# Results of Proficiency Test
# Biogasoline E10
# May 2015


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**CONTENTS**

# 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 EN228 specification. During the annual proficiency testing program 2014/2015, it was decided to continue the round robin for the analysis of Biogasoline E10.
This interlaboratory study, in total 43 laboratories in 18 different countries has participated. See appendix 3 for the number of participants per country. In this report, the results of the 2015 Biogasoline E10 proficiency test are presented and discussed. This report is also electronically available through the iis internet site 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. In this proficiency test, the participants received, depending on their registration, 1*1 litre Biogasoline E10 (labelled #15060) and/or 1*1 litre Biogasoline E10 (± 750 mL filled, labelled #15061 for DVPE only) and/or 1*1 litre Biogasoline E10 (labelled #15062 for RON/MON only)
Participants were requested to report rounded and unrounded results. The unrounded 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% confidentially 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 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 internet site www.iisnl.com.

## 2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and are 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, 69 amber glass bottles of 1 litre for the main sample (labelled #15060) and 39 amber glass bottles for RON/MON only (labelled #15062) were filled. From the same batch another 60 brown glass bottles of 1 litre were filled with approx. 750 mL especially for Dry Vapour Pressure Equivalent (labelled #15061).
The homogeneity of the subsamples #15060 and #15062, 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 #15061 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 #15060-1 | 737.65 |
| Sample #15060-2 | 737.58 |
| Sample #15060-3 | 737.67 |
| Sample #15060-4 | 737.66 |
| Sample #15062-1 | 737.65 |
| Sample #15062-2 | 737.65 |
| Sample #15062-3 | 737.57 |
| Sample #15062-4 | 737.68 |

table 1: homogeneity test results of ubsamples #15060 and #15062

| | DVPE in psi |
|---|---|
| Sample #15061-1 | 11.2 |
| Sample #15061-2 | 11.3 |
| Sample #15061-3 | 11.3 |
| Sample #15061-4 | 11.4 |
| Sample #15061-5 | 11.4 |
| Sample #15061-6 | 11.4 |
| Sample #15061-7 | 11.4 |
| Sample #15061-8 | 11.4 |

table 2: homogeneity test results of subsamples #15061

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 #15060) | 0.11 | -- |
| r (sample #15061) | -- | 0.16 |
| reference test | ISO12185:96 | D5191:13 |
| 0.3*R (Reference) | 0.45 | (0.11) |
| r (Reference) | (0.40) | 0.21 |

table 3: repeatabilities of the subsamples #15060 and #15061

The calculated repeatability of the Density was less than 0.3 times the reproducibility of the corresponding reference method. Due to the strict reproducibility requirements of ASTM D5191:13, the calculated repeatability for DVPE was compared with repeatability of the corresponding reference method. The calculated repeatability of DVPE was less than the repeatability of the corresponding reference method.
Therefore, homogeneity of the subsamples #15060, #15061 and #15062 was assumed.

To the participants, depending on their registration, 1*1 litre of sample #15060 and/or 1*1 litre (± 750 mL filled) of sample #15061 and/or 1*1 litre of sample #15062 were sent on April 22, 2015.

### 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 ANALYSIS

The participants were requested to determine on sample #15060: API gravity, Aromatics (by GC), Benzene, Copper Strip Corrosion 3hrs/50°C, Density at 15°C, Distillation, Doctor test, Existent Gum, FIA (olefins & aromatics), Lead as Pb, Manganese as Mn, Mercaptan Sulphur as S, Oxidation Stability, Olefins (by GC), Oxidation Stability, Oxygenates, Oxygen and Sulphur.
On sample #15061 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/MON on sample #15062.

To get comparable results a detailed report form, on which the units were prescribed as well as the required standards and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The detailed report form was also made available for download on the iis website www.iisnl.com. A SDS and a form to confirm receipt of the samples were added to the sample package.

## 3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original data are tabulated per determination in the appendix of this report. The laboratories are presented by their code numbers
Directly after the deadline, a reminder fax was sent to those laboratories that had not reported results at that moment.

Shortly after the deadline, the available results were screened for suspect data. A 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 results. Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

## 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 results. 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 (1986 and 1994) the original results per determination were submitted subsequently to Dixon, Grubbs and Rosner outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test and by R(0.01) for the Rosner General ESD test (see appendix 4, no.16). Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test and by R(0.05). 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 analysis 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 (see appendix 4; nos 13 and 14). 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 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:

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

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.
Three laboratories reported the test results after the final reporting date and two laboratories did not report any result at all. Not all laboratories were able to perform all analyses requested. Finally, 41 laboratories did report 713 numerical results. Observed were 20 outlying results, which is 2.8%. In proficiency tests, outlier percentages of
3% - 7.5% are quite normal.

### 4.1 EVALUATION PER TEST

In this section, the 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 reported data. The abbreviations, used in these tables, are listed in appendix 3.
In the iis PT reports, ASTM methods are referred to with a number (e.g. D2086) and an added designation for the year that the method was adopted or revised (e.g. D2086-08). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D2086-08 (2013)). In the results tables of Appendix 1 only the method number and year of adoption or revision will be used.

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 #15060**

API gravity: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D4052:11.

Aromatics by GC: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ISO22854:14. Six participants used method ASTM D5769. This method is not equivalent to ISO22854:14. Two ASTM D5769 test results appeared to be statistical outliers. When the ISO22854 test results were evaluated separately, a higher aromatics content is found with a smaller standard deviation than for the full data set.

Benzene: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ISO22854:14.

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

Density at 15°C: This determination is not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ISO12185:96 and of ASTM D4052:11.

Distillation: The determination of the distillation was not problematic. In total five statistical outliers were observed. When compared against the automated mode requirements of ASTM D86:12, the calculated reproducibilities for IBP, 10% rec, 50% rec, 90% rec, FBP, % evap at 100°C and % evap at 150°C after rejection of the statistical outliers, are all in agreement.
When compared against the manual mode, the calculated reproducibilities for IBP, 10% rec, 50% rec, 90% rec, % evap at 70°C and % evap at 150°C after rejection of the statistical outlier, are all in agreement with requirements of ASTM D86:12.

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

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

FIA Olefins : This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D1319:14. The large spread may be caused by not or wrongly correcting the results for the (high) oxygenate content.

FIA Aromatics: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D1319:14. The large spread may be caused by not or wrongly correcting the results for the (high) oxygenate content.

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

Manganese: The consensus value of the group was below the application range (0.25 – 40 mg/L) of ASTM D3831:12. Therefore, no significant conclusions were drawn.

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

Olefins by GC: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ISO22854:14.

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

Ethanol: This determination may be problematic depending on the test method used. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ISO22854:14 or EN1601:14 or EN13132:00, but it is in agreement with the requirements of ASTM D5599:10. When the reproducibility of the used test method differs significantly from the reproducibility of the reference test, the laboratory is advised to recalculate its z-score as described in paragraph 3.3.

Ethers The consensus value of the group was near or below the application range of ISO22854:14 (min. 0.2 %V/V). Therefore, no significant conclusions were drawn.

Other oxygenates: The consensus values for the various oxygenates were near or below the application range of ISO22854:14 (min. 0.2 %V/V). Therefore, no significant conclusions were drawn.

Oxygen: 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 mentioned in EN228:13 (note k).

Sulphur: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO20846:11.

**For sample #15061**

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 D5191:13.

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 one statistical outlier. Both calculated reproducibilities after rejection of the statistical outlier are in agreement with the requirement of ASTM D5191:13.

**For sample #15062**

RON: This determination was not problematic. Following EN228 (note b) the measured test result for RON should be corrected by subtraction of 0.2 to get the final test result. One laboratory reported that its test result was not corrected. Therefore this result was excluded from the statistical evaluation. No statistical outliers were observed. The calculated reproducibility after rejection of the suspect test result is in agreement with the requirements of ASTM D2699:13b. To try to explain the bimodal distribution observed and to check whether the correction was applied on the ISO5164 results and not on the ASTM D2699 results, a separate evaluation per method was done. The differences were not significant and the possible omission of the correction was obviously not correlated to a specific test method.

MON: This determination was not problematic. Following EN228 (note b) the measured test result for MON should be corrected by subtraction of 0.2 to get the final test result. One laboratory reported that its test result was not corrected. Therefore this result was excluded from the statistical evaluation. No statistical outliers were observed. The calculated reproducibility after rejection of the suspect test result is in agreement with the requirements of ASTM D2700:14. To check whether the correction was applied on the ISO5164 results and not on the ASTM D2699 results, a separate evaluation per method was done. The differences were not significant and the possible omission of the correction was obviously not correlated to a specific test method.

## 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 | | 18 | 60.27 | 0.18 | 0.61 |
| Aromatics (GC) | %V/V | 17 | 25.48 | 1.24 | 1.29 |
| Benzene | %V/V | 25 | 0.53 | 0.06 | 0.04 |
| Copper Strip 3 hrs at 50°C | ----- | 23 | 1(1A) | n.a. | n.a. |
| Density at 15°C | $kg/m^3$ | 37 | 737.72 | 0.60 | 1.50 |
| Initial Boiling Point | ºC | 36 | 31.2 | 4.0 | 4.9 |
| 10% evaporated | ºC | 35 | 46.8 | 1.7 | 3.2 |
| 50% evaporated | ºC | 36 | 67.3 | 1.6 | 1.9 |
| 90% evaporated | ºC | 33 | 149.8 | 2.4 | 4.0 |
| Final Boiling Point | ºC | 37 | 188.1 | 5.0 | 6.8 |
| %Vol at70ºC | %V/V | 31 | 53.5 | 2.5 | 1.9 |
| %Vol at100ºC | %V/V | 29 | 63.5 | 1.4 | 1.7 |
| %Vol at150ºC | %V/V | 29 | 90.0 | 1.2 | 1.2 |
| Doctor test | | 14 | negative | n.a. | n.a. |
| Existent Gum (solvent washed) | mg/100mL | 14 | 0.6 | 0.7 | 2.2 |
| FIA Olefins | %V/V | 16 | 10.9 | 3.1 | 3.4 |
| FIA Aromatics | %V/V | 17 | 27.1 | 5.2 | 3.7 |
| Lead as Pb | mg/L | 14 | <2.5 | n.a. | n.a. |
| Manganese as Mn | mg/L | 7 | <0.25 | n.a. | n.a. |
| Mercaptans as S | %M/M | 11 | <0.0003 | n.a. | n.a. |
| Olefins by GC | %V/V | 12 | 10.44 | 0.85 | 1.74 |
| Oxidation Stability | minutes | 12 | >360 | n.a. | n.a. |
| Ethanol | %V/V | 25 | 10.2 | 1.0 | 0.6 |
| Ethers C5 | %V/V | 14 | <0.2 | n.a. | n.a. |
| Ethers C5 or more C atoms | %V/V | 14 | <0.2 | n.a. | n.a. |
| Ethers C6 or more C atoms | %V/V | 12 | <0.2 | n.a. | n.a. |
| Oxygen content | %M/M | 23 | 3.8 | 0.4 | 0.4 |
| Sulphur | mg/kg | 33 | 3.4 | 1.5 | 1.5 |

table 4: performance evaluation sample #15060

| Parameter | unit | n | average | 2.8 * sd | R (lit) |
|---|---|---|---|---|---|
| TVP acc.to ASTM D5191 | psi | 29 | 12.19 | 0.21 | 0.36 |
| DVPE acc.to ASTM D5191 | psi | 32 | 11.19 | 0.26 | 0.35 |
| DVPE acc.to EPA | psi | 25 | 11.31 | 0.20 | 0.35 |

table 5: performance evaluation sample #15061

| Parameter | unit | n | average | 2.8 * sd | R (lit) |
|---|---|---|---|---|---|
| RON | ----- | 16 | 96.30 | 0.68 | 0.70 |
| MON | ----- | 16 | 85.56 | 0.93 | 0.90 |

table 6: performance evaluation sample #15062

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 2015 WITH PREVIOUS PT

| Determination | May 2015 | May 2014 | May 2013 | May 2012 | May 2011 |
|---|---|---|---|---|---|
| Number of reporting labs | 41 | 50 | 48 | 40 | 34 |
| Number of results reported | 713 | 1164 | 892 | 831 | 642 |
| Statistical outliers | 20 | 45 | 25 | 30 | 21 |
| Percentage outliers | 2.8% | 3.9% | 2.8% | 3.6% | 3.3% |

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 2015 | May 2014 | May 2013 | May 2012 | May 2011 |
|---|---|---|---|---|---|
| API gravity | ++ | ++ | + | + | ++ |
| Aromatics by GC | + | + | - | + | ++ |
| Benzene | - | +/- | - | - | + |
| Density at 15°C | ++ | ++ | +/- | +/- | - |
| Distillation | ++ | + | + | + | + |
| Existent Gum (solvent washed) | ++ | +/- | +/- | -- | n.a |
| FIA - Olefins | + | + | -- | ++ | -- |
| FIA – Aromatics by FIA | - | - | -- | +/- | -- |
| Mercaptans as S | n.e. | ++ | ++ | ++ | ++ |
| Olefins by GC | ++ | ++ | + | ++ | ++ |
| Oxidation Stability | n.e. | n.e | n.e. | n.e. | n.e. |
| Ethanol | - | -- | -- | ++ | ++ |
| 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:

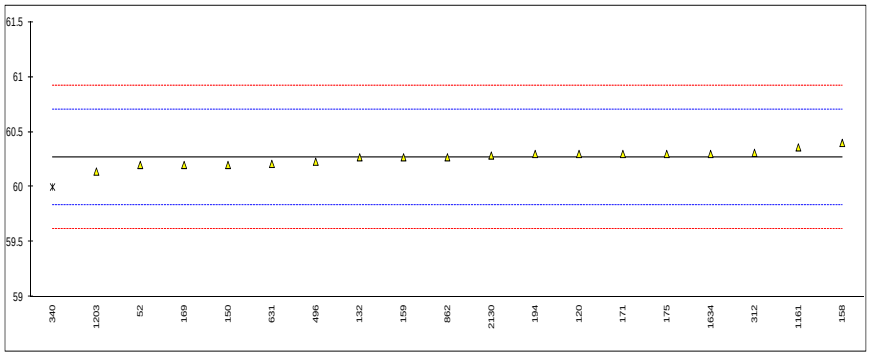
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- - : group performed worse than the standard
- -- : group performed much worse than the standard
- n.e.: not evaluated

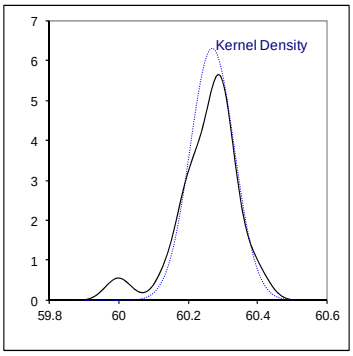
## APPENDIX 1

Determination of API gravity on sample #15060;

