	ISO22854-A	5.64		-0.23	
1397	EN13132	5.77		0.94	
1459		-----		-----	
1544	ISO22854-A	5.660		-0.05	
1554	EN13132	5.466		-1.81	
1634		-----		-----	
1635	ISO22854-A	5.80		1.21	
1656	ISO22854-B	5.6		-0.60	
1706		-----		-----	
1776	ISO22854-A	5.14	R(0.01)	-4.75	
1807	ISO22854-A	5.82		1.39	
1810	ISO22854-A	5.66		-0.05	
1811	ISO22854-A	5.65		-0.14	
2146	ISO22854-A	5.65		-0.14	
6168		-----		-----	

normality	OK
n	31
outliers	2
mean (n)	5.666
st.dev. (n)	0.0974
R(calc.)	0.273
st.dev.(ISO22854:16)	0.1107
R(ISO22854:16)	0.310

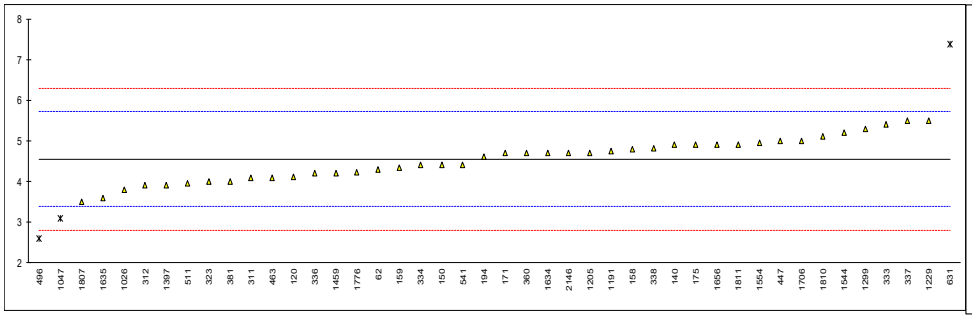


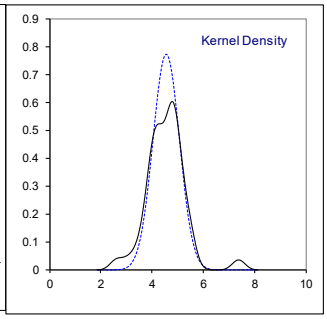


Determination of Sulfur on sample #19075; results in mg/kg

lab	method	value	mark	z(targ)	remarks
62	D5453	4.3		-0.43	
120	D2622	4.115		-0.74	
140	D2622	4.9		0.61	
150	D5453	4.40		-0.25	
158	D5453	4.80		0.43	
159	D5453	4.33		-0.37	
169		-----		-----	
171	D2622	4.7		0.26	
175	D5453	4.9		0.61	
194	D7039	4.6		0.09	
311	ISO20846	4.1		-0.77	
312	D5453	3.9		-1.11	
323	ISO20846	4	C	-0.94	first reported <3
333	ISO20846	5.4		1.46	
334	ISO20846	4.4		-0.25	
335		-----		-----	
336	ISO20846	4.2		-0.60	
337	ISO20846	5.5		1.64	
338	ISO20846	4.82		0.47	
360	ISO20846	4.70		0.26	
381	ISO20846	4.0		-0.94	
447	IP490	5.0		0.78	
463	ISO20846	4.10		-0.77	
496	ISO20846	2.60	DG(0.05)	-3.35	
511	D5453	3.95		-1.03	
541	ISO20846	4.40		-0.25	
631	D4294	7.3824	G(0.01)	4.87	
1026	ISO20846	3.8		-1.29	
1033		-----		-----	
1047	ISO20846	3.1	DG(0.05)	-2.49	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	ISO20846	4.75		0.35	
1205	ISO20846	4.708		0.28	
1229	ISO20846	5.5		1.64	
1299	ISO20846	5.3		1.29	
1397	ISO20846	3.9		-1.11	
1459	ISO20884	4.2		-0.60	
1544	ISO20846	5.21		1.14	
1554	ISO20846	4.956		0.70	
1634	ISO20846	4.7		0.26	
1635	ISO20846	3.6		-1.63	
1656	ISO20846	4.9		0.61	
1706	ISO20884	5.0		0.78	
1776	ISO20846	4.22		-0.56	
1807	ISO20846	3.5		-1.80	
1810	ISO20846	5.1		0.95	
1811	D5453	4.9		0.61	
2146	ISO20846	4.7		0.26	
6168		-----		-----	

