Results of Proficiency Test
Biogasoline E10
May 2016

Organised by: Institute for Interlaboratory Studies
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1 INTRODUCTION

Since 2009, the Institute for Interlaboratory Studies organizes a proficiency test 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 2015/2016, it was decided to continue the round robin for the analysis of Biogasoline E10.
In this interlaboratory study, a total of 56 laboratories in 23 different countries registered for participation. See appendix 3 for the number of participants per country. In this report, the results of the 2016 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 organiser of this proficiency test. The 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, 1*1 litre Biogasoline E10 (labelled #16080) and/or 1*1 litre Biogasoline E10 (± 750 mL filled, labelled #16081) for DVPE only and/or 1*1 litre Biogasoline E10 (labelled #16082) 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 organisation 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 April 2014 (iis-protocol, version 3.3). This protocol can be downloaded via the FAQ page of the iis website www.iisnl.com.

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 sample material of about 200 litres of Biogasoline E10 was purchased at a local petrol station. From this batch, after homogenisation, 62 amber glass bottles of 1 litre for the main sample (labelled #16080) and 32 amber glass bottles for RON/MON only (labelled #16082) were filled. From the same batch another 70 brown glass bottles of 1 litre were filled with approx. 750 mL especially for Dry Vapour Pressure Equivalent (labelled #16081).
The homogeneity of the subsamples #16080 and #16082, from the same batch, was checked by determination of Density at 15°C in accordance with ASTM D4052 on 8 stratified randomly selected samples. The homogeneity of the subsamples #16081 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 #16080-1	727.88
Sample #16080-2	727.88
Sample #16080-3	727.85
Sample #16080-4	727.79
Sample #16080-5	727.85
Sample #16080-6	727.90
Sample #16082-1	727.96
Sample #16082-2	727.96

table 1: homogeneity test results of subsamples #16080 and #16082

	DVPE in psi
Sample #16081-1	12.43
Sample #16081-2	12.44
Sample #16081-3	12.47
Sample #16081-4	12.49
Sample #16081-5	12.53
Sample #16081-6	12.52
Sample #16081-7	12.49
Sample #16081-8	12.47

table 2: homogeneity test results of subsamples #16081

From the above test results, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities 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 #16080/16082)	0.16	--
r (sample #16081)	--	0.09
reference test method	ISO12185:96	D5191:15
0.3 * R (ref. test method)	0.45	0.11

table 3: evaluation of the repeatabilities of the subsamples #16080, #16082 and #16081

The calculated repeatabilities were less than 0.3 times the reproducibilities of the corresponding the target method. Therefore, homogeneity of the subsamples #16080, #16081 and #16082 was assumed.

To the participants, depending on their registration, 1 litre of sample #16080 and/or 1 litre (± 750 mL filled) of sample #16081 and/or 1 litre of sample #16082 were sent on May 4, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of Gasoline, packed in the brown 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 #16080: API gravity, Aromatics (by FIA and by GC), Benzene, Copper Strip Corrosion 3hrs/50°C, Density at 15°C, Distillation, Doctor test, Existent Gum, Lead as Pb, Manganese as Mn, Mercaptan Sulphur as S, Olefins (by FIA and by GC), Oxidation Stability, Oxygenates, Oxygen and Sulphur.
On sample #16081 the participants were requested to determine TVP and to calculate DVPE only (in accordance with ASTM D5191 and EPA requirements). The participants were requested to determine RON and MON on sample #16082 (EN228 correction not applied).

To get comparable results a detailed report form, on which the units were prescribed as well as the reference test methods and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. A SDS and a form to confirm receipt of the samples were added to the sample package.

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. 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

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, April 2014 version 3.3). 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. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

In accordance to ISO 5725 the original test results per determination were submitted subsequently to Dixon's and/or 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 the averages and the 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. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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 standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". 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.

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 reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the spread of this interlaboratory study. This target standard deviation was calculated from the literature reproducibility by division with 2.8.

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

The z-scores were calculated according to:

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

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

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

	$\lvert z\rvert < 1$	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 during the dispatch of the samples to the participants. Two laboratories reported test results after the final reporting date and two laboratories did not report any test result at all. Not all laboratories were able to perform all analyses requested. Finally, 54 laboratories did report 1073 numerical test results. Observed were 31 outlying test results, which is 2.9%. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section, the reported test results are discussed per sample and per test. The specified test methods and requirements were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 3.

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

For sample #16080

API gravity: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D4052:15.

Aromatics by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1319:15 and EN15553:07.

Aromatics by GC: This determination may not be problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is almost in agreement with the requirements of ISO22854:16 and in full agreement with ASTM D5769:15. Six participants used method ASTM D5769. When the ISO22854 test results were evaluated separately, the calculated reproducibility is in good agreement with the requirements of ISO22854:16.

Benzene: This determination was problematic. One statistical outlier was observed and six test results were excluded. The calculated reproducibility is not in agreement with the requirements of ISO22854:16, but is in agreement with the much less strict requirements of ASTM D3606:10e1.
Six participants used method EN238. The reproducibility of this method is about four times larger than the reproducibility of ISO22854:16. Therefore these test results were excluded and evaluated separately. When looking at the test results performed with method EN238, the calculated reproducibility is in full agreement with the requirements of EN238:96/A1:03.

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

Density at 15°C: This determination was not problematic. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ISO12185:96 and with ASTM D4052:15.

Distillation: The determination of the distillation may be problematic. In total eleven statistical outliers were observed. Only one laboratory performed the test in manual mode. When compared against the automated mode requirements of ASTM D86:16, the calculated reproducibilities after rejection of the statistical outliers for IBP, temperature at 10% evaporated, temperature at 90% evaporated and volume% evaporated at 150°C are all in agreement. The calculated reproducibilities after rejection of the statistical outliers for temperature at 50% evaporated, FBP, volume % evaporated at 70°C and 100°C are not in agreement with the automated mode requirements of ASTM D86:16.
When compared against the automated mode requirements of ISO3405:11, the calculated reproducibilities after rejection of the statistical outliers for IBP, temperature at 10% evaporated, temperature at 90% evaporated, volume %

evaporated at 70°C, at 100°C and at 150°C are all in agreement. The calculated reproducibilities after rejection of the statistical outliers for temperature at 50% evaporated and FBP are not in agreement with the automated mode requirements of ISO3405:11.

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

Existent Gum: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with requirements of ASTM D381:12 and with the more strict requirements of ISO6245:95.

Lead: The lead concentration was below the application range (2.5 – 25 mg/L) of ASTM D3237:12. Therefore, no significant conclusions were drawn.

Manganese: The manganese concentration was below the application range of the test methods used by the participants. Therefore, no significant conclusions were drawn.

Mercaptans: The mercaptans concentration was below the application range (0.0003 – 0.01 %M/M) of ASTM D3227:13. Therefore, no significant conclusions were drawn.

Olefins by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1319:15 and EN15553:07.

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

Oxidation Stability: All participants, except one, agreed that the Oxidation Stability is >360 minutes.

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 ISO22854:16 as well as with the requirements of EN1601:14 and EN13132:00 and the less strict requirements of ASTM D5599.

MTBE: This determination may not be problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO22854:16, but not in agreement with the requirements of EN1601:14, EN13132:00 and ASTM D5599:15.

Ethers: This determination was not problematic. No statistical outliers were observed. The calculated reproducibilities are in agreement with the requirements of ISO22854:16.

Other oxygenates: The concentration of the various oxygenates were near or below the application range of ISO22854:16 (min. 0.2 %V/V). Therefore, no significant conclusions were drawn.

Oxygen: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements mentioned in ISO22854:16, D5599:15, EN1601:14 and EN13132:00.

Sulphur: 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 ISO20846:11 and ASTM D5453:16e1.

For sample #16081

TVP: 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 ASTM D5191:15 and EN13016-1:07.

DVPE: The conversion of the measured Total Vapour Pressure to the corresponding Dry Vapour Pressure Equivalent (DVPE) as described in the ASTM D5191:13 and the U.S. EPA guidelines (40 CFR Part 80, App. E, Method 3) showed in total five statistical outliers. Both calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirement of ASTM D5191:15 and EN13016-1:07.

For sample #16082

RON: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D2699:15a and ISO5164:14.

MON: 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 ASTM D2700:16 and ISO5163:14.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories. The assigned values, calculated reproducibilities and reproducibilities, derived from literature standards (in casu ASTM, ISO, EN standards) are compared in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
API gravity		21	62.76	0.35	0.71
Aromatics by FIA	%V/V	26	24.9	3.9	3.7
Aromatics by GC	%V/V	26	23.6	1.3	1.2
Benzene	%V/V	31	0.66	0.07	0.04
Copper Strip 3 hrs at 50°C		39	1	n.a.	n.a.
Density at 15°C	kg/m^3	43	727.99	0.65	1.50
Initial Boiling Point	ºC	49	29.3	4.5	4.7
10% evaporated	ºC	50	42.8	2.9	3.4
50% evaporated	ºC	49	65.6	4.7	4.1
90% evaporated	ºC	47	140.5	3.9	6.3
Final Boiling Point	ºC	50	184.3	9.4	7.1
%Volume at 70ºC	%V/V	39	53.0	2.2	1.9
%Volume at 100ºC	%V/V	41	66.5	1.9	1.7
%Volume at 150ºC	%V/V	38	93.3	1.2	1.1
Doctor test		22	Negative	n.a.	n.a.
Existent Gum (solvent washed)	mg/100mL	19	0.5	1.4	2.0
Lead as Pb	mg/L	24	<2.5	n.a.	n.a.
Manganese as Mn	mg/L	20	<2.0	n.a.	n.a.
Mercaptans Sulphur as S	%M/M	22	<0.0003	n.a.	n.a.
Olefins by FIA	%V/V	25	6.8	2.4	2.6
Olefins by GC	%V/V	19	6.9	0.8	1.3
Oxidation Stability	minutes	25	>360	n.a.	n.a.
Ethanol	%V/V	35	7.3	0.6	0.5
MTBE	%V/V	32	2.8	0.4	0.4
Ethers C5	%V/V	14	2.8	0.4	0.4
Ethers C5 or more C atoms	%V/V	16	2.9	0.4	0.4
Ethers C6 or more C atoms	%V/V	10	0.1	0.2	0.4
Oxygen content	%M/M	32	3.3	0.3	0.3
Sulphur	mg/kg	40	4.8	1.7	1.7

table 4: performance evaluation sample #16080

Parameter	unit	n	average	2.8 * sd	R (lit)
TVP acc.to ASTM D5191	psi	43	13.51	0.28	0.37
DVPE acc.to ASTM D5191	psi	43	12.50	0.24	0.36
DVPE acc.to EPA	psi	34	12.59	0.24	0.36

table 5: performance evaluation sample #16081

Parameter	unit	n	average	2.8 * sd	R (lit)
RON		29	95.9	0.8	0.7
MON		26	85.9	0.8	0.9

table 6: performance evaluation sample #16082

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 standards. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF MAY 2016 WITH PREVIOUS PT

Determination	May 2016	May 2015	May 2014	May 2013	May 2012
Number of reporting labs	54	41	50	48	40
Number of results reported	1073	713	1164	892	831
Statistical outliers	31	20	45	25	30
Percentage outliers	2.9%	2.8%	3.9%	2.8%	3.6%

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 standards. The conclusions are given the following table:

Determination	May 2016	May 2015	May 2014	May 2013	May 2012
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	+	++	++	+	++
Oxidation Stability	n.e.	n.e.	n.e.	n.e.	n.e.
Ethanol	+/-	-	--	--	++
MTBE	+/-	n.e.	+	n.e.	n.e.
Oxygen content	+/-	-	+/-	+/-	+/-
Sulphur	+/-	+/-	+/-	+/-	-
TVP acc.to ASTM D5191	+	++	+	+	+/-
DVPE acc.to ASTM D5191	+	+	+	+	+/-
DVPE acc.to EPA	+	++	+	+	+/-
RON	+/-	+/-	-	+	+
MON	+/-	+/-	-	-	-

table 8: comparison of the quality of the various determinations against the respective standard requirements

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

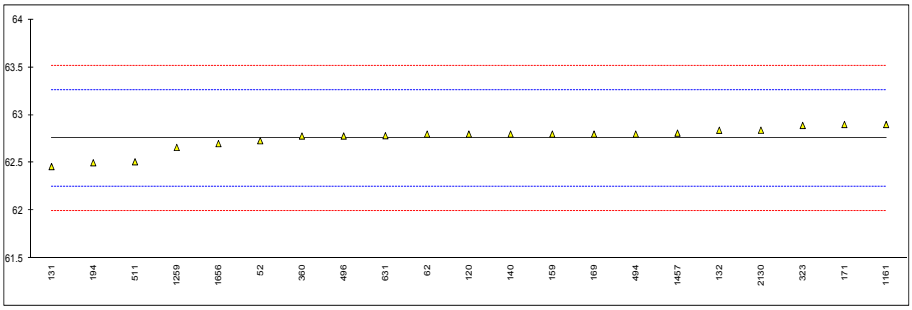
++: group performed much better than the standard
+ : group performed better than the standard
+/-: group performance equals the standard
- : group performed worse than the standard
-- : group performed much worse than the standard
n.e.: not evaluated

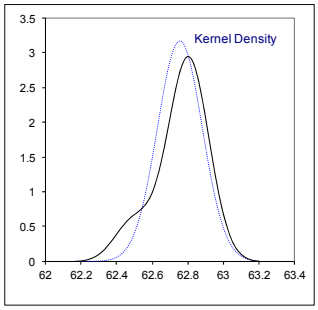
APPENDIX 1

Determination of API gravity on sample #16080;

lab	method	value	mark	z(targ)	remarks
52	D4052	62.73		-0.10	
62	D4052	62.8		0.17	
120	D4052	62.8		0.17	
131	D4052	62.46		-1.17	
132	D4052	62.84		0.33	
140	D4052	62.8		0.17	
159	D4052	62.8		0.17	
169	D4052	62.8		0.17	
171	D4052	62.9		0.57	
175		-----		-----	
194	D4052	62.5		-1.01	
312		-----		-----	
323	ISO12185	62.89		0.53	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360	D4052	62.78		0.09	
381		-----		-----	
447		-----		-----	
494	D4052	62.8	C	0.17	first reported: 728.3
496	D4052	62.78		0.09	
511	D4052	62.51		-0.97	
631	D4052	62.783		0.10	
862		-----		-----	
970		-----		-----	
1033		-----		-----	
1047		-----		-----	
1082		-----		-----	
1126		-----		-----	
1134		-----		-----	
1161	D4052	62.9		0.57	
1191		-----		-----	
1205		-----		-----	
1212		-----		-----	
1229		-----		-----	
1237		-----		-----	
1259		62.66		-0.38	
1299		-----		-----	
1457	D4052	62.81		0.21	
1459		-----		-----	
1634		-----		-----	
1656	ISO12185	62.70		-0.22	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130	D4052	62.841		0.33	
2146		-----		-----	

normality	suspect
n	21
outliers	0
mean (n)	62.756
st.dev. (n)	0.1259
R(calc.)	0.352
R(D4052:15)	0.710



