Results of Proficiency Test
Biodiesel 100% FAME (B100)
October 2017

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. A. Lewinska
Correctors: dr. R.G. Visser, ing. C.M. Nijssen-Wester & ing R.J. Starink
Report no.: iis17G06EN

December 2017

--- Empty page --

CONTENTS

Appendices:

1 INTRODUCTION

Since 2001, the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for Fatty Acid Methyl Esters (FAME) every year. During the annual proficiency testing program of 2017/2018, it was decided to continue the October proficiency test on Biodiesel B100 in accordance with the latest applicable version of the specification EN14214:12+A1:14 and additional specifications (e.g. ASTM D6751).
In this interlaboratory study 72 laboratories from 31 different countries did register for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2017 October Biodiesel B100 proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

In this proficiency test on Biodiesel B100, a sample of esterified fat from offal (distilled) was used. Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. In this proficiency test, the participants received, depending on the registration, from one up to four different samples of Biodiesel B100, see table below.

Samples	Amount	Purpose	Spiked
#17180	1.5 L	For regular analysis	-
#17181	2 L	Cetane Number and DCN	-
#17182	0.1 L	Analysis of metals	Phosphorus and Calcium
#17183	0.85 L	Total Contamination	Dust (fine)

Table 1: four different Biodiesel B100 samples used in iis17G06EN

Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of March 2017 (iis-protocol, version 3.4). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

2.4 SAMPLES

The necessary bulk material of approx. 400L of Biodiesel B100 (an esterified fat from offal (distilled)) was obtained from an European producer.

Biodiesel B100 #17180 - regular sample

After fit-for-use testing and homogenisation, 104 amber glass bottles of 1L and 104 amber glass bottles of 0.5L were filled and both labelled #17180. The homogeneity of the subsamples #17180 was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples:

	Density at 15°C in kg/m^3
sample #17180-1	874.63
sample #17180-2	874.63
sample #17180-3	874.64
sample #17180-4	874.64
sample #17180-5	874.63
sample #17180-6	874.64
sample #17180-7	874.64
sample #17180-8	874.63

Table 2: homogeneity test results of subsamples #17180

	Density at 15ºC in kg/m^3
r (observed)	0.02
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.15

Table 3: evaluation of the repeatability of subsamples #17180

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the target method. Therefore, the homogeneity of the subsamples was assumed.

Biodiesel B100 #17181 – Cetane Number and Derived Cetane Number

After fit-for-use testing and homogenisation, 68 amber glass bottles of 1L were filled and labelled #17181.The homogeneity of the subsamples #17181 was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples:

	Density at 15°C in kg/m^3
sample #17181-1	874.59
sample #17181-2	874.59
sample #17181-3	874.58
sample #17181-4	874.59
sample #17181-5	874.58
sample #17181-6	874.59
sample #17181-7	874.59
sample #17181-8	874.58

Table 4: homogeneity test results of subsamples #17181

	Density at 15ºC in kg/m^3
r (observed)	0.01
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.15

Table 5: evaluation of the repeatability of subsamples #17181

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, the homogeneity of the subsamples was assumed.

Biodiesel B100 #17182 - Metals

For metals in Biodiesel B100, subsample #17182, a batch of approx. 6.3 kg was separated from the large batch and was spiked with Phosphorus (approx. 7 mg/kg) and with Calcium (approx. 5 mg/kg).

After homogenisation, out of the batch 68 HDPE bottles of 0.1L were filled and labelled #17182. The homogeneity of the subsamples #17182 was checked by determination of Phosphorus and Sodium on 8 stratified randomly selected samples:

	Phosphorus in mg/kg
sample #17182-1	6.9
sample #17182-2	7.0
sample #17182-3	7.1
sample #17182-4	7.0
sample #17182-5	6.9
sample #17182-6	6.9
sample #17182-7	7.0
sample #17182-8	6.9

Table 6: homogeneity test results of subsamples #17182

	Phosphorus in mg/kg
r (observed)	0.2
reference test method	EN14107:03
0.3 * R test method	0.4

Table 7: evaluation of repeatability of subsamples #17182

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, the homogeneity of the subsamples was assumed.

Biodiesel B100 #17183 – Total Contamination

Into 82 amber glass bottles 1 ml of a freshly prepared and ultrasonically homogenized 15 g/kg Arizona Dust (fine) in oil suspension was pipetted. The addition was checked by weighing each bottle before and after the addition of the oil suspension. Subsequently, each bottle with inner and outer caps was filled with one litre Biodiesel B100. The bottles were labelled #17183.

2.5 STABILITY OF THE SAMPLES

The stability of the Biodiesel B100, packed in the brown glass bottles and PE bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The tests methods to be used by the participating laboratories should be in accordance with the requirements of EN14214:12+A1:14 and/or ASTM D6751:15ce1.

Parameter	EN14214:12	Parameter	ASTM D6751:15ce1
Acid Value	EN14104	Acid Number	ASTM D664
Calorific Value	DIN51900		
		Carbon Residue on 100% FAME	ASTM D4530
CFPP	EN116		
Cloud Point	EN23015	Cloud Point	ASTM D2500
Copper Strip Corrosion	ISO2160	Copper Strip Corrosion	ASTM D130
Density at 15°C	ISO12185		
		Distillation	ASTM D1160
Flash Point (Recc)	ISO3679		
Flash Point (PMcc)	ISO2719	Flash Point	ASTM D93
Iodine Value	EN14111		
Kin. Visc. At 40°C	ISO3104	Kin. Visc. at 40°C	ASTM D445
Oxidation Stability	EN14112	Oxidation Stability	EN15751
Sulphated Ash	ISO3987	Sulphated Ash	ASTM D874
Sulphur	ISO20846	Sulphur	ASTM D5453
Water	ISO12937	Water and Sediment	ASTM D2709
Cetane Number	EN 5165	Cetane Number	ASTM D613
		Derived Cetane Number	ASTM D7668
Calcium + Magnesium	EN14538	Calcium + Magnesium	EN14538

Table 8a: requirements and test methods acc. to specifications EN14214:12+A1:14 and ASTM D6751:15ce1

Parameter	EN14214:12	Parameter	ASTM D6751:15ce1
Phosphorus	EN14107	Phosphorus	ASTM D4951
Potassium + Sodium	EN14108/14109	Potassium + Sodium	EN14538
Polyunsaturated esters	EN15779		
Methanol	EN14110	Methanol	EN14110
mono-, di-, tri-Glycerides	EN14105	Monoglyceride content	ASTM D6584
Free + Total Glycerol	EN14105	Free + Total Glycerol	ASTM D6584
Total ester content	EN14103		
Linolenic Acid	EN14103		
Total Contamination	EN12662		

Table 8b: requirements and test methods acc. to specifications EN14214:12+A1:14 and/or ASTM D6751:15ce1 (cont.)

It was explicitly requested to treat the samples as if they were routine samples and to report the test results using the indicated units on the report form and not to round the test results, but report as much significant figures as possible. It was also requested not to report ‘less than’ test results, which are above the detection limit, because such test results cannot be used for meaningful statistical calculations.

To get comparable test results, a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

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

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

3.1 STATISTICS

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, March 2017 version 3.4).

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

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

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

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other targets values were used. In some cases, a reproducibility based on former iis proficiency tests could be used.

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

The z-scores were calculated in accordance with:

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

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

Absolute values for z<2 are very common and absolute values for z>3 are very rare. Therefore, the usual interpretation of z-scores maybe 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 some problems were encountered during the execution.
For the regular Biodiesel PT: four participants reported test results after the final reporting date and four other participants did not report any test results at all.
For the Cetane Number in Biodiesel PT: three participants reported test results after the final reporting date and three other participants that did not report any test results at all.
For the Metals in Biodiesel PT: three participants reported the test results after the final reporting date and six other participants did not report any test results at all.
For the Total Contamination PT: two participants reported the test results after the final reporting date and six other participants did not report any test results at all.

Finally, in total 70 participants reported in total 1054 numerical results. Observed were 24 outlying results, which is 2.3%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section, the results are discussed per sample and per test. The specified test methods and requirements acc. to EN14214:12+A1:14 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.

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 Biodiesel B100 sample #16190 – main sample

Acid Value: (EN) 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 EN14214:12+A1:14 and EN14104:03.

Acid Number: (ASTM) This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D664:11ae1 (method B).

Cloud Point: 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 EN14214:12+A1:14 and EN23015:94.

CFPP: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14214:12+A1:14, but not in agreement with the requirements of EN116:97 and EN116:15.

Carbon Residue: (on 100%) The consensus value was near or below the application limit of ISO10370 (<0.1%M/M). Therefore, no significant conclusions were drawn.

Copper Corrosion: No problems have been observed. All participants agreed on a result of 1.

Density at 15°C: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of EN14214:12+A1:14 and ISO12185:96.

Flash Point PMcc: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of EN14214:12+A1:14, but is in agreement with requirements of ISO2719C:16.

Flash Point recc: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14214:12+A1:14 and ISO3679:15.

Iodine Number: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN14111:03 and EN16300:12.

Kin.Visco. at 40°C: The determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of EN14214:12+A1:14 and ISO3104:94.

Oxidation Stability: This determination was very problematic as the test results appear to be bimodally divided. Therefore, the test results from EN14112 and from EN15751 were evaluated separately. It was surprisingly to see that the two data sets differ significantly for this level (11.8 vs 14.7 hours). No statistical outliers were observed. Both calculated reproducibilities are not at all in agreement with the respective requirements of EN14112:03 and EN15751:14.

Pour Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ISO3016:94.

Sulphated Ash: All reported test results were near or below the application limit of EN14214:12+A1:14 (0.005% M/M). Therefore, no significant conclusions were drawn.

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

Water: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14214:12+A1:14.

Calorific Value: Only three participants submitted a result for Gross Calorific Value at constant volume and only one participants for Net Calorific Value at constant volume. No participants reported a test result for Net Calorific Value at constant pressure.

The determination on Gross Calorific Value was not problematic. The calculated reproducibility is in agreement with the requirements of DIN51900-1:00.

Methanol: All reported test results were near or below the application limit of EN14110:03 (<0.01% M/M). Therefore, no significant conclusions were drawn.

mono-Glycerides All, except three reported test results were near or below the application limit of EN14105:11 (<0.1% M/M). Therefore, no significant conclusions were drawn.

di-Glycerides All reported test results were near or below the application limit of EN14105:11 (<0.1% M/M). Therefore, no significant conclusions were drawn.

tri-Glycerides All reported test results were near or below the application limit of EN14105:11 (<0.1% M/M). Therefore, no significant conclusions were drawn.