normality	OK
n	41
outliers	3
mean (n)	4.548
st.dev. (n)	0.5168
R(calc.)	1.447
st.dev.(ISO20846:11)	0.5819
R(ISO20846:11)	1.629



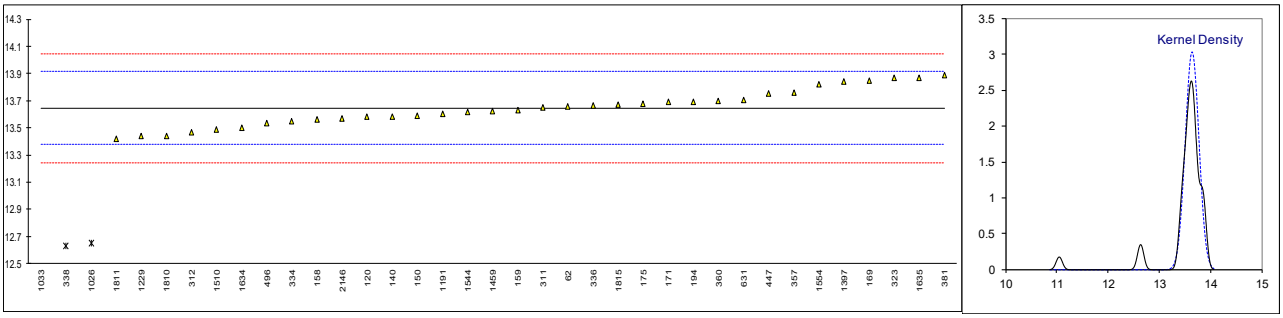


Determination of Total Vapour Pressure on sample #19076; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	13.66		0.11	
120	D5191	13.58		-0.49	
140	D5191	13.58		-0.49	
150	D5191	13.59		-0.42	
158	D5191	13.56		-0.64	
159	D5191	13.63		-0.12	
169	D5191	13.85		1.53	
171	D5191	13.69		0.33	
175	D5191	13.68		0.26	
194	D5191	13.69		0.33	
311	D5191	13.65		0.03	
312	D5191	13.47		-1.32	
323	D5191	13.87		1.68	
333		-----		-----	
334	D5191	13.55		-0.72	
335		-----		-----	
336	D5191	13.66	C	0.13	first reported 12.63
337		-----		-----	
338	EN13016-1	12.63	R(0.01)	-7.61	
357	D5191	13.76		0.86	
360	D5191	13.70		0.41	
381	D5191	13.89		1.83	
447	D5191	13.75		0.78	
496	D5191	13.53	C	-0.85	first reported 14.34
541		-----		-----	
631	D5191	13.704		0.44	
1026	D5191	12.65	R(0.01)	-7.46	
1033	D5191	11.05	R(0.01)	-19.45	
1047		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN13016-1	13.61		-0.30	
1229	EN13016-1	13.44		-1.54	
1299		-----		-----	
1397	EN13016-1	13.84		1.46	
1459	EN13016-1	13.620		-0.19	
1510	D5191	13.490		-1.17	
1544	D5191	13.614		-0.24	
1554	EN13016-1	13.82		1.31	
1634	EN13016-1	13.50		-1.09	
1635	EN13016-1	13.87		1.68	
1656		-----		-----	
1776		-----		-----	
1810	EN13016-1	13.44		-1.54	
1811	D5191	13.42		-1.69	
1815	EN13016-1	13.67		0.18	
2146	EN13016-1	13.57		-0.57	

	normality	OK
	n	34
	outliers	3
	mean (n)	13.646
	st.dev. (n)	0.1313
	R(calc.)	0.368
	st.dev.(D5191:19)	0.1334
	R(D5191:19)	0.374