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D4052 | 60.2 | | -0.32 | |
| 120 | D4052 | 60.3 | | 0.14 | |
| 132 | D4052 | 60.27 | | 0.00 | |
| 150 | D4052 | 60.2 | | -0.32 | |
| 158 | D4052 | 60.4 | | 0.60 | |
| 159 | D4052 | 60.27 | | 0.00 | |
| 169 | D4052 | 60.2 | | -0.32 | |
| 171 | D4052 | 60.3 | | 0.14 | |
| 175 | D4052 | 60.3 | | 0.14 | |
| 194 | D4052 | 60.3 | | 0.14 | |
| 312 | D4052 | 60.31 | | 0.19 | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D4052 | 60.00 | G(0.05) | -1.23 | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | D4052 | 60.23 | | -0.18 | |
| 511 | | ----- | | ----- | |
| 631 | D4052 | 60.21 | | -0.27 | |
| 862 | D4052 | 60.27 | | 0.00 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | D4052 | 60.36 | | 0.42 | |
| 1191 | | ----- | | ----- | |
| 1203 | D4052 | 60.14 | | -0.59 | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | D4052 | 60.3 | | 0.14 | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | D4052 | 60.286 | | 0.08 | |
| 2146 | | ----- | | ----- | |

| | |
|---|---|
| normality | OK |
| n | 18 |
| outliers | 1 |
| mean (n) | 60.269 |
| st.dev. (n) | 0.0633 |
| R(calc.) | 0.177 |
| R(D4052:11) | 0.611 |

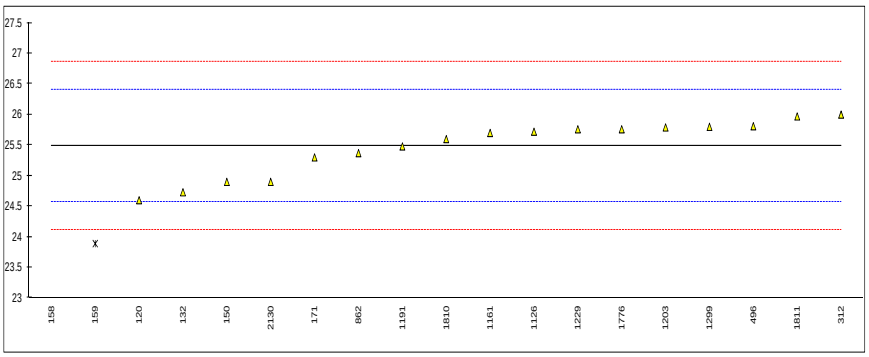


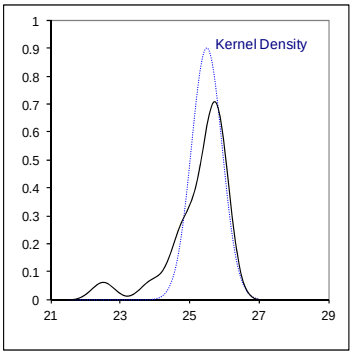



# Determination of Aromatics by GC on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D5769 | 24.6 | | -1.92 | |
| 132 | D5769 | 24.73 | | -1.64 | |
| 150 | D5769 | 24.9 | | -1.27 | |
| 158 | D5769 | 22.5 | G(0.01) | -6.50 | |
| 159 | D5769 | 23.89 | G(0.05) | -3.47 | |
| 169 | | ----- | | ----- | |
| 171 | D5769 | 25.3 | | -0.40 | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | ISO22854 | 26.0 | | 1.13 | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | ISO22854 | 25.81 | | 0.72 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | ISO22854 | 25.37 | | -0.24 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | in house | 25.72 | | 0.52 | |
| 1161 | ISO22854 | 25.7 | | 0.48 | |
| 1191 | ISO22854 | 25.48 | | 0.00 | |
| 1203 | ISO22854 | 25.79 | | 0.67 | |
| 1229 | ISO22854 | 25.76 | | 0.61 | |
| 1299 | ISO22854 | 25.8 | | 0.69 | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO22854 | 25.76 | | 0.61 | |
| 1810 | | 25.6 | | 0.26 | |
| 1811 | ISO22854 | 25.97 | | 1.06 | |
| 2130 | D6730 | 24.9 | C | -1.27 | first reported:23.688 |
| 2146 | | ----- | | ----- | |
| | | | | | Only ISO22854 data |
| | normality | OK | | | OK |
| | n | 17 | | | 11 |
| | outliers | 2 | | | 0 |
| | mean (n) | 25.482 | | | 25.731 |
| | st.dev. (n) | 0.44365 | | | 0.1890 |
| | R(calc.) | 1.242 | | | 0.529 |
| | R(ISO22854:14) | 1.285 | | | 1.296 |

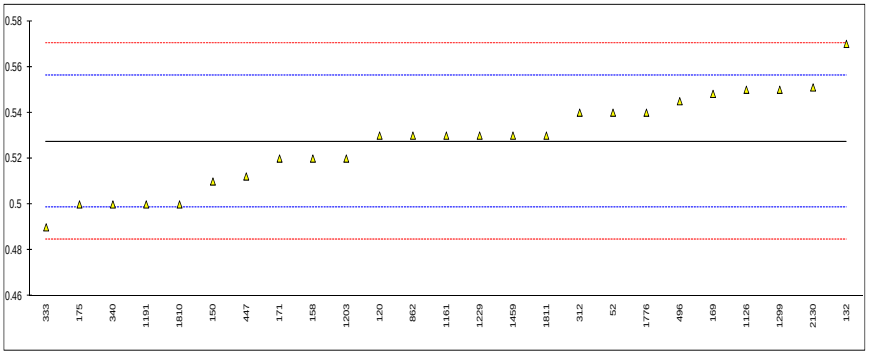
Compare R(D5769:10) = 2.767

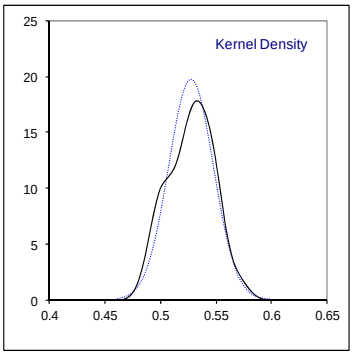


# Determination of Benzene on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | INH-14.3 | 0.54 | | 0.88 | |
| 120 | D5769 | 0.53 | C | 0.18 | first reported:0.51 |
| 132 | D3606 | 0.570 | | 2.98 | |
| 150 | D3606 | 0.51 | | -1.22 | |
| 158 | D3606 | 0.52 | | -0.52 | |
| 159 | | ----- | | ----- | |
| 169 | D3606 | 0.5482 | | 1.45 | |
| 171 | D3606 | 0.52 | | -0.52 | |
| 175 | D3606 | 0.50 | | -1.92 | |
| 194 | | ----- | | ----- | |
| 312 | ISO22854 | 0.54 | | 0.88 | |
| 333 | EN238 | 0.49 | | -2.62 | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | EN238 | 0.50 | | -1.92 | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | IP429 | 0.51218 | | -1.07 | |
| 496 | ISO22854 | 0.545 | | 1.23 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | ISO22854 | 0.53 | | 0.18 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | in house | 0.55 | | 1.58 | |
| 1161 | ISO22854 | 0.53 | | 0.18 | |
| 1191 | ISO22854 | 0.5 | | -1.92 | |
| 1203 | ISO22854 | 0.52 | | -0.52 | |
| 1229 | ISO22854 | 0.53 | | 0.18 | |
| 1299 | ISO22854 | 0.55 | | 1.58 | |
| 1459 | | 0.53 | | 0.18 | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO22854 | 0.54 | | 0.88 | |
| 1810 | | 0.5 | | -1.92 | |
| 1811 | ISO22854 | 0.53 | | 0.18 | |
| 2130 | D6730 | 0.551 | | 1.65 | |
| 2146 | | ----- | | ----- | |
| | normality | OK | | | |
| | n | 25 | | | |
| | outliers | 0 | | | |
| | mean (n) | 0.527 | | | |
| | st.dev. (n) | 0.0202 | | | |
| | R(calc.) | 0.056 | | | |
| | R(ISO22854:14) | 0.040 | | | Compare R(D3606) = 0.119 |



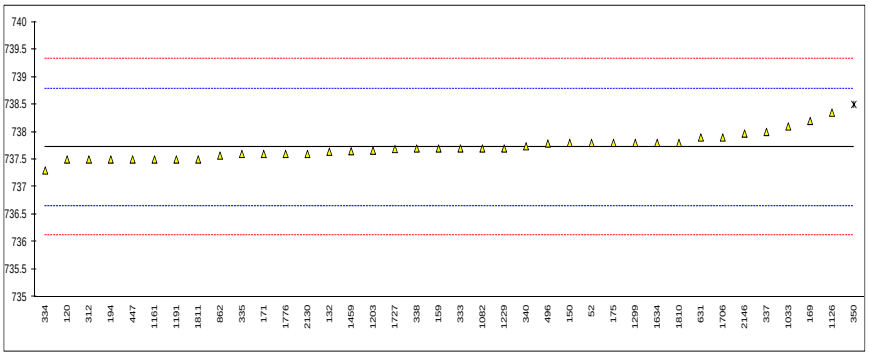



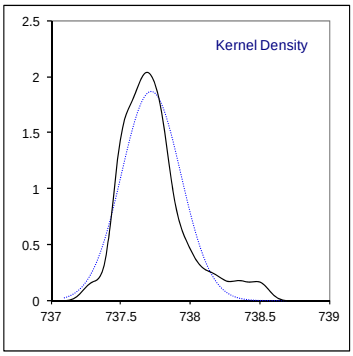
## Determination of Copper strip 3hrs/50°C on sample #15060

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D130 | 1A | | ----- | |
| 120 | D130 | 1A | | ----- | |
| 132 | D130 | 1A | | ----- | |
| 150 | D130 | 1A | | ----- | |
| 158 | D130 | 1A | | ----- | |
| 159 | D130 | 1A | | ----- | |
| 169 | D130 | 1A | | ----- | |
| 171 | D130 | 1A | | ----- | |
| 175 | D130 | 1A | | ----- | |
| 194 | D130 | 1A | | ----- | |
| 312 | D130 | 1A | | ----- | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | D130 | 1 | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D130 | 1A | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D130 | 1B | | ----- | |
| 496 | D130 | 1A | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | D130 | 1A | | ----- | |
| 862 | D130 | 1A | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | D130 | 1A | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | ISO2160 | 1 | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | D130 | 1A | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | D130 | 1A | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | ISO2160 | 1 | | ----- | |
| 2130 | D130 | 1A | | ----- | |
| 2146 | | ----- | | ----- | |
| | normality | n.a | | | |
| | n | 23 | | | |
| | outliers | n.a | | | |
| | mean (n) | 1(A) | | | |
| | st.dev. (n) | n.a | | | |
| | R(calc.) | n.a | | | |
| | R(130:12) | n.a | | | |

# Determination of Density at 15°C on sample #15060; results in kg/m$^3$

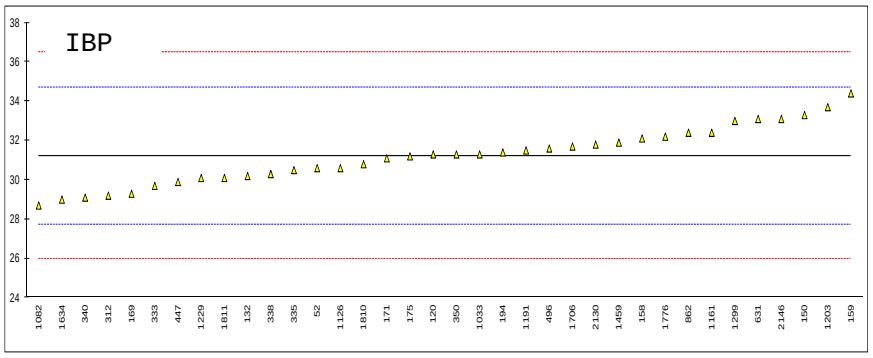
| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D4052 | 737.8 | | 0.15 | |
| 120 | D4052 | 737.5 | | -0.41 | |
| 132 | D4052 | 737.64 | | -0.15 | |
| 150 | D4052 | 737.8 | | 0.15 | |
| 158 | | ----- | | ----- | |
| 159 | D4052 | 737.7 | | -0.04 | |
| 169 | D4052 | 738.2 | | 0.89 | |
| 171 | D4052 | 737.6 | | -0.23 | |
| 175 | D4052 | 737.8 | C | 0.15 | first reported: 0.7378 kg/m$^3$ |
| 194 | D4052 | 737.5 | | -0.41 | |
| 312 | D4052 | 737.5 | | -0.41 | |
| 333 | ISO12185 | 737.7 | | -0.04 | |
| 334 | ISO12185 | 737.3 | | -0.79 | |
| 335 | ISO12185 | 737.6 | | -0.23 | |
| 337 | ISO12185 | 738.0 | | 0.52 | |
| 338 | ISO12185 | 737.7 | | -0.04 | |
| 340 | ISO12185 | 737.74 | | 0.04 | |
| 350 | ISO3675 | 738.5 | G(0.05) | 1.45 | |
| 381 | | ----- | | ----- | |
| 447 | D4052 | 737.5 | | -0.41 | |
| 496 | ISO12185 | 737.79 | | 0.13 | |
| 511 | | ----- | | ----- | |
| 631 | D4052 | 737.9 | | 0.33 | |
| 862 | D4052 | 737.57 | | -0.28 | |
| 1033 | IP365 | 738.1 | | 0.71 | |
| 1082 | ISO12185 | 737.7 | | -0.04 | |
| 1126 | ISO12185 | 738.35 | | 1.17 | |
| 1161 | ISO12185 | 737.5 | | -0.41 | |
| 1191 | ISO12185 | 737.5 | | -0.41 | |
| 1203 | ISO12185 | 737.66 | | -0.11 | |
| 1229 | ISO12185 | 737.7 | | -0.04 | |
| 1299 | D4052 | 737.8 | | 0.15 | |
| 1459 | ISO12185 | 737.65 | | -0.13 | |
| 1634 | ISO12185 | 737.8 | | 0.15 | |
| 1706 | ISO12185 | 737.9 | | 0.33 | |
| 1727 | D4052 | 737.69 | | -0.06 | |
| 1776 | ISO12185 | 737.6 | | -0.23 | |
| 1810 | | 737.8 | | 0.15 | |
| 1811 | ISO12185 | 737.5 | | -0.41 | |
| 2130 | D4052 | 737.6 | | -0.23 | |
| 2146 | ISO12185 | 737.97 | | 0.47 | |
| | | | | | |
| | normality | suspect | | | |
| | n | 37 | | | |
| | outliers | 1 | | | |
| | mean (n) | 737.721 | | | |
| | st.dev. (n) | 0.2131 | | | |
| | R(calc.) | 0.597 | | | |
| | R(ISO12185:96) | 1.500 | | | Compare R(D4052:11) = 2.322 |