Free Glycerol This determination was problematic for a number of laboratories. Two statistical outliers were observed and one result was excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of EN14105:11.

Total Glycerol This determination was very problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of EN14105:11.

Total Ester content This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN14103:11.

Linolenic Acid Methyl Ester: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14103:11.

Polyunsaturated Methyl Esters This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN15779:09+A1:13.

For Biodiesel B100 sample #17181 – Cetane Number

Cetane Number: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the

statistical outlier is in agreement with the requirements of EN14214:12+A1:14 and ISO5165:98.

DCN (D7668): This determination was problematic. No statistical outliers were observed. All three calculated reproducibilities (Derived Cetane Number, Ignition Delay and Combustion Delay) are not in agreement with the requirements of ASTM D7668:14a.

For Biodiesel B100 sample #17183 - Total Contamination

There has been some discussion about using method EN12662 version 2014 for total contamination in biodiesel (neat FAME or B100). The CEN/TC 19 working group published a letter in September 2015 (see lit. 16) about this issue. In short, for FAME blends (B100) either EN12662:1998 or EN12662:2008 should be used and not EN12662:14. Surprisingly, still nine of the forty-four reporting laboratories used the 2014 version. Therefore, the test results of these laboratories were excluded in the statistical evaluation.

Total Contamination: This determination was problematic. One statistical outlier was observed and nine test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of EN14214:12+A1:14 and EN12662:08. When the reported test results of the different method versions (1998,2008 and 2014) are evaluated separately, none of the calculated reproducibilities is in agreement with the requirements of the respective test method.

For Biodiesel B100 sample #17182 – Metals

Sum Ca + Mg This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of EN141538:06. The samples were spiked with Calcium. The average recovery of Calcium (theoretical increment of 5 mg/kg) may be good: “less than 122%”. The actual blank concentration for Calcium and Magnesium is unknown.

Phosphorus: This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of EN14107:03. The samples were spiked with Phosphorus. The average recovery of Phosphorus (theoretical increment of 7 mg/kg) may be good: “less than 93%”. The actual blank concentration for Phosphorus is unknown.

Potassium: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14109:03 (or EN14214:12+A1:14).

Sodium: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14214:12+A1:14 and EN14108:03.

Sum K + Na This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN14214:12+A1:14. (or EN14538:06).

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 laboratories that participated. The reproducibilities derived from literature standards (in casu the ASTM, EN, ISO and IP standards) and the calculated reproducibilities of the samples (see appendix 1) are compared in the next table.

Parameter	unit	n	average	R (Calc.)	R (lit)
Acid Value (EN spec.)	mg KOH/g	38	0.32	0.06	0.06
Acid Number (ASTM spec.)	mg KOH/g	26	0.31	0.09	0.11
Cloud Point	°C	50	13.9	2.3	4
Cold Filter Plugging Point	°C	54	11.0	2.8	4.5
Carbon Residue on 100% FAME	%M/M	31	<0.1	n.a.	n.a.
Copper Strip Corrosion		50	1	n.a.	n.a.
Density at 15°C	kg/m^3	62	874.6	0.3	0.5
Flash Point - PMcc (ISO2719)	°C	44	173.2	13.8	11.4
Flash Point- recc (ISO3679)	°C	20	173.9	10.4	15
Iodine Value	g I_2/100g	41	54.3	6.4	5
Kinematic Viscosity at 40°C	mm^2/s	56	4.548	0.048	0.046
Oxidation Stability (EN14112)	hours	36	11.8	7.5	3.3
Oxidation Stability (EN15751)	hours	12	14.7	8.0	3.2
Pour Point	°C	36	13.5	4.6	6
Sulphated Ash	%M/M	39	<0.005	n.a.	n.a.
Sulphur (EN spec.)	mg/kg	51	9.5	2.2	2.2
Water	mg/kg	62	74	45	59
Calorific Value, Gross	kJ/kg	3	39911	272	400
Methanol	%M/M	38	<0.01	n.a.	n.a.
mono-Glycerides	%M/M	35	<0.1	n.a.	n.a.
di-Glycerides	%M/M	38	<0.1	n.a.	n.a.
tri-Glycerides	%M/M	38	<0.1	n.a.	n.a.
Free Glycerol	%M/M	24	0.006	0.006	0.007
Total Glycerol	%M/M	27	0.014	0.031	0.014
Total Ester Content	%M/M	45	97.8	5.0	4.2
Linolenic Acid Methyl Ester	%M/M	38	0.93	0.35	0.41
Polyunsat. Methyl Esters	%M/M	15	0.23	0.27	0.27

Table 9: comparison of the observed and target reproducibilities of Biodiesel B100 sample #17180

Parameter	unit	n	average	R (Calc.)	R (lit)
Cetane No.(ISO5165)		10	62.5	3.7	5.0
Derived Cetane No. (D7688)		11	64.1	2.7	2.0
Ignition Delay		8	2.8	0.6	0.1
Combustion Delay		6	3.8	0.1	0.1

Table 10: comparison of the observed and target reproducibilities of Biodiesel B100 sample #17181

Parameter	unit	n	average	R (Calc.)	R (lit)
Total Contamination	mg/kg	34	17.2	10.5	6.9

Table 11: comparison of the observed and target reproducibility of Biodiesel B100 sample #17183

Parameter	unit	n	average	R (Calc.)	R (lit)
Calcium & Magnesium	mg/kg	25	5.6	4.1	2.0
Phosphorus	mg/kg	27	6.5	2.7	1.3
Potassium	mg/kg	22	3.2	1.9	3.0
Sodium	mg/kg	23	3.7	2.3	3.1
Sum Potassium & Sodium	mg/kg	20	6.5	3.4	2.1

Table 12 comparison of the observed and target reproducibilities of Biodiesel B100 sample #17182

Without further statistical calculations it can be concluded that for many tests there is a good compliance of the group of participating laboratories with the relevant standards.

The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2017 WITH PREVIOUS PTS

	October 2017	October 2016	May 2016	October 2015	April 2015
Type of FAME	Offal-ME	RME	RME	RME	RME
Number of reporting labs	70	79	54	54	60
Number of results reported	1054	1369	596	788	965
Number of statistical outliers	24	41	25	19	23
Percentage statistical outliers	2.3%	3.0%	4.2%	2.4%	2.4%

Table 13: 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	October 2017	October 2016	May 2016	October 2015	April 2015
Acid Value (EN spec.)	+/-	+	n.e	+	+
Acid Number (ASTM spec.)	+	+	+	+	++
Cloud Point	++	+/-	+/-	+	+
Cold Filter Plugging Point	-	+/-	+	++	+/-
Carbon Residue on 100%FAME	n.e.	n.e.	n.e	(-)	n.e.
Density at15°C	++	++	++	++	+/-
Flash Point PMcc	-	+	+/-	-	+
Flash Point (ISO3679)	++	+/-	n.e	++	+
Iodine Value	-	+/-	+/-	+	+/-
Kinematic Viscosity at 40°C	-	+	++	+/-	-
Oxidation Stability	--	+	+	++	++
Pour Point	+	+	n.e.	n.e.	n.e.
Sulphated Ash	n.e.	n.e.	n.e.	n.e.	(--)
Sulphur	+/-	+	+	+	+
Water	+	+	++	+	++
Methanol	n.e.	+/-	-	-	-
mono-Glycerides	n.e.	+/-	++	+	+
di-Glycerides	n.e.	+	++	+/-	+/-
tri-Glycerides	n.e.	+	++	+	++
Free Glycerol	+	+	++	++	+
Total Glycerol	--	+/-	++	+	+
Total Ester content	-	+	n.e.	++	+
Linolenic Acid Methyl Ester	+	+	n.e.	+/-	-
Polyunsat. Methyl esters	+/-	n.e.	n.e.	(+)	(-)
Cetane Number	+	-	n.e.	n.e.	n.e.
Derived Cetane Number	-	+	n.e.	n.e.	n.e.
Total Contamination	--	--	--	--	-
Sum of Calcium and Magnesium	--	-	+/-	+	-
Phosphorus	-	--	--	--	--
Potassium	-	n.e.	++	++	++
Sodium	+	+	+	++	+
Sum of Potassium and Sodium	-	-	--	n.e.	n.e.

Table 14: comparison of group performances against the standard requirements of all samples
* Signs between brackets are for assigned values below the application range of the respective reference test method and therefore should be used with due care

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

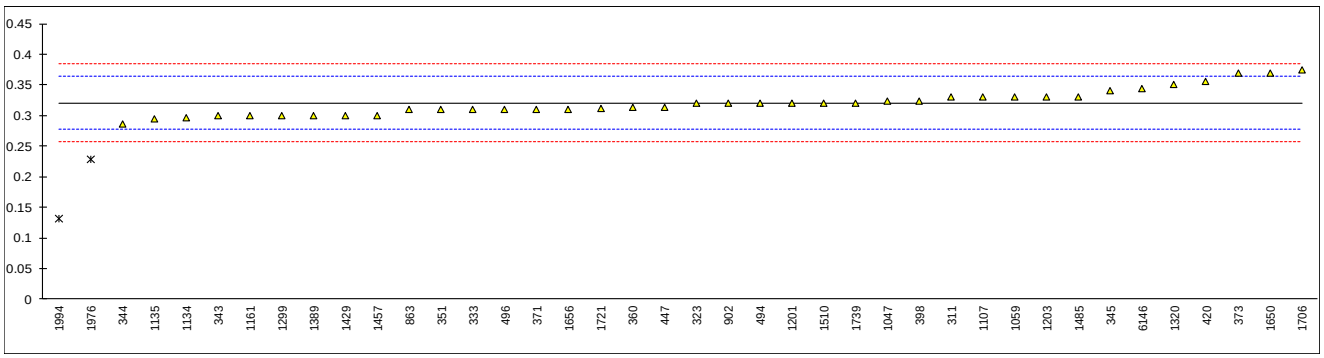
APPENDIX 1

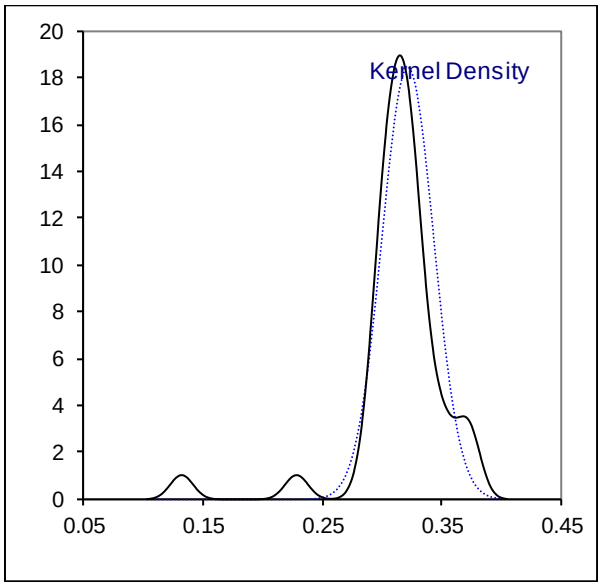
Determination of Acid Value conform EN spec. on sample #17180; results in mg KOH/g