Compare R (EN13016-1:07) = 0.374

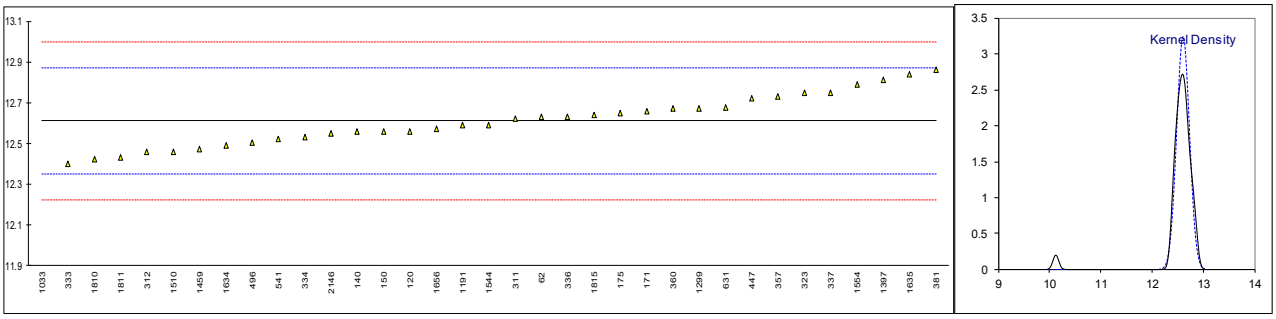


Determination of DVPE (ASTM D5191 calculation) on sample #19076; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.63		0.15	
120	D5191	12.56		-0.39	
140	D5191	12.56		-0.39	
150	D5191	12.56		-0.39	
158		-----		-----	
159		-----		-----	
169		-----		-----	
171	D5191	12.66		0.38	
175	D5191	12.65		0.30	
194		-----		-----	
311	D5191	12.62		0.07	
312	D5191	12.46		-1.16	
323	D5191	12.75		1.07	
333	D5191	12.4		-1.62	
334	D5191	12.53		-0.62	
335		-----		-----	
336	D5191	12.63	C	0.17	first reported 80.3
337	EN13016-1	12.75		1.07	
338		-----		-----	
357	D5191	12.73		0.92	
360	D5191	12.67		0.46	
381	D5191	12.86		1.92	
447	D5191	12.72		0.84	
496	D5191	12.50	C	-0.84	first reported 13.30
541	D6378	12.520		-0.70	
631	D5191	12.676		0.50	
1026		-----		-----	
1033	D5191	10.12	R(0.01)	-19.21	
1047		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	D5191	12.59		-0.16	
1229		-----		-----	
1299	D5191	12.67		0.46	
1397	EN13016-1	12.81		1.54	
1459	EN13016-1	12.473		-1.06	
1510	D5191	12.46		-1.16	
1544	D5191	12.590		-0.16	
1554	EN13016-1	12.79		1.38	
1634	EN13016-1	12.49		-0.93	
1635	EN13016-1	12.84		1.77	
1656	EN13016-1	12.57		-0.31	
1776		-----		-----	
1810	EN13016-1	12.42		-1.47	
1811	D5191	12.43		-1.39	
1815	EN13016-1	12.64		0.23	
2146	EN13016-1	12.55		-0.47	

	normality	OK
	n	34
	outliers	1
	mean (n)	12.611
	st.dev. (n)	0.1233
	R(calc.)	0.345
	st.dev.(D5191:19)	0.1297
	R(D5191:19)	0.363