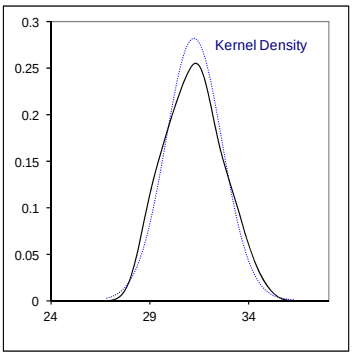


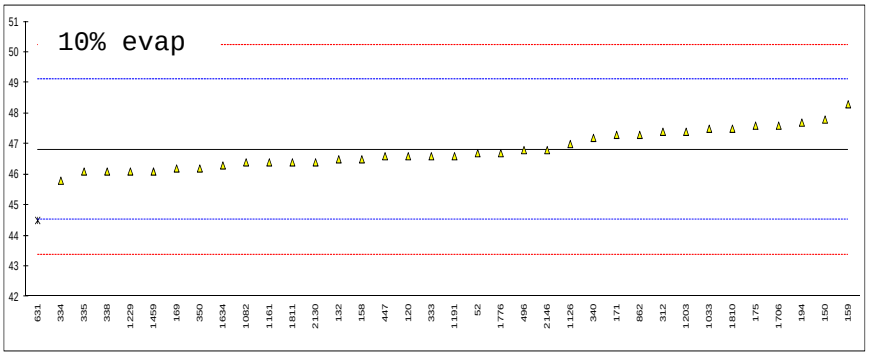



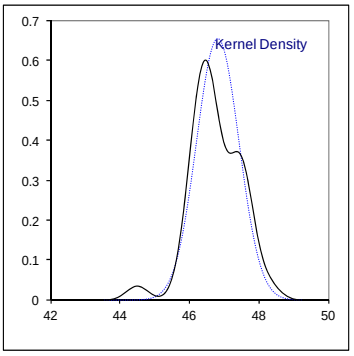
## Determination of Distillation on sample #15060; results in °C

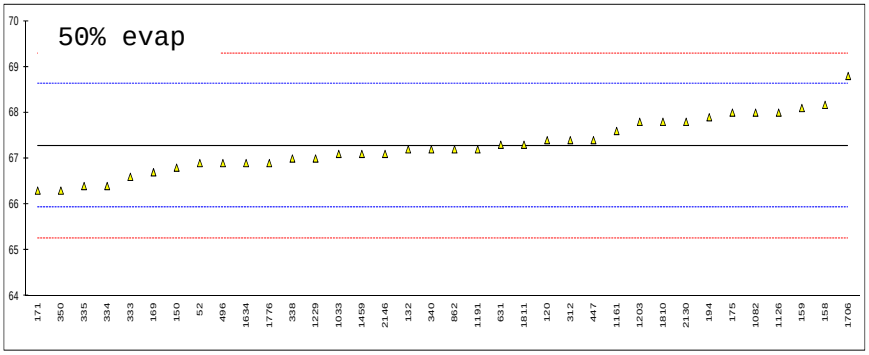
| lab | method | mode | IBP | mark | 10%eva | mark | 50%eva | mark | 90%eva | mark | FBP | mark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 | D86 | Automated | 30.6 | | 46.7 | | 66.9 | | 149.9 | | 186.1 | |
| 120 | D86 | Automated | 31.3 | | 46.6 | | 67.4 | | 150.4 | | 187.7 | |
| 132 | D86 | Automated | 30.2 | | 46.5 | | 67.2 | | 150.4 | | 188.7 | |
| 150 | D86 | Automated | 33.3 | | 47.8 | | 66.8 | | 149.4 | | 189.1 | |
| 158 | D86 | Automated | 32.11 | | 46.5 | | 68.17 | | 149.61 | | 189.5 | |
| 159 | D86 | Automated | 34.4 | | 48.3 | | 68.1 | | 151.6 | | 187.0 | |
| 169 | D86 | Automated | 29.3 | | 46.2 | | 66.7 | | 150.4 | | 187.2 | |
| 171 | D86 | Automated | 31.1 | | 47.3 | | 66.3 | | 153.7 | R(0.05) | 187.9 | |
| 175 | D86 | Automated | 31.2 | | 47.6 | | 68.0 | | 149.9 | | 187.9 | |
| 194 | D86 | Automated | 31.4 | | 47.7 | | 67.9 | | 149.0 | | 189.0 | |
| 312 | D86 | Automated | 29.2 | | 47.4 | | 67.4 | | 150.1 | | 186.2 | |
| 333 | D86 | Automated | 29.7 | | 46.6 | | 66.6 | | 149.5 | | 186.2 | |
| 334 | | Automated | ----- | | 45.8 | | 66.4 | | 147.7 | | 185.1 | |
| 335 | D86 | Automated | 30.5 | | 46.1 | | 66.4 | | 149.5 | | 185.5 | |
| 337 | | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 338 | ISO3405 | Automated | 30.3 | | 46.1 | | 67.0 | | 150.1 | | 188.8 | |
| 340 | D86 | Automated | 29.1 | | 47.2 | | 67.2 | | 150.2 | | 184.6 | |
| 350 | ISO3405 | Manual | 31.3 | | 46.2 | | 66.3 | | 147.4 | | 187.7 | |
| 381 | | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 447 | D86 | Automated | 29.9 | | 46.6 | | 67.4 | | 149 | | 187.9 | |
| 496 | D86 | Automated | 31.6 | | 46.8 | | 66.9 | | 149.5 | | 189.5 | |
| 511 | | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 631 | D86 | Manual | 33.1 | | 44.5 | R(0.05) | 67.3 | | 150.0 | | 189.0 | |
| 862 | D86 | Automated | 32.4 | | 47.3 | | 67.2 | | 150.0 | | 187.9 | |
| 1033 | IP123 | Automated | 31.3 | | 47.5 | | 67.1 | | 151.0 | | 187.4 | |
| 1082 | ISO3405 | Automated | 28.7 | | 46.4 | | 68.0 | | 150.2 | | 189.1 | |
| 1126 | D86 | Automated | 30.6 | | 47.0 | | 68.0 | | 154.1 | R(0.05) | 191.8 | |
| 1161 | ISO3405 | Automated | 32.4 | | 46.4 | | 67.6 | | 152.9 | R(0.05) | 187.8 | |
| 1191 | ISO3405 | Automated | 31.5 | | 46.6 | | 67.2 | | 150.2 | | 186.2 | |
| 1203 | ISO3405 | Automated | 33.7 | | 47.4 | | 67.8 | | 151.4 | | 192.4 | |
| 1229 | ISO3405 | Automated | 30.1 | | 46.1 | | 67.0 | | 149.7 | | 187.9 | |
| 1299 | D86 | Automated | 33.0 | | ----- | | ----- | | ----- | | 186.2 | |
| 1459 | ISO3405 | | 31.9 | | 46.1 | | 67.1 | | 149.9 | | 187.0 | |
| 1634 | D86 | Automated | 29.0 | | 46.3 | | 66.9 | | 150.2 | | 187.0 | |
| 1706 | D86 | Automated | 31.7 | | 47.6 | | 68.8 | | 149.9 | | 188.5 | |
| 1727 | | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1776 | ISO3405 | Automated | 32.2 | | 46.7 | | 66.9 | | 149.8 | | 191.2 | |
| 1810 | | Automated | 30.8 | | 47.5 | | 67.8 | | 150.0 | | 189.0 | |
| 1811 | D86 | Automated | 30.1 | | 46.4 | | 67.3 | | 149.9 | | 187.7 | |
| 2130 | D86 | Automated | 31.8 | | 46.4 | | 67.8 | | 148.3 | | 190.1 | |
| 2146 | ISO3405 | Automated | 33.1 | | 46.8 | | 67.1 | | 150.1 | | 190.4 | |
| | | | OK | | | | | | | | | |
| | | normality | | | OK | | OK | | not OK | | OK | |
| | | n | 36 | | 35 | | 36 | | 33 | | 37 | |
| | | outliers | 0 | | 1 | | 0 | | 3 | | 0 | |
| | | mean (n) | 31.22 | | 46.81 | | 67.28 | | 149.82 | | 188.06 | |
| | | st.dev. (n) | 1.416 | | 0.610 | | 0.586 | | 0.858 | | 1.768 | |
| | | R(calc.) | 3.96 | | 1.71 | | 1.64 | | 2.40 | | 4.95 | |
| | | R(D86:12auto) | 4.90 | | 3.20 | | 1.88 | | 3.98 | | 6.78 | |
| | Compare | R(D86:12manual) | 4.44 | | 2.94 | | 2.94 | | 3.70 | | 4.29 | |

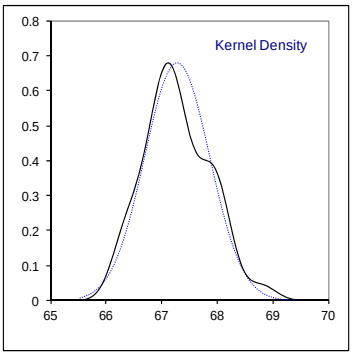

IBP

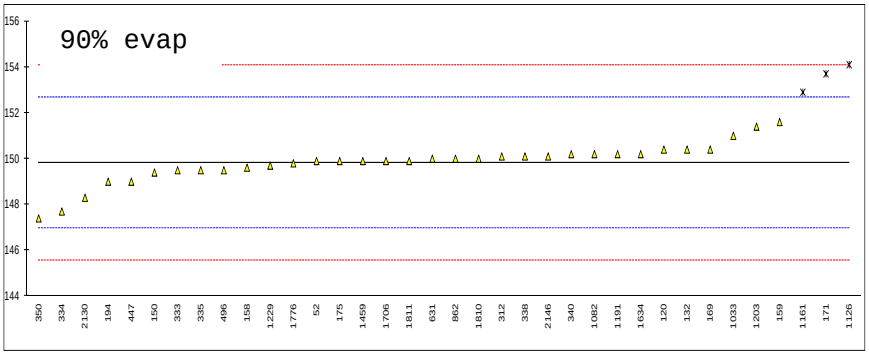

Kernel Density

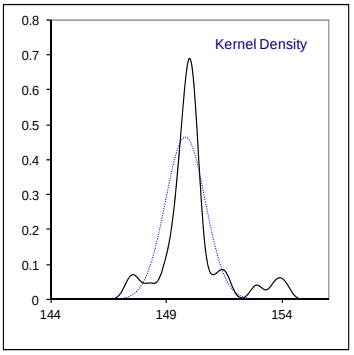

10% evap

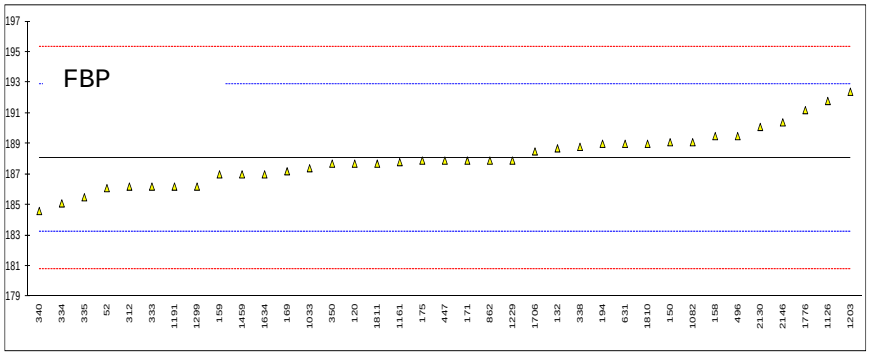

Kernel Density

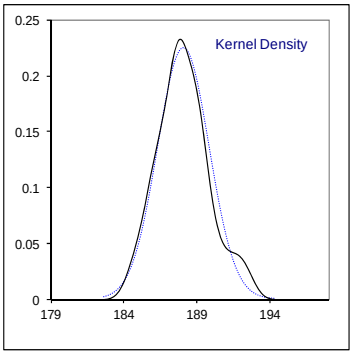

50% evap


Kernel Density


90% evap


Kernel Density

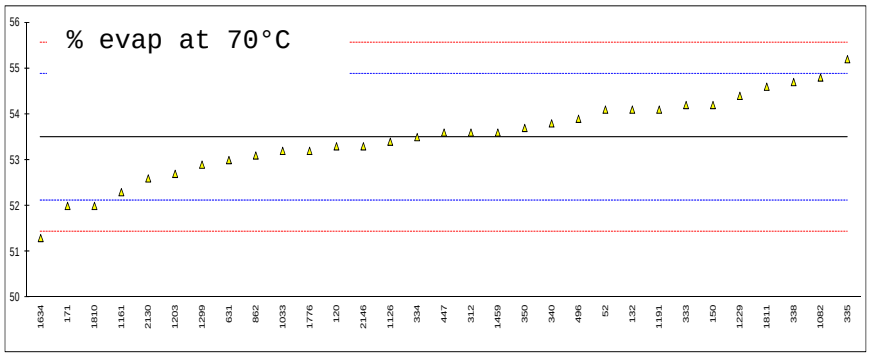

FBP

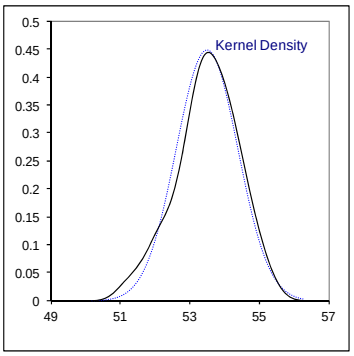

Kernel Density

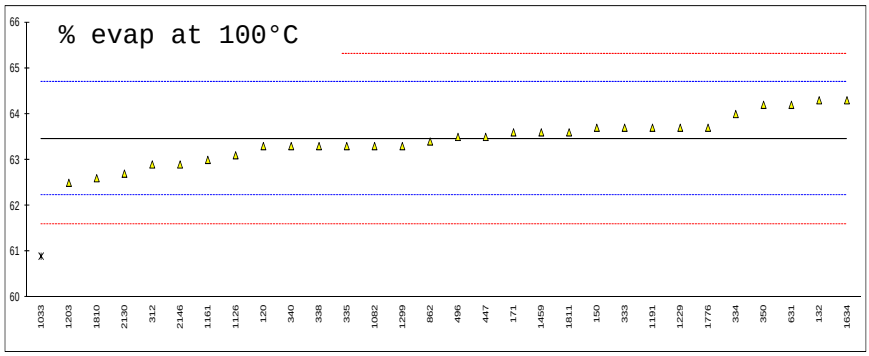
Determination of Distillation on sample #15060; results in %V/V