lab	method	value	mark	z(targ)	Remarks
120		-----		-----	
150		-----		-----	
171		-----		-----	
311	EN14104	0.33		0.42	
312		-----		-----	
323	EN14104	0.32		-0.04	
333	EN14104	0.31		-0.51	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14104	0.30		-0.98	
344	EN14104	0.286		-1.63	
345	EN14104	0.34		0.89	
351	EN14104	0.310		-0.51	
360	EN14104	0.313		-0.37	
370		-----		-----	
371	EN14104	0.31		-0.51	
373	EN14104	0.37		2.29	
391		-----		-----	
398	EN14104	0.324		0.14	
420	EN14104	0.356		1.64	
447	EN14104	0.314		-0.32	
494	EN14104	0.32		-0.04	
496	EN14104	0.31		-0.51	
511		-----		-----	
540		-----		-----	
603		-----		-----	
663		-----		-----	
863	EN14104	0.31		-0.51	
902	EN14104	0.32		-0.04	
1011		-----		-----	
1033		-----		-----	
1047	EN14104	0.323		0.10	
1059	EN14104	0.33		0.42	
1107	EN14104	0.33		0.42	
1134	EN14104	0.296		-1.16	
1135	EN14104	0.294		-1.26	
1161	EN14104	0.3		-0.98	
1199		-----		-----	
1201	EN14104	0.32		-0.04	
1203	EN14104	0.33		0.42	
1299	EN14104	0.30		-0.98	
1316		-----		-----	
1320	EN14104	0.35		1.36	
1389	EN14104	0.30		-0.98	
1397		-----		-----	
1428		-----		-----	
1429	EN14104	0.30		-0.98	
1443		-----		-----	
1457	EN14104	0.300		-0.98	
1459		-----		-----	
1485	EN14104	0.330		0.42	
1494		-----		-----	
1510	EN14104	0.32		-0.04	
1586		-----		-----	
1634		-----		-----	
1650	EN14104	0.37		2.29	
1656	EN14104	0.31		-0.51	
1706	EN14104	0.375		2.52	
1710		-----		-----	
1721	EN14104	0.311		-0.46	
1739	EN14104	0.32		-0.04	
1744		-----		-----	
1769		-----		-----	
1976	EN14104	0.228	R(0.01)	-4.34	
1989		-----		-----	
1994		0.132	R(0.01)	-8.82	
6057		-----		-----	
6144		-----		-----	
6146	EN14104	0.344		1.08	

normality	OK
n	38
outliers	2
mean (n)	0.3209
st.dev. (n)	0.02160
R(calc.)	0.0605
st.dev.(EN14104:03)	0.02143
R(EN14104:03)	0.06

Compare R(EN14214:12+A1:14) = 0.06



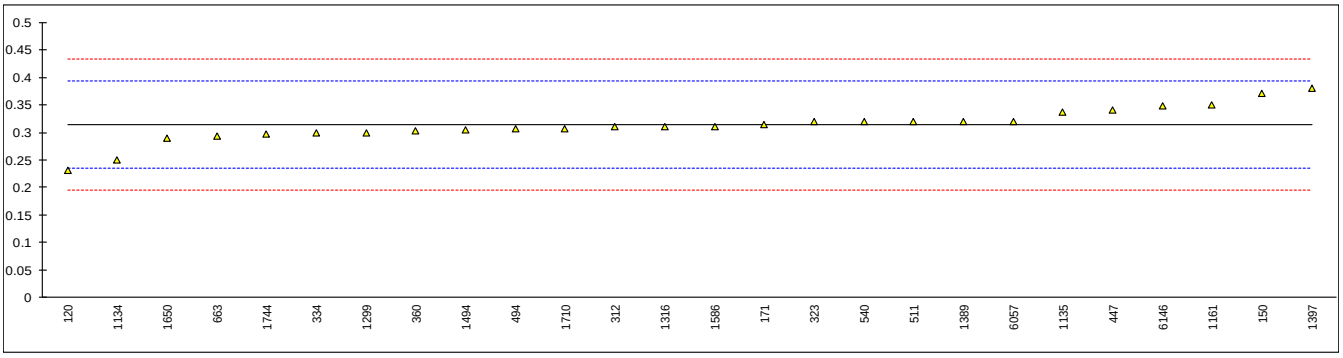


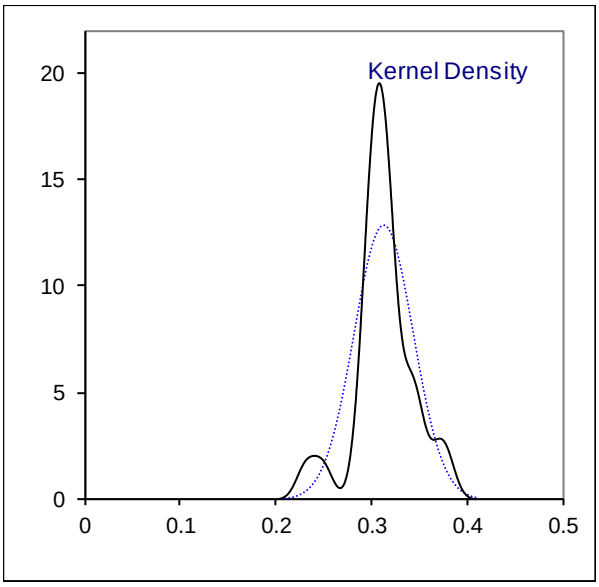
Determination of Acid Number conform ASTM spec. on sample #17180; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D664-B	0.232		-2.05	
150	D664-B	0.37		1.42	
171	D664-B	0.3144		0.02	
311		-----		-----	
312	D664-B	0.31		-0.09	
323	D664-B	0.32		0.16	
333		-----		-----	
334	D664-B	0.30		-0.34	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351		-----		-----	
360	D664-B	0.303		-0.27	
370		-----		-----	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420		-----		-----	
447	D664-B	0.34		0.66	
494	D664-B	0.307		-0.17	
496		-----		-----	
511	D664-B	0.32		0.16	
540	D664-B	0.320		0.16	
603		-----		-----	
663	D664-B	0.294		-0.50	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059		-----		-----	
1107		-----		-----	
1134	D664-B	0.25		-1.60	
1135	D664-B	0.337		0.59	
1161	D664-B	0.35		0.91	
1199		-----		-----	
1201		-----		-----	
1203		-----		-----	
1299	D664-B	0.30		-0.34	
1316	D664-A	0.31		-0.09	
1320		-----		-----	
1389	D664-B	0.32		0.16	
1397	D664-B	0.38		1.67	
1428		-----		-----	
1429		-----		-----	
1443		-----		-----	
1457		-----		-----	
1459		-----		-----	
1485		-----		-----	
1494	D664-B	0.3054		-0.21	
1510		-----		-----	
1586	D664-B	0.31		-0.09	
1634		-----		-----	
1650	D664-B	0.29		-0.60	
1656		-----		-----	
1706		-----		-----	
1710	D664-B	0.307		-0.17	
1721		-----		-----	
1739		-----		-----	
1744	D664-B	0.298		-0.39	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	D664-B	0.32		0.16	
6144		-----		-----	
6146	D664-B	0.348		0.86	

normality suspect

n	26
outliers	0
mean (n)	0.3137
st.dev. (n)	0.03106
R(calc.)	0.0870
st.dev.(D664B:11a)	0.03976
R(D664B:11a)	0.1113



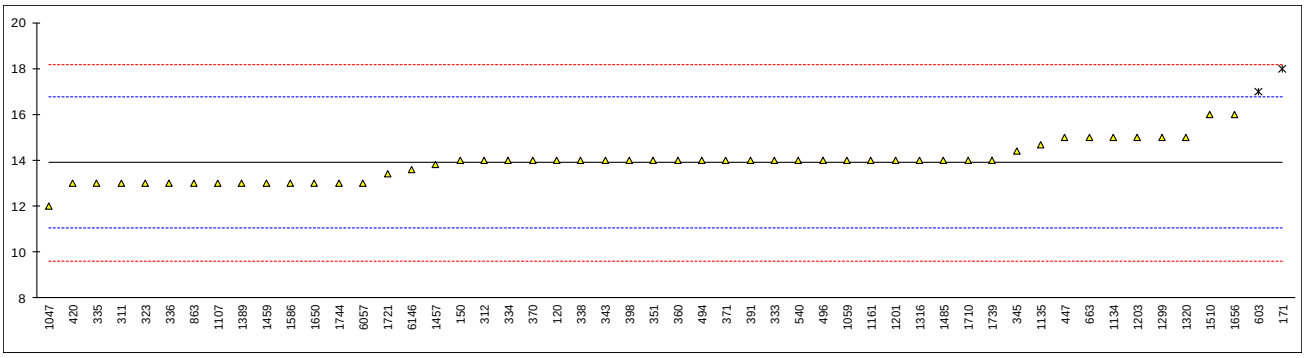


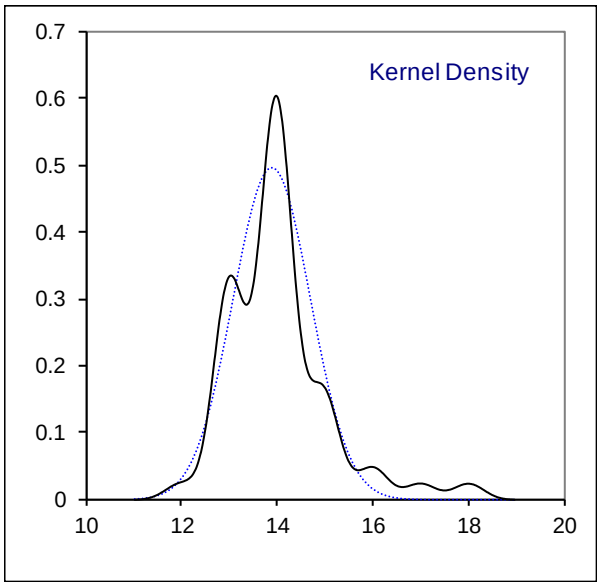
Determination of Cloud Point on sample #17180; results in °C