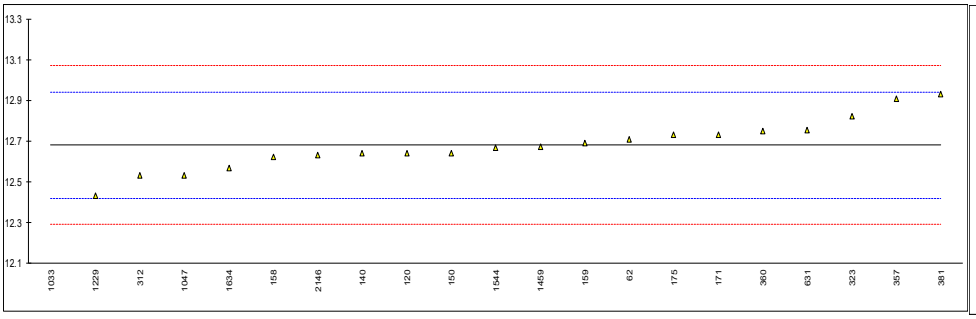
Compare R (EN13016-1:07) = 0.363

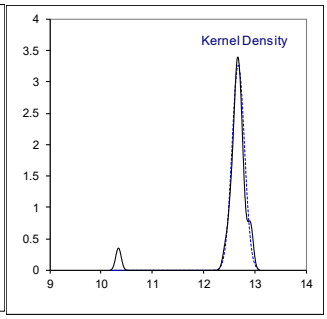


Determination of DVPE (EPA calculation) on sample #19076; results in psi

lab	method	value	mark	z(targ)	remarks
62	D5191	12.71		0.23	
120	D5191	12.64		-0.31	
140	D5191	12.64		-0.31	
150	D5191	12.64		-0.31	
158	D5191	12.62		-0.46	
159	D5191	12.69		0.08	
169		-----		-----	
171	D5191	12.73		0.39	
175	D5191	12.73		0.39	
194		-----		-----	
311		-----		-----	
312	D5191	12.53		-1.15	
323	D5191	12.82		1.08	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
357	D5191	12.91		1.77	
360	D5191	12.75		0.54	
381	D5191	12.93		1.93	
447		-----		-----	
496		-----		-----	
541		-----		-----	
631	D5191	12.754		0.57	
1026		-----		-----	
1033	D5191	10.34	R(0.01)	-18.01	
1047	EN13016-1	12.53		-1.15	
1134		-----		-----	
1161		-----		-----	
1191		-----		-----	
1229	EN13016-1	12.43		-1.92	
1299		-----		-----	
1397		-----		-----	
1459	EN13016-1	12.673		-0.05	
1510		-----		-----	
1544	D5191	12.669		-0.08	
1554		-----		-----	
1634	EN13016-1	12.567		-0.87	
1635		-----		-----	
1656		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811		-----		-----	
1815		-----		-----	
2146	EN13016-1	12.63		-0.38	

normality	OK
n	20
outliers	1
mean (n)	12.680
st.dev. (n)	0.1220
R(calc.)	0.342
st.dev.(D5191:19)	0.1299
R(D5191:19)	0.364