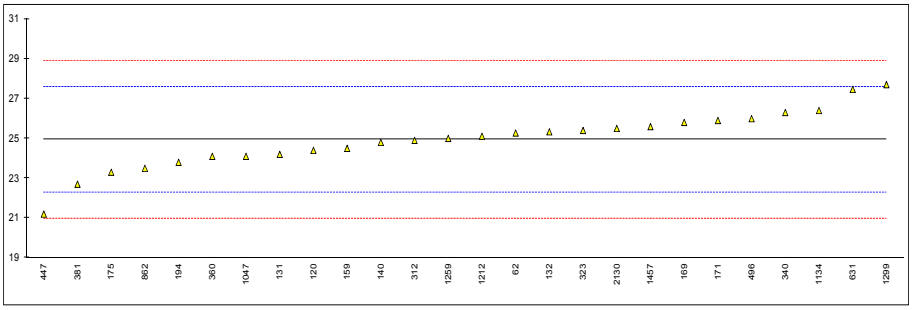


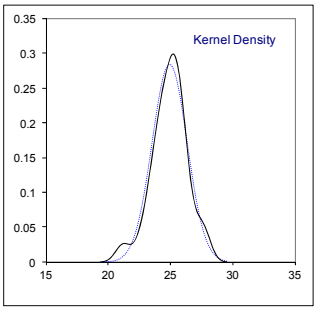
Determination of Aromatics by FIA on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62	D1319	25.27		0.26	
120	D1319	24.4		-0.40	
131	D1319	24.2		-0.55	
132	D1319	25.33		0.30	
140	D1319	24.8		-0.10	
159	D1319	24.5		-0.33	
169	D1319	25.8		0.66	
171	D1319	25.9		0.73	
175	D1319	23.3		-1.24	
194	D1319	23.8		-0.86	
312	D1319	24.9		-0.02	
323	D1319	25.4		0.35	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340	D1319	26.3		1.03	
350		-----		-----	
360	D1319	24.1		-0.63	
381	EN15553	22.7		-1.69	
447	D1319	21.2		-2.82	
494		-----		-----	
496	D1319	25.99		0.80	
511		-----		-----	
631	D1319	27.46		1.91	
862	D1319	23.5		-1.08	
970		-----		-----	
1033		-----		-----	
1047	EN15553	24.1		-0.63	
1082		-----		-----	
1126		-----		-----	
1134	D1319	26.4		1.11	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1212	D1319	25.11		0.13	
1229		-----		-----	
1237		-----		-----	
1259	EN15553	25.0		0.05	
1299	D1319	27.7		2.09	
1457	D1319	25.59		0.50	
1459		-----		-----	
1634		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130	D1319	25.5		0.43	
2146		-----		-----	

	normality	suspect
	n	26
	outliers	0
	mean (n)	24.93
	st.dev. (n)	1.407
	R(calc.)	3.94
	R(D1319:15)	3.70

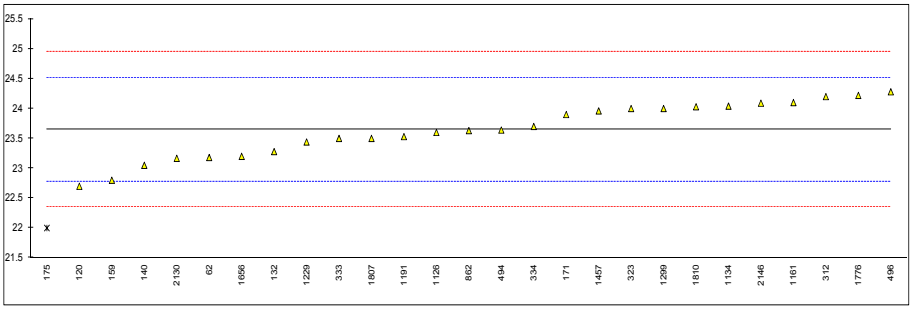
Compare R(EN15553:07) = 3.70

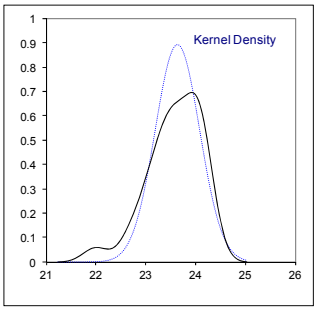




Determination of Aromatics by GC on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62	INH-14	23.18		-1.07	
120	D5769	22.7	C	-2.18	first reported: 21.7
131		-----		-----	
132	D5769	23.28	C	-0.84	first reported: 21.76
140	D5769	23.05		-1.37	
159	D5769	22.8		-1.95	
169		-----		-----	
171	D5769	23.9		0.59	
175	D5769	22.0	R(0.05)	-3.80	
194		-----		-----	
312	ISO22854	24.2		1.29	
323	ISO22854	24.0		0.82	
333	ISO22854	23.5		-0.33	
334	ISO22854	23.7		0.13	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360		-----		-----	
381		-----		-----	
447		-----		-----	
494	ISO22854	23.64		-0.01	
496	ISO22854	24.28		1.47	
511		-----		-----	
631		-----		-----	
862	D6839	23.63		-0.03	
970		-----		-----	
1033		-----		-----	
1047		-----		-----	
1082		-----		-----	
1126	EN14517	23.60		-0.10	
1134	ISO22854	24.04		0.92	
1161	ISO22854	24.1		1.05	
1191	ISO22854	23.53		-0.26	
1205		-----		-----	
1212		-----		-----	
1229	ISO22854	23.44		-0.47	
1237		-----		-----	
1259		-----		-----	
1299	ISO22854	24.0		0.82	
1457	ISO22854	23.96		0.73	
1459		-----		-----	
1634		-----		-----	
1656	ISO22854	23.2		-1.03	
1706		-----		-----	
1776	ISO22854	24.22		1.33	
1807	ISO22854	23.5		-0.33	
1810	ISO22854	24.03		0.89	
2130	D6730	23.167		-1.10	
2146	ISO22854	24.09		1.03	
					Only ISO22854 data
	normality	OK			OK
	n	26			17
	outliers	1			0
	mean (n)	23.644			23.849
	st.dev. (n)	0.4475			0.3254
	R(calc.)	1.253			0.911
	R(ISO22854:16)	1.212			1.221 Compare R(D5769:15) = 2.616

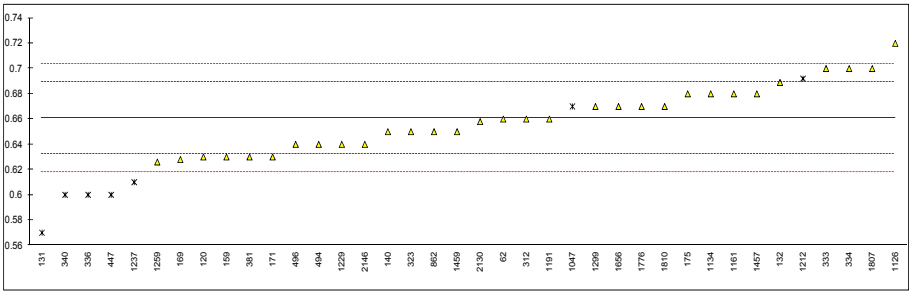


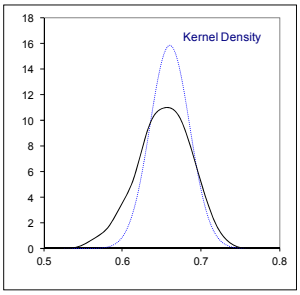


Determination of Benzene on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62	INH-14	0.66		-0.05	
120	D3606	0.63		-2.15	
131	D5580	0.57	R(0.05)	-6.35	
132	D3606	0.689		1.98	
140	D3606	0.65		-0.75	
159	D3606	0.63	C	-2.15	first reported: 0.84
169	D3606	0.628		-2.29	
171	D3606	0.63		-2.15	
175	D3606	0.68		1.35	
194		-----		-----	
312	ISO22854	0.66		-0.05	
323	ISO22854	0.65		-0.75	
333	ISO22854	0.7		2.75	
334	ISO22854	0.7		2.75	
335		-----		-----	
336	EN238	0.6	ex	-4.25	see §4.1
337		-----		-----	
338		-----		-----	
340	EN238	0.60	ex	-4.25	see §4.1
350		-----		-----	
360		-----		-----	
381	EN12177	0.63		-2.15	
447	IP429	0.6	ex	-4.25	see §4.1
494	ISO22854	0.64		-1.45	
496	ISO22854	0.640		-1.45	
511		-----		-----	
631		-----		-----	
862	D6839	0.65		-0.75	
970		-----		-----	
1033		-----		-----	
1047	EN238	0.67	ex	0.65	see §4.1
1082		-----		-----	
1126	EN14517	0.72		4.15	
1134	ISO22854	0.68		1.35	
1161	ISO22854	0.68		1.35	
1191	ISO22854	0.66		-0.05	
1205		-----		-----	
1212	EN238	0.692	ex	2.19	see §4.1
1229	ISO22854	0.64		-1.45	
1237	EN238	0.61	ex	-3.55	see §4.1
1259	EN12177	0.626		-2.43	
1299	ISO22854	0.67		0.65	
1457	ISO22854	0.68		1.35	
1459		0.65		-0.75	
1634		-----		-----	
1656	ISO22854	0.67		0.65	
1706		-----		-----	
1776	ISO22854	0.67		0.65	
1807	ISO22854	0.70		2.75	
1810	ISO22854	0.67		0.65	
2130	D6730	0.658		-0.19	
2146	ISO22854	0.64		-1.45	
					EN238/IP429 only:
	normality	OK			suspect
	n	31			6
	outliers	1 (+6ex)			0
	mean (n)	0.661			0.629
	st.dev. (n)	0.0252			0.0413
	R(calc.)	0.071			0.116
	R(ISO22854:16)	0.040			
	R(EN238/A1:03)				0.170

Compare R(D3606:10e1) = 0.135



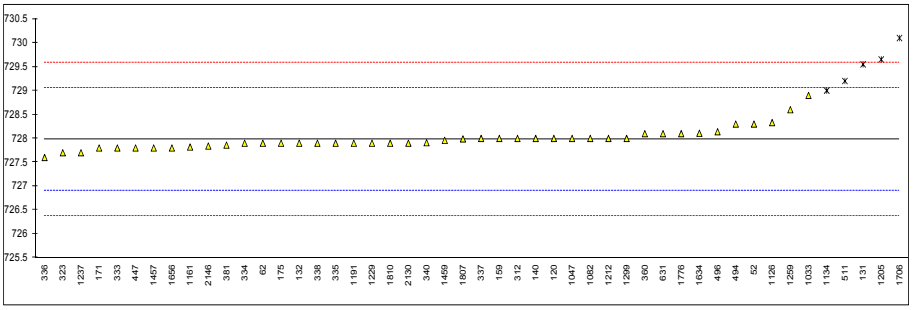


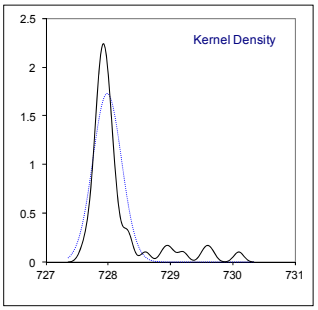
Determination of Copper strip 3hrs at 50°C on sample #16080

lab	method	value	mark	z(targ)	remarks
52	D130	1a		-----	
62	D130	1a		-----	
120	D130	1A		-----	
131	D130	1a		-----	
132	D130	1a		-----	
140	D130	1A		-----	
159	D130	1a		-----	
169	D130	1a		-----	
171	D130	1a		-----	
175		-----		-----	
194	D130	1a		-----	
312	D130	1a		-----	
323	D130	1A		-----	
333		-----		-----	
334		-----		-----	
335	ISO2160	1b		-----	
336	D130	1		-----	
337	ISO2160	1B		-----	
338		-----		-----	
340	ISO2160	1		-----	
350		-----		-----	
360	D130	1A		-----	
381	ISO2160	1		-----	
447	D130	1a		-----	
494	D130	1a		-----	
496	D130	1a		-----	
511	D130	1 A		-----	
631	D130	1A		-----	
862	D130	1a		-----	
970		-----		-----	
1033	IP154	1a		-----	
1047	ISO2160	1		-----	
1082	ISO2160	1a		-----	
1126		-----		-----	
1134	D130	1a		-----	
1161	ISO2160	1A		-----	
1191	ISO2160	1a		-----	
1205		-----		-----	
1212	ISO2160	1A		-----	
1229	ISO2160	1a		-----	
1237		-----		-----	
1259	ISO2160	1a		-----	
1299	D130	1A		-----	
1457	D130	1A		-----	
1459		-----		-----	
1634	D130	1a		-----	
1656	ISO2160	1		-----	
1706		-----		-----	
1776		-----		-----	
1807	D130	1a		-----	
1810		-----		-----	
2130	D130	1a		-----	
2146		-----		-----	
	normality	n.a.			
	n	39			
	outliers	n.a.			
	mean (n)	1			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			

Determination of Density at 15°C on sample #16080; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
52	D4052	728.3		0.59	
62	D4052	727.9		-0.16	
120	D4052	728.0		0.03	
131	D4052	729.55	R(0.01)	2.92	
132	D4052	727.9		-0.16	
140	D1298	728.0		0.03	
159	D4052	728.0		0.03	
169		-----		-----	
171	D4052	727.8		-0.35	
175	D4052	727.9		-0.16	
194		-----		-----	
312	ISO12185	728.0		0.03	
323	ISO12185	727.7		-0.53	
333	ISO12185	727.8		-0.35	
334	ISO12185	727.9		-0.16	
335	ISO12185	727.9		-0.16	
336	ISO12185	727.6		-0.72	
337	ISO12185	728.0		0.03	
338	ISO12185	727.9		-0.16	
340	ISO12185	727.91		-0.14	
350		-----		-----	
360	ISO12185	728.1		0.21	
381	ISO12185	727.86		-0.23	
447	D4052	727.8		-0.35	
494	ISO12185	728.3		0.59	
496	ISO12185	728.14		0.29	
511	D4052	729.2	R(0.01)	2.27	
631	D4052	728.10		0.21	
862		-----		-----	
970		-----		-----	
1033	IP365	728.9		1.71	
1047	ISO12185	728.0		0.03	
1082	ISO12185	728.0		0.03	
1126	ISO12185	728.33		0.64	
1134	IP365	729.0	R(0.01)	1.89	
1161	ISO12185	727.82		-0.31	
1191	ISO12185	727.9		-0.16	
1205	ISO12185	729.65	R(0.01)	3.11	
1212	ISO12185	728.0		0.03	
1229	ISO12185	727.9		-0.16	
1237	ISO12185	727.7		-0.53	
1259	ISO12185	728.6		1.15	
1299	D4052	728.0		0.03	
1457	D4052	727.8		-0.35	
1459	ISO12185	727.96		-0.05	
1634	ISO12185	728.108		0.23	
1656	ISO12185	727.8		-0.35	
1706	ISO12185	730.1	R(0.01)	3.95	
1776	ISO12185	728.1		0.21	
1807	D4052	727.99		0.01	
1810	ISO12185	727.9		-0.16	
2130	ISO12185	727.9		-0.16	
2146	ISO12185	727.84		-0.27	
	normality	not OK			
	n	43			
	outliers	5			
	mean (n)	727.985			
	st.dev. (n)	0.2308			
	R(calc.)	0.646			
	R(ISO12185:96)	1.500			Compare R(D4052:15) = 2.657