lab	method	value	mark	z(targ)	remarks
120	D2500	14		0.07	
150	D2500	14		0.07	
171	D2500	18	R(0.01)	2.87	
311	D2500	13		-0.63	
312	D2500	14		0.07	
323	EN23015	13		-0.63	
333	EN23015	14		0.07	
334	EN23015	14		0.07	
335	EN23015	13		-0.63	
336	EN23015	13		-0.63	
337		-----		-----	
338	EN23015	14		0.07	
343	D2500	14.0		0.07	
344		-----		-----	
345	D5771	14.4		0.35	
351	D7683	14		0.07	
360	EN23015	14		0.07	
370	EN23015	14		0.07	
371	EN23015	14		0.07	
373		-----		-----	
391	EN23015	14		0.07	
398	EN23015	14		0.07	
420	D7683	13		-0.63	
447	D2500	15		0.77	
494	EN23015	14		0.07	
496	EN23015	14.0		0.07	
511		-----		-----	
540	EN23015	14.0		0.07	
603	D2500	17	R(0.05)	2.17	
663	D2500	15		0.77	
863	D2500	13		-0.63	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN23015	12		-1.33	
1059	EN23015	14		0.07	
1107	ISO3015	13		-0.63	
1134	IP219	15		0.77	
1135	EN23015	14.7		0.56	
1161	EN23015	14		0.07	
1199		-----		-----	
1201	EN23015	14		0.07	
1203	EN23015	15		0.77	
1299	D2500	15		0.77	
1316	EN23015	14.0		0.07	
1320	EN23015	15		0.77	
1389	D2500	13		-0.63	
1397		-----		-----	
1428		-----		-----	
1429		-----		-----	
1443		-----		-----	
1457	EN23015	13.8		-0.07	
1459	EN23015	13.0		-0.63	
1485	D2500	14.0		0.07	
1494		-----		-----	
1510	D2500	16		1.47	
1586	D2500	13		-0.63	
1634		-----		-----	
1650	D5771	13		-0.63	
1656	IP219	16		1.47	
1706		-----		-----	
1710	EN23015	14		0.07	
1721	D2500	13.4		-0.35	
1739	EN23015	14		0.07	
1744	D2500	13		-0.63	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN23015	13		-0.63	
6144		-----		-----	
6146	EN23015	13.6		-0.21	
	normality	OK			

n	50
outliers	2
mean (n)	13.90
st.dev. (n)	0.804
R(calc.)	2.25
st.dev.(EN14214:12+A1:14)	1.429
R(EN14214:12+A1:14)	4

Compare R(EN23015:94) = 6



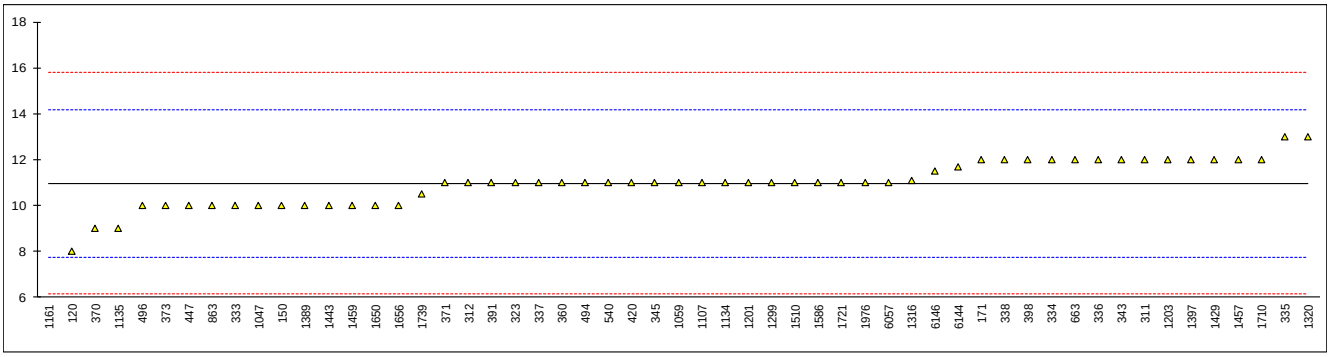


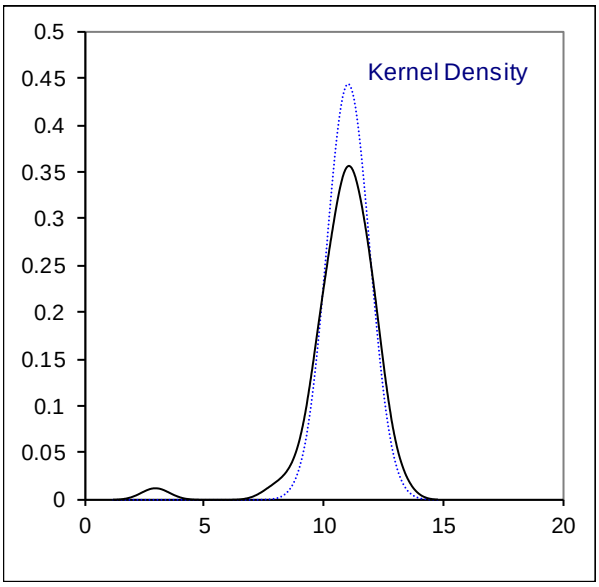
Determination of Cold Filter Plugging Point on sample #17180; results in °C

lab	method	value	mark	z(targ)	remarks
120	EN116	8		-1.85	
150	EN116	10		-0.61	
171	D6371	12		0.64	
311	EN116	12		0.64	
312	EN116	11		0.01	
323	EN116	11		0.01	
333	EN116	10		-0.61	
334	EN116	12		0.64	
335	EN116	13		1.26	
336	EN116	12		0.64	
337	EN116	11		0.01	
338	EN116	12		0.64	
343	EN116	12.0		0.64	
344		-----		-----	
345	EN116	11		0.01	
351		-----		-----	
360	EN116	11		0.01	
370	EN116	9		-1.23	
371	EN116	11		0.01	
373	EN116	10		-0.61	
391	EN116	11		0.01	
398	EN116	12		0.64	
420	EN116	11		0.01	
447	IP309	10		-0.61	
494	EN116	11		0.01	
496	EN116	10.0		-0.61	
511		-----		-----	
540	EN116	11.0		0.01	
603		-----		-----	
663	EN116	12		0.64	
863	EN116	10		-0.61	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN116	10		-0.61	
1059	EN116	11		0.01	
1107	EN116	11		0.01	
1134	EN116	11		0.01	
1135	EN116	9		-1.23	
1161	EN116	3	R(0.01)	-4.96	
1199		-----		-----	
1201	EN116	11		0.01	
1203	EN116	12		0.64	
1299	EN116	11		0.01	
1316	EN116	11.1		0.08	
1320	EN116	13		1.26	
1389	EN116	10		-0.61	
1397	EN116	12		0.64	
1428		-----		-----	
1429	EN116	12		0.64	
1443	EN116	10		-0.61	
1457	EN116	12		0.64	
1459	EN116	10.0		-0.61	
1485		-----		-----	
1494		-----		-----	
1510	IP309	11		0.01	
1586	EN116	11		0.01	
1634		-----		-----	
1650	EN116	10		-0.61	
1656	EN116	10		-0.61	
1706		-----		-----	
1710	EN116	12		0.64	
1721	EN116	11		0.01	
1739	EN116	10.5		-0.30	
1744		-----		-----	
1769		-----		-----	
1976	EN116	11		0.01	
1989		-----		-----	
1994		-----		-----	
6057	EN116	11		0.01	
6144	EN116	11.7		0.45	
6146	EN116	11.5		0.32	
	normality	OK			

n	54
outliers	1
mean (n)	10.98
st.dev. (n)	0.980
R(calc.)	2.75
st.dev.(EN14214:12+A1:14)	1.609
R(EN14214:12+A1:14)	4.51

Compare R(EN116:97) = 1.44
Compare R(EN116:15) = 2.34





Determination of Carbon Residue on 100% FAME on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	ISO10370	0.015		-----	
150	ISO10370	<0.10		-----	
171	D4530	<0.10		-----	
311		-----		-----	
312		-----		-----	
323	ISO10370	< 0.10		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351	ISO10370	0.0004		-----	
360	ISO10370	0.003		-----	
370	ISO10370	0.006		-----	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420	ISO6615	<0,01		-----	
447	IP398	<0.10		-----	
494	ISO10370	0.03		-----	
496		-----		-----	
511		-----		-----	
540	ISO10370	<0.10		-----	
603	D4530	<0.10		-----	
663		-----		-----	
863	ISO10370	<0.1		-----	
902	ISO10370	<0,1		-----	
1011		-----		-----	
1033		-----		-----	
1047	ISO10370	0.01		-----	
1059	ISO10370	<0,01		-----	
1107	D4530	<0.01		-----	
1134	D4530	0.00661		-----	
1135	ISO10370	0.038		-----	
1161	ISO10370	0.02		-----	
1199		-----		-----	
1201	ISO10370	0.01		-----	
1203	ISO10370	0.02		-----	
1299		-----		-----	
1316	ISO10370	<0,01		-----	
1320		-----		-----	
1389	ISO10370	<0.1		-----	
1397		-----		-----	
1428		-----		-----	
1429		-----		-----	
1443		-----		-----	
1457	ISO10370	0.002		-----	
1459		-----		-----	
1485		-----		-----	
1494		-----		-----	
1510	D4530	0.01		-----	
1586	ISO10370	0.01		-----	
1634		-----		-----	
1650		-----		-----	
1656		<0.1		-----	
1706		-----		-----	
1710	ISO10370	0.005		-----	
1721	ISO10370	<0,02		-----	
1739		-----		-----	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057		-----		-----	
6144		-----		-----	
6146	ISO10370	0		-----	
	normality	n.a.			