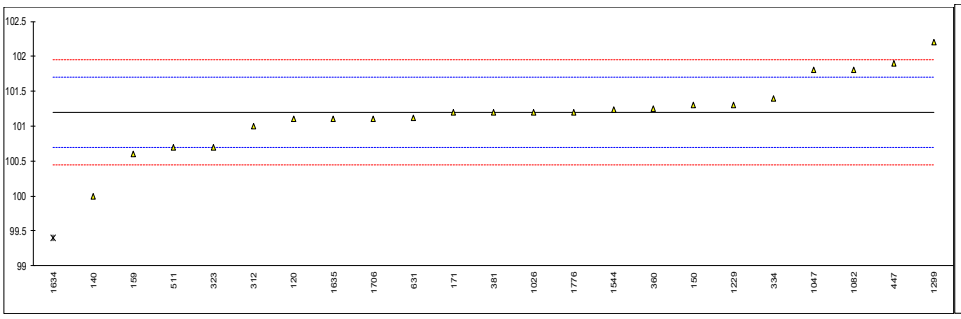


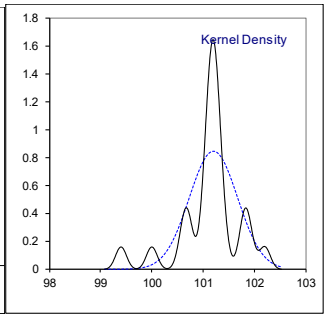


Determination of RON on sample #19077

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D2699	101.1		-0.40	
140	D2699	100.0		-4.80	
150	D2699	101.3		0.40	
159	D2699	100.6		-2.40	
169		-----		-----	
171	D2699	101.2		0.00	
312	D2699	101.0		-0.80	
323	D2699	100.7		-2.00	
333		-----		-----	
334	D2699	101.4		0.80	
360	D2699	101.25		0.20	
381	D2699	101.2		0.00	
447	D2699	101.9		2.80	
511	D2699	100.7	C	-2.00	first reported 99.75
631	D2699	101.12		-0.32	
1026	ISO5164	101.2		0.00	
1047	D2699	101.8		2.40	
1082	ISO5164	101.8		2.40	
1161		-----		-----	
1191		-----		-----	
1229	ISO5164	101.3		0.40	
1299	D2699	102.2		4.00	
1544	D2699	101.24		0.16	
1634		99.4	R(0.05)	-7.20	
1635	ISO5164	101.1		-0.40	
1706	In house	101.1		-0.40	
1776	ISO5164	101.2		0.00	

normality	suspect
n	22
outliers	1
mean (n)	101.20
st.dev. (n)	0.471
R(calc.)	1.32
st.dev.(D2699:18a)	0.250
R(D2699:18a)	0.7

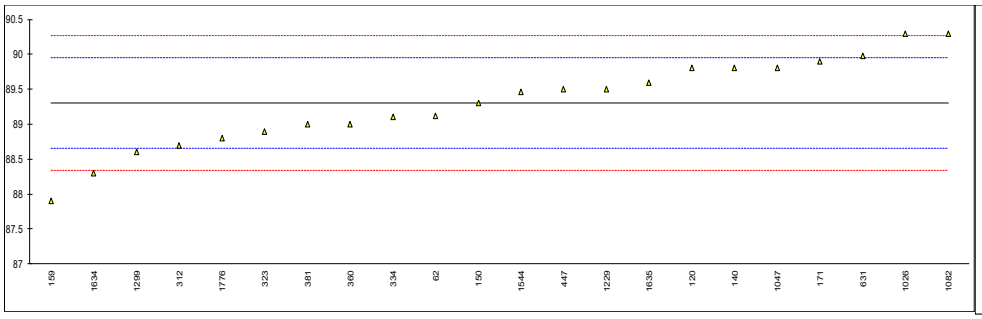


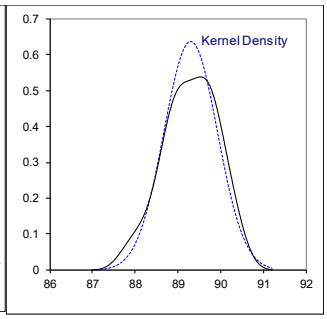


Determination of MON on sample #19077

lab	method	value	mark	z(targ)	remarks
62	D2700	89.12		-0.57	
120	D2700	89.8		1.55	
140	D2700	89.8		1.55	
150	D2700	89.3		-0.01	
159	D2700	87.9		-4.36	
169		-----		-----	
171	D2700	89.9		1.86	
312	D2700	88.7		-1.88	
323	D2700	88.9		-1.25	
333		-----		-----	
334	D2700	89.1		-0.63	
360	D2700	89.00		-0.94	
381	D2700	89.0		-0.94	
447	D2700	89.5		0.61	
511		-----		-----	
631	D2700	89.98		2.11	
1026	ISO5163	90.3		3.10	
1047	D2700	89.8		1.55	
1082	ISO5163	90.3		3.10	
1161		-----		-----	
1191		-----		-----	
1229	ISO5163	89.5		0.61	
1299	D2700	88.6		-2.19	
1544	D2700	89.46		0.49	
1634		88.3		-3.12	
1635	ISO5163	89.6		0.92	
1706		-----		-----	
1776	ISO5163	88.8		-1.56	