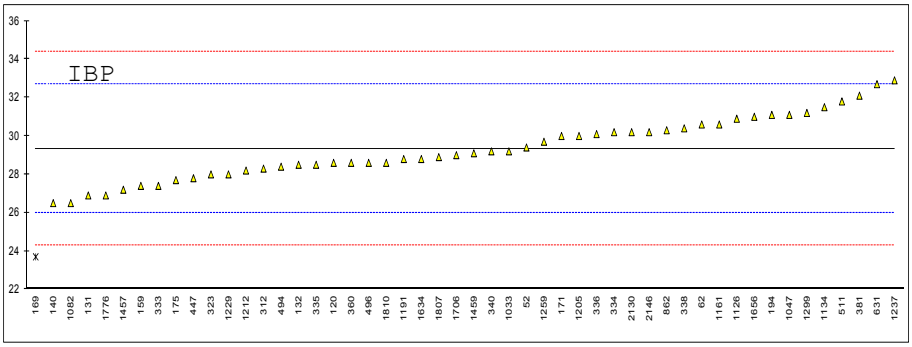


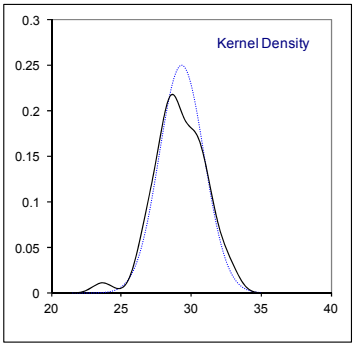


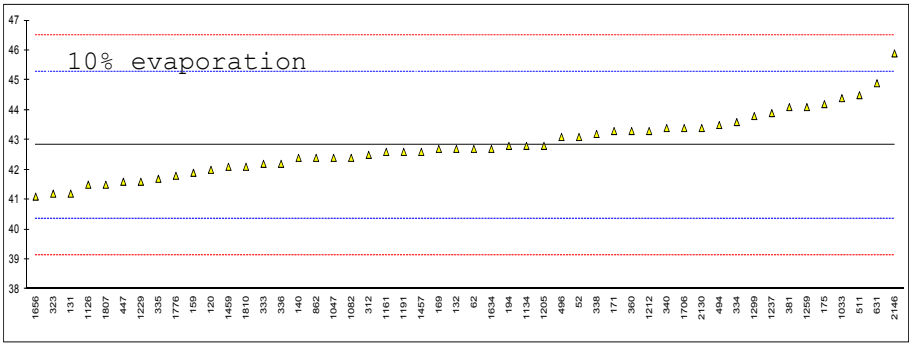
Determination of Distillation on sample #16080; results in °C

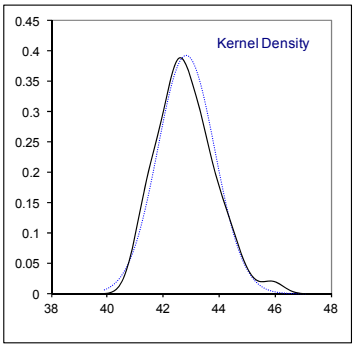
lab	method	mode	IBP	mark	10%eva	mark	50%eva	mark	90%eva	mark	FBP	mark
52	D86	Automated	29.4		43.1		65.1		140		182.4	
62	D86	Automated	30.6		42.7		65.8		142.0		185.0	C
120	D86	Automated	28.6		42.0		65.9		140.1		183.0	
131	D86	Automated	26.9		41.2		62.0		139.9		178.3	
132	D86	Automated	28.5		42.7		65.6		140.3		186.2	
140	D86	Automated	26.5		42.4		64.8		140.3		184.4	
159	D86	Automated	27.4		41.9		65.1		140.2		184.6	
169	D86	Automated	23.7	R(5)	42.7		65.5		139.8		177.2	
171	D86	Automated	30.0		43.3		65.5		140.6		184.8	
175	D86	Automated	27.7		44.2		67.6		140.2		182.0	
194	D86	Automated	31.1		42.8		65.5		139.0		183.5	
312	D86	Automated	28.3		42.5		65.2		140.0		184.2	
323	D86	Automated	28.0		41.2		64.0		138.9		182.4	
333	D86	Automated	27.4		42.2		64.9		140.9		183.2	
334	D86	Automated	30.2		43.6		66.0		142.3		186.4	
335	D86	Automated	28.5		41.7		63.2		138.8		181.0	
336	D86	Automated	30.1		42.2		64.5		140.2		180.8	
337		-----	-----		-----		-----		-----		-----	
338	D86	Automated	30.4		43.2		65.2		140.4		187.2	
340	D86	Automated	29.2		43.4		65.8		139.2		180.6	
350		-----	-----		-----		-----		-----		-----	
360	D86	Automated	28.6		43.3		66.1		143.0		183.3	
381	ISO3405	Automated	32.1		44.1		65.9		141.5		193.5	
447	D86	-----	27.8		41.6		63.1		140.0		190.6	
494	ISO3405	Automated	28.4		43.5		65.8		140.1		182.8	
496	D86	Automated	28.6		43.1		66.1		140		183.1	
511	D86	Manual	31.8		44.5		68.5	C	138.5		183.5	
631	D86	Automated	32.7		44.9		69.5		142	C	187.1	
862	D86	Automated	30.3		42.4		64.6		139.5		185.8	
970		-----	-----		-----		-----		-----		-----	
1033	IP123	Automated	29.2		44.4		68.7		148.2	R(1)	188.0	
1047	ISO3405	Automated	31.1		42.4		65.9		140.0		183.8	
1082	ISO3405	Automated	26.5		42.4		64.7		140.4		186.6	
1126	D86	Automated	30.9		41.5		64.4		140.9		185.2	
1134	IP123	Automated	31.5		42.8		64.1		139.5		186.5	
1161	ISO3405	Automated	30.6		42.6		66.6		141.7		180.4	
1191	ISO3405	Automated	28.8		42.6		65.1		140.4		185.8	
1205	D86	Automated	30.0		42.8		65.6		140.4		178.2	
1212	ISO3405	Automated	28.2		43.3		65.5		141.4		185.6	
1229	ISO3405	Automated	28.0		41.6		64.8		139.8		184.2	
1237	ISO3405	-----	32.9		43.9		70.3	C	144.8		183.8	
1259	ISO3405	Automated	29.7		44.1		68.6		145.7		188.7	
1299	D86	Automated	31.2		43.8		67.8		147.1	R(1)	186.2	
1457	D86	Automated	27.2		42.6		66.1		139.2		181.5	
1459	ISO3405	Automated	29.1		42.1		63.6		140.0		186.0	
1634	D86	Automated	28.8		42.7		66.2		141.5		184.6	
1656	ISO3405	Automated	31.0		41.1		63.8		139.4		191.2	
1706	ISO3405	Automated	29.0		43.4		67.1		140.5		183.0	
1776	ISO3405	Automated	26.9		41.8		63.1		139.0		181.2	
1807	ISO3405	Automated	28.9		41.5		63.8		139.0		178.4	
1810	D86	Automated	28.6		42.1		64.3		139.9		181.7	
2130	D86	Automated	30.2		43.4		66.6		141.2		188.3	
2146	ISO3405	Automated	30.2		45.9		76.2	R(1)	152.8	R(1)	189.0	
	normality		OK		OK		OK		not OK		OK	
	n		49		50		49		47		50	
	outliers		1		0		1		3		0	
	mean (n)		29.34		42.82		65.58		140.48		184.30	
	st.dev. (n)		1.600		1.018		1.675		1.409		3.351	
	R(calc.)		4.48		2.85		4.69		3.94		9.38	
	R(D86:16 auto)		4.70		3.44		4.05		6.33		7.10	
	R(ISO3405:11 auto)		(4.79)		(3.2)		(1.88)		(3.81)		(6.78)	

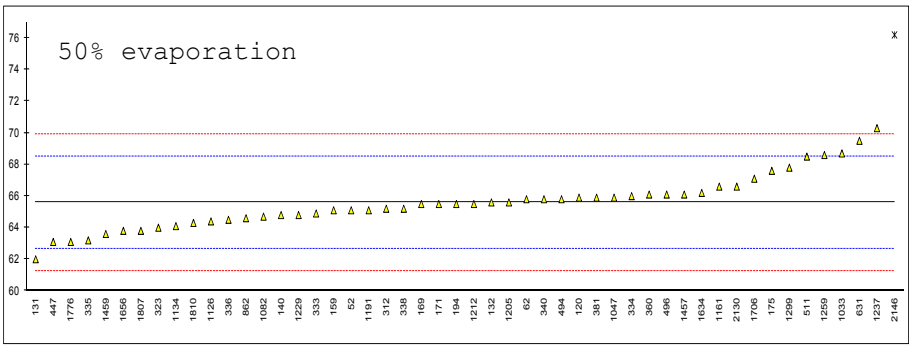
Lab 62 first reported for FBP: 194.4
Lab 511 first reported for temperature at 50% evaporation: 70.5
Lab 631 first reported for FBP: 149.2
Lab 1237 first reported for temperature at 50% evaporation: 73.8

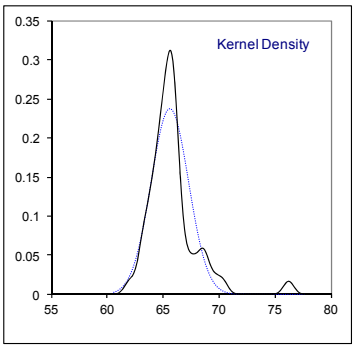

IBP

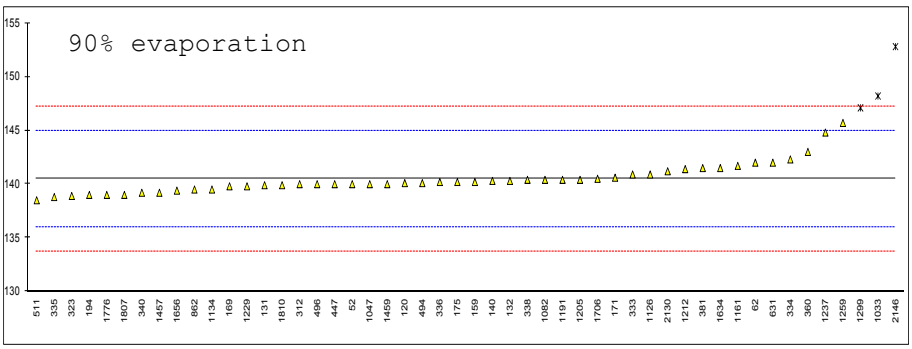

Kernel Density

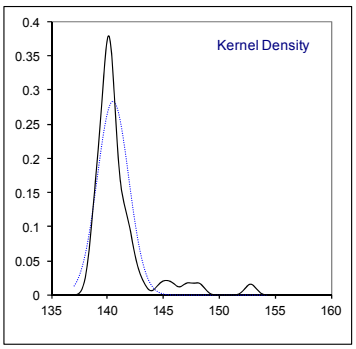

10% evaporation

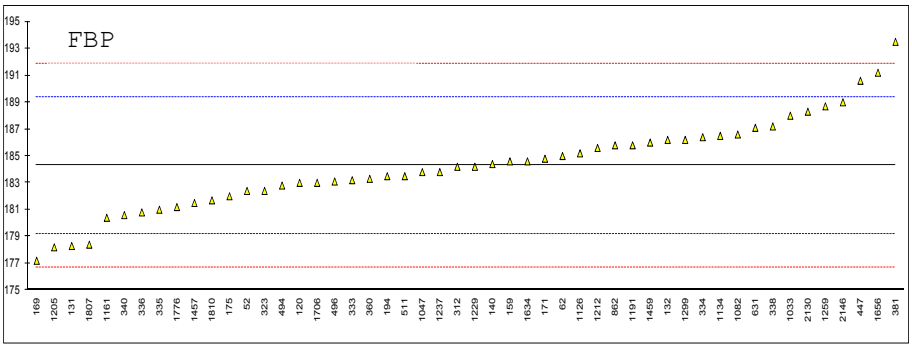

Kernel Density

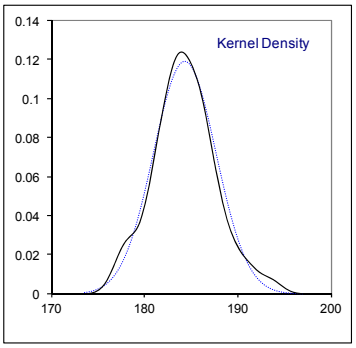

50% evaporation


Kernel Density


90% evaporation


Kernel Density

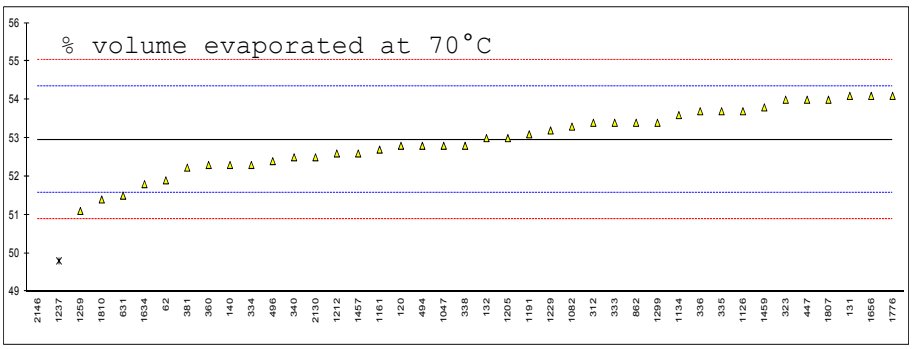

FBP

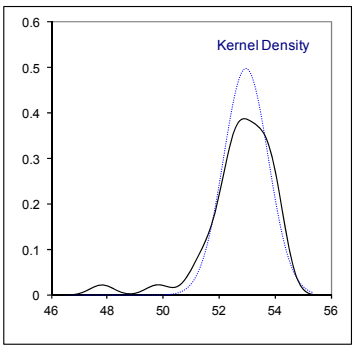

Kernel Density

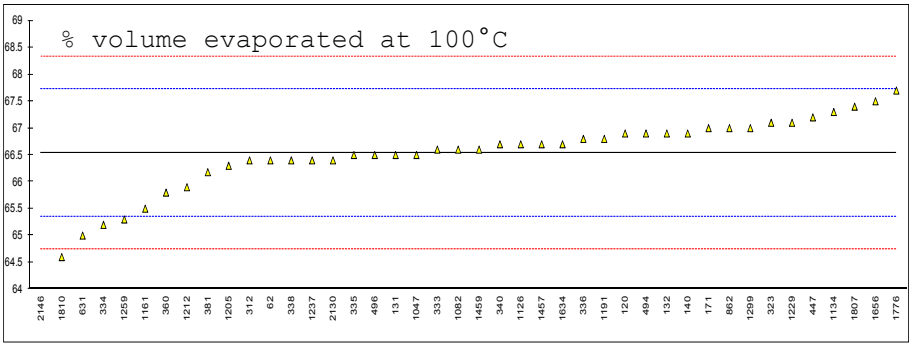
Determination of Distillation on sample #16080; results in %V/V