n	31	
outliers	n.a.	
mean (n)	<0.1	
st.dev. (n)	n.a.	
R(calc.)	n.a.	
st.dev.(ISO10370:14)	n.a.	
R(ISO10370:14)	n.a.	Application range: 0.10 – 30 %M/M

Determination of Copper Strip Corrosion 3 hrs/50°C on sample #17180

lab	method	value	mark	z(targ)	remarks
120	D130	1a		-----	
150	D130	1b		-----	
171	D130	1a		-----	
311	ISO2160	1a		-----	
312		-----		-----	
323	ISO2160	1A		-----	
333		-----		-----	
334	D130	1a		-----	
335	D130	1b		-----	
336	D130	1		-----	
337		-----		-----	
338		-----		-----	
343	ISO2160	1A		-----	
344	D130	1a		-----	
345	D130	1a		-----	
351	ISO2160	1a		-----	
360	ISO2160	1A		-----	
370	ISO2160	1a		-----	
371	ISO2160	1A		-----	
373		-----		-----	
391	D130	1a		-----	
398	ISO2160	1a		-----	
420		-----		-----	
447	D130	1a		-----	
494	ISO2160	1a		-----	
496	ISO2160	1A		-----	
511	D130	1A		-----	
540	D130	1a		-----	
603	D130	1A		-----	
663	D130	1a		-----	
863	D130	1a		-----	
902	ISO2160	1a		-----	
1011		-----		-----	
1033		-----		-----	
1047	ISO2160	1a		-----	
1059	ISO2160	1a		-----	
1107		-----		-----	
1134	D130	1a		-----	
1135	ISO2160	1A		-----	
1161	ISO2160	1a		-----	
1199		-----		-----	
1201	D130	1A		-----	
1203	ISO2160	1		-----	
1299	ISO2160	1A		-----	
1316	D130	1a		-----	
1320		-----		-----	
1389	D130	1A		-----	
1397	ISO2160	1		-----	
1428		-----		-----	
1429	D130	1A		-----	
1443	ISO2160	1a		-----	
1457	ISO2160	1A		-----	
1459		-----		-----	
1485		-----		-----	
1494		-----		-----	
1510	IP154	1A		-----	
1586	D130	1A		-----	
1634	D130	1A		-----	
1650	D130	1a		-----	
1656	ISO2160	1		-----	
1706		-----		-----	
1710	ISO2160	1A		-----	
1721	ISO2160	1a		-----	
1739	ISO2160	1a		-----	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	D130	1A		-----	
6144		-----		-----	
6146	ISO2160	1a		-----	
	normality	n.a.			

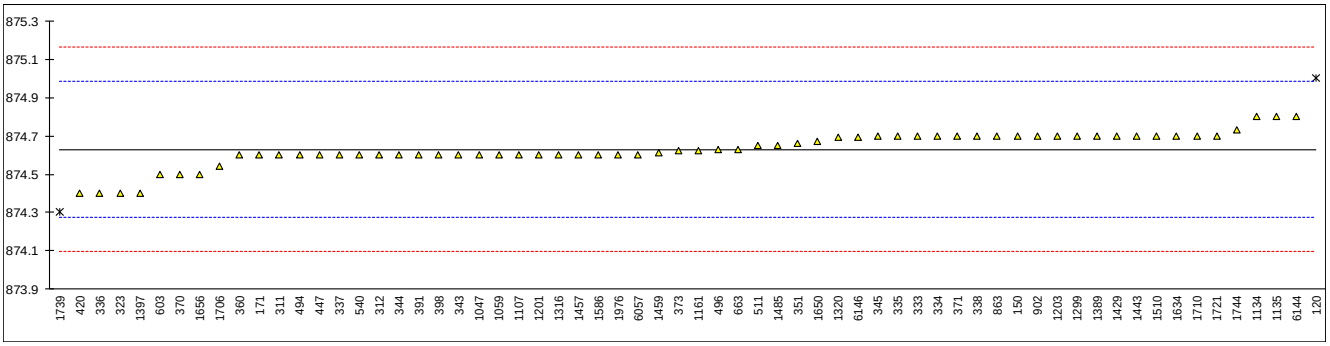
n	50
outliers	n.a.
mean (n)	1(1A/1B)
st.dev. (n)	n.a.
R(calc.)	n.a
R(ISO2160:98)	n.a.

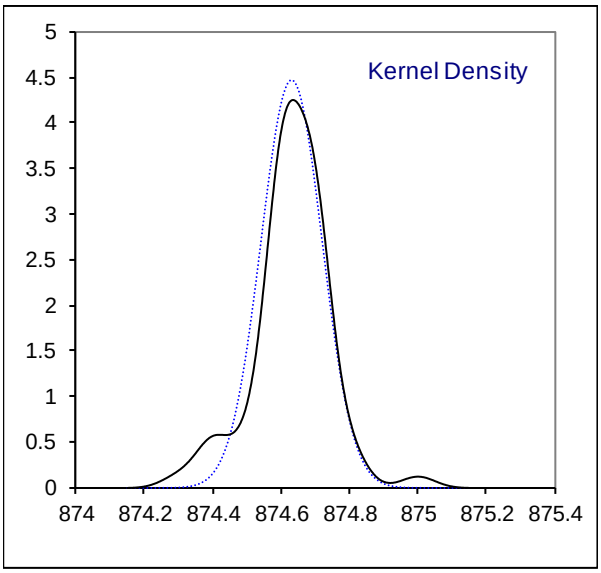
Determination of Density at 15°C conform EN spec. on sample #17180; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	ISO12185	875.0	R(0.05)	2.07	
150	D4052	874.7		0.39	
171	D4052	874.6		-0.17	
311	ISO12185	874.6		-0.17	
312	ISO12185	874.6		-0.17	
323	ISO12185	874.4		-1.29	
333	ISO12185	874.7		0.39	
334	ISO12185	874.7		0.39	
335	ISO12185	874.7		0.39	
336	ISO12185	874.4		-1.29	
337	ISO12185	874.6		-0.17	
338	ISO12185	874.7		0.39	
343	ISO12185	874.6		-0.17	
344	D4052	874.6		-0.17	
345	ISO12185	874.7		0.39	
351	ISO12185	874.66		0.17	
360	ISO12185	874.6		-0.17	
370	ISO12185	874.5		-0.73	
371	ISO12185	874.7		0.39	
373	ISO12185	874.62		-0.06	
391	ISO12185	874.6		-0.17	
398	ISO12185	874.6		-0.17	
420	ISO12185	874.4		-1.29	
447	D4052	874.6		-0.17	
494	ISO12185	874.6		-0.17	
496	ISO12185	874.63		0.00	
511	D4052	874.65		0.11	
540	ISO12185	874.60		-0.17	
603	D1298	874.5		-0.73	
663	D4052	874.63		0.00	
863	ISO12185	874.70		0.39	
902	ISO12185	874.7		0.39	
1011		-----		-----	
1033		-----		-----	
1047	ISO12185	874.6		-0.17	
1059	ISO12185	874.6		-0.17	
1107	D4052	874.6		-0.17	
1134	D4052	874.8		0.95	
1135	ISO12185	874.8		0.95	
1161	ISO12185	874.62		-0.06	
1199		-----		-----	
1201	ISO12185	874.6		-0.17	
1203	ISO12185	874.7		0.39	
1299	ISO12185	874.7		0.39	
1316	ISO12185	874.6		-0.17	
1320	ISO12185	874.69		0.33	
1389	ISO12185	874.7		0.39	
1397	ISO12185	874.4		-1.29	
1428		-----		-----	
1429	ISO12185	874.7		0.39	
1443	ISO12185	874.7		0.39	
1457	ISO12185	874.6		-0.17	
1459	ISO12185	874.61		-0.11	
1485	ISO12185	874.65		0.11	
1494		-----		-----	
1510	IP365	874.7		0.39	
1586	D4052	874.6		-0.17	
1634	ISO12185	874.7		0.39	
1650	ISO12185	874.67		0.22	
1656		874.5		-0.73	
1706	ISO12185	874.54		-0.51	
1710	ISO12185	874.7		0.39	
1721	ISO12185	874.7		0.39	
1739	ISO3675	874.3	R(0.05)	-1.85	
1744	D4052	874.73		0.56	
1769		-----		-----	
1976	ISO12185	874.6		-0.17	
1989		-----		-----	
1994		-----		-----	
6057	ISO12185	874.6		-0.17	
6144	ISO12185	874.8		0.95	
6146	ISO12185	874.69		0.33	
	normality	suspect			

n	62
outliers	2
mean (n)	874.63
st.dev. (n)	0.089
R(calc.)	0.25
st.dev.(ISO12185:96)	0.179
R(ISO12185:96)	0.5

Compare R(EN14214:12+A1:14) = 0.5





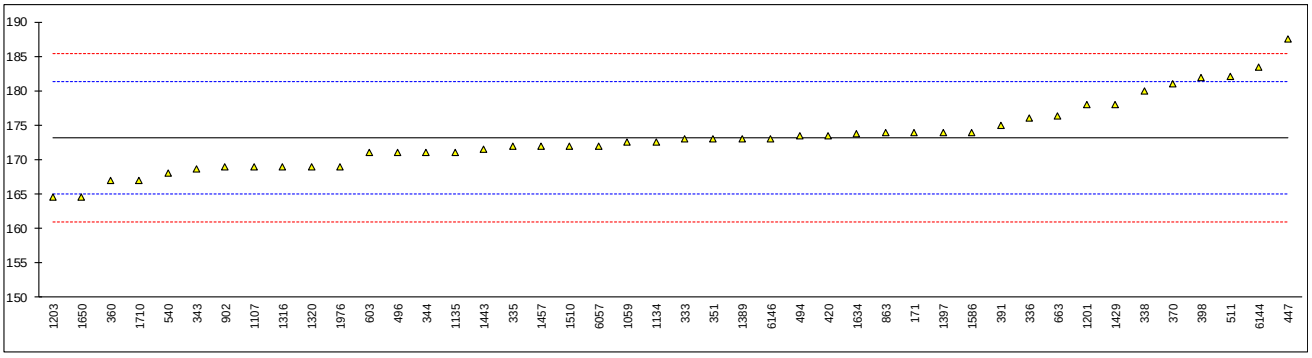
Determination of Flash Point, PMcc conform EN spec. on sample #17180; results in °C