normality	OK
n	22
outliers	0
mean (n)	89.30
st.dev. (n)	0.626
R(calc.)	1.75
st.dev.(D2700:18a)	0.321
R(D2700:18a)	0.9





APPENDIX 2: Z-scores of Distillation (ASTM D86)

lab	IBP	10%eva	50%eva	90%eva	FBP	%evap.70°C	%evap.100°C	%evap.150°C
62	0.16	0.18	0.07	0.21	0.28	0.23	0.18	-0.62
120	2.19	-0.44	-0.13	0.52	0.40	0.09	-0.63	-0.85
140	0.40	1.12	-0.13	0.78	-0.08	-0.19	-0.47	-1.31
150	1.14	1.71	0.94	-0.20	0.16	-3.27	-0.14	0.29
158	1.18	0.11	0.33	0.12	-0.63	-----	-----	-----
159	-0.07	-1.23	-1.26	0.04	1.03	-----	-----	-----
169	-2.40	-2.24	-0.79	-0.83	0.52	-----	-----	-----
171	-0.19	0.18	-0.93	-0.57	-0.43	1.34	1.63	0.98
175	-----	-----	-----	-----	-----	-----	-----	-----
194	0.94	-0.60	0.07	0.12	0.08	-1.17	2.27	-0.39
311	-2.64	-0.76	-0.40	-0.75	-0.79	0.64	0.02	0.29
312	-0.73	0.42	0.27	0.26	1.03	-0.89	-1.27	-0.16
323	1.59	-0.83	0.13	-0.01	-0.79	-0.75	-0.14	0.07
333	-1.62	-0.52	-0.60	-0.14	0.12	1.06	-0.47	0.52
334	0.52	-0.99	-0.99	-0.88	-1.22	2.18	0.82	0.98
335	-----	-----	-----	-----	-----	-----	-----	-----
336	-2.22	-0.60	-0.33	-0.40	-0.19	0.51	-0.79	0.52
337	-----	-----	-----	-----	-----	-----	-----	-----
338	-0.67	0.97	0.33	16.13	-0.31	1.34	-0.47	0.29
360	0.58	-0.05	-0.33	-0.31	-0.63	0.37	0.02	0.29
381	0.22	0.18	-0.46	0.34	0.24	0.78	0.34	-0.39
447	-0.67	0.18	-0.33	0.30	0.44	0.51	-0.14	0.07
463	1.59	0.65	-0.26	0.52	1.30	0.37	-0.95	-0.39
496	1.00	0.03	0.00	0.78	-0.35	-0.33	-0.14	-0.16
511	-----	-----	-----	-----	-----	-----	-----	-----
541	-1.77	-0.05	-0.63	-0.01	-0.49	0.58	1.15	-0.16
631	0.88	-0.05	2.12	-0.31	1.70	-6.76	-0.31	-1.76
1026	0.28	-0.13	-0.26	-0.22	0.32	0.37	0.02	-43.15
1033	0.05	1.75	1.66	3.96	-0.59	-2.99	-4.66	-5.88
1047	1.12	0.34	0.20	0.34	0.91	-1.03	-1.11	0.07
1126	-----	-----	-----	-----	-----	-----	-----	-----
1134	-----	-----	-----	-----	-----	-----	-----	-----
1161	-----	-----	-----	-----	-----	-----	-----	-----
1191	0.16	-0.44	-0.46	-0.97	-0.15	1.06	0.18	0.98
1205	-0.13	0.03	0.60	0.04	-0.23	-2.57	-0.95	-0.16
1229	-0.25	-1.46	-0.99	-0.83	-0.71	2.18	1.15	1.21
1299	-1.15	1.12	1.06	3.13	-0.35	1.06	0.66	1.21
1397	-----	-----	-----	-----	-----	-----	-----	-----
1459	-0.67	-0.13	-0.20	-0.31	-0.51	0.23	-0.79	0.75
1544	-0.25	0.16	-0.07	0.44	-0.55	-1.59	0.71	-0.85
1554	2.43	-----	-----	-----	0.00	0.23	1.47	0.52
1634	-0.31	0.18	1.26	0.04	0.71	-5.37	0.34	-0.16
1635	1.06	-0.29	-0.07	0.04	0.75	-0.05	-0.14	0.07
1656	0.28	-0.36	-0.40	-0.31	0.32	0.64	-0.31	0.07
1706	-0.19	1.67	1.39	3.00	-1.53	-----	-----	-----
1776	-0.37	-0.60	-0.26	0.30	-0.51	0.37	0.02	0.07
1807	-0.13	-1.07	-0.46	0.30	0.04	0.92	0.50	-0.16
1810	-1.44	0.57	-0.46	0.39	-0.31	0.51	-0.47	-0.39
1811	0.10	1.28	0.79	1.17	0.99	-2.71	-1.76	-1.31
2146	-----	-----	-----	-----	-----	-----	-----	-----
6168	-----	-----	-----	-----	-----	-----	-----	-----