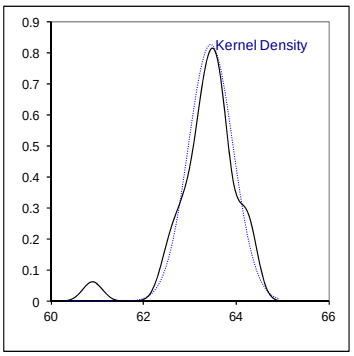
| lab | Method | %evap. at 70°C | mark | %evap. at 100°C | mark | %evap. at 150°C | mark | residue | mark |
|---|---|---|---|---|---|---|---|---|---|
| 52 | D86 | 54.1 | | ----- | | ----- | | 1.0 | |
| 120 | D86 | 53.3 | C | 63.3 | | 89.8 | | 1.0 | |
| 132 | D86 | 54.1 | | 64.3 | | 89.8 | | 1.0 | |
| 150 | D86 | 54.2 | | 63.7 | | 90.3 | | 0.8 | |
| 158 | | ----- | | ----- | | ----- | | 1.1 | |
| 159 | | ----- | | ----- | | ----- | | 1.0 | |
| 169 | | ----- | | ----- | | ----- | | 1.1 | |
| 171 | D86 | 52.0 | | 63.6 | C | 89.8 | C | 1.5 | |
| 175 | | ----- | | ----- | | ----- | | 1.0 | |
| 194 | | ----- | | ----- | | ----- | | 0.5 | |
| 312 | D86 | 53.6 | | 62.9 | | 90.0 | | 1.0 | |
| 333 | D86 | 54.2 | | 63.7 | | 90.2 | | 1.3 | |
| 334 | D86 | 53.5 | | 64.0 | | 90.7 | | 0.9 | |
| 335 | D86 | 55.2 | | 63.3 | | 90.1 | | 1.0 | |
| 337 | | ----- | | ----- | | ----- | | ----- | |
| 338 | ISO3405 | 54.7 | | 63.3 | | 90.0 | | 1.0 | |
| 340 | D86 | 53.8 | | 63.3 | | 89.9 | | 1.0 | |
| 350 | ISO3405 | 53.7 | | 64.2 | | 90.7 | | 0.8 | |
| 381 | | ----- | | ----- | | ----- | | ----- | |
| 447 | D86 | 53.6 | | 63.5 | | 90.9 | | 1.0 | |
| 496 | D86 | 53.9 | | 63.5 | | 90.2 | | 0.8 | |
| 511 | | ----- | | ----- | | ----- | | ----- | |
| 631 | D86 | 53.0 | | 64.2 | | 89.8 | | 1.1 | |
| 862 | D86 | 53.1 | | 63.4 | | 90.0 | | 1.0 | |
| 1033 | IP123 | 53.2 | | 60.9 | R(0.01) | ----- | | 1.2 | |
| 1082 | ISO3405 | 54.8 | | 63.3 | | 89.9 | | 0.9 | |
| 1126 | D86 | 53.4 | | 63.1 | | 90.0 | | 0.9 | |
| 1161 | ISO3405 | 52.3 | | 63.0 | | 89.0 | | 0.8 | |
| 1191 | ISO3405 | 54.1 | | 63.7 | | 89.9 | | 1.0 | |
| 1203 | ISO3405 | 52.7 | | 62.5 | | 89.5 | | 1.0 | |
| 1229 | ISO3405 | 54.4 | | 63.7 | | 90.1 | | 1.1 | |
| 1299 | D86 | 52.9 | | 63.3 | | 90.0 | | 1.0 | |
| 1459 | ISO3405 | 53.6 | | 63.6 | | 90.0 | | 1.0 | |
| 1634 | D86 | 51.3 | | 64.3 | | 89.3 | | 1.0 | |
| 1706 | | ----- | | ----- | | ----- | | 1.1 | |
| 1727 | | ----- | | ----- | | ----- | | ----- | |
| 1776 | ISO3405 | 53.2 | | 63.7 | | 90.1 | | 1.0 | |
| 1810 | | 52.0 | C | 62.6 | C | 89.4 | C | 1.0 | |
| 1811 | D86 | 54.6 | | 63.6 | | 90.1 | | 1 | |
| 2130 | D86 | 52.6 | | 62.7 | | 90.7 | | 1.0 | |
| 2146 | ISO3405 | 53.3 | | 62.9 | | 90.0 | | 1.1 | |
| | | | | | | | | 1.0 | |
| | normality | OK | | OK | | OK | | 1.0 | |
| | n | 31 | | 29 | | 29 | | | |
| | outliers | 0 | | 1 | | 0 | | | |
| | mean (n) | 53.50 | | 63.46 | | 90.01 | | | |
| | st.dev. (n) | 0.889 | | 0.482 | | 0.413 | | | |
| | R(calc.) | 2.49 | | 1.35 | | 1.16 | | | |
| | R(D86:12 auto) | 1.93 | | 1.73 | | 1.20 | | | |
| Compare | R(D86:12 man) | 4.63 | | unknown | | 4.44 | | | |

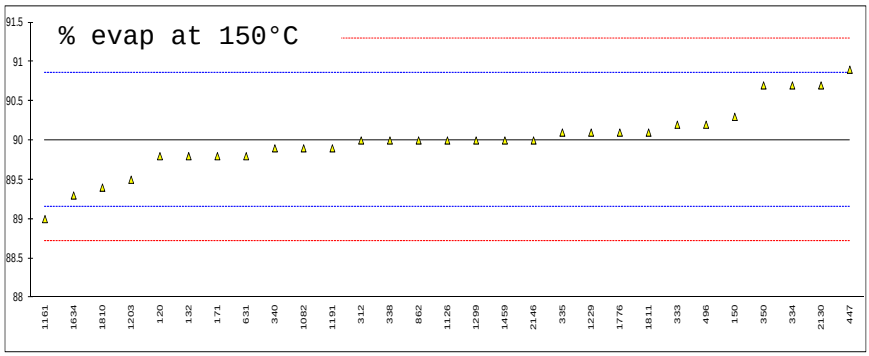
Lab 120 first reported: % evap at 70 °C: 29.6
Lab 171 first reported: % evap at 100 °C: 62.0; % evap at 150 °C: 88.5
Lab 1810 first reported: % evap at 70 °C: no result, % evap at 100 °C: 52.0 %,evap at 150 °C: 62.6

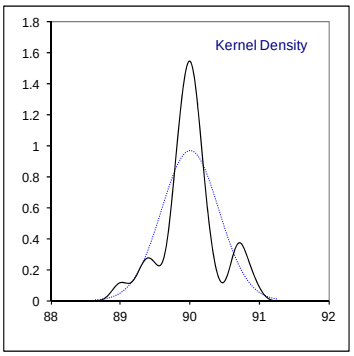

% evap at 70°C
56
55
54
53
52
51
50
1634 171 1610 1161 2130 1203 1299 631 862 1033 1776 120 2146 1126 334 447 312 1459 350 340 496 52 132 1191 333 150 1229 1811 338 1082 335


Kernel Density
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
49 51 53 55 57


% evap at 100°C
66
65
64
63
62
61
60
1033 1203 1810 2130 312 2146 1161 1126 120 340 338 335 1062 1299 862 496 447 171 1459 1811 150 333 1191 1229 1776 334 350 631 132 1634


Kernel Density
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
60 62 64 66


% evap at 150°C
91.5
91
90.5
90
89.5
89
88.5
88
1161 1634 1810 1203 120 132 171 631 340 1082 1191 312 338 862 1126 1299 1459 2146 335 1229 1776 1811 333 496 150 350 334 2130 447


Kernel Density
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
88 89 90 91 92

## Determination of Doctor test on sample #15060

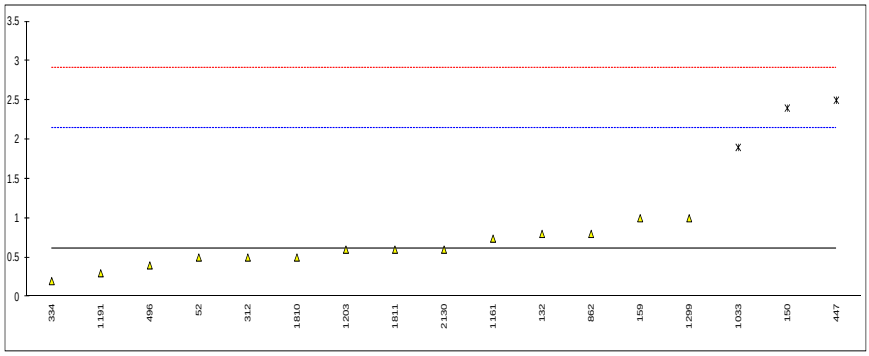
| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D4952 | Negative | | ----- | |
| 120 | D4952 | Negative | | ----- | |
| 132 | D4952 | Negative | | ----- | |
| 150 | D4952 | Negative | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | D4952 | Negative | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D4952 | Negative | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | D4952 | Negative | | ----- | |
| 312 | IP30 | Negative | | ----- | |
| 333 | D4952 | Negative | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D4952 | Negative | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | | ----- | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | D4952 | Negative | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | D4952 | Negative | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | D4952 | Negative | | ----- | |
| 2130 | D4952 | Negative | | ----- | |
| 2146 | | ----- | | ----- | |

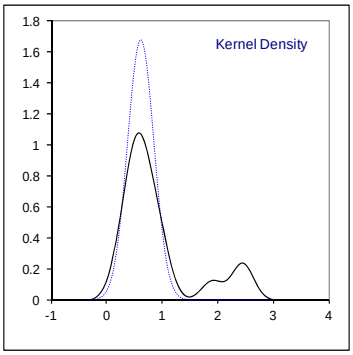
| | |
|---|---|
| normality | n.a |
| n | 14 |
| outliers | n.a |
| mean (n) | Negative |
| st.dev. (n) | n.a |
| R(calc.) | n.a |
| R() | n.a |

Determination of Existent Gum (solvent washed) on sample #15060; results in mg/100mL

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D381 | 0.5 | | -0.14 | |
| 120 | D381 | <0.5 | | ----- | |
| 132 | D381 | 0.8 | | 0.25 | |
| 150 | D381 | 2.4 | DG(0.01) | 2.33 | |
| 158 | | ----- | | ----- | |
| 159 | D381 | 1.0 | | 0.51 | |
| 169 | | ----- | | ----- | |
| 171 | D381 | <0.5 | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | D381 | 0.5 | | -0.14 | |
| 333 | | ----- | | ----- | |
| 334 | D381 | 0.2 | | -0.53 | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D381 | <1 | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D381 | 2.5 | DG(0.01) | 2.46 | |
| 496 | D381 | 0.4 | | -0.27 | |
| 511 | | ----- | | ----- | |
| 631 | D381 | <0.5 | | ----- | |
| 862 | D381 | 0.8 | | 0.25 | |
| 1033 | IP131 | 1.90 | G(0.01) | 1.68 | |
| 1082 | ISO6246 | <1 | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | ISO6246 | 0.74 | | 0.17 | |
| 1191 | ISO6246 | 0.3 | | -0.40 | |
| 1203 | D381 | 0.6 | | -0.01 | |
| 1229 | ISO6246 | <1 | | ----- | |
| 1299 | D381 | 1.0 | | 0.51 | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | 0.5 | | -0.14 | |
| 1811 | D381 | 0.6 | | -0.01 | |
| 2130 | D381 | 0.6 | | -0.01 | |
| 2146 | | ----- | | ----- | |

| | |
|---|---|
| normality | OK |
| n | 14 |
| outliers | 3 |
| mean (n) | 0.61 |
| st.dev. (n) | 0.238 |
| R(calc.) | 0.67 |
| R(D381:12) | 2.15 |

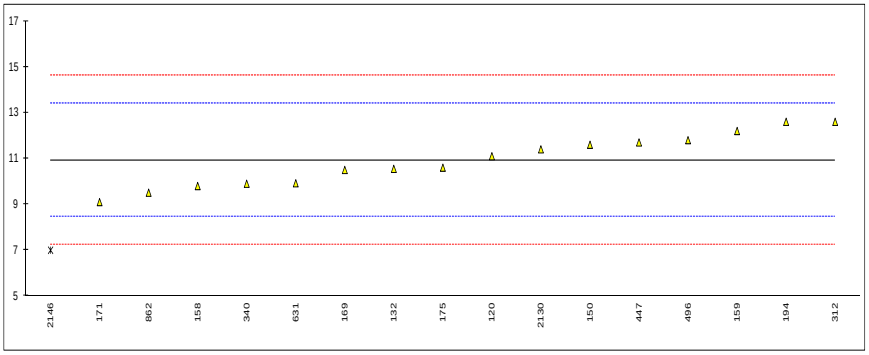


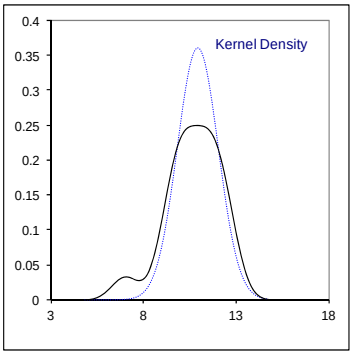



# Determination of FIA - Olefins on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D1319 | 11.1 | | 0.14 | |
| 132 | D1319 | 10.55 | | -0.31 | |
| 150 | D1319 | 11.6 | | 0.54 | |
| 158 | D1319 | 9.8 | | -0.92 | |
| 159 | D1319 | 12.2 | | 1.03 | |
| 169 | D1319 | 10.5 | C | -0.35 | first reported: 25.9 |
| 171 | D1319 | 9.1 | | -1.49 | |
| 175 | D1319 | 10.6 | | -0.27 | |
| 194 | D1319 | 12.6 | | 1.36 | |
| 312 | D1319 | 12.6 | | 1.36 | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D1319 | 9.9 | | -0.84 | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D1319 | 11.7 | | 0.63 | |
| 496 | D1319 | 11.8 | | 0.71 | |
| 511 | | ----- | | ----- | |
| 631 | D1319 | 9.92 | | -0.82 | |
| 862 | D1319 | 9.51 | | -1.15 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | | ----- | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | D1319 | 11.4 | | 0.38 | |
| 2146 | D1319 | 7.0 | G(0.05) | -3.20 | |

| | |
|---|---|
| normality | OK |
| n | 16 |
| outliers | 1 |
| mean (n) | 10.93 |
| st.dev. (n) | 1.108 |
| R(calc.) | 3.10 |
| R(D1319:14) | 3.44 |