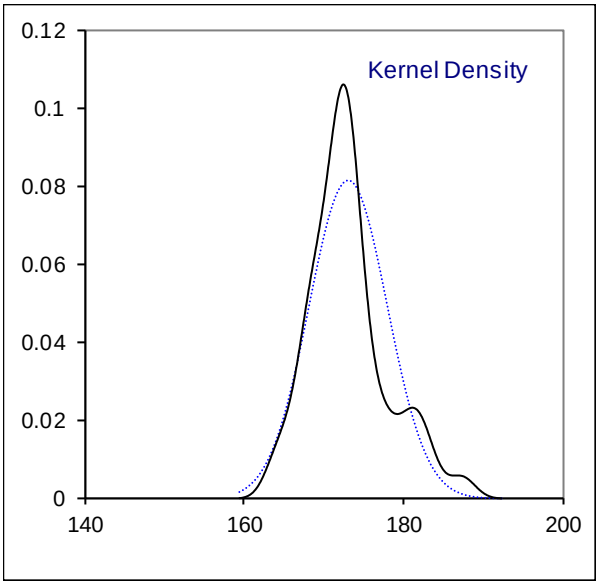
lab	method	value	mark	z(targ)	remarks
120	ISO2719-A	>110		-----	
150	D93-C	>130.0		-----	
171	D93-B	174.0		0.19	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333	D93-C	173.0		-0.05	
334		-----		-----	
335	D93-A	172.0		-0.30	
336	ISO2719-C	176		0.69	
337		-----		-----	
338	ISO2719-A	180		1.67	
343		168.6		-1.13	
344	D93-A	171.0		-0.54	
345		-----		-----	
351	ISO2719-A	173.0		-0.05	
360	ISO2719-C	167.0		-1.53	
370	D93-C	181.0		1.91	
371		-----		-----	
373		-----		-----	
391	ISO2719-C	175		0.44	
398	ISO2719-C	182		2.16	
420	ISO2719-C	173.5		0.07	
447	D93-C	187.5		3.51	
494	ISO2719-C	173.4		0.05	
496	ISO2719-A	171		-0.54	
511	D93-C	182.02		2.16	
540	ISO2719-C	168.0		-1.28	
603	D93-C	171.0		-0.54	
663	D93-C	176.4		0.78	
863	D93-C	174.0		0.19	
902	D93-C	169.0		-1.03	
1011		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	ISO2719-C	172.5		-0.17	
1107	D93-A	169.0		-1.03	
1134	D93-A	172.5		-0.17	
1135	ISO2719-A	171.0		-0.54	
1161		-----		-----	
1199		-----		-----	
1201	ISO2719-A	178.0		1.18	
1203	ISO2719-A	164.5		-2.14	
1299		-----		-----	
1316	ISO2719-A	169.0		-1.03	
1320	ISO2719-C	169		-1.03	
1389	D93-C	173.0		-0.05	
1397	ISO2719-C	174.0		0.19	
1428		-----		-----	
1429	D93-C	178.0		1.18	
1443	ISO2719-C	171.5		-0.42	
1457	ISO2719-A	172.0		-0.30	
1459	ISO2719-A	>160		-----	
1485		-----		-----	
1494		-----		-----	
1510	IP34-A	172.0		-0.30	
1586	ISO2719-C	174.0		0.19	
1634	D93-C	173.8		0.15	
1650	D93-C	164.5		-2.14	
1656	ISO2719-B	>170		-----	
1706		-----		-----	
1710	ISO2719-A	167.0		-1.53	
1721		-----		-----	
1739		-----		-----	
1744		-----		-----	
1769		-----		-----	
1976	ISO2719-A	169		-1.03	
1989		-----		-----	
1994		-----		-----	
6057	ISO2719-C	172		-0.30	
6144	ISO2719-C	183.5		2.53	
6146	ISO2719-C	173.0		-0.05	

Only method C

normality	OK	OK
n	44	27
outliers	0	0
mean (n)	173.21	174.36
st.dev. (n)	4.911	5.275
R(calc.)	13.75	14.77
st.dev.(EN14214:12+A1:14)	4.071	5.250
R(EN14214:12+A1:14)	11.4	11.4

Compare R(ISO2719 C:16) = 14.7



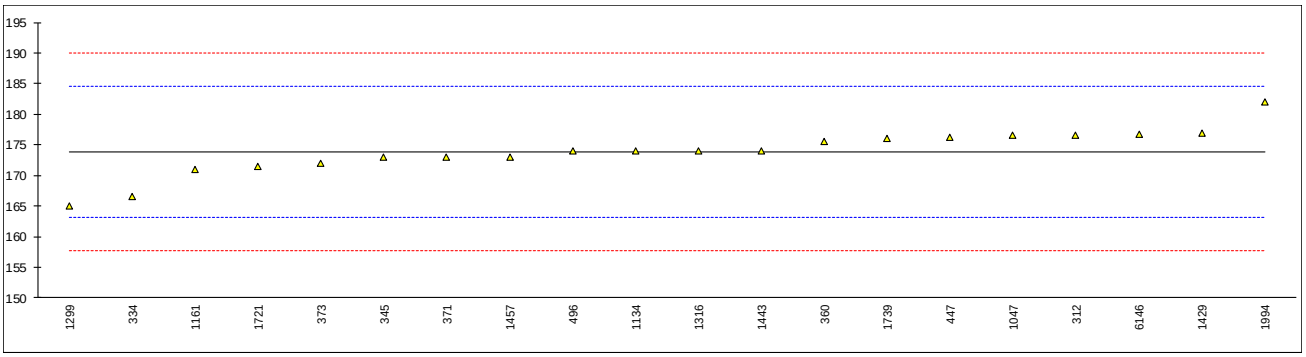


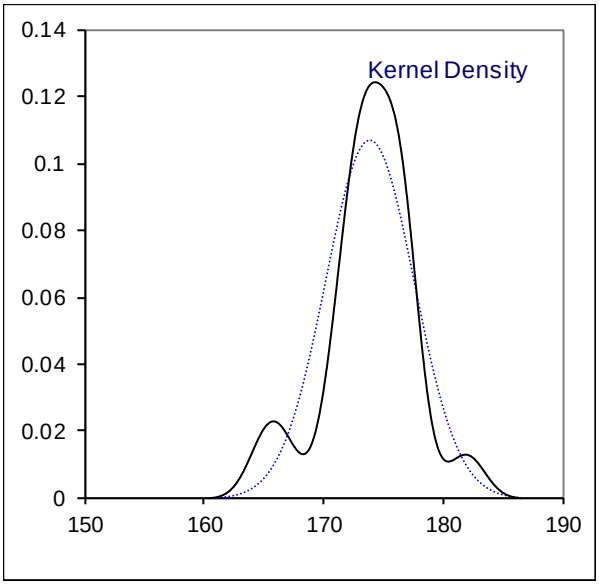
Determination of Flash Point, recc conform EN spec. on sample #17180; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171		-----		-----	
311	ISO3679	>160		-----	
312	ISO3679	176.5		0.49	
323		-----		-----	
333		-----		-----	
334	ISO3679	166.5		-1.38	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345	ISO3679	173		-0.16	
351		-----		-----	
360	ISO3679	175.5		0.30	
370		-----		-----	
371	ISO3679	173.0		-0.16	
373	ISO3679	172		-0.35	
391		-----		-----	
398		-----		-----	
420		-----		-----	
447	IP523	176.2		0.43	
494		-----		-----	
496	ISO3679	174		0.02	
511		-----		-----	
540		-----		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	ISO3679	176.5		0.49	
1059		-----		-----	
1107		-----		-----	
1134	IP523	174.0		0.02	
1135		-----		-----	
1161	ISO3679	171		-0.54	
1199		-----		-----	
1201		-----		-----	
1203		-----		-----	
1299	ISO3679	165.0		-1.66	
1316	ISO3679	174.0		0.02	
1320		-----		-----	
1389		-----		-----	
1397		-----		-----	
1428		-----		-----	
1429	ISO3679	176.9		0.56	
1443	ISO3679	174.0		0.02	
1457	ISO3679	173.0		-0.16	
1459		-----		-----	
1485		-----		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650		-----		-----	
1656		-----		-----	
1706		-----		-----	
1710		-----		-----	
1721	ISO3679	171.5		-0.44	
1739	ISO3679	176.1		0.42	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		182		1.52	
6057		-----		-----	
6144		-----		-----	
6146	ISO3679	176.8		0.55	
	n	20			

outliers	0
mean (n)	173.88
st.dev. (n)	3.724
R(calc.)	10.43
st.dev.(ISO3679:15)	5.357
R(ISO3679:15)	15