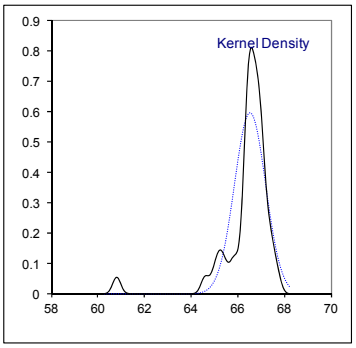
lab	method	mode	%evap. at 70°C	mark	%evap. at 100°C	mark	%evap. at 150°C	mark	residue	mark
52	D86	Automated	-----		-----		-----		1.1	
62	D86	Automated	51.9		66.4		93.0		1.0	
120	D86	Automated	52.8		66.9		93.4		1.1	
131	D86	Automated	54.1		66.5		94.0		1.1	
132	D86	Automated	53.0		66.9		93.3		1.0	
140	D86	Automated	52.3		66.9		93.2		1.3	
159	D86	Automated	-----		-----		-----		1.0	
169	D86	Automated	-----		-----		-----		1.0	
171	D86	Automated	-----		67.0		93.0		1.1	
175	D86	Automated	-----		-----		-----		1.0	
194	D86	Automated	-----		-----		-----		1.0	
312	D86	Automated	53.4		66.4		93.7		1.0	
323	D86	Automated	54.0		67.1		93.8		1.0	
333	D86	Automated	53.4		66.6		93.2		1.5	
334	D86	Automated	52.3		65.2		92.5		1.4	
335	D86	Automated	53.7		66.5		93.6		0.8	
336	D86	Automated	53.7		66.8		93.5		1.2	
337		-----	-----		-----		-----		-----	
338	D86	Automated	52.8		66.4		93.4		1.0	
340	D86	Automated	52.5		66.7		-----		1.0	
350		-----	-----		-----		-----		-----	
360	D86	Automated	52.3		65.8		92.3		1.0	
381	ISO3405	Automated	52.23		66.18		93.03		0.5	
447	D86	-----	54.0		67.2		93.5		1.0	
494	ISO3405	Automated	52.8		66.9		93.7		1.1	
496	D86	Automated	52.4		66.5		93.6		1.1	
511	D86	Manual	-----		-----		-----		0.8	
631	D86	Automated	51.5		65.0		93.5	C	0.7	
862	D86	Automated	53.4		67.0		93.5		1.1	
970		-----	-----		-----		-----		-----	
1033	IP123	Automated	-----		-----		-----		1.0	
1047	ISO3405	Automated	52.8		66.5		93.6		1.2	
1082	ISO3405	Automated	53.3		66.6		93.3		1.2	
1126	D86	Automated	53.7		66.7		93.4		1.1	
1134	IP123	Automated	53.6		67.3		93.5		1.0	
1161	ISO3405	Automated	52.7		65.5		92.4		1.0	
1191	ISO3405	Automated	53.1		66.8		93.3		1.1	
1205	D86	Automated	53.0		66.3		93.3		1.0	
1212	ISO3405	Automated	52.6		65.9		93.1		1.4	
1229	ISO3405	Automated	53.2		67.1		93.6		1.3	
1237	ISO3405	-----	49.8	R(5)	66.4		92.3	C	1.2	
1259	ISO3405	Automated	51.1		65.3		91.7	R(5)	1.0	
1299	D86	Automated	53.4		67.0		93.4		1.3	
1457	D86	Automated	52.6		66.7		93.8		1.0	
1459	ISO3405	Automated	53.8		66.6		93.3		1.0	
1634	D86	Automated	51.8		66.7		92.6		1.2	
1656	ISO3405	Automated	54.1		67.5		94.1		0.6	
1706	ISO3405	Automated	-----		-----		-----		1.3	
1776	ISO3405	Automated	54.1		67.7		93.8		1.0	
1807	ISO3405	Automated	54.0		67.4		93.8		1.0	
1810	D86	Automated	51.4		64.6		91.1	R(1)	0.2	
2130	D86	Automated	52.5		66.4		93.2		1.0	
2146	ISO3405	Automated	47.8	R(1)	60.8	R(1)	88.7	R(1)	5.3	
	normality		OK		suspect		OK			
	n		39		41		38			
	outliers		2		1		3			
	mean (n)		52.96		66.53		93.33			
	st.dev. (n)		0.801		0.668		0.444			
	R(calc.)		2.24		1.87		1.24			
	R(D86:16 auto)		1.94		1.67		1.13			
	R(ISO3405:11 auto)		(2.7)		(2.2)		(1.3)			

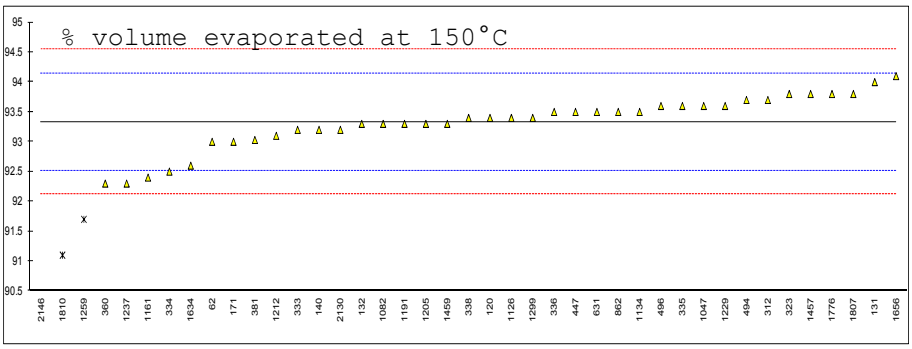
Lab 631 first reported for vol.% evaporated at 150°C: 91.5
Lab 1237 first reported for vol.% evaporated at 150°C: 91.7

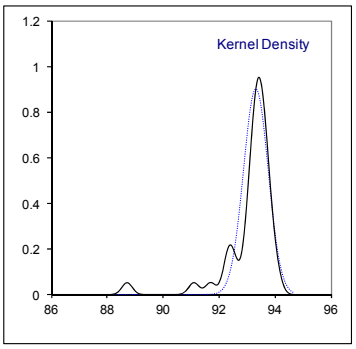

% volume evaporated at 70°C


Kernel Density


% volume evaporated at 100°C


Kernel Density


% volume evaporated at 150°C


Kernel Density

Determination of Doctor test on sample #16080

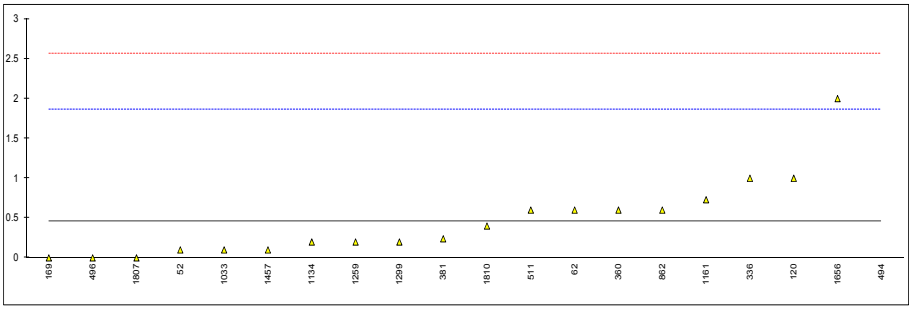
lab	method	value	mark	z(targ)	remarks
52	D4952	negative		-----	
62		-----		-----	
120	D4952	Negative		-----	
131		-----		-----	
132	D4952	Negative		-----	
140	D4952	NEG		-----	
159	D4952	negative		-----	
169		-----		-----	
171	D4952	Negative		-----	
175		-----		-----	
194		-----		-----	
312	IP30	Negative		-----	
323	D4952	negative		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336	D4952	Negative		-----	
337		-----		-----	
338		-----		-----	
340	D4952	NEGATIF		-----	
350		-----		-----	
360	D4952	Negative		-----	
381		-----		-----	
447		-----		-----	
494		-----		-----	
496		-----		-----	
511		-----		-----	
631		-----		-----	
862	D4952	Negative		-----	
970		-----		-----	
1033		-----		-----	
1047	IP30	negative		-----	
1082		-----		-----	
1126		-----		-----	
1134	IP30	Negative		-----	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1212	D4952	Neg		-----	
1229		-----		-----	
1237		-----		-----	
1259	D4952	negative		-----	
1299	IP30	NEGATIVE		-----	
1457	IP30	Negative		-----	
1459		-----		-----	
1634		-----		-----	
1656	IP30	Negative		-----	
1706		-----		-----	
1776	D4952	neg		-----	
1807	D4952	negative		-----	
1810		-----		-----	
2130	IP30	Negative		-----	
2146		-----		-----	
	normality	n.a.			
	n	22			
	outliers	n.a.			
	mean (n)	Negative			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			

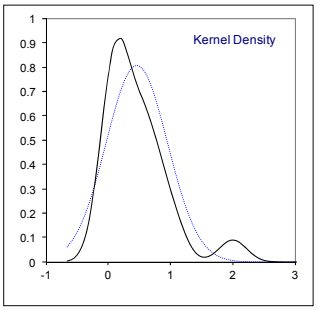
Determination of Existent Gum (solvent washed) on sample #16080; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
52	D381	0.10		-0.51	
62	D381	0.6		0.20	
120	D381	1.0		0.77	
131	D381	<0.5	C	-----	first reported: 2.6
132	D381	<0.5		-----	
140	D381	<0.5		-----	
159		-----		-----	
169	D381	0.0		-0.65	
171	D381	<0.5		-----	
175		-----		-----	
194		-----		-----	
312		-----		-----	
323	ISO6246	<1		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336	D381	1		0.77	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360	D381	0.6		0.20	
381	ISO6246	0.24		-0.31	
447	D381	<0.5		-----	
494	ISO6246	30.4	R(0.01)	42.54	
496	D381	0.0		-0.65	
511	D381	0.6		0.20	
631	D381	<0.5		-----	
862	D381	0.6		0.20	
970		-----		-----	
1033	IP131	0.1		-0.51	
1047	ISO6246	<1		-----	
1082		-----		-----	
1126		-----		-----	
1134	D381	0.2		-0.36	
1161	ISO6246	0.73		0.39	
1191		-----		-----	
1205		-----		-----	
1212		-----		-----	
1229		-----		-----	
1237		-----		-----	
1259	ISO6246	0.2		-0.36	
1299	D381	0.2		-0.36	
1457	D381	0.1		-0.51	
1459		-----		-----	
1634		-----		-----	
1656	ISO6246	2		2.19	
1706		-----		-----	
1776	ISO6246	<1		-----	
1807	ISO6246	0		-0.65	
1810	D381	0.4		-0.08	
2130	D381	<1		-----	
2146		-----		-----	

	normality	not OK
	n	19
	outliers	1
	mean (n)	0.46
	st.dev. (n)	0.494
	R(calc.)	1.38
	R(D381:12)	1.97

Compare R(ISO6246:95) = 1.31





Determination of Lead as Pb on sample #16080; results in mg/L

lab	method	value	mark	z(targ)	remarks
52	D3237	0		-----	
62	D3237	<2.5		-----	
120		-----		-----	
131		-----		-----	
132	D3237	<2.5		-----	
140	D3237	<2.5		-----	
159		-----		-----	
169		-----		-----	
171	D3237	<2.5		-----	
175		-----		-----	
194		-----		-----	
312	D3237	<2.5		-----	
323	EN237	<2.5		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360	In house	< 2.5		-----	
381	EN237	<2,5		-----	
447	D3237	<2.5		-----	
494		-----		-----	
496	D3237	0.52		-----	
511	D3237	1.909		-----	
631	D3237	<0.0025		-----	
862	D3237	<2.0		-----	
970		-----		-----	
1033		-----		-----	
1047	EN237	<2,5		-----	
1082	INH-534	<0,1		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	INH-101	0.3		-----	
1205		-----		-----	
1212		-----		-----	
1229		<0,025		-----	
1237		-----		-----	
1259		-----		-----	
1299	EN237	<0.0025		-----	
1457	D3237	0		-----	
1459		0		-----	
1634		-----		-----	
1656	EN237	<2.5		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130	IP352	<2.5		-----	
2146	In house	0.58		-----	
	normality	n.a.			
	n	24			
	outliers	n.a.			
	mean (n)	<2.5			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			Application range: 2.5 – 25 mg/L for D3237:12
	R(D3237:12)	n.a.			Application range: 2.5 – 10 mg/L for EN237:04

Determination of Manganese as Mn on sample #16080; results in mg/L

lab	method	value	mark	z(targ)	remarks
52	D3831	0		-----	
62		-----		-----	
120		-----		-----	
131		-----		-----	
132	D3831	<0.25	C	-----	first reported: 0.75
140	D3831	<0.25		-----	
159		-----		-----	
169		-----		-----	
171	D3831	<0.25		-----	
175		-----		-----	
194		-----		-----	
312	D3831	<0.25		-----	
323	D3831	<0.25		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340	EN16136	<0.5		-----	
350		-----		-----	
360	EN16136	< 0.50		-----	
381	EN16135	<2,0		-----	
447		-----		-----	
494		-----		-----	
496	EN16136	0.135		-----	
511	D3831	0.13		-----	
631	D3831	<0.25		-----	
862	D3831	<0.25		-----	
970		-----		-----	
1033		-----		-----	
1047	EN16135	<1,0		-----	
1082	INH-534	<0,1		-----	
1126		-----		-----	
1134		-----		-----	
1161		-----		-----	
1191	EN16136	0.1		-----	
1205		-----		-----	
1212		-----		-----	
1229		-----		-----	
1237		-----		-----	
1259		-----		-----	
1299	EN16135	<2.0		-----	
1457	EN16136	0		-----	
1459		-----		-----	
1634		-----		-----	
1656	EN16135	<2.0		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130		-----		-----	
2146	In house	< 2.0		-----	
	normality	n.a.			
	n	20			
	outliers	n.a.			
	mean (n)	<2.0			
	st.dev. (n)	n.a.			Application range: 0.25 – 40 mg/L for D3831:12
	R(calc.)	n.a.			Application range : 2 – 8 mg/L for EN16135:11
	R(D3831:12)	n.a.			Application range: 0.5 – 7.5 mg/L for EN16136:15