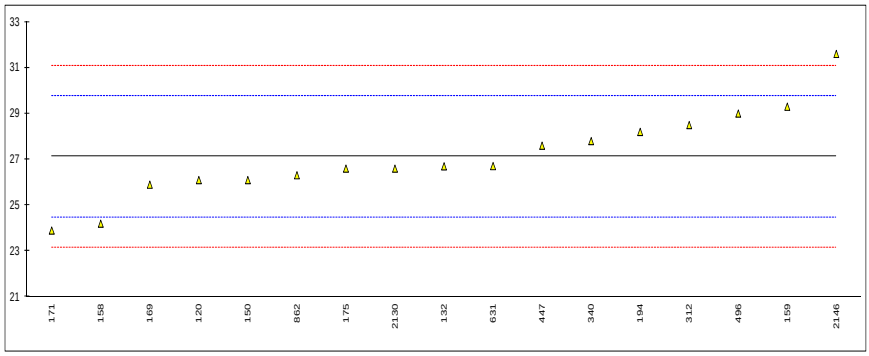


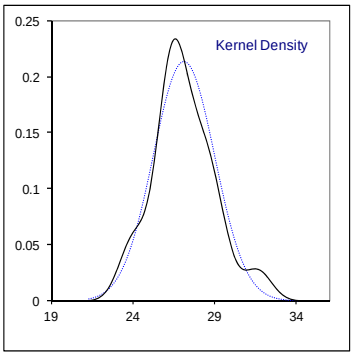



## Determination of FIA – Aromatics on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D1319 | 26.1 | | -0.78 | |
| 132 | D1319 | 26.70 | | -0.32 | |
| 150 | D1319 | 26.1 | | -0.78 | |
| 158 | D1319 | 24.2 | | -2.21 | |
| 159 | D1319 | 29.3 | | 1.65 | |
| 169 | D1319 | 25.9 | C | -0.93 | first reported:10.5 |
| 171 | D1319 | 23.9 | | -2.44 | |
| 175 | D1319 | 26.6 | | -0.40 | |
| 194 | D1319 | 28.2 | | 0.81 | |
| 312 | D1319 | 28.5 | | 1.04 | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D1319 | 27.8 | | 0.51 | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D1319 | 27.6 | | 0.36 | |
| 496 | D1319 | 29.0 | | 1.42 | |
| 511 | | ----- | | ----- | |
| 631 | D1319 | 26.71 | | -0.31 | |
| 862 | D1319 | 26.31 | | -0.62 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | | ----- | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | D1319 | 26.6 | | -0.40 | |
| 2146 | D1319 | 31.6 | | 3.39 | |

| | |
|---|---|
| normality | OK |
| n | 17 |
| outliers | 0 |
| mean (n) | 27.12 |
| st.dev. (n) | 1.873 |
| R(calc.) | 5.24 |
| R(D1319:14) | 3.70 |



## Determination of Lead as Pb on sample #15060; results in mg/L

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D3237 | <2.5 | | ----- | |
| 120 | | ----- | | ----- | |
| 132 | D3237 | <2.5 | | ----- | |
| 150 | D3237 | <2.5 | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | | ----- | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D3237 | <2.5 | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | D3237 | <2.5 | | ----- | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | D3237 | <0.1 | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | D3237 | <2.5 | | ----- | |
| 862 | D3237 | <1 | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | in house | 0.31 | | ----- | |
| 1203 | in house | <1 | | ----- | |
| 1229 | | 0 | | ----- | |
| 1299 | EN237 | <2.5 | | ----- | |
| 1459 | | <5 | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | IP352 | <2.5 | | ----- | |
| 2146 | in house | 0.4 | | ----- | |
| | | | | | |
| | normality | n.a | | | |
| | n | 14 | | | |
| | outliers | n.a | | | |
| | mean (n) | <2.5 | | | |
| | st.dev. (n) | n.a | | | |
| | R(calc.) | n.a | | | |
| | R(D3237:12) | n.a | | | Application range: 2.5 - 25 mg/L |

Determination of Manganese as Mn on sample #15060; results in mg/L

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D3831 | <0.25 | | ----- | |
| 120 | | ----- | | ----- | |
| 132 | D3831 | 0.9 | | ----- | false positive test result? |
| 150 | | ----- | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | | ----- | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D3831 | <0.25 | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | D3831 | <0.25 | | ----- | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | EN16136 | 0.13 | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | D3831 | <0.25 | | ----- | |
| 862 | D3831 | <0.25 | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | in house | 0.015 | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | EN16136 | 0.42 | | ----- | |
| 1203 | EN16136 | <0.5 | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | | ----- | | ----- | |
| 2146 | in house | 1.8 | | ----- | false positive test result? |
| | | | | | |
| | normality | n.a | | | |
| | n | 7 | | | |
| | outliers | n.a | | | |
| | mean (n) | <0.25 | | | |
| | st.dev. (n) | n.a | | | |
| | R(calc.) | n.a | | | |
| | R(D3831:12) | n.a | | | Application range: 0.25 – 40 mg/L |

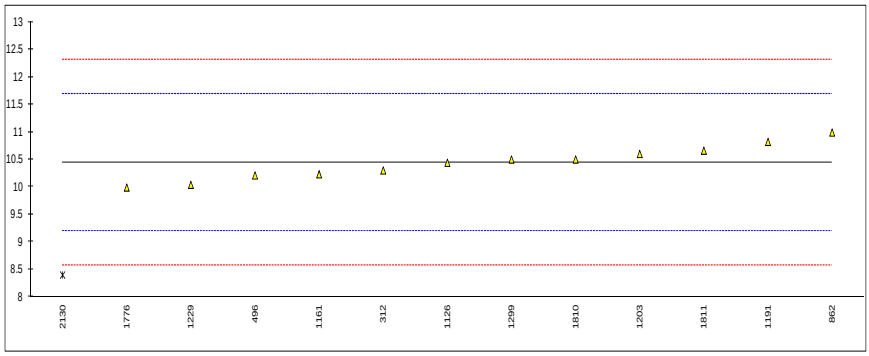
Determination of Mercaptans as S on sample #15060; results in %M/M

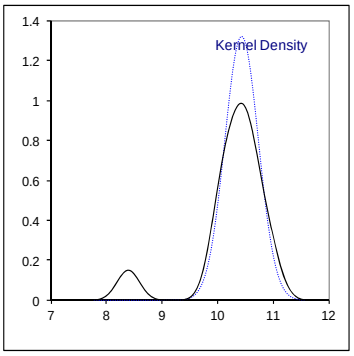
| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D3227 | <0.0003 | | ----- | |
| 120 | D3227 | <0.0003 | | ----- | |
| 132 | D3227 | <0.0003 | | ----- | |
| 150 | D3227 | <0.0003 | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | D3227 | <0.0001 | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D3227 | <0.0003 | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | D3227 | <0.0003 | | ----- | |
| 333 | | ----- | | ----- | |
| 334 | D3227 | 0.00005 | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | D3227 | 0.0003 | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | D3227 | 0.00005 | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | | ----- | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | UOP163 | 0.000060 | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | D3227 | 0.0001 | | ----- | |
| 2146 | | ----- | | ----- | |
| | normality | n.a | | | |
| | n | 11 | | | |
| | 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 GC on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | | ----- | | ----- | |
| 132 | | ----- | | ----- | |
| 150 | | ----- | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | | ----- | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | | ----- | | ----- | |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | ISO22854 | 10.3 | | -0.23 | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | ISO22854 | 10.21 | | -0.37 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | ISO22854 | 10.99 | | 0.89 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | in house | 10.44 | | 0.00 | |
| 1161 | ISO22854 | 10.23 | | -0.34 | |
| 1191 | ISO22854 | 10.82 | | 0.61 | |
| 1203 | ISO22854 | 10.60 | | 0.26 | |
| 1229 | ISO22854 | 10.04 | | -0.64 | |
| 1299 | ISO22854 | 10.5 | | 0.10 | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO22854 | 9.99 | | -0.72 | |
| 1810 | | 10.5 | | 0.10 | |
| 1811 | ISO22854 | 10.66 | | 0.35 | |
| 2130 | D6730 | 8.4 | C,G(0.01) | -3.28 | first reported:8.288 |
| 2146 | | ----- | | ----- | |

| | |
|---|---|
| normality | OK |
| n | 12 |
| outliers | 1 |
| mean (n) | 10.440 |
| st.dev. (n) | 0.3026 |
| R(calc.) | 0.847 |
| R(ISO22854:14) | 1.740 |



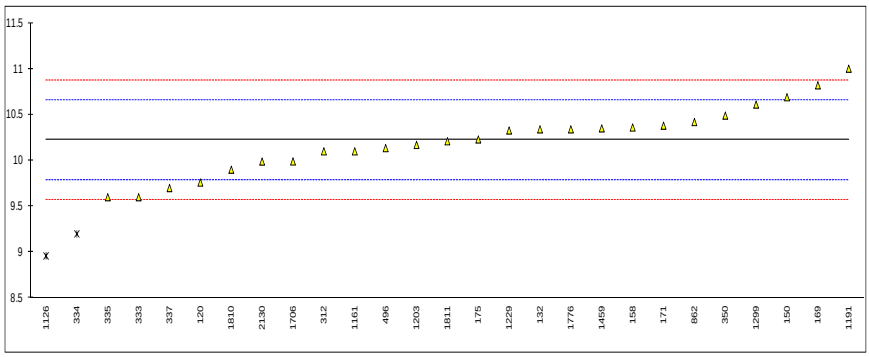
## Determination of Oxidation Stability on sample #15060; results in minutes

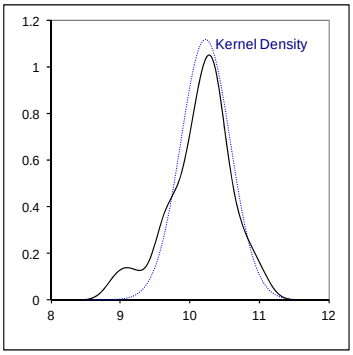
| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D525 | >900 | | ----- | |
| 120 | | ----- | | ----- | |
| 132 | D525 | >954 | | ----- | |
| 150 | D525 | >900 | | ----- | |
| 158 | | ----- | | ----- | |
| 159 | | ----- | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D525 | 241 | | ----- | False positive test result? |
| 175 | | ----- | | ----- | |
| 194 | | ----- | | ----- | |
| 312 | D525 | >900 | | ----- | |
| 333 | | ----- | | ----- | |
| 334 | | ----- | | ----- | |
| 335 | | ----- | | ----- | |
| 337 | | ----- | | ----- | |
| 338 | | ----- | | ----- | |
| 340 | ISO7536 | >900 | | ----- | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D525 | >900 | | ----- | |
| 496 | D525 | >900 | | ----- | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | D525 | >900 | | ----- | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | | ----- | | ----- | |
| 1161 | ISO7536 | >900 | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | ISO7536 | >900 | | ----- | |
| 1229 | | ----- | | ----- | |
| 1299 | D525 | >960 | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | | ----- | | ----- | |
| 1810 | | ----- | | ----- | |
| 1811 | | ----- | | ----- | |
| 2130 | D525 | >900 | | ----- | |
| 2146 | | ----- | | ----- | |

| | |
|---|---|
| normality | n.a |
| n | 12 |
| outliers | n.a |
| mean (n) | >360 |
| st.dev. (n) | n.a |
| R(calc.) | n.a |
| R(D525:12a) | n.a |

# Determination of Ethanol on sample #15060; results in %V/V

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D5599 | 9.76 | | -2.14 | |
| 132 | D5599 | 10.34 | | 0.53 | |
| 150 | D5599 | 10.69 | | 2.14 | |
| 158 | D5599 | 10.36 | | 0.62 | |
| 159 | | ----- | | ----- | |
| 169 | D4815 | 10.82 | | 2.74 | |
| 171 | D4815 | 10.38 | C | 0.72 | first reported: 11.21 |
| 175 | D5599 | 10.23 | | 0.03 | |
| 194 | | ----- | | ----- | |
| 312 | ISO22854 | 10.10 | | -0.57 | |
| 333 | EN13132 | 9.6 | | -2.88 | |
| 334 | EN1601 | 9.2 | G(0.05) | -4.72 | |
| 335 | EN1601 | 9.6 | | -2.88 | |
| 337 | EN13132 | 9.7 | | -2.41 | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | EN13132 | 10.49 | | 1.22 | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | ISO22854 | 10.135 | | -0.41 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | D4815 | 10.419 | | 0.90 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | in house | 8.96 | G(0.05) | -5.82 | |
| 1161 | EN22854 | 10.1 | | -0.57 | |
| 1191 | EN1601 | 11.001 | | 3.58 | |
| 1203 | ISO22854 | 10.17 | | -0.25 | |
| 1229 | EN1601 | 10.3275 | | 0.47 | |
| 1299 | ISO22854 | 10.61 | | 1.78 | |
| 1459 | | 10.35 | | 0.58 | |
| 1634 | | ----- | | ----- | |
| 1706 | EN13132 | 9.99 | | -1.08 | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO22854 | 10.34 | | 0.53 | |
| 1810 | | 9.9 | | -1.49 | |
| 1811 | EN22854 | 10.21 | | -0.07 | |
| 2130 | D6730 | 9.989 | | -1.08 | |
| 2146 | | ----- | | ----- | |
| | normality | OK | | | |
| | n | 25 | | | |
| | outliers | 2 | | | |
| | mean (n) | 10.22 | | | |
| | st.dev. (n) | 0.357 | | | |
| | R(calc.) | 1.00 | | | |
| | R(ISO22854:14) | 0.61 | | | Compare R(D5599:10) = 1.73, R(EN1601:14)=R(EN13132:00)=0.8 |