APPENDIX 3: Analytical details

lab	Lot number of the fluorescent indicator	Manufacturer name of the distillation device	Manufacturer type of the distillation device
62			
120	N/A - not analyzed	TANAKA	ad-7
140			
150			
158		D83 PAC	D86 Auto
159			
169			
171			
175			
194			
311			
312			Optidist
323	lot number Fluorescent indicator:30000000925	Herzog	Optidist
333			
334			
335		PAC	OPTIDIST V2
336			
337		pac	OPTIDIST
338			
360			
381		PAC Germany	OptiDist
447			
463	Batch number: M1107	PAC	Optidist
496	3000000870	Orbis BV	Orbis BV, PAM V1m first edition from year 2008
511		PAC	OptiDist
541			
631		PAC	Optidist
1026			
1033			
1047	NA	IP123-HERZOG BY PAC	OPTIDIST
1126		ISL AD 86 G	
1134			
1161			
1191			
1205			
1229			
1299		PAC	
1397		PAC	OPTIDIST
1459	ASTM D1319, Lot#300000775	ISO 3405, PAC	OptiDist
1544		PAC ISL	Optidist
1554	HONEYWEL UOP LOT NO:3000000960 MAT.NO80675-204	HERZOG by PAC	OptiDist tm/ PAC
1634		Anton Paar GmbH, Austria - ISO3405	Type of the distillation device is ADU5.
1635			
1656		PAC (HERZOG)	Optidist
1706		ISL	Optidist
1776		PAC	OptiDist
1807			
1810			
1811			
2146			
6168			

APPENDIX 4: Number of participants per country (sample #19075 only)

#19075 Regular round

1 lab in ARGENTINA
1 lab in AUSTRIA
2 labs in BELGIUM
3 labs in BULGARIA
1 lab in CANADA
2 labs in CROATIA
2 labs in CZECH REPUBLIC
3 labs in FINLAND
7 labs in FRANCE
1 lab in GERMANY
4 labs in NETHERLANDS
2 labs in PERU
1 lab in PHILIPPINES
1 lab in POLAND
1 lab in PORTUGAL
1 lab in SERBIA
2 labs in SPAIN
2 labs in SWEDEN
1 lab in TURKEY
4 labs in UNITED KINGDOM
9 labs in UNITED STATES OF AMERICA

APPENDIX 5

Abbreviations

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

Literature

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