Determination of Mercaptans Sulphur as S on sample #16080; results in %M/M

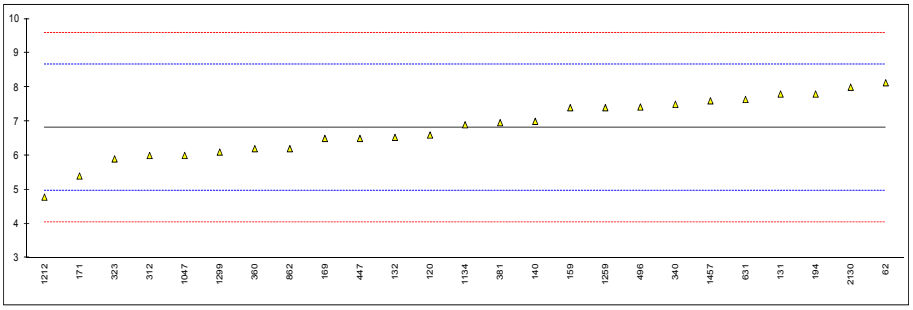
lab	method	value	mark	z(targ)	remarks
52	D3227	0		-----	
62	D3227	<0.0003		-----	
120	D3227	<0.0003		-----	
131		-----		-----	
132	D3227	<0.0003		-----	
140	D3227	<0.0003		-----	
159	D3227	<0.0001		-----	
169	D3227	0.0000		-----	
171	D3227	<0.0003		-----	
175		-----		-----	
194		-----		-----	
312	D3227	<0.0003		-----	
323	D3227	<0.0003		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360	D3227	0.00011		-----	
381		-----		-----	
447		-----		-----	
494	D3227	0.00004		-----	
496	D3227	0.00008		-----	
511		-----		-----	
631		-----		-----	
862	D3227	0.000089		-----	
970		-----		-----	
1033		-----		-----	
1047	D3227	0.00011		-----	
1082		-----		-----	
1126		-----		-----	
1134	IP342	0.000235		-----	
1161	ISO3012	0.00018		-----	
1191		-----		-----	
1205		-----		-----	
1212		-----		-----	
1229		-----		-----	
1237		-----		-----	
1259	D3227	0.00009		-----	
1299	D3227	0.0001		-----	
1457	UOP163	0.00005		-----	
1459		-----		-----	
1634		-----		-----	
1656	IP342	<0.0005		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130	D3227	0.0001		-----	
2146		-----		-----	
	normality	n.a.			
	n	22			
	outliers	n.a.			
	mean (n)	<0.0003			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D3227:13)	n.a.			Application range: 0.0003 – 0.01% M/M

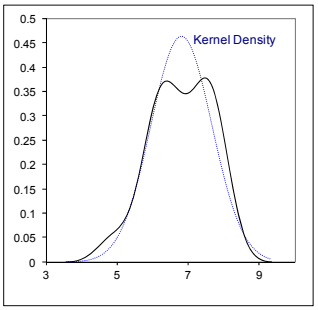
Determination of Olefins by FIA on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62	D1319	8.13		1.43	
120	D1319	6.6		-0.23	
131	D1319	7.8		1.07	
132	D1319	6.53		-0.30	
140	D1319	7.0		0.20	
159	D1319	7.4		0.64	
169	D1319	6.5		-0.34	
171	D1319	5.4		-1.52	
175		-----		-----	
194	D1319	7.8		1.07	
312	D1319	6.0		-0.88	
323	D1319	5.9		-0.98	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340	D1319	7.5		0.74	
350		-----		-----	
360	D1319	6.2		-0.66	
381	D1319	6.96		0.16	
447	D1319	6.5		-0.34	
494		-----		-----	
496	D1319	7.42		0.66	
511		-----		-----	
631	D1319	7.64		0.90	
862	D1319	6.2		-0.66	
970		-----		-----	
1033		-----		-----	
1047	EN15553	6.0		-0.88	
1082		-----		-----	
1126		-----		-----	
1134	D1319	6.9		0.10	
1161		-----		-----	
1191		-----		-----	
1205		-----		-----	
1212	D1319	4.78		-2.19	
1229		-----		-----	
1237		-----		-----	
1259	EN15553	7.4		0.64	
1299	D1319	6.1		-0.77	
1457	D1319	7.60		0.85	
1459		-----		-----	
1634		-----		-----	
1656		-----		-----	
1706		-----		-----	
1776		-----		-----	
1807		-----		-----	
1810		-----		-----	
2130	D1319	8.0		1.28	
2146		-----		-----	

normality	OK
n	25
outliers	0
mean (n)	6.81
st.dev. (n)	0.863
R(calc.)	2.42
R(D1319:15)	2.59

Compare R(EN15553:07) = 2.59

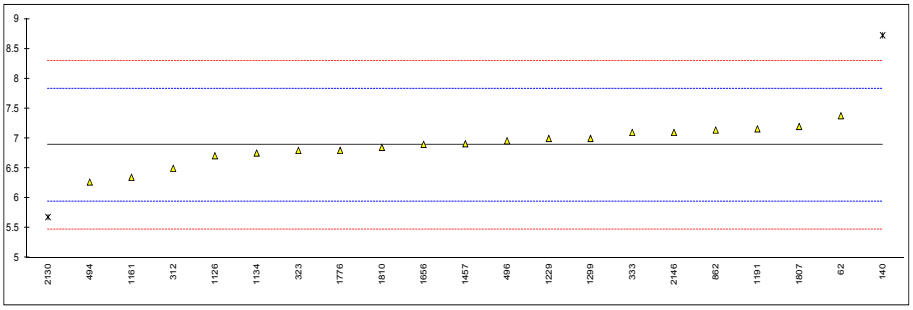


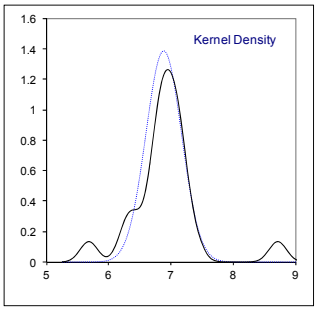


Determination of Olefins by GC on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		7.38		1.04	
120		-----		-----	
131		-----		-----	
132		-----		-----	
140	D6729	8.725	R(0.01)	3.89	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
194		-----		-----	
312	ISO22854	6.5		-0.82	
323	ISO22854	6.8		-0.19	
333	ISO22854	7.1		0.45	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
340		-----		-----	
350		-----		-----	
360		-----		-----	
381		-----		-----	
447		-----		-----	
494	ISO22854	6.27		-1.31	
496	ISO22854	6.96		0.15	
511		-----		-----	
631		-----		-----	
862	D6839	7.14		0.53	
970		-----		-----	
1033		-----		-----	
1047		-----		-----	
1082		-----		-----	
1126	EN14517	6.71		-0.38	
1134	ISO22854	6.755		-0.28	
1161	ISO22854	6.35		-1.14	
1191	ISO22854	7.16		0.57	
1205		-----		-----	
1212		-----		-----	
1229	ISO22854	7.0		0.24	
1237		-----		-----	
1259		-----		-----	
1299	ISO22854	7.0		0.24	
1457	ISO22854	6.91		0.05	
1459		-----		-----	
1634		-----		-----	
1656	ISO22854	6.9		0.02	
1706		-----		-----	
1776	ISO22854	6.80		-0.19	
1807	ISO22854	7.2		0.66	
1810	ISO22854	6.85		-0.08	
2130	D6730	5.683	R(0.05)	-2.55	
2146	ISO22854	7.10		0.45	

normality	OK
n	19
outliers	2
mean (n)	6.889
st.dev. (n)	0.2873
R(calc.)	0.804
R(ISO22854:16)	1.322





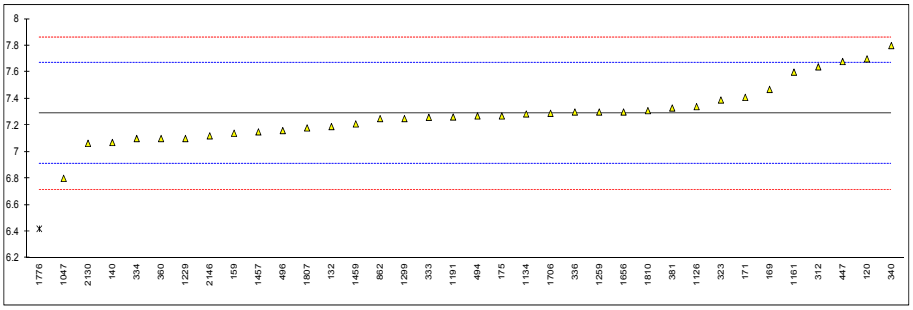
Determination of Oxidation Stability on sample #16080; results in minutes

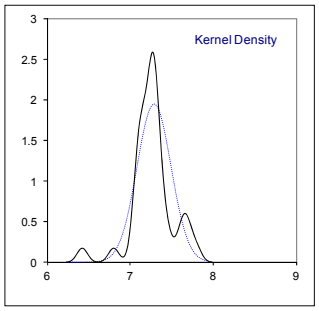
lab	method	value	mark	z(targ)	remarks
52	D525	>480		-----	
62		-----		-----	
120	D525	>260		-----	
131		-----		-----	
132	D525	>980		-----	
140	D525	>900		-----	
159		-----		-----	
169		-----		-----	
171	D525	660		-----	
175		-----		-----	
194		-----		-----	
312	D525	>900		-----	
323	D525	900		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336	D525	>900		-----	
337		-----		-----	
338		-----		-----	
340	D525	>		-----	
350		-----		-----	
360	D525	> 900		-----	
381		-----		-----	
447	D525	>900		-----	
494	D525	1367.47		-----	
496	D525	>900		-----	
511		-----		-----	
631		-----		-----	
862	D525	>900		-----	
970		-----		-----	
1033		-----		-----	
1047	ISO7536	>360		-----	
1082	ISO7536	>1500		-----	
1126		-----		-----	
1134	D525	810		-----	
1161	ISO7536	>900		-----	
1191	ISO7536	1000		-----	
1205		-----		-----	
1212	D525	>900		-----	
1229	ISO7536	>600		-----	
1237		-----		-----	
1259	ISO7536	>900		-----	
1299	D525	>960		-----	
1457	D525	>1400		-----	
1459		-----		-----	
1634		-----		-----	
1656	ISO7536	>900		-----	
1706		-----		-----	
1776		-----		-----	
1807	D525	>380		-----	
1810		-----		-----	
2130	D525	>900		-----	
2146		-----		-----	

	normality	n.a.	
	n	25	
	outliers	n.a.	
	mean (n)	>360	
	st.dev. (n)	n.a.	
	R(calc.)	n.a.	Specification EN228:12 limit: >360 minutes
	R(D525:12a)	n.a.	Specification ASTM D4814 limit: >240 minutes

Determination of Ethanol on sample #16080; results in %V/V

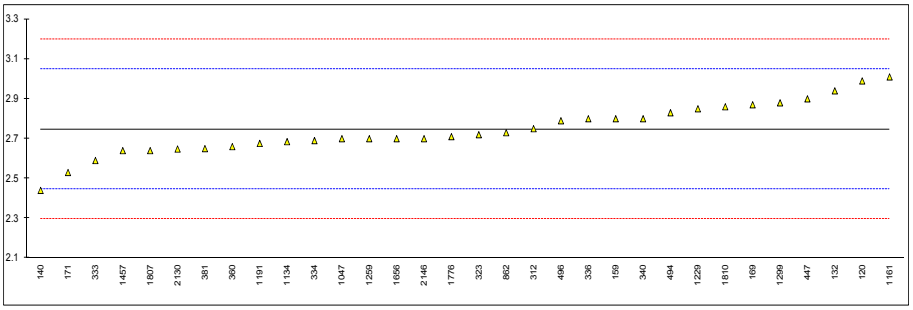
lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120	D5599	7.70		2.16	
131		-----		-----	
132	D5599	7.19		-0.52	
140	D5599	7.07		-1.14	
159	D5599	7.14		-0.78	
169	D4815	7.47		0.95	
171	D5599	7.41		0.64	
175	D5599	7.27		-0.10	
194		-----		-----	
312	ISO22854	7.64		1.84	
323	ISO22854	7.39		0.53	
333	ISO22854	7.26		-0.15	
334	ISO22854	7.1		-0.99	
335		-----		-----	
336	EN1601	7.3		0.06	
337		-----		-----	
338		-----		-----	
340	EN1601	7.8		2.68	
350		-----		-----	
360	EN13132	7.10	C	-0.99	first reported: 6.60
381	EN13132	7.33		0.22	
447	EN13132	7.68		2.05	
494	ISO22854	7.27		-0.10	
496	ISO22854	7.160		-0.67	
511		-----		-----	
631		-----		-----	
862	D4815	7.25		-0.20	
970		-----		-----	
1033		-----		-----	
1047	EN1601	6.8		-2.56	
1082		-----		-----	
1126	EN14517	7.34		0.27	
1134	ISO22854	7.285		-0.02	
1161	ISO22854	7.6		1.63	
1191	EN1601	7.262		-0.14	
1205		-----		-----	
1212		-----		-----	
1229	ISO22854	7.10		-0.99	
1237		-----		-----	
1259	EN13132	7.3		0.06	
1299	ISO22854	7.25		-0.20	
1457	ISO22854	7.15		-0.72	
1459		7.21		-0.41	
1634		-----		-----	
1656	ISO22854	7.3		0.06	
1706	In house	7.29		0.01	
1776	ISO22854	6.42	R(0.01)	-4.55	
1807	ISO22854	7.18		-0.57	
1810	ISO22854	7.31		0.11	
2130	D6730	7.064		-1.18	
2146	ISO22854	7.12		-0.88	
	normality	OK			
	n	35			
	outliers	1			
	mean (n)	7.29			
	st.dev. (n)	0.205			
	R(calc.)	0.57			
	R(ISO22854:16)	0.53			Compare R(D5599:15) = 1.32, R(EN1601:14) = R(EN13132:00) = 0.60

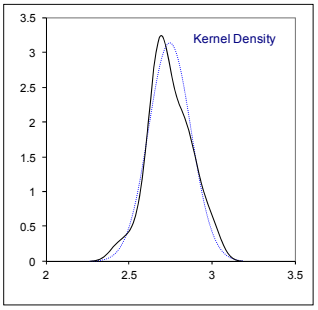




Determination of MTBE on sample #16080; results in %V/V

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120	D5599	2.99		1.62	
131		-----		-----	
132	D5599	2.94		1.29	
140	D5599	2.44		-2.04	
159	D5599	2.80		0.36	
169	D4815	2.87		0.82	
171	D5599	2.53		-1.44	
175		-----		-----	
194		-----		-----	
312	ISO22854	2.75		0.03	
323	ISO22854	2.72		-0.17	
333	ISO22854	2.59		-1.04	
334	ISO22854	2.69		-0.37	
335		-----		-----	
336	EN1601	2.8		0.36	
337		-----		-----	
338		-----		-----	
340	EN1601	2.8		0.36	
350		-----		-----	
360	EN13132	2.66		-0.57	
381	EN13132	2.65		-0.64	
447	EN13132	2.9		1.02	
494	ISO22854	2.83		0.56	
496	ISO22854	2.790		0.29	
511		-----		-----	
631		-----		-----	
862	D4815	2.73		-0.11	
970		-----		-----	
1033		-----		-----	
1047	EN1601	2.7		-0.31	
1082		-----		-----	
1126	EN14517	<0,1		<-17.67	possible false negative test result?
1134	ISO22854	2.685		-0.41	
1161	ISO22854	3.01		1.76	
1191	EN1601	2.676		-0.47	
1205		-----		-----	
1212		-----		-----	
1229	ISO22854	2.85		0.69	
1237		-----		-----	
1259	EN13132	2.7		-0.31	
1299	ISO22854	2.88		0.89	
1457	ISO22854	2.64		-0.71	
1459		-----		-----	
1634		-----		-----	
1656	ISO22854	2.7		-0.31	
1706		-----		-----	
1776	ISO22854	2.71		-0.24	
1807	ISO22854	2.64		-0.71	
1810	ISO22854	2.86		0.76	
2130	D6730	2.648		-0.65	
2146	ISO22854	2.70		-0.31	
	normality	OK			
	n	32			
	outliers	0			
	mean (n)	2.75			
	st.dev. (n)	0.127			
	R(calc.)	0.36			
	R(ISO22854:16)	0.42			Compare R(D5599:15) = 0.26, R(EN1601:14) = R(EN13132:00) = 0.30