Determination of Ethers (C5, C5 or more C atoms and C6 and more) on sample #15060; results in %V/V

| lab | Method | C5 | mark | C5 or more | mark | C6 and more | mark |
|---|---|---|---|---|---|---|---|
| 52 | | ----- | | ----- | | ----- | |
| 120 | D5599 | <0.01 | | <0.01 | | <0.01 | |
| 132 | D5599 | <0.10 | | <0.10 | | <0.10 | |
| 150 | D5599 | <0.10 | | <0.10 | | <0.10 | |
| 158 | D5599 | <0.01 | | <0.01 | | <0.01 | |
| 159 | | ----- | | ----- | | ----- | |
| 169 | | ----- | | ----- | | ----- | |
| 171 | D5599 | <0.10 | | <0.10 | | <0.10 | |
| 175 | | ----- | | ----- | | ----- | |
| 194 | | ----- | | ----- | | ----- | |
| 312 | ISO22854 | 0.05 | | 0.1 | | <0.1 | |
| 333 | | ----- | | ----- | | ----- | |
| 334 | EN1601 | 0 | | 0 | | 0 | |
| 335 | | ----- | | ----- | | ----- | |
| 337 | EN13132 | <0.17 | | <0.17 | | <0.17 | |
| 338 | | ----- | | ----- | | ----- | |
| 340 | | ----- | | ----- | | ----- | |
| 350 | | ----- | | 0.09 | | ----- | |
| 381 | | ----- | | ----- | | ----- | |
| 447 | | ----- | | ----- | | ----- | |
| 496 | ISO22854 | 0.090 | | 0.140 | | 0.050 | |
| 511 | | ----- | | ----- | | ----- | |
| 631 | | ----- | | ----- | | ----- | |
| 862 | D4815 | <0.2 | | ----- | | ----- | |
| 1033 | | ----- | | ----- | | ----- | |
| 1082 | | ----- | | ----- | | ----- | |
| 1126 | | ----- | | ----- | | ----- | |
| 1161 | | ----- | | ----- | | ----- | |
| 1191 | | ----- | | ----- | | ----- | |
| 1203 | ISO22854 | 0.05 | | 0.09 | | 0.04 | |
| 1229 | | ----- | | ----- | | ----- | |
| 1299 | | ----- | | <0.8 | | ----- | |
| 1459 | | ----- | | ----- | | ----- | |
| 1634 | | ----- | | ----- | | ----- | |
| 1706 | | ----- | | ----- | | ----- | |
| 1727 | | ----- | | ----- | | ----- | |
| 1776 | ISO22854 | <0.20 | | <0.20 | | <0.20 | |
| 1810 | | ----- | | ----- | | ----- | |
| 1811 | | ----- | | ----- | | ----- | |
| 2130 | D6730 | <0.1 | | <0.1 | | <0.1 | |
| 2146 | | ----- | | ----- | | ----- | |
| | | | | | | | |
| | normality | n.a | | n.a | | n.a | |
| | n | 13 | | 13 | | 12 | |
| | 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(ISO22854:14) | n.a | | n.a | | n.a | |

Determination of Oxygenates on sample #15060; results in %V/V

| lab | Method | DIPE | mark | ETBE | mark | i-BuOH | mark | IPA | mark | MeOH | mark | MTBE | mark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 120 | D5599 | <0.01 | | <0.01 | | <0.01 | | <0.01 | | 0.053 | | <0.01 | |
| 132 | D5599 | <0.10 | | <0.10 | | <0.10 | | <0.10 | | <0.10 | | <0.10 | |
| 150 | D5599 | <0.10 | | <0.10 | | <0.10 | | <0.10 | | <0.10 | | <0.10 | |
| 158 | D5599 | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| 159 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 169 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 171 | D4815 | <0.20 | | <0.20 | | <0.10 | | <0.10 | | <0.10 | | <0.10 | |
| 175 | | ----- | | ----- | | ----- | | ----- | | ----- | | 0.22 | |
| 194 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 312 | ISO22854 | <0.01 | | 0.04 | | <0.01 | | <0.01 | | <0.01 | | 0.04 | |
| 333 | | ----- | | <0.17 | | <0.17 | | <0.17 | | <0.17 | | <0.17 | |
| 334 | EN1601 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 335 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 337 | EN13132 | <0.17 | | 0.05 | C | <0.17 | | <0.17 | | <0.17 | | <0.17 | |
| 338 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 340 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 350 | | ----- | | 0.04 | | ----- | | ----- | | ----- | | 0.05 | |
| 381 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 447 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 496 | ISO22854 | <0.010 | | 0.050 | | <0.10 | | <0.10 | | 0.065 | | 0.090 | |
| 511 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 631 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 862 | D4815 | <0.2 | | <0.2 | | <0.2 | | <0.2 | | <0.2 | | <0.2 | |
| 1033 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1082 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1126 | | ----- | | 0.04 | | ----- | | ----- | | ----- | | 0.05 | |
| 1161 | | ----- | | ----- | | ----- | | ----- | | ----- | | 0.1 | |
| 1191 | | ----- | | 0.035 | | ----- | | ----- | | 0.048 | | 0.044 | |
| 1203 | ISO22854 | <0.02 | | 0.04 | | <0.02 | | <0.02 | | <0.02 | | 0.05 | |
| 1229 | EN1601 | 0 | | 0.036 | | 0 | | 0 | | 0 | | 0.043 | |
| 1299 | | ----- | | <0.8 | | <0.8 | | <0.8 | | <0.8 | | <0.8 | |
| 1459 | | ----- | | 0.04 | | ----- | | ----- | | ----- | | ----- | |
| 1634 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1706 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1727 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| 1776 | ISO22854 | <0.20 | | 0.04 | | <0.20 | | <0.20 | | <0.20 | | 0.05 | |
| 1810 | | ----- | | ----- | | ----- | | ----- | | ----- | | 0.05 | |
| 1811 | | ----- | | 0.04 | | ----- | | ----- | | 0.0 | | 0.05 | |
| 2130 | D6730 | <0.1 | | <0.1 | | <0.1 | | <0.1 | | 0.089 | | <0.1 | |
| 2146 | | ----- | | ----- | | ----- | | ----- | | ----- | | ----- | |
| | normality | n.a | | n.a | | n.a | | n.a | | n.a | | n.a | |
| | n | 14 | | 20 | | 15 | | 15 | | 17 | | 21 | |
| | outliers | n.a | | n.a | | n.a | | n.a | | n.a | | n.a | |
| | mean (n) | <0.2 | | <0.2 | | <0.2 | | <0.2 | | <0.2 | | <0.2 | |
| | st.dev. (n) | n.a | | n.a | | n.a | | n.a | | n.a | | n.a | |
| | R(calc.) | n.a | | n.a | | n.a | | n.a | | n.a | | n.a | |
| | R(ISO22854:14) | n.a | | n.a | | n.a | | n.a | | n.a | | n.a | |

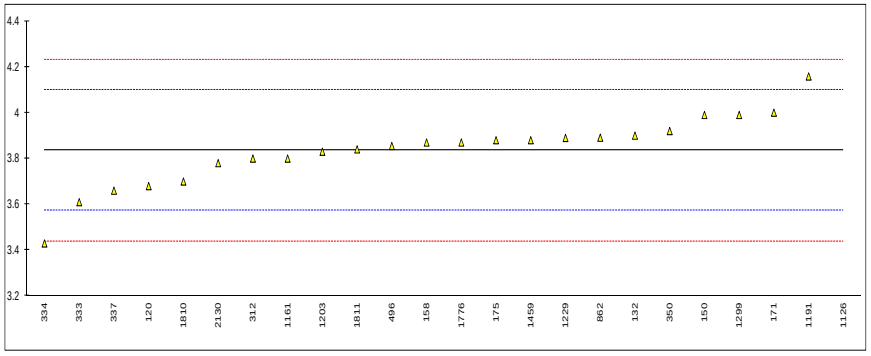
Lab 33 first reported ETBE: <0.17

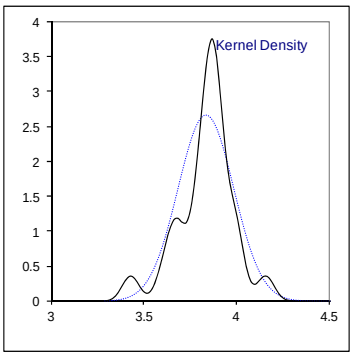
Determination of Oxygenates on sample #15060; results in %V/V

| lab | Method | TAME | mark | t-BuOH | mark | Other oxygenates | mark |
|---|---|---|---|---|---|---|---|
| 52 | | ----- | | ----- | | ----- | |
| 120 | D5599 | <0.01 | | <0.01 | | <0.01 | |
| 132 | D5599 | <0.10 | | <0.10 | | <0.10 | |
| 150 | D5599 | <0.10 | | <0.10 | | <0.10 | |
| 158 | D5599 | <0.01 | | <0.01 | | <0.01 | |
| 159 | | ----- | | ----- | | ----- | |
| 169 | | ----- | | ----- | | ----- | |
| 171 | D4815 | <0.10 | | <0.10 | | <0.10 | |
| 175 | | ----- | | ----- | | ----- | |
| 194 | | ----- | | ----- | | ----- | |
| 312 | ISO22854 | <0.01 | | <0.01 | | <0.1 | |
| 333 | | ----- | | <0.17 | | ----- | |
| 334 | EN1601 | 0 | | 0 | | 0 | |
| 335 | | ----- | | ----- | | ----- | |
| 337 | EN13132 | <0.17 | | <0.17 | | <0.17 | |
| 338 | | ----- | | ----- | | ----- | |
| 340 | | ----- | | ----- | | ----- | |
| 350 | | ----- | | ----- | | ----- | |
| 381 | | ----- | | ----- | | ----- | |
| 447 | | ----- | | ----- | | ----- | |
| 496 | ISO22854 | <0.010 | | <0.1 | | <0.10 | |
| 511 | | ----- | | ----- | | ----- | |
| 631 | | ----- | | ----- | | ----- | |
| 862 | D4815 | <0.2 | | <0.2 | | ----- | |
| 1033 | | ----- | | ----- | | ----- | |
| 1082 | | ----- | | ----- | | ----- | |
| 1126 | | ----- | | ----- | | ----- | |
| 1161 | | ----- | | ----- | | ----- | |
| 1191 | | <0.05 | | ----- | | ----- | |
| 1203 | ISO22854 | <0.02 | | <0.02 | | 0.03 | |
| 1229 | EN1601 | 0 | | 0 | | 0 | |
| 1299 | | ----- | | <0.8 | | <0.8 | |
| 1459 | | ----- | | ----- | | ----- | |
| 1634 | | ----- | | ----- | | ----- | |
| 1706 | | ----- | | ----- | | ----- | |
| 1727 | | ----- | | ----- | | ----- | |
| 1776 | ISO22854 | <0.20 | | <0.20 | | <0.20 | |
| 1810 | | ----- | | ----- | | ----- | |
| 1811 | | ----- | | ----- | | ----- | |
| 2130 | D6730 | <0.1 | | <0.1 | | <0.1 | |
| 2146 | | ----- | | ----- | | ----- | |
| | | | | | | | |
| | normality | n.a | | n.a | | n.a | |
| | n | 15 | | 15 | | 13 | |
| | 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(ISO22854:14) | n.a | | n.a | | n.a | |

# Determination of Oxygen content on sample #15060; results in %M/M

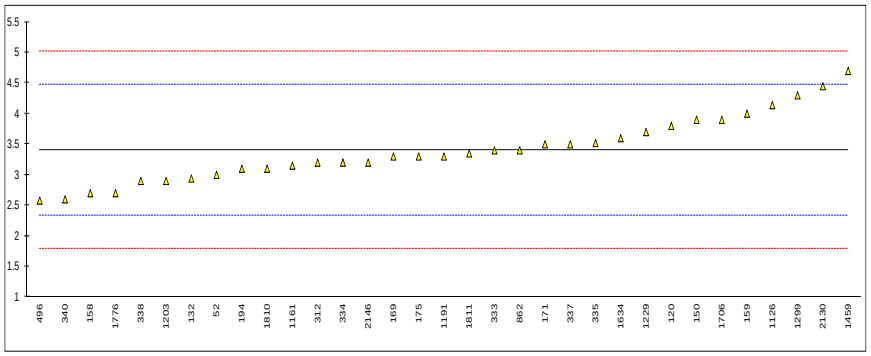
| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D5599 | 3.68 | | -1.18 | |
| 132 | D5599 | 3.9 | | 0.49 | |
| 150 | D5599 | 3.99 | | 1.17 | |
| 158 | D5599 | 3.87 | | 0.26 | |
| 159 | | ----- | | ----- | |
| 169 | | ----- | | ----- | |
| 171 | D5599 | 4.0 | | 1.24 | |
| 175 | D5599 | 3.88 | | 0.33 | |
| 194 | | ----- | | ----- | |
| 312 | ISO22854 | 3.80 | | -0.27 | |
| 333 | EN13132 | 3.61 | | -1.71 | |
| 334 | EN1601 | 3.43 | | -3.07 | |
| 335 | | ----- | | ----- | |
| 337 | EN13132 | 3.66 | | -1.33 | |
| 338 | | ----- | | ----- | |
| 340 | | ----- | | ----- | |
| 350 | EN13132 | 3.92 | | 0.64 | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | ISO22854 | 3.855 | | 0.15 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | D4815 | 3.891 | | 0.42 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | in house | 9.05 | R(0.01), E | 39.46 | calculation error was observed, iis calculated 3.37% |
| 1161 | ISO22854 | 3.8 | | -0.27 | |
| 1191 | EN1601 | 4.158 | | 2.44 | |
| 1203 | ISO22854 | 3.83 | | -0.04 | |
| 1229 | EN1601 | 3.89 | | 0.41 | |
| 1299 | ISO22854 | 3.99 | | 1.17 | |
| 1459 | | 3.88 | | 0.33 | |
| 1634 | | ----- | | ----- | |
| 1706 | | ----- | | ----- | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO22854 | 3.87 | | 0.26 | |
| 1810 | | 3.7 | | -1.03 | |
| 1811 | ISO22854 | 3.84 | | 0.03 | |
| 2130 | D6730 | 3.780 | | -0.42 | |
| 2146 | | ----- | | ----- | |
| | normality | suspect | | | |
| | n | 23 | | | |
| | outliers | 1. | | | |
| | mean (n) | 3.84 | | | |
| | st.dev. (n) | 0.150 | | | |
| | R(calc.) | 0.42 | | | |
| | R(EN228:13(k)) | 0.37 | | | Application range ISO22854:14 <3%M/M (or <3.7%M/M, see EN228 (f)) |