Compare R(EN14214:12+A1:14) = 15



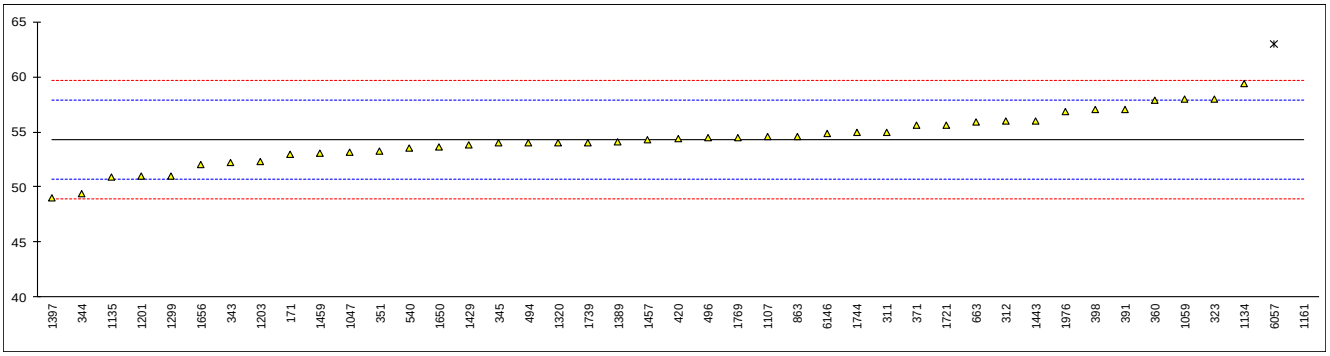


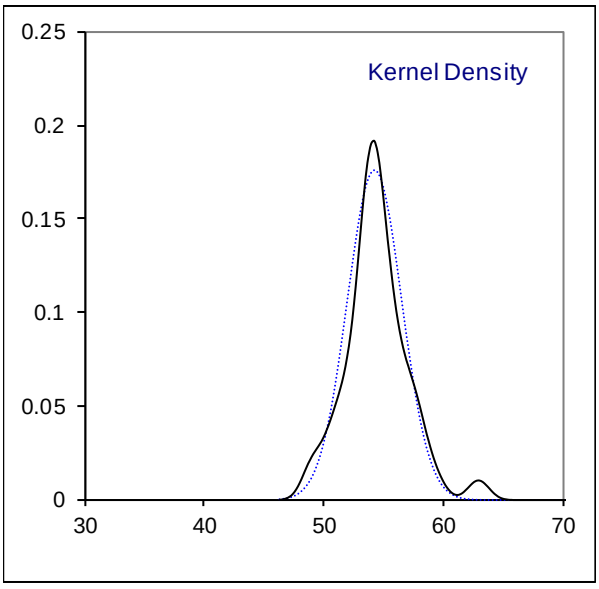
Determination of Iodine Value conform EN spec. on sample #17180; results in g I_2/100g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14111	53		-0.73	
311	EN14111	55		0.39	
312	EN14111	56.0		0.95	
323	EN14111	58		2.07	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN16300	52.2		-1.18	
344	EN14111	49.41		-2.74	
345	EN14111	54		-0.17	
351	EN14111	53.30		-0.56	
360	EN14111	57.9		2.01	
370		-----		-----	
371	EN14111	55.6		0.73	
373		-----		-----	
391	EN14111	57		1.51	
398	EN14111	57	C	1.51	first reported: 47.0
420	EN14111	54.37		0.04	
447		-----		-----	
494	EN14111	54.0		-0.17	
496	EN14111	54.5		0.11	
511		-----		-----	
540	EN14111	53.5		-0.45	
603		-----		-----	
663	EN14111	55.9		0.89	
863	EN14111	54.6		0.17	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14111	53.2		-0.62	
1059	EN14111	58		2.07	
1107	EN14111	54.6		0.17	
1134	EN14111	59.4		2.85	
1135	EN14111	50.9		-1.91	
1161	EN14111	116.0	R(0.01)	34.55	
1199		-----		-----	
1201	EN14111	51		-1.85	
1203	EN14111	52.32		-1.11	
1299	EN14111	51		-1.85	
1316		-----		-----	
1320	EN14111	54.0		-0.17	
1389	EN14111	54.1		-0.11	
1397	EN16300	49.0		-2.97	
1428		-----		-----	
1429	EN14111	53.84		-0.26	
1443	EN14111	56		0.95	
1457	EN14111	54.3		0.00	
1459	EN16300	53.1		-0.67	
1485		-----		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14111	53.61		-0.39	
1656	EN14111	52		-1.29	
1706		-----		-----	
1710		-----		-----	
1721	EN14111	55.6		0.73	
1739	EN14111	54		-0.17	
1744	EN14111	54.93		0.35	
1769	EN14111	54.513		0.12	
1976	EN14111	56.8		1.40	
1989		-----		-----	
1994		-----		-----	
6057	EN16300	63	R(0.05)	4.87	
6144		-----		-----	
6146	EN14111	54.9		0.33	
	normality	OK			

n	41
outliers	2
mean (n)	54.30
st.dev. (n)	2.272
R(calc.)	6.36
st.dev.(EN14111:03)	1.786
R(EN14111:03)	5

Compare R(EN16300:12) = 3.99





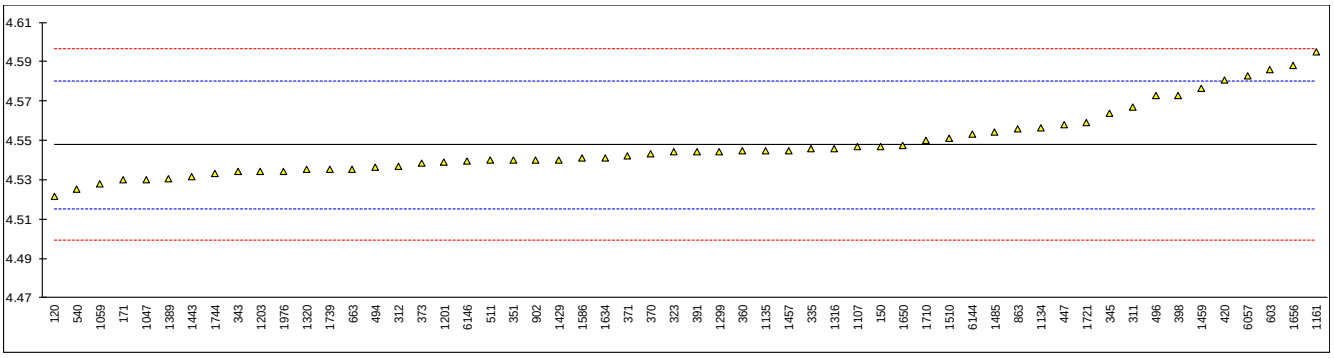
Determination of Kinematic Viscosity at 40°C on sample #17180; results in mm^2/s

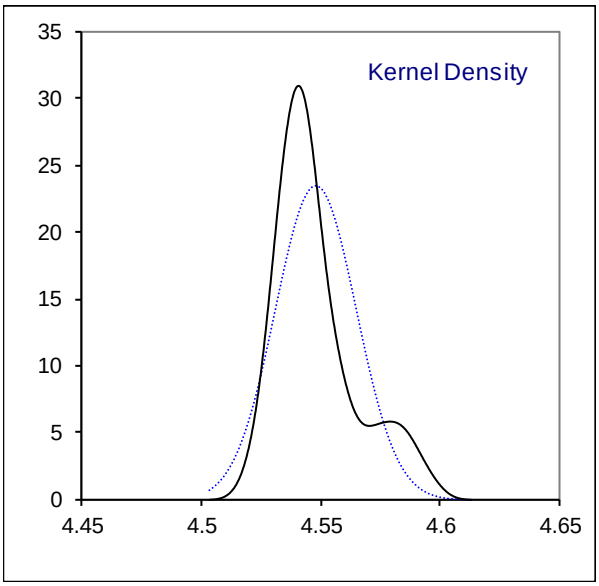
lab	method	value	mark	z(targ)	remarks
120	ISO3104	4.5213		-1.63	
150	D445	4.547		-0.05	
171	D445	4.530		-1.10	
311	D445	4.567		1.18	
312	D445	4.537		-0.67	
323	ISO3104	4.544		-0.24	
333		-----		-----	
334		-----		-----	
335	ISO3104	4.546		-0.11	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	ISO3104	4.534		-0.85	
344		-----		-----	
345	D445	4.564		0.99	
351	ISO3104	4.540		-0.48	
360	ISO3104	4.5450		-0.17	
370	ISO3104	4.5432		-0.29	
371	ISO3104	4.542		-0.36	
373	ISO3104	4.5383		-0.59	
391	ISO3104	4.544		-0.24	
398	ISO3104	4.573		1.55	
420	D7042	4.5809		2.04	
447	D445	4.558		0.63	
494	ISO3104	4.5363		-0.71	
496	ISO3104	4.5730		1.55	
511	D445	4.540		-0.48	
540	ISO3104	4.5250		-1.41	
603	D445	4.586	C	2.35	first reported: 4.620
663	D445	4.5351		-0.78	
863	ISO3104	4.556		0.50	
902	ISO3104	4.540		-0.48	
1011		-----		-----	
1033		-----		-----	
1047	ISO3104	4.530		-1.10	
1059	ISO3104	4.528		-1.22	
1107	D445	4.5468		-0.06	
1134	D445	4.5566		0.54	
1135	ISO3104	4.545		-0.17	
1161	ISO3104	4.595		2.90	
1199		-----		-----	
1201	ISO3104	4.539		-0.54	
1203	ISO3104	4.534		-0.85	
1299	D445	4.544		-0.24	
1316	ISO3104	4.546		-0.11	
1320	ISO3104	4.535		-0.79	
1389	D445	4.5305		-1.07	
1397		-----		-----	
1428		-----		-----	
1429	D445	4.540		-0.48	
1443	ISO3104	4.5316		-1.00	
1457	ISO3104	4.545		-0.17	
1459	D7042	4.5767		1.78	
1485	D445	4.5543		0.40	
1494		-----		-----	
1510	D445	4.551		0.19	
1586	D445	4.541		-0.42	
1634	ISO3104	4.541		-0.42	
1650	ISO3104	4.5475		-0.02	
1656	ISO3104	4.588	C	2.47	first reported: 4.499
1706		-----		-----	
1710	ISO3104	4.550		0.13	
1721	ISO3104	4.5590		0.69	
1739	ISO3104	4.535		-0.79	
1744	D445	4.5330		-0.91	
1769		-----		-----	
1976	ISO3104	4.534		-0.85	
1989		-----		-----	
1994		-----		-----	
6057	ISO3104	4.583		2.16	
6144	ISO3104	4.5532		0.33	
6146	ISO3104	4.5394		-0.52	

	normality	suspect			

n	56
outliers	0
mean (n)	4.5478
st.dev. (n)	0.01699
R(calc.)	0.0476
st.dev.(ISO3104:94)	0.01625
R(ISO3104:94)	0.0455