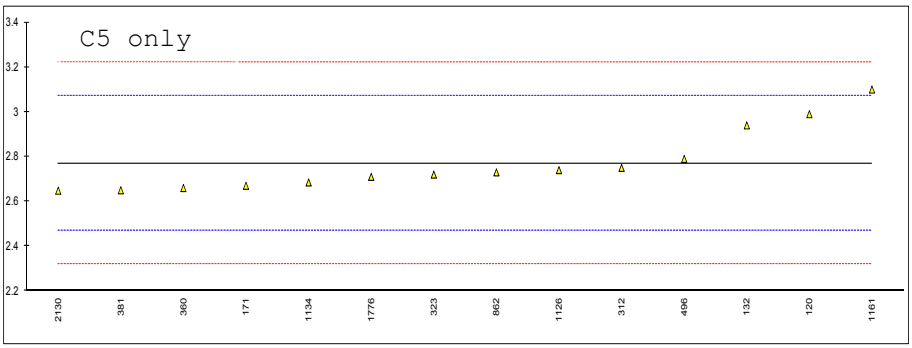


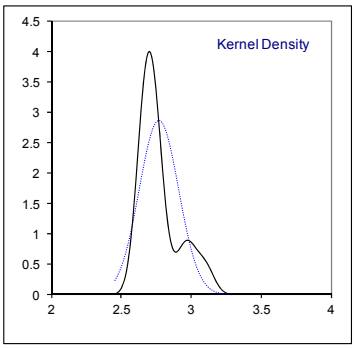
Determination of Ethers (C5, C5 or more C atoms and C6 and more) on sample #16080; results in %V/V

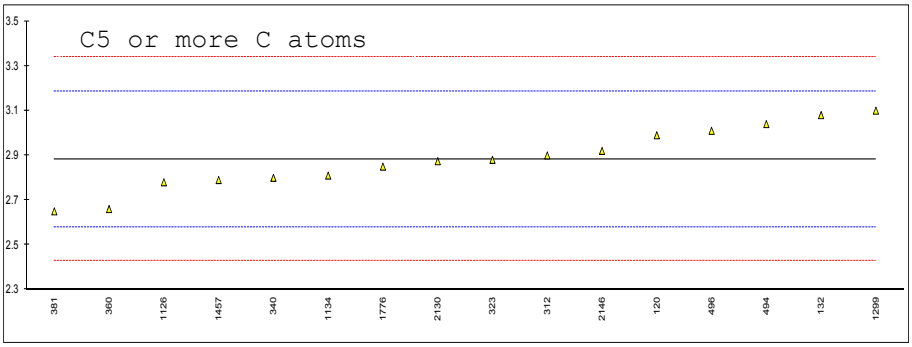
lab	Method	C5	mark		C5 or more	mark		C6 and more	mark	
52		-----		-----	-----		-----	-----		-----
62		-----		-----	-----		-----	-----		-----
120	D5599	2.99		1.46	2.99		0.70	0.00		-1.10
131		-----		-----	-----		-----	-----		-----
132	D5599	2.94		1.13	3.08		1.30	0.14		0.00
140		-----		-----	-----		-----	-----		-----
159		-----		-----	-----		-----	-----		-----
169		-----		-----	-----		-----	-----		-----
171	D5599	2.67	C	-----	<0.10	f-?	<-18.53	<0.10		-----
175		-----		-----	-----		-----	-----		-----
194		-----		-----	-----		-----	-----		-----
312	ISO22854	2.75		-0.13	2.90		0.11	0.15		0.08
323	ISO22854	2.72		-0.33	2.88		-0.02	0.16		0.16
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
336		-----		-----	-----		-----	-----		-----
337		-----		-----	-----		-----	-----		-----
338		-----		-----	-----		-----	-----		-----
340	EN1601	-----		-----	2.8		-0.55	-----		-----
350		-----		-----	-----		-----	-----		-----
360	EN13132	2.66		-0.73	2.66		-1.48	< 0.17		-----
381	EN13132	2.65		-0.80	2.65		-1.54	<0,2		-----
447		-----		-----	-----		-----	-----		-----
494	ISO22854	-----		-----	3.04		1.03	0.21	C	0.55
496	ISO22854	2.790		0.13	3.010		0.84	0.220		0.63
511		-----		-----	-----		-----	-----		-----
631		-----		-----	-----		-----	-----		-----
862	D4815	2.73		-0.27	-----		-----	0.13		-0.08
970		-----		-----	-----		-----	-----		-----
1033		-----		-----	-----		-----	-----		-----
1047		-----		-----	-----		-----	-----		-----
1082		-----		-----	-----		-----	-----		-----
1126	EN14517	2.74		-0.20	2.78		-0.68	0.04		-0.79
1134	ISO22854	2.685		-0.57	2.81		-0.48	0.125		-0.12
1161	ISO22854	3.10	C	-----	<0,01	f-?	<-19.13	<0,01		-----
1191		-----		-----	-----		-----	-----		-----
1205		-----		-----	-----		-----	-----		-----
1212		-----		-----	-----		-----	-----		-----
1229		-----		-----	-----		-----	-----		-----
1237		-----		-----	-----		-----	-----		-----
1259		-----		-----	-----		-----	-----		-----
1299	ISO22854	-----		-----	3.10		1.43	-----		-----
1457	ISO22854	-----		-----	2.79		-0.62	-----		-----
1459		-----		-----	-----		-----	-----		-----
1634		-----		-----	-----		-----	-----		-----
1656		-----		-----	-----		-----	-----		-----
1706		-----		-----	-----		-----	-----		-----
1776	ISO22854	2.71		-0.40	2.85		-0.22	<0,2		-----
1807		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
2130	D6730	2.648		-0.81	2.874		-0.06	0.226		0.68
2146	ISO22854	-----		-----	2.92		0.24	-----		-----
	normality	not OK			OK			OK		
	n	14			16			10		
	outliers	0			0			0		
	mean (n)	2.77			2.88			0.14		
	st.dev. (n)	0.140			0.136			0.074		
	R(calc.)	0.39			0.38			0.21		
	R(ISO22854:16)	0.42			0.42			0.36		

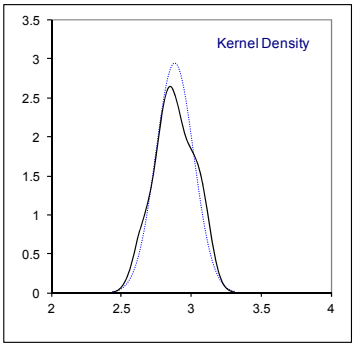
f-? = possible false negative test result

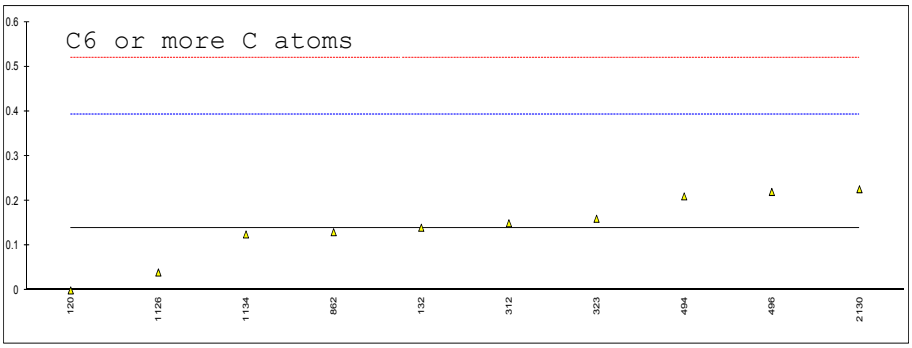
Lab 171 first reported for C5: <0.10
Lab 494 first reported for C5: 0.64
Lab 1161 first reported for C6 and more: <0.01

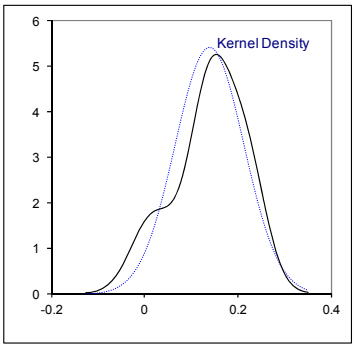

C5 only
3.4
3.2
3
2.8
2.6
2.4
2.2
2130
381
360
171
1134
1776
323
862
1126
312
496
132
120
1161


Kernel Density
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2
2.5
3
3.5
4


C5 or more C atoms
3.5
3.3
3.1
2.9
2.7
2.5
2.3
381
360
1126
1457
340
1134
1776
2130
323
312
2146
120
496
494
132
1299


Kernel Density
3.5
3
2.5
2
1.5
1
0.5
0
2
2.5
3
3.5
4


C6 or more C atoms
0.6
0.5
0.4
0.3
0.2
0.1
0
120
1126
1134
862
132
312
323
494
496
2130


Kernel Density
6
5
4
3
2
1
0
-0.2
0
0.2
0.4

Determination of Oxygenates on sample #16080; results in %V/V

lab	Method	DIPE	mark	ETBE	mark	i-BuOH	mark	IPA	mark	MeOH	mark
52		-----		-----		-----		-----		-----	
62		-----		-----		-----		-----		-----	
120	D5599	0.00		0.00		0.00		0.00		0.00	
131		-----		-----		-----		-----		-----	
132	D5599	<0.10		<0.10		<0.10		<0.10		<0.10	
140	D5599	<0.1		<0.1		<0.10		<0.10		<0.10	
159		-----		-----		-----		-----		-----	
169	D4815	ND		ND		ND		ND		ND	
171	D5599	<0.10		<0.10		<0.10		<0.10		<0.10	
175		-----		-----		-----		-----		-----	
194		-----		-----		-----		-----		-----	
312	ISO22854	<0.1		<0.1		<0.1		<0.1		<0.1	
323	ISO22854	<0.10		<0.10		<0.10		<0.10		<0.10	
333		-----		-----		-----		-----		-----	
334		-----		-----		-----		-----		-----	
335		-----		-----		-----		-----		-----	
336	EN1601	<0.17		<0.17		<0.17		<0.17		<0.17	
337		-----		-----		-----		-----		-----	
338		-----		-----		-----		-----		-----	
340	EN1601	-----		<0.17		<0.17		<0.17		<0.17	
350		-----		-----		-----		-----		-----	
360	EN13132	< 0.17		< 0.17		< 0.17		< 0.17		< 0.17	
381	EN13132	<0,2		<0,2		<0,2		<0,2		<0,2	
447		-----		-----		-----		-----		-----	
494	ISO22854	0.05		0		0		0		0	
496	EN1601/ISO22854	<0.010		0.060		<0.10		<0.10		<0.010	
511		-----		-----		-----		-----		-----	
631		-----		-----		-----		-----		-----	
862	D4815	<0.01		<0.01		<0.01		<0.01		<0.01	
970		-----		-----		-----		-----		-----	
1033		-----		-----		-----		-----		-----	
1047		-----		-----		-----		-----		-----	
1082		-----		-----		-----		-----		-----	
1126	EN14517	<0,1		0.04		<0,1		<0,1		<0,1	
1134	ISO22854	0.04		<0.01		-----		0.05		<0.01	
1161	ISO22854	0.04		<0,01		<0,01		0.05		<0,01	
1191	EN1601	-----		0.0115		-----		0		0.012	
1205		-----		-----		-----		-----		-----	
1212		-----		-----		-----		-----		-----	
1229	ISO22854	0		0		0		0		0	
1237		-----		-----		-----		-----		-----	
1259		-----		-----		-----		-----		-----	
1299	ISO22854	0.05		<0.8		<0.8		<0,8		<0.8	
1457	ISO22854	0.05		0		0		0		0	
1459		-----		0.01		-----		-----		-----	
1634		-----		-----		-----		-----		-----	
1656	ISO22854	-----		<0.1		-----		-----		<0.1	
1706		-----		-----		-----		-----		-----	
1776	ISO22854	0.05		0		<0,2		<0,2		<0,2	
1807	ISO22854	0.05		0.04		-----		-----		-----	
1810		-----		-----		-----		-----		-----	
2130	D6730	<0.1		0.226		<0.1		<0.1		<0.1	
2146	ISO22854	0.00		0.01		0.00		0.00		0.03	
	normality	n.a.		n.a.		n.a.		n.a.		n.a.	
	n	23		25		21		23		24	
	outliers	n.a.		n.a.		n.a.		n.a.		n.a.	
	mean (n)	<0.2		<0.2		<0.2		<0.2		<0.2	
	st.dev. (n)	n.a.		n.a.		n.a.		n.a.		n.a.	
	R(calc.)	n.a.		n.a.		n.a.		n.a.		n.a.	
	R(ISO22854:16)	n.a.		n.a.		n.a.		n.a.		n.a.	

Lab 496 performed EN1601 for isobutanol and isopropanol and performed ISO22854 for DIPE, ETBE and methanol.

Determination of Oxygenates on sample #16080; results in %V/V

lab	Method	TAME	mark	t-BuOH	mark	Other oxygenates	mark
52		-----		-----		-----	
62		-----		-----		-----	
120	D5599	0.00		0.00		0.00	
131		-----		-----		-----	
132	D5599	0.14		<0.10		<0.10	
140	D5599	<0.10		<0.10		<0.10	
159	D5599	0.27		-----		-----	
169	D4815	ND		ND		ND	
171	D5599	<0.10		<0.10		-----	
175		-----		-----		-----	
194		-----		-----		-----	
312	ISO22854	0.15		<0.1		<0.1	
323	ISO22854	0.16		<0.10		<0.10	
333		-----		-----		-----	
334		-----		-----		-----	
335		-----		-----		-----	
336	EN1601	<0.17		<0.17		<0.17	
337		-----		-----		-----	
338		-----		-----		-----	
340	EN1601	<0.17		<0.17		-----	
350		-----		-----		-----	
360	EN13132	< 0.17		< 0.17		< 0.17	
381	EN13132	<0,2		<0,2		<0,2	
447		-----		-----		-----	
494	ISO22854	0.16		0.09		0.0	
496	ISO22854 /EN1601	0.160		<0.10		<0.10	
511		-----		-----		-----	
631		-----		-----		-----	
862	D4815	0.13		0.02		-----	
970		-----		-----		-----	
1033		-----		-----		-----	
1047	EN1601	0.15		-----		-----	
1082		-----		-----		-----	
1126	EN14517	<0,1		<0,1		0.03	
1134	ISO22854	0.075		0		-----	
1161	ISO22854	<0,01		<0,01		<0,01	
1191	EN1601	0.12		0		-----	
1205		-----		-----		-----	
1212		-----		-----		-----	
1229	ISO22854	0.16		0		0	
1237		-----		-----		-----	
1259		-----		-----		-----	
1299	ISO22854	0.17		<0.8		<0.8	
1457	ISO22854	0.10		0.04		0	
1459		-----		-----		-----	
1634		-----		-----		-----	
1656		-----		-----		-----	
1706		-----		-----		-----	
1776	ISO22854	0.14		<0,2		<0,2	
1807	ISO22854	-----		0.05		-----	
1810		-----		-----		-----	
2130	D6730	<0.1		<0.1		<0.1	
2146	ISO22854	0.16		0.00		0.06	
	normality	n.a.		n.a.		n.a.	
	n	26		24		18	
	outliers	n.a.		n.a.		n.a.	
	mean (n)	<0.2		<0.2		<0.2	
	st.dev. (n)	n.a.		n.a.		n.a.	
	R(calc.)	n.a.		n.a.		n.a.	
	R(ISO22854:16)	n.a.		n.a.		n.a.	