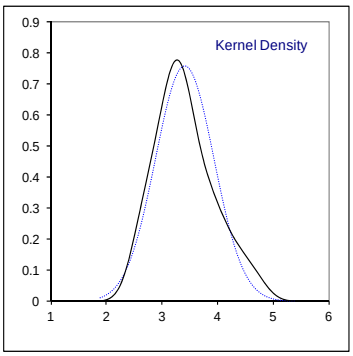


# Determination of Sulphur on sample #15060; results in mg/kg

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D5453 | 3.0 | | -0.75 | |
| 120 | D2622 | 3.8 | | 0.74 | |
| 132 | D2622 | 2.94 | | -0.87 | |
| 150 | D2622 | 3.9 | | 0.93 | |
| 158 | D5453 | 2.7 | | -1.31 | |
| 159 | D5453 | 4.0 | | 1.11 | |
| 169 | D5453 | 3.3 | | -0.19 | |
| 171 | D5453 | 3.5 | | 0.18 | |
| 175 | D5453 | 3.3 | | -0.19 | |
| 194 | D5453 | 3.1 | | -0.57 | |
| 312 | ISO20846 | 3.2 | | -0.38 | |
| 333 | ISO20846 | 3.4 | | -0.01 | |
| 334 | ISO20846 | 3.2 | | -0.38 | |
| 335 | ISO20846 | 3.52 | | 0.22 | |
| 337 | ISO20846 | 3.5 | | 0.18 | |
| 338 | ISO20846 | 2.9 | | -0.94 | |
| 340 | ISO20846 | 2.6 | | -1.50 | |
| 350 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | ISO20846 | 2.58 | | -1.54 | |
| 511 | | ----- | | ----- | |
| 631 | | ----- | | ----- | |
| 862 | D5453 | 3.4 | | -0.01 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1126 | IOS20846 | 4.14 | | 1.37 | |
| 1161 | ISO20846 | 3.15 | | -0.47 | |
| 1191 | ISO20846 | 3.3 | | -0.19 | |
| 1203 | ISO20846 | 2.9 | C | -0.94 | first reported:1.5 |
| 1229 | ISO20846 | 3.7 | | 0.55 | |
| 1299 | ISO20884 | 4.3 | | 1.67 | |
| 1459 | | 4.7 | | 2.42 | |
| 1634 | ISO20846 | 3.6 | | 0.37 | |
| 1706 | ISO20884 | 3.9 | | 0.93 | |
| 1727 | | ----- | | ----- | |
| 1776 | ISO20846 | 2.7 | | -1.31 | |
| 1810 | | 3.1 | | -0.57 | |
| 1811 | ISO20846 | 3.35 | | -0.10 | |
| 2130 | IP490 | 4.45 | | 1.95 | |
| 2146 | ISO20846 | 3.2 | | -0.38 | |
| | | | | | |
| | normality | OK | | | |
| | n | 33 | | | |
| | outliers | 0 | | | |
| | mean (n) | 3.40 | | | |
| | st.dev. (n) | 0.527 | | | |
| | R(calc.) | 1.48 | | | |
| | R(ISO20846:11) | 1.50 | | | |

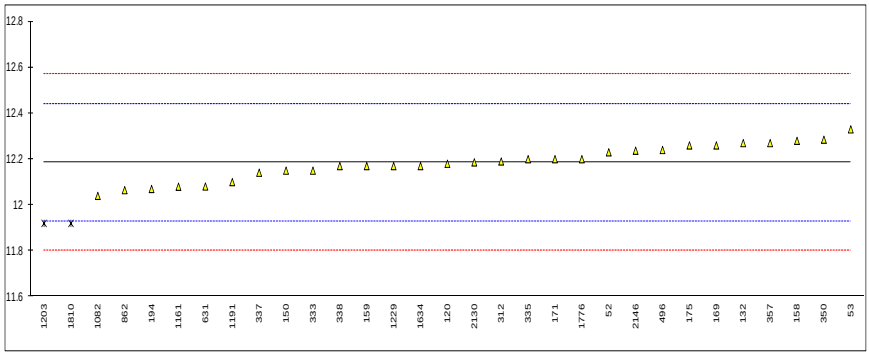


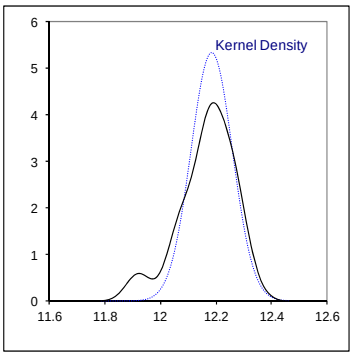



# Determination of Total Vapour Pressure on sample #15061; results in psi

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D5191 | 12.23 | | 0.35 | |
| 53 | D5191 | 12.33 | | 1.13 | |
| 120 | D5191 | 12.18 | | -0.04 | |
| 132 | D5191 | 12.27 | | 0.66 | |
| 150 | D5191 | 12.15 | | -0.28 | |
| 158 | D5191 | 12.28 | | 0.74 | |
| 159 | D5191 | 12.17 | | -0.12 | |
| 169 | D5191 | 12.26 | | 0.58 | |
| 171 | D5191 | 12.20 | | 0.11 | |
| 175 | D5191 | 12.26 | | 0.58 | |
| 194 | D5191 | 12.07 | | -0.90 | |
| 312 | D5191 | 12.19 | | 0.04 | |
| 333 | D5191 | 12.15 | | -0.28 | |
| 334 | | ----- | | ----- | |
| 335 | D5191 | 12.20 | | 0.11 | |
| 337 | D5191 | 12.141 | | -0.35 | |
| 338 | D5191 | 12.17 | | -0.12 | |
| 340 | | ----- | | ----- | |
| 350 | EN13016-1 | 12.285 | C | 0.78 | first reported: 11.458 |
| 357 | D5191 | 12.27 | | 0.66 | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | D5191 | 12.24 | | 0.43 | first reported: 11.661 |
| 631 | D5191 | 12.081 | C | -0.81 | |
| 862 | D5191 | 12.065 | | -0.94 | |
| 1033 | | ----- | | ----- | |
| 1082 | EN13016-1 | 12.04 | C | -1.13 | first reported: 80.9 kPa |
| 1161 | EN13016-1 | 12.08 | | -0.82 | |
| 1191 | EN13016-1 | 12.10 | | -0.67 | |
| 1203 | EN13016-1 | 11.92 | R(0.05) | -2.07 | |
| 1229 | EN13016-1 | 12.17 | | -0.12 | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | EN13016-1 | 12.17 | | -0.12 | |
| 1776 | EN13016-1 | 12.2 | | 0.11 | |
| 1810 | D5191 | 11.92 | R(0.05) | -2.07 | |
| 2130 | D5191 | 12.186 | | 0.01 | |
| 2146 | EN13016-1 | 12.237 | | 0.40 | |

| | |
|---|---|
| normality | OK |
| n | 29 |
| outliers | 2 |
| mean (n) | 12.185 |
| st.dev. (n) | 0.0749 |
| R(calc.) | 0.210 |
| R(D5191:13) | 0.359 |

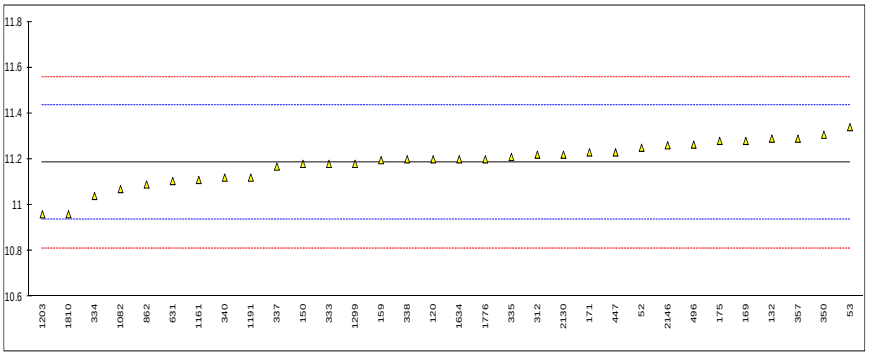


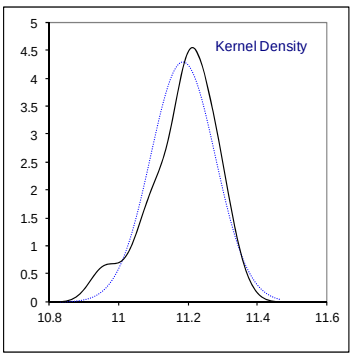



Determination of DVPE (ASTM D5191 calculation) on sample #15061; results in psi

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D5191 | 11.25 | | 0.51 | |
| 53 | D5191 | 11.34 | | 1.24 | |
| 120 | D5191 | 11.20 | | 0.11 | |
| 132 | D5191 | 11.29 | | 0.84 | |
| 150 | D5191 | 11.18 | | -0.05 | |
| 158 | | ----- | | ----- | |
| 159 | D5191 | 11.196 | | 0.08 | |
| 169 | D5191 | 11.28 | | 0.76 | |
| 171 | D5191 | 11.23 | | 0.35 | |
| 175 | D5191 | 11.28 | | 0.76 | |
| 194 | | ----- | | ----- | |
| 312 | D5191 | 11.22 | | 0.27 | |
| 333 | D5191 | 11.18 | | -0.05 | |
| 334 | D5191 | 11.04 | | -1.17 | |
| 335 | D5191 | 11.21 | | 0.19 | |
| 337 | D5191 | 11.168 | | -0.14 | |
| 338 | D5191 | 11.20 | | 0.11 | |
| 340 | EN13016-1 | 11.12 | | -0.53 | |
| 350 | EN13016-1 | 11.307 | C | 0.97 | first reported: 10.509 |
| 357 | D5191 | 11.29 | | 0.84 | |
| 381 | | ----- | | ----- | |
| 447 | D5191 | 11.23 | | 0.35 | |
| 496 | D5191 | 11.264 | | 0.63 | |
| 631 | D5191 | 11.105 | C | -0.65 | first reported: 10.705 |
| 862 | D5191 | 11.090 | | -0.77 | |
| 1033 | | ----- | | ----- | |
| 1082 | EN13016-1 | 11.07 | | -0.93 | |
| 1161 | EN13016-1 | 11.11 | | -0.61 | |
| 1191 | EN13016-1 | 11.12 | | -0.53 | |
| 1203 | | 10.96 | | -1.81 | |
| 1229 | | ----- | | ----- | |
| 1299 | D5191 | 11.18 | | -0.05 | |
| 1459 | | ----- | | ----- | |
| 1634 | EN13016-1 | 11.20 | | 0.11 | |
| 1776 | EN13016-1 | 11.2 | | 0.11 | |
| 1810 | | 10.96 | | -1.81 | |
| 2130 | D5191 | 11.22 | | 0.27 | |
| 2146 | EN13016-1 | 11.261 | | 0.60 | |

| | |
|---|---|
| normality | OK |
| n | 32 |
| outliers | 0 |
| mean (n) | 11.186 |
| st.dev. (n) | 0.0931 |
| R(calc.) | 0.261 |
| R(D5191:13) | 0.349 |

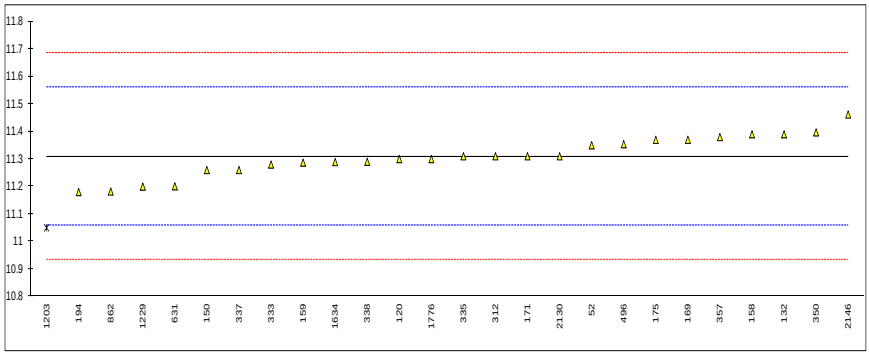


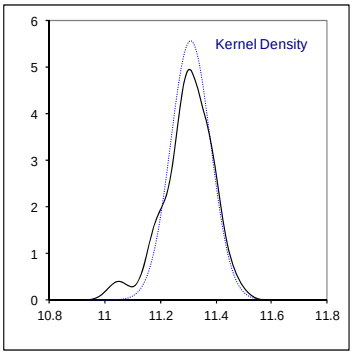



# Determination of DVPE (EPA calculation) on sample #15061; results in psi

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D5191 | 11.35 | | 0.33 | |
| 53 | | ----- | | ----- | |
| 120 | D5191 | 11.30 | | -0.07 | |
| 132 | D5191 | 11.39 | | 0.65 | |
| 150 | D5191 | 11.26 | | -0.39 | |
| 158 | D5191 | 11.39 | | 0.65 | |
| 159 | D5191 | 11.287 | | -0.18 | |
| 169 | D5191 | 11.37 | | 0.49 | |
| 171 | D5191 | 11.31 | | 0.01 | |
| 175 | D5191 | 11.37 | | 0.49 | |
| 194 | D5191 | 11.18 | | -1.03 | |
| 312 | D5191 | 11.31 | | 0.01 | |
| 333 | D5191 | 11.28 | | -0.23 | |
| 334 | | ----- | | ----- | |
| 335 | D5191 | 11.31 | | 0.01 | |
| 337 | D5191 | 11.260 | | -0.39 | |
| 338 | D5191 | 11.29 | | -0.15 | |
| 340 | | ----- | | ----- | |
| 350 | EN13016-1 | 11.397 | C | 0.70 | first reported: 10.607 |
| 357 | D5191 | 11.38 | | 0.57 | |
| 381 | | ----- | | ----- | |
| 447 | | ----- | | ----- | |
| 496 | D5191 | 11.354 | | 0.36 | |
| 631 | D5191 | 11.201 | C | -0.87 | first reported: 10.801 |
| 862 | D5191 | 11.182 | | -1.02 | |
| 1033 | | ----- | | ----- | |
| 1082 | | ----- | | ----- | |
| 1161 | | ----- | | ----- | |
| 1191 | | ----- | | ----- | |
| 1203 | | 11.05 | G(0.05) | -2.07 | |
| 1229 | EN13016-1 | 11.20 | | -0.87 | |
| 1299 | | ----- | | ----- | |
| 1459 | | ----- | | ----- | |
| 1634 | EN13016-1 | 11.289 | | -0.16 | |
| 1776 | EN13016-1 | 11.3 | | -0.07 | |
| 1810 | | ----- | | ----- | |
| 2130 | D5191 | 11.31 | | 0.01 | |
| 2146 | EN13016-1 | 11.462 | | 1.22 | |

| | |
|---|---|
| normality | OK |
| n | 25 |
| outliers | 1 |
| mean (n) | 11.309 |
| st.dev. (n) | 0.0718 |
| R(calc.) | 0.201 |
| R(D5191:13) | 0.350 |

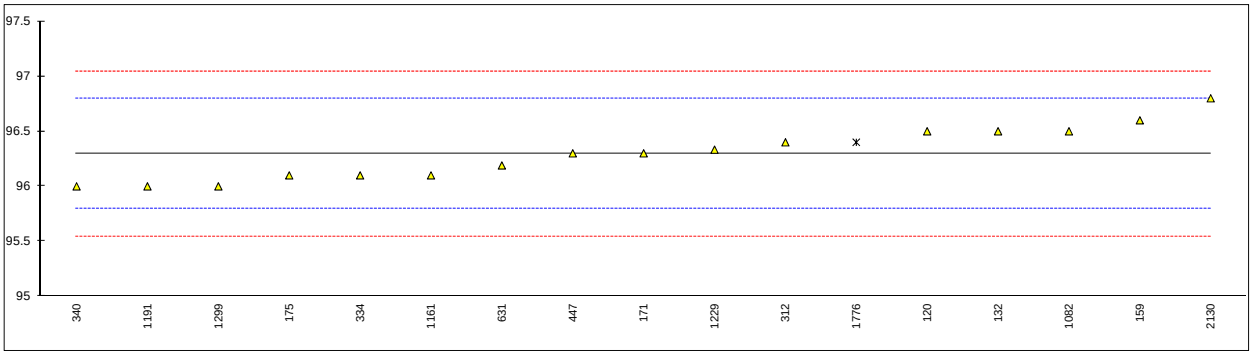


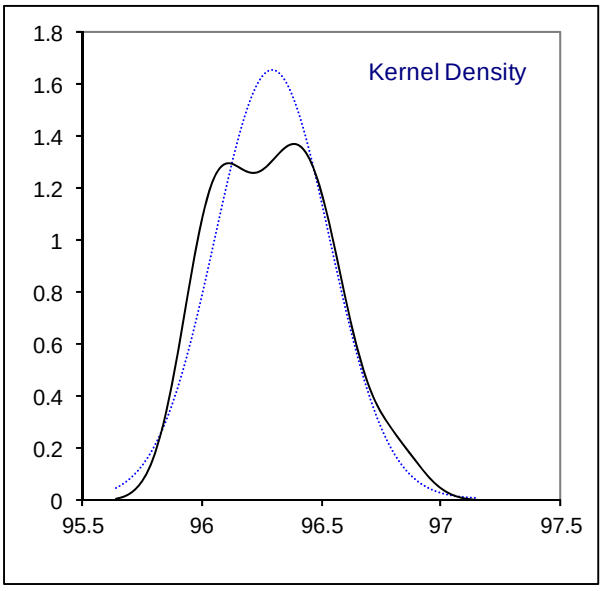



# Determination of RON on sample #15062

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | | ----- | | ----- | |
| 120 | D2699 | 96.5 | | 0.82 | |
| 132 | D2699 | 96.5 | | 0.82 | |
| 159 | D2699 | 96.6 | | 1.22 | |
| 171 | D2699 | 96.3 | | 0.02 | |
| 175 | D2699 | 96.1 | | -0.78 | |
| 312 | D2699 | 96.4 | | 0.42 | |
| 334 | D2699 | 96.1 | | -0.78 | |
| 340 | D2699 | 96.0 | | -1.18 | |
| 381 | | ----- | | ----- | |
| 447 | D2699 | 96.3 | | 0.02 | |
| 631 | D2699 | 96.19 | | -0.42 | |
| 1082 | ISO5164 | 96.5 | | 0.82 | |
| 1161 | ISO5164 | 96.1 | | -0.78 | |
| 1191 | ISO5164 | 96.0 | | -1.18 | |
| 1229 | ISO5164 | 96.333 | | 0.15 | |
| 1299 | D2699 | 96.0 | | -1.18 | |
| 1776 | ISO5164 | 96.4 | ex | 0.42 | did not subtract the correction of 0.2 for calculation of the final result |
| 2130 | D2699 | 96.8 | | 2.02 | |

| | | | Only D2699 data | Only ISO5164 data |
|---|---|---|---|---|
| | normality | OK | OK | not OK |
| | n | 16 | 12 | 4 |
| | outliers | 0 + 1 excl. | 0 | 1 |
| | mean (n) | 96.30 | 96.32 | 96.23 |
| | st.dev. (n) | 0.241 | 0.252 | 0.226 |
| | R(calc.) | 0.68 | 0.71 | 0.63 |
| | R(D2699:13b) | 0.70 | 0.70 | 0.70 |

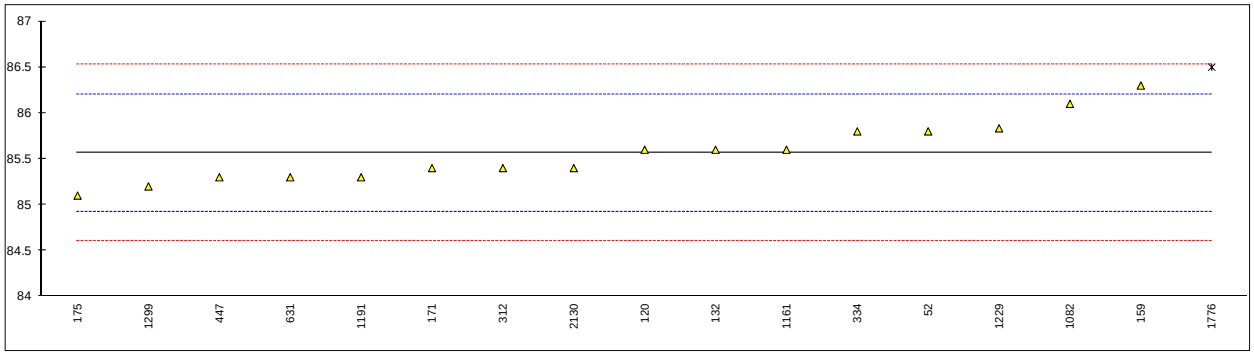


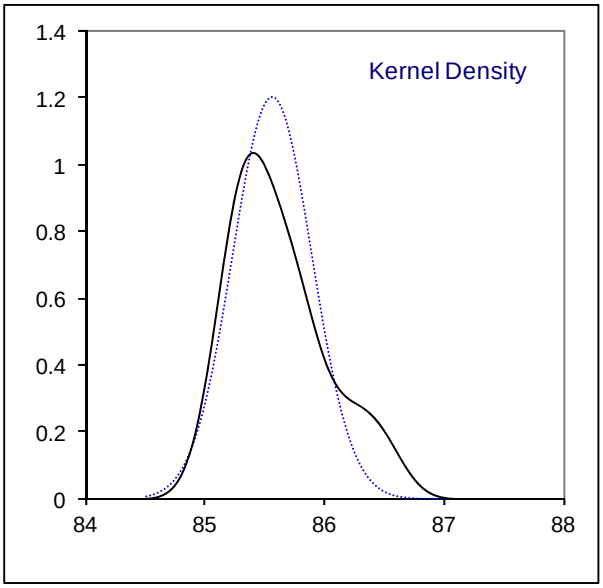



# Determination of MON on sample #15062

| lab | method | value | mark | z(targ) | remarks |
|---|---|---|---|---|---|
| 52 | D2700 | 85.8 | | 0.73 | |
| 120 | D2700 | 85.6 | | 0.11 | |
| 132 | D2700 | 85.6 | | 0.11 | |
| 159 | D2700 | 86.3 | | 2.29 | |
| 171 | D2700 | 85.4 | | -0.51 | |
| 175 | D2700 | 85.1 | | -1.45 | |
| 312 | D2700 | 85.4 | | -0.51 | |
| 334 | D2700 | 85.8 | | 0.73 | |
| 340 | | ----- | | ----- | |
| 381 | | ----- | | ----- | |
| 447 | D2700 | 85.3 | | -0.82 | |
| 631 | D2700 | 85.30 | | -0.82 | |
| 1082 | ISO5163 | 86.1 | | 1.67 | |
| 1161 | ISO5163 | 85.6 | | 0.11 | |
| 1191 | ISO5163 | 85.3 | | -0.82 | |
| 1229 | ISO5163 | 85.833 | | 0.84 | |
| 1299 | D2700 | 85.2 | | -1.13 | |
| 1776 | ISO5163 | 86.5 | ex | 2.91 | did not subtract the correction of 0.2 for calculation of the final result |
| 2130 | D2700 | 85.4 | | -0.51 | |

| | | | Only D2700 data | Only ISO5163 data |
|---|---|---|---|---|
| | normality | OK | not OK | not OK |
| | n | 16 | 12 | 4 |
| | outliers | 0 + 1 excl. | 0 | 1 |
| | mean (n) | 85.56 | 85.52 | 85.71 |
| | st.dev. (n) | 0.332 | 0.330 | 0.340 |
| | R(calc.) | 0.93 | 0.92 | 0.95 |
| | R(D2700:14) | 0.90 | 0.90 | 0.90 |



## APPENDIX 2:

### Z-scores of Distillation

| lab | IBP | 10%eva | 50%eva | 90%eva | FBP | %volat70°C | %volat100°C | %volat150°C |
|---|---|---|---|---|---|---|---|---|
| 52 | -0.35 | -0.10 | -0.56 | 0.05 | -0.81 | 0.88 | ----- | ----- |
| 120 | 0.05 | -0.19 | 0.18 | 0.40 | -0.15 | -0.29 | -0.25 | -0.48 |
| 132 | -0.58 | -0.27 | -0.11 | 0.40 | 0.26 | 0.88 | 1.37 | -0.48 |
| 150 | 1.19 | 0.86 | -0.71 | -0.30 | 0.43 | 1.02 | 0.40 | 0.68 |
| 158 | 0.51 | -0.27 | 1.33 | -0.15 | 0.59 | ----- | ----- | ----- |
| 159 | 1.82 | 1.30 | 1.23 | 1.25 | -0.44 | ----- | ----- | ----- |
| 169 | -1.10 | -0.54 | -0.86 | 0.40 | -0.35 | ----- | ----- | ----- |
| 171 | -0.07 | 0.43 | -1.46 | 2.72 | -0.07 | -2.17 | 0.23 | -0.48 |
| 175 | -0.01 | 0.69 | 1.08 | 0.05 | -0.07 | ----- | ----- | ----- |
| 194 | 0.10 | 0.78 | 0.93 | -0.58 | 0.39 | ----- | ----- | ----- |
| 312 | -1.15 | 0.51 | 0.18 | 0.19 | -0.77 | 0.15 | -0.90 | -0.02 |
| 333 | -0.87 | -0.19 | -1.01 | -0.23 | -0.77 | 1.02 | 0.40 | 0.45 |
| 334 | ----- | -0.89 | -1.31 | -1.49 | -1.22 | 0.00 | 0.88 | 1.62 |
| 335 | -0.41 | -0.62 | -1.31 | -0.23 | -1.06 | 2.47 | -0.25 | 0.22 |
| 337 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 338 | -0.53 | -0.62 | -0.41 | 0.19 | 0.31 | 1.75 | -0.25 | -0.02 |
| 340 | -1.21 | 0.34 | -0.11 | 0.26 | -1.43 | 0.44 | -0.25 | -0.25 |
| 350 | 0.05 | -0.54 | -1.46 | -1.70 | -0.15 | 0.29 | 1.20 | 1.62 |
| 381 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 447 | -0.75 | -0.19 | 0.18 | -0.58 | -0.07 | 0.15 | 0.07 | 2.08 |
| 496 | 0.22 | -0.01 | -0.56 | -0.23 | 0.59 | 0.58 | 0.07 | 0.45 |
| 511 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 631 | 1.07 | -2.02 | 0.03 | 0.12 | 0.39 | -0.72 | 1.20 | -0.48 |
| 862 | 0.67 | 0.43 | -0.11 | 0.12 | -0.07 | -0.58 | -0.09 | -0.02 |
| 1033 | 0.05 | 0.60 | -0.26 | 0.83 | -0.27 | -0.43 | -4.13 | ----- |
| 1082 | -1.44 | -0.36 | 1.08 | 0.26 | 0.43 | 1.89 | -0.25 | -0.25 |
| 1126 | -0.35 | 0.16 | 1.08 | 3.01 | 1.54 | -0.14 | -0.57 | -0.02 |
| 1161 | 0.67 | -0.36 | 0.48 | 2.16 | -0.11 | -1.74 | -0.74 | -2.35 |
| 1191 | 0.16 | -0.19 | -0.11 | 0.26 | -0.77 | 0.88 | 0.40 | -0.25 |
| 1203 | 1.42 | 0.51 | 0.78 | 1.11 | 1.79 | -1.16 | -1.55 | -1.18 |
| 1229 | -0.64 | -0.62 | -0.41 | -0.09 | -0.07 | 1.31 | 0.40 | 0.22 |
| 1299 | 1.02 | ----- | ----- | ----- | -0.77 | -0.87 | -0.25 | -0.02 |
| 1459 | 0.39 | -0.62 | -0.26 | 0.05 | -0.44 | 0.15 | 0.23 | -0.02 |
| 1634 | -1.27 | -0.45 | -0.56 | 0.26 | -0.44 | -3.19 | 1.37 | -1.65 |
| 1706 | 0.27 | 0.69 | 2.27 | 0.05 | 0.18 | ----- | ----- | ----- |
| 1727 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 1776 | 0.56 | -0.10 | -0.56 | -0.02 | 1.30 | -0.43 | 0.40 | 0.22 |
| 1810 | -0.24 | 0.60 | 0.78 | 0.12 | 0.39 | -2.17 | -1.38 | -1.42 |
| 1811 | -0.64 | -0.36 | 0.03 | 0.05 | -0.15 | 1.60 | 0.23 | 0.22 |
| 2130 | 0.33 | -0.36 | 0.78 | -1.07 | 0.84 | -1.30 | -1.22 | 1.62 |
| 2146 | 1.07 | -0.01 | -0.26 | 0.19 | 0.97 | -0.29 | -0.90 | -0.02 |

## APPENDIX 3

### Number of participants per country

| | |
|---|---|
| 1 lab in | AUSTRIA |
| 2 labs in | CANADA |
| 1 lab in | CHINA, People's Republic |
| 2 labs in | CZECH REPUBLIC |
| 5 labs in | FINLAND |
| 7 labs in | FRANCE |
| 1 lab in | GERMANY |
| 1 lab in | HUNGARY |
| 2 labs in | NETHERLANDS |
| 1 lab in | PERU |
| 1 lab in | PHILIPPINES |
| 1 lab in | PORTUGAL |
| 1 lab in | SERBIA |
| 3 labs in | SPAIN |
| 1 lab in | SWEDEN |
| 1 lab in | TURKEY |
| 3 labs in | UNITED KINGDOM |
| 9 labs in | UNITED STATES OF AMERICA |

**APPENDIX 4**

**Abbreviations**:

| | |
|---|---|
| C | = final result after checking of first reported suspect 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 |
| ex | = excluded from calculations |
| E | = error in calculations |
| n.a. | = not applicable |
| n.e. | = not evaluated |
| W | = withdrawn |
| fr. | = first reported |
| U | = reported in different unit |
| SDS | = Safety Data Sheet |

**Literature**:


1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014

2 ASTM E178-02

3 ASTM E1301-03

4 ISO 5725-86

5 ISO 5725, parts 1-6, 1994

6 ISO13528-05

7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)

8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)

9 IP 367/84

10 DIN 38402 T41/42

11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)

12 J.N. Miller, Analyst, 118, 455, (1993)

13 Analytical Methods Committee Technical Brief, No4 January 2001

14 The Royal Society of Chemistry 2002, Analyst 2002, 127 page1359-1364, P.J. Lowthian and M. Thompson. (see http://www.rsc.org/suppdata/an/b2/b205600n/)

15 H. Verplaetse and M. Lacourt, Accred Qual Assur (2006) 11:521-522

16 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), pp. 165-172, (1983)