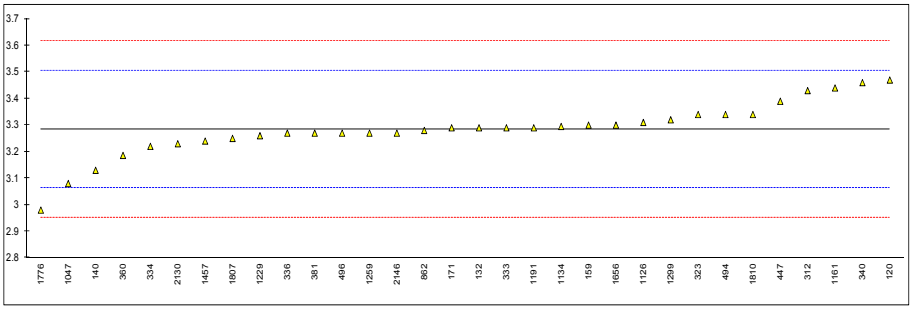
Lab 496 performed ISO22854 for TAME and EN1601 for tert-butanol and other oxygenates

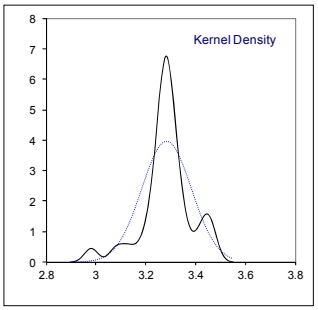
Determination of Oxygen content on sample #16080; results in %M/M

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120	D5599	3.47		1.68	
131		-----		-----	
132	D5599	3.29		0.05	
140	D5599	3.13		-1.39	
159	D5599	3.30		0.14	
169		-----		-----	
171	D5599	3.29		0.05	
175		-----		-----	
194		-----		-----	
312	ISO22854	3.43		1.32	
323	ISO22854	3.34		0.50	
333	ISO22854	3.29		0.05	
334	ISO22854	3.22		-0.58	
335		-----		-----	
336	EN1601	3.27		-0.13	
337		-----		-----	
338		-----		-----	
340	EN1601	3.46		1.59	
350		-----		-----	
360	EN13132	3.186	C	-0.89	first reported: 2.997
381	EN13132	3.27		-0.13	
447	EN13132	3.39		0.95	
494	ISO22854	3.34		0.50	
496	ISO22854	3.270		-0.13	
511		-----		-----	
631		-----		-----	
862	D4815	3.28		-0.04	
970		-----		-----	
1033		-----		-----	
1047	EN1601	3.08		-1.85	
1082		-----		-----	
1126	EN14517	3.31		0.23	
1134	ISO22854	3.295		0.10	
1161	ISO22854	3.44		1.41	
1191	EN1601	3.290		0.05	
1205		-----		-----	
1212		-----		-----	
1229	ISO22854	3.26		-0.22	
1237		-----		-----	
1259	EN13132	3.27		-0.13	
1299	ISO22854	3.32		0.32	
1457	ISO22854	3.24		-0.40	
1459		-----	W	-----	first reported: 2.73
1634		-----		-----	
1656	ISO22854	3.3		0.14	
1706		-----		-----	
1776	ISO22854	2.98		-2.75	
1807	ISO22854	3.25		-0.31	
1810	ISO22854	3.34		0.50	
2130	D6730	3.230		-0.49	
2146	ISO22854	3.27		-0.13	

	normality	not OK
	n	32
	outliers	0
	mean (n)	3.28
	st.dev. (n)	0.101
	R(calc.)	0.28
	R(ISO22854:16)	0.31

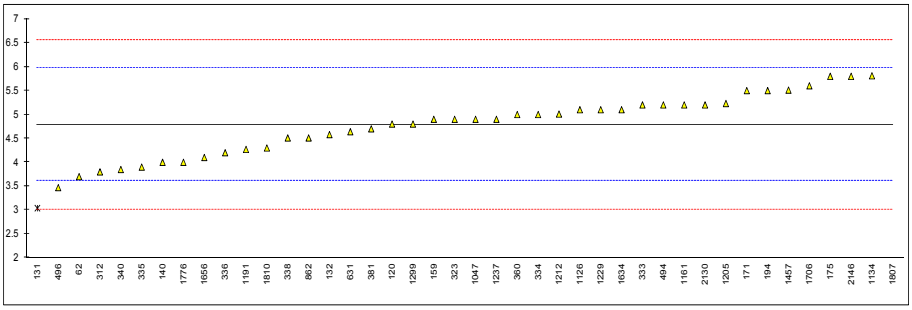
Compare R(D5599:15) = 0.35, R(EN1601:14) = 0.41 and R(EN13132:00) = 0.30

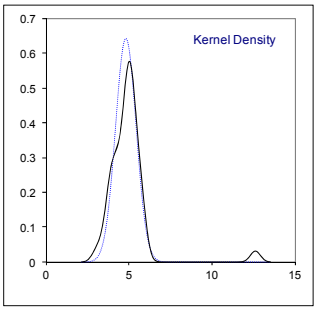




Determination of Sulphur on sample #16080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62	D5453	3.7		-1.84	
120	D2622	4.8		0.02	
131	D5453	3.04	C,R(0.05)	-2.96	first reported: 0.22
132	D2622	4.58		-0.35	
140	D5453	4.0		-1.33	
159	D5453	4.9		0.19	
169		-----		-----	
171	D5453	5.5		1.20	
175	D5453	5.8		1.71	
194	D5453	5.5		1.20	
312	ISO20846	3.8		-1.67	
323	ISO20846	4.9		0.19	
333	ISO20846	5.2		0.69	
334	ISO20846	5.0		0.36	
335	ISO20846	3.9		-1.50	
336	ISO20846	4.2		-1.00	
337		-----		-----	
338	ISO20846	4.51		-0.47	
340	ISO20846	3.85		-1.59	
350		-----		-----	
360	ISO20846	5.00		0.36	
381	D5453	4.7		-0.15	
447		-----		-----	
494	ISO20846	5.2		0.69	
496	ISO20846	3.47		-2.23	
511		-----		-----	
631	D5453	4.64		-0.25	
862	D5453	4.51		-0.47	
970		-----		-----	
1033		-----		-----	
1047	ISO20846	4.9		0.19	
1082		-----		-----	
1126	ISO20846	5.10		0.52	
1134	IP490	5.81		1.72	
1161	ISO20846	5.2		0.69	
1191	ISO20846	4.27		-0.88	
1205	ISO20846	5.23		0.74	
1212	ISO20846	5.01		0.37	
1229	ISO20846	5.1		0.52	
1237	ISO20846	4.90		0.19	
1259		-----		-----	
1299	ISO20884	4.8		0.02	
1457	ISO20846	5.51		1.22	
1459		-----		-----	
1634	ISO20846	5.1		0.52	
1656	ISO20846	4.1		-1.17	
1706	ISO20846	5.6		1.37	
1776	ISO20846	4.0		-1.33	
1807	ISO20846	12.6	R(0.01)	13.20	
1810	ISO20846	4.3		-0.83	
2130	ISO20846	5.2		0.69	
2146	ISO8754	5.8		1.71	
	normality	OK			
	n	40			
	outliers	2			
	mean (n)	4.79			
	st.dev. (n)	0.620			
	R(calc.)	1.74			
	R(ISO20846:11)	1.66			Compare R(D5453:16e1) = 1.88



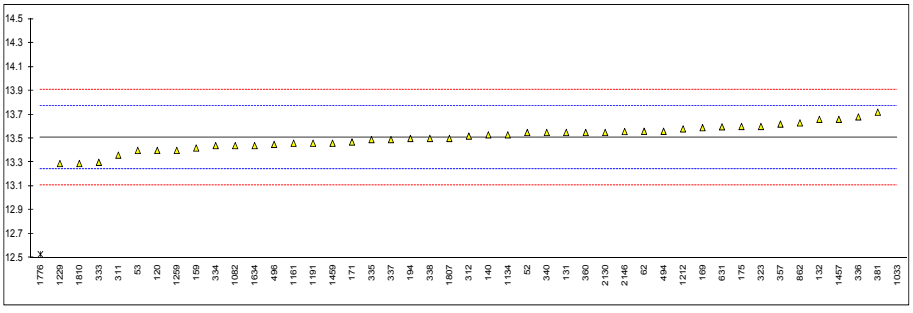


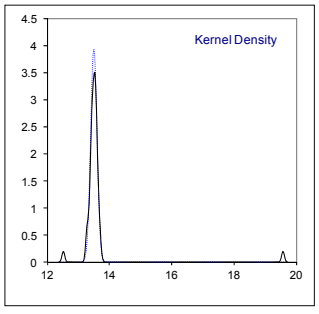
Determination of Total Vapour Pressure on sample #16081; results in psi

lab	method	value	mark	z(targ)	remarks
52	D5191	13.55		0.31	
53	D5191	13.40		-0.82	
62	D5191	13.56		0.38	
120	D5191	13.40		-0.82	
131	D5191	13.55		0.31	
132	D5191	13.66		1.13	
140	D5191	13.53		0.15	
159	D5191	13.42		-0.67	
169	D5191	13.59		0.61	
171	D5191	13.47		-0.30	
175	D5191	13.60		0.68	
194	D5191	13.50		-0.07	
311	D5191	13.36	C	-1.12	first reported: 9.13
312	D5191	13.52		0.08	
323	D5191	13.60		0.68	
333	D5191	13.3		-1.58	
334	D5191	13.44		-0.52	
335	D5191	13.49		-0.15	
336	D5191	13.68		1.28	
337	EN13016-1	13.49		-0.15	
338	D5191	13.5		-0.07	
340	D5191	13.55		0.31	
350		-----		-----	
357	D5191	13.62		0.83	
360	D5191	13.55		0.31	
381	EN13016-1	13.72		1.58	
447		-----		-----	
494	EN13016-1	13.56		0.38	
496	D5191	13.45		-0.45	
631	D5191	13.597		0.66	
862	D5191	13.63		0.91	
970		-----		-----	
1033	D5191	19.59	R(0.01)	45.74	
1047		-----		-----	
1082	EN13016-1	13.44		-0.52	
1134	D5191	13.53		0.15	
1161	EN13016-1	13.46		-0.37	
1191	EN13016-1	13.46		-0.37	
1212	D5191	13.58		0.53	
1229	EN13016-1	13.29		-1.65	
1259	EN13016-1	13.40		-0.82	
1299		-----		-----	
1457	D5191	13.66		1.13	
1459	EN13016-1	13.46		-0.37	
1634	D5191	13.44		-0.52	
1656		-----		-----	
1776	EN13016-1	12.53	R(0.01)	-7.37	
1807	EN13016-1	13.50		-0.07	
1810	D5191	13.29		-1.65	
2130	D5191	13.55		0.31	
2146	EN13016-1	13.558		0.37	

	normality	OK
	n	43
	outliers	2
	mean (n)	13.509
	st.dev. (n)	0.1014
	R(calc.)	0.284
	R(D5191:15)	0.372

Compare R(EN13016-1:07) = 0.372



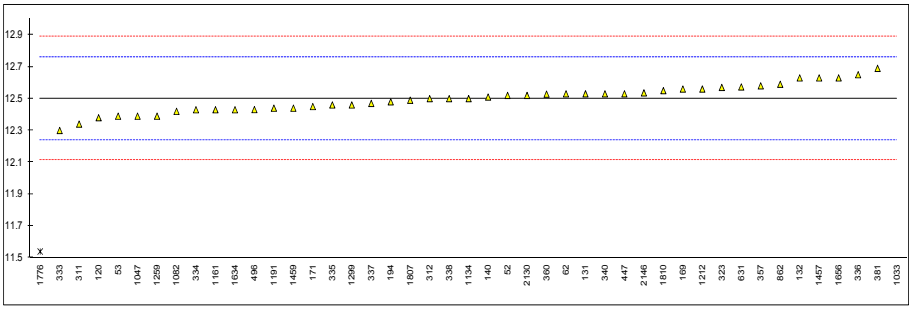


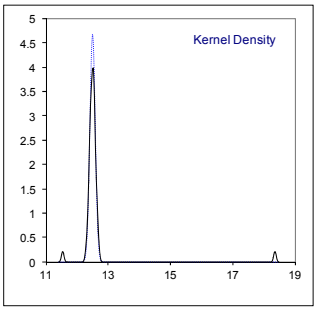
Determination of DVPE (ASTM D5191 calculation) on sample #16081; results in psi

lab	method	value	mark	z(targ)	remarks
52	D5191	12.52		0.16	
53	D5191	12.39		-0.85	
62	D5191	12.53		0.24	
120	D5191	12.38		-0.92	
131	D5191	12.53		0.24	
132	D5191	12.63		1.01	
140	D5191	12.51		0.08	
159		-----		-----	
169	D5191	12.56		0.47	
171	D5191	12.45		-0.38	
175		-----		-----	
194	D5191	12.48		-0.15	
311	D5191	12.34	C	-1.23	first reported: 8.27
312	D5191	12.50		0.01	
323	D5191	12.57		0.55	
333	D5191	12.3		-1.54	
334	D5191	12.43		-0.54	
335	D5191	12.46		-0.30	
336	D5191	12.65		1.17	
337	EN13016-1	12.47		-0.23	
338	D5191	12.5		0.01	
340	D5191	12.53		0.24	
350		-----		-----	
357	D5191	12.58		0.62	
360	D5191	12.528		0.22	
381	EN13016-1	12.69		1.48	
447	D5191	12.53		0.24	
494		-----		-----	
496	D5191	12.431		-0.53	
631	D5191	12.573		0.57	
862	D5191	12.59		0.70	
970		-----		-----	
1033	D5191	18.36	R(0.01)	45.33	
1047	EN13016-1	12.39		-0.85	
1082	EN13016-1	12.42		-0.61	
1134	D5191	12.50		0.01	
1161	EN13016-1	12.43		-0.54	
1191	EN13016-1	12.44		-0.46	
1212	D5191	12.56		0.47	
1229		-----		-----	
1259	EN13016-1	12.39		-0.85	
1299	D5191	12.46		-0.30	
1457	D5191	12.63		1.01	
1459	EN13016-1	12.44		-0.46	
1634	D5191	12.43		-0.54	
1656	EN13016-1	12.63		1.01	
1776	EN13016-1	11.54	R(0.01)	-7.42	
1807	EN13016-1	12.49		-0.07	
1810	D5191	12.55		0.39	
2130	D5191	12.52		0.16	
2146	EN13016-1	12.536		0.28	

normality	OK
n	43
outliers	2
mean (n)	12.499
st.dev. (n)	0.0855
R(calc.)	0.239
R(D5191:15)	0.362

Compare R(EN13016-1:07) = 0.362

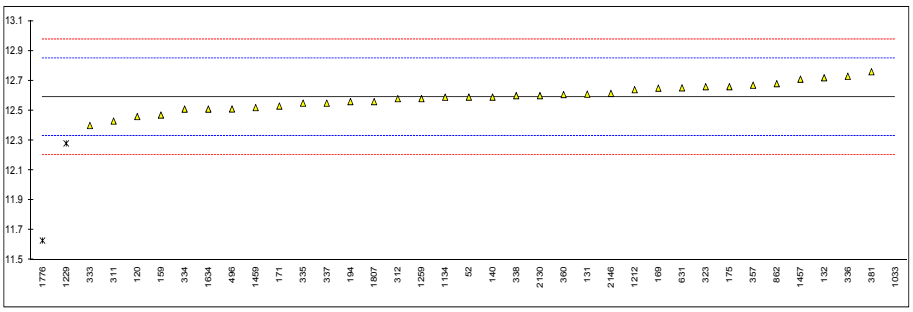


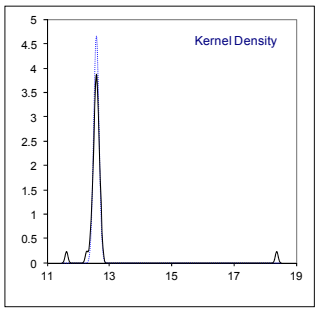


Determination of DVPE (EPA calculation) on sample #16081; results in psi

lab	method	value	mark	z(targ)	remarks
52	D5191	12.59		0.00	
53		-----		-----	
62		-----		-----	
120	D5191	12.46		-1.00	
131	D5191	12.61		0.16	
132	D5191	12.72		1.00	
140	D5191	12.59		0.00	
159	D5191	12.47		-0.92	
169	D5191	12.65		0.46	
171	D5191	12.53		-0.46	
175	D5191	12.66		0.54	
194	D5191	12.56		-0.23	
311	D5191	12.43	C	-1.23	first reported: 8.38
312	D5191	12.58		-0.08	
323	D5191	12.66		0.54	
333	D5191	12.4		-1.46	
334	D5191	12.51		-0.62	
335	D5191	12.55		-0.31	
336	D5191	12.73		1.08	
337	EN13016-1	12.55		-0.31	
338	D5191	12.6		0.08	
340		-----		-----	
350		-----		-----	
357	D5191	12.67		0.62	
360	D5191	12.607		0.13	
381	EN13016-1	12.76		1.31	
447		-----		-----	
494		-----		-----	
496	D5191	12.511		-0.61	
631	D5191	12.652		0.48	
862	D5191	12.68		0.70	
970		-----		-----	
1033	D5191	18.39	R(0.01)	44.75	
1047		-----		-----	
1082		-----		-----	
1134	D5191	12.58961112	C	0.00	first reported 80.02 kPa (11.6059 psi)
1161		-----		-----	
1191		-----		-----	
1212	D5191	12.64		0.39	
1229	EN13016-1	12.28	R(0.05)	-2.39	
1259	EN13016-1	12.58		-0.08	
1299		-----		-----	
1457	D5191	12.71		0.93	
1459	EN13016-1	12.52		-0.54	
1634	D5191	12.510		-0.62	
1656		-----		-----	
1776	EN13016-1	11.63	R(0.01)	-7.41	
1807	EN13016-1	12.56		-0.23	
1810		-----		-----	
2130	D5191	12.60		0.08	
2146	EN13016-1	12.615		0.19	

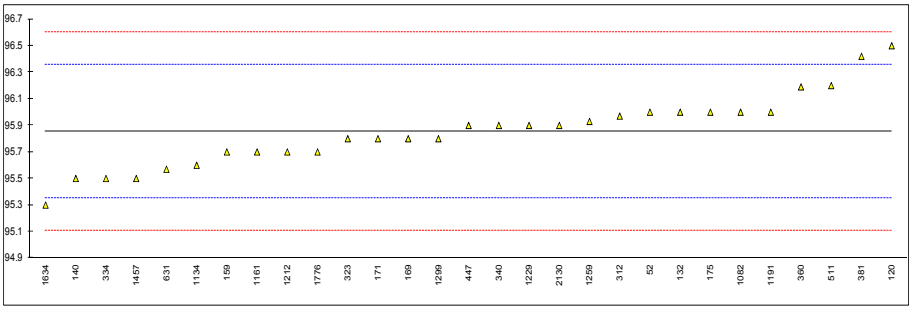
	normality	OK	
	n	34	
	outliers	3	
	mean (n)	12.590	
	st.dev. (n)	0.0855	
	R(calc.)	0.239	
	R(D5191:15)	0.363	Compare R(EN13016-1:07) = 0.363

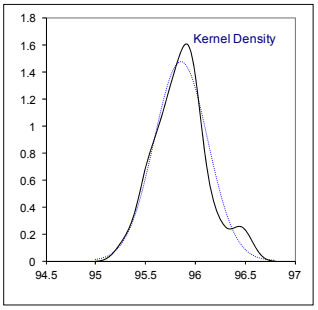




Determination of RON on sample #16082

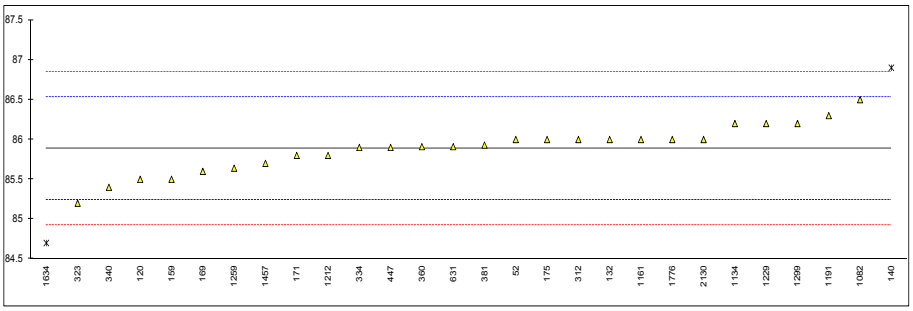
lab	method	value	mark	z(targ)	remarks
52	D2699	96.0		0.58	
62		-----		-----	
120	D2699	96.5		2.58	
132	D2699	96.0		0.58	
140	D2699	95.5		-1.42	
159	D2699	95.7		-0.62	
169	D2699	95.8		-0.22	
171	D2699	95.8		-0.22	
175	D2699	96.0		0.58	
312	D2699	95.97		0.46	
323	ISO5164	95.8		-0.22	
334	D2699	95.5		-1.42	
340	D2699	95.9		0.18	
360	D2699	96.19		1.34	
381	ISO5164	96.42		2.26	
447	D2699	95.9		0.18	
511	D2699	96.2		1.38	
631	D2699	95.57		-1.14	
970		-----		-----	
1082	ISO5164	96.0		0.58	
1134	IP237	95.6		-1.02	
1161	ISO5164	95.7		-0.62	
1191	ISO5164	96.0		0.58	
1212	D2699	95.7		-0.62	
1229	ISO5164	95.9		0.18	
1259	ISO5164	95.93		0.30	
1299	D2699	95.8		-0.22	
1457	D2699	95.5		-1.42	
1634		95.3	C	-2.22	first reported 95
1776	ISO5164	95.7		-0.62	
2130	D2699	95.9		0.18	
	normality	OK			
	n	29			
	outliers	0			
	mean (n)	95.85			
	st.dev. (n)	0.270			
	R(calc.)	0.76			
	R(D2699:15a)	0.70			Compare R(ISO5164:14) = 0.7

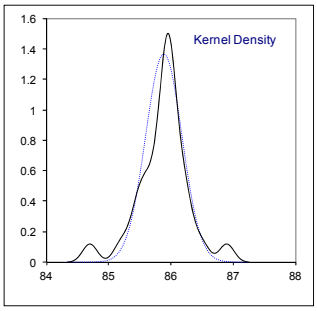




Determination of MON on sample #16082

lab	method	value	mark	z(targ)	remarks
52	D2700	86.0		0.35	
62		-----		-----	
120	D2700	85.5		-1.21	
132	D2700	86.0		0.35	
140	D2700	86.9	R(0.05)	3.15	
159	D2700	85.5		-1.21	
169	D2700	85.6		-0.90	
171	D2700	85.8		-0.27	
175	D2700	86.0		0.35	
312	D2700	86.0		0.35	
323	ISO5163	85.2		-2.14	
334	D2700	85.9		0.04	
340	D2700	85.4		-1.52	
360	D2700	85.91		0.07	
381	ISO5163	85.93		0.13	
447	D2700	85.9		0.04	
511		-----		-----	
631	D2700	85.91		0.07	
970		-----		-----	
1082	ISO5163	86.5		1.90	
1134	IP236	86.2		0.97	
1161	ISO5163	86.0		0.35	
1191	ISO5163	86.3		1.28	
1212	D2700	85.8		-0.27	
1229	ISO5163	86.2		0.97	
1259	ISO5163	85.64		-0.77	
1299	D2700	86.2		0.97	
1457	D2700	85.7		-0.59	
1634		84.7	C,R(0.05)	-3.70	first reported 85
1776	ISO5163	86.0		0.35	
2130	D2700	86.0		0.35	
	normality	OK			
	n	26			
	outliers	2			
	mean (n)	85.89			
	st.dev. (n)	0.292			
	R(calc.)	0.82			
	R(D2700:16)	0.90			Compare R(ISO5163:14) = 0.9





APPENDIX 2

Z-scores of Distillation (ASTM D86)

lab	IBP	10%eva	50%eva	90%eva	FBP	%volat70°C	%volat100°C	%volat150°C
52	0.04	0.22	-0.33	-0.34	-0.75	-----	-----	-----
62	0.75	-0.10	0.15	0.54	0.28	-1.53	-0.22	-0.81
120	-0.44	-0.67	0.22	-0.30	-0.51	-0.23	0.61	0.17
131	-1.45	-1.32	-2.48	-0.38	-2.36	1.65	-0.06	1.66
132	-0.50	-0.10	0.01	-0.21	0.75	0.06	0.61	-0.07
140	-1.69	-0.34	-0.54	-0.21	0.04	-0.95	0.61	-0.32
159	-1.16	-0.75	-0.33	-0.25	0.12	-----	-----	-----
169	-3.36	-0.10	-0.06	-0.43	-2.80	-----	-----	-----
171	0.39	0.39	-0.06	-0.07	0.20	-----	0.78	-0.81
175	-0.98	1.12	1.40	-0.25	-0.91	-----	-----	-----
194	1.05	-0.02	-0.06	-0.78	-0.31	-----	-----	-----
312	-0.62	-0.26	-0.26	-0.34	-0.04	0.64	-0.22	0.91
323	-0.80	-1.32	-1.09	-0.83	-0.75	1.50	0.95	1.16
333	-1.16	-0.51	-0.47	0.06	-0.43	0.64	0.11	-0.32
334	0.51	0.63	0.29	0.68	0.83	-0.95	-2.24	-2.05
335	-0.50	-0.91	-1.65	-0.87	-1.30	1.07	-0.06	0.67
336	0.45	-0.51	-0.75	-0.25	-1.38	1.07	0.45	0.42
337	-----	-----	-----	-----	-----	-----	-----	-----
338	0.63	0.31	-0.26	-0.16	1.15	-0.23	-0.22	0.17
340	-0.08	0.47	0.15	-0.69	-1.46	-0.66	0.28	-----
350	-----	-----	-----	-----	-----	-----	-----	-----
360	-0.44	0.39	0.36	0.99	-0.39	-0.95	-1.23	-2.54
381	1.64	1.04	0.22	0.32	3.63	-1.05	-0.59	-0.74
447	-0.92	-0.99	-1.72	-0.34	2.49	1.50	1.12	0.42
494	-0.56	0.55	0.15	-0.30	-0.59	-0.23	0.61	0.91
496	-0.44	0.22	0.36	-0.34	-0.47	-0.80	-0.06	0.67
511	1.47	1.36	2.02	-1.00	-0.31	-----	-----	-----
631	2.00	1.69	2.71	0.54	1.11	-2.10	-2.57	0.42
862	0.57	-0.34	-0.68	-0.56	0.59	0.64	0.78	0.42
970	-----	-----	-----	-----	-----	-----	-----	-----
1033	-0.08	1.28	2.16	3.29	1.46	-----	-----	-----
1047	1.05	-0.34	0.22	-0.34	-0.20	-0.23	-0.06	0.67
1082	-1.69	-0.34	-0.61	-0.16	0.91	0.49	0.11	-0.07
1126	0.93	-1.08	-0.82	0.06	0.36	1.07	0.28	0.17
1134	1.29	-0.02	-1.03	-0.56	0.87	0.93	1.29	0.42
1161	0.75	-0.18	0.70	0.41	-1.54	-0.37	-1.73	-2.30
1191	-0.32	-0.18	-0.33	-0.16	0.59	0.21	0.45	-0.07
1205	0.39	-0.02	0.01	-0.16	-2.40	0.06	-0.39	-0.07
1212	-0.68	0.39	-0.06	0.28	0.51	-0.52	-1.06	-0.57
1229	-0.80	-0.99	-0.54	-0.43	-0.04	0.35	0.95	0.67
1237	2.12	0.87	3.27	1.78	-0.20	-4.55	-0.22	-2.54
1259	0.22	1.04	2.09	2.18	1.74	-2.68	-2.07	-4.03
1299	1.11	0.79	1.54	2.80	0.75	0.64	0.78	0.17
1457	-1.27	-0.18	0.36	-0.69	-1.10	-0.52	0.28	1.16
1459	-0.14	-0.59	-1.37	-0.34	0.67	1.22	0.11	-0.07
1634	-0.32	-0.10	0.43	0.32	0.12	-1.67	0.28	-1.80
1656	0.99	-1.40	-1.23	-0.61	2.72	1.65	1.62	1.90
1706	-0.20	0.47	1.05	-0.12	-0.51	-----	-----	-----
1776	-1.45	-0.83	-1.72	-0.78	-1.22	1.65	1.96	1.16
1807	-0.26	-1.08	-1.23	-0.78	-2.33	1.50	1.45	1.16
1810	-0.44	-0.59	-0.89	-0.38	-1.02	-2.25	-3.24	-5.51
2130	0.51	0.47	0.70	0.19	1.58	-0.66	-0.22	-0.32
2146	0.51	2.50	7.35	5.32	1.86	-7.44	-9.62	-11.44

APPENDIX 3

Number of participants per country

1 lab in AUSTRIA
2 labs in BELGIUM
1 lab in BULGARIA
3 labs in CANADA
1 lab in CHINA, People's Republic
1 lab in CROATIA
1 lab in CZECH REPUBLIC
5 labs in FINLAND
8 labs in FRANCE
2 labs in GERMANY
4 labs in NETHERLANDS
1 lab in OMAN
1 lab in PERU
1 lab in PHILIPPINES
1 lab in POLAND
1 lab in PORTUGAL
1 lab in SERBIA
1 lab in SLOVENIA
3 labs in SPAIN
2 labs in SWEDEN
1 lab in TURKEY
5 labs in UNITED KINGDOM
9 labs in UNITED STATES OF AMERICA

APPENDIX 4

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 outlier test
R(0.05)	= straggler in Rosner outlier test
R(1)	= outlier in Rosner outlier test
R(5)	= straggler in Rosner outlier test
ex	= test result excluded from calculations
E	= probably an error in calculations
n.a.	= not applicable
n.e.	= not evaluated
W	= test result withdrawn on request of the participant
fr.	= first reported
U	= test result probably reported in a different unit
SDS	= Safety Data Sheet

Literature:

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3 ASTM E1301:03

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