Compare R(EN14214:12+A1:14) = 0.0455

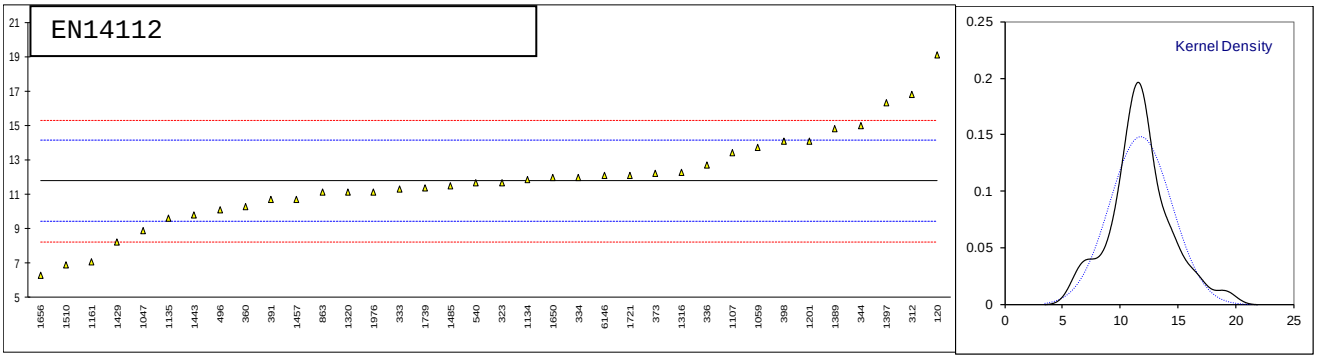


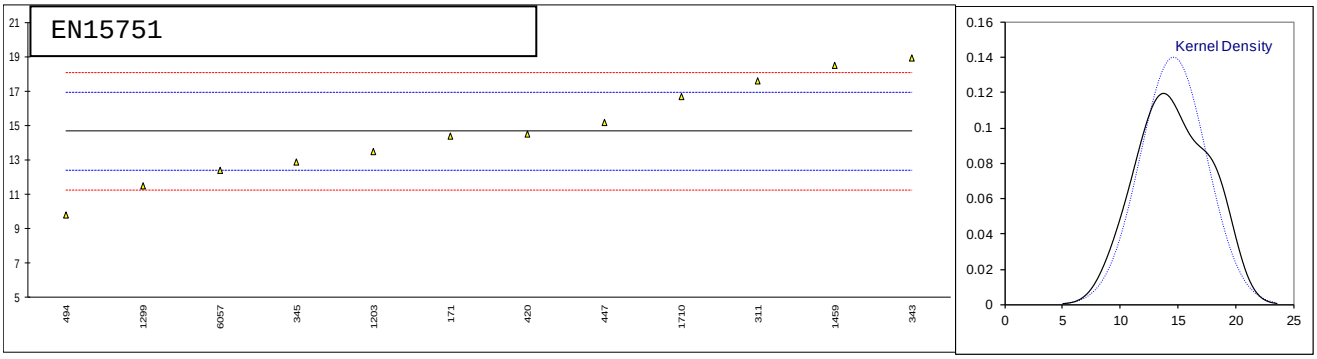


Determination of Oxidation Stability on sample #17180; results in hours

lab	method	EN14112	mark	z(targ)	EN15751	mark	z(targ)	remarks
120	EN14112	19.1		6.23	-----		-----	
150		-----		-----	-----		-----	
171	EN15751	-----		-----	14.4		-0.23	
311	EN15751	-----		-----	17.6		2.60	
312	EN14112	16.8		4.27	-----		-----	
323	EN14112	11.7		-0.07	-----		-----	
333	EN14112	11.3		-0.41	-----		-----	
334	EN14112	12.0		0.19	-----		-----	
335		-----		-----	-----		-----	
336	EN14112	12.7		0.78	-----		-----	
337		-----		-----	-----		-----	
338		-----		-----	-----		-----	
343	EN15751	-----		-----	18.93		3.78	
344	EN14112	14.97		2.71	-----		-----	
345	EN15751	-----		-----	12.9		-1.56	
351		-----		-----	-----		-----	
360	EN14112	10.29		-1.27	-----		-----	
370		-----		-----	-----		-----	
371		-----		-----	-----		-----	
373	EN14112	12.2		0.36	-----		-----	
391	EN14112	10.7		-0.92	-----		-----	
398	EN14112	14.1		1.97	-----		-----	
420	EN15751	-----		-----	14.52		-0.13	
447	EN15751	-----		-----	15.2		0.48	
494	EN15751	-----		-----	9.8		-4.30	
496	EN14112	10.11		-1.42	-----		-----	
511		-----		-----	-----		-----	
540	EN14112	11.70		-0.07	-----		-----	
603		-----		-----	-----		-----	
663		-----		-----	-----		-----	
863	EN14112	11.1		-0.58	-----		-----	
902		-----		-----	-----		-----	
1011		-----		-----	-----		-----	
1033		-----		-----	-----		-----	
1047	EN14112	8.9		-2.45	-----		-----	
1059	EN14112	13.7		1.63	-----		-----	
1107	EN14112	13.44		1.41	-----		-----	
1134	EN14112	11.88		0.09	-----		-----	
1135	EN14112	9.6		-1.85	-----		-----	
1161	EN14112	7.1		-3.98	-----		-----	
1199		-----		-----	-----		-----	
1201	EN14112	14.1		1.97	-----		-----	
1203	EN15751	-----		-----	13.5		-1.03	
1299	EN15751	-----		-----	11.5		-2.80	
1316	EN14112	12.3		0.44	-----		-----	
1320	EN14112	11.1		-0.58	-----		-----	
1389	EN14112	14.8		2.57	-----		-----	
1397	EN14112	16.3		3.84	-----		-----	
1428		-----		-----	-----		-----	
1429	EN14112	8.22		-3.03	-----		-----	
1443	EN14112	9.795		-1.69	-----		-----	
1457	EN14112	10.71		-0.91	-----		-----	
1459	EN15751	-----		-----	18.50		3.40	
1485	EN14112	11.50		-0.24	-----		-----	
1494		-----		-----	-----		-----	
1510	EN14112	6.9		-4.15	-----		-----	
1586		-----		-----	-----		-----	
1634		-----		-----	-----		-----	
1650	EN14112	11.97		0.16	-----		-----	
1656		6.3		-4.66	-----		-----	
1706		-----		-----	-----		-----	
1710	EN15751	-----		-----	16.7		1.80	
1721	EN14112	12.1		0.27	-----		-----	
1739	EN14112	11.37		-0.35	-----		-----	
1744		-----		-----	-----		-----	
1769		-----		-----	-----		-----	
1976	EN16091	11.1		-0.58	-----		-----	
1989		-----		-----	-----		-----	
1994		-----		-----	-----		-----	
6057	EN15751	-----		-----	12.39		-2.01	
6144		-----		-----	-----		-----	
6146	EN14112	12.09		0.26	-----		-----	

normality	OK	OK	
n	36	12	
outliers	0	0	
mean (n)	11.779	14.662	
st.dev. (n)	2.6828	2.8503	
R(calc.)	7.512	7.981	
st.dev.(EN14112:03)	1.1759	1.1300	St.dev. (EN15751:11)
R(EN14112:03)	3.293	3.164	R(EN15751:11)

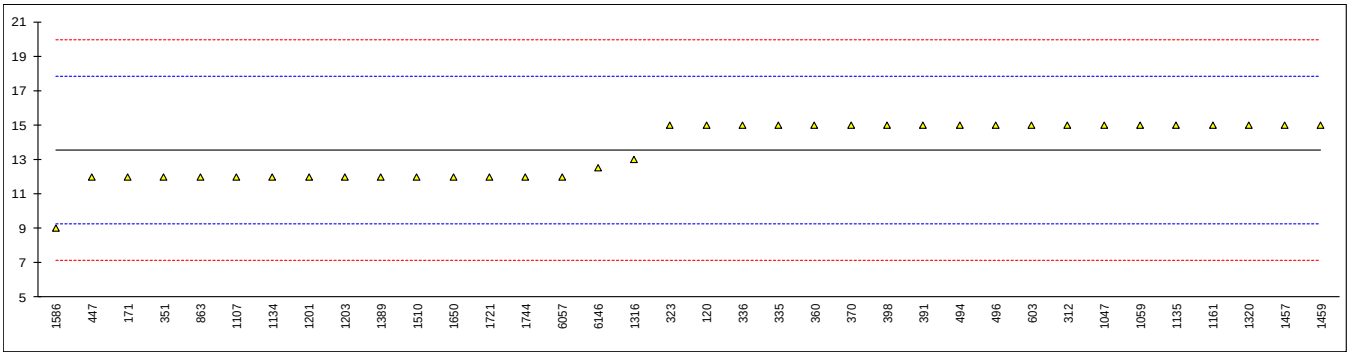


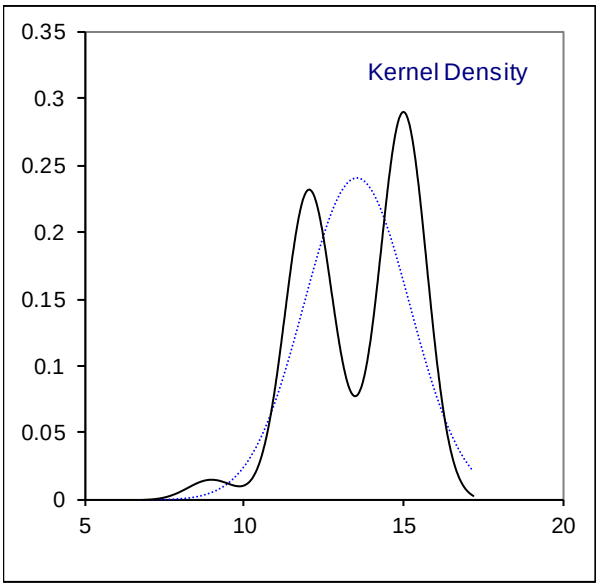


Determination of Pour Point on sample #17180; results in °C

lab	method	value	mark	z(targ)	Remarks
120	ISO3016	15		0.68	
150		-----		-----	
171	ISO3016	12		-0.72	
311		-----		-----	
312	ISO3016	15		0.68	
323	ISO3016	15		0.68	
333		-----		-----	
334		-----		-----	
335	ISO3016	15		0.68	
336	ISO3016	15		0.68	
337		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351	D6749	12.0		-0.72	
360	ISO3016	15		0.68	
370	ISO3016	15		0.68	
371		-----		-----	
373		-----		-----	
391	ISO3016	15		0.68	
398	ISO3016	15		0.68	
420		-----		-----	
447	IP15	12		-0.72	
494	ISO3016	15		0.68	
496	ISO3016	15.0		0.68	
511		-----		-----	
540		-----		-----	
603	ISO3016	15		0.68	
663		-----		-----	
863	ISO3016	12		-0.72	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	ISO3016	15		0.68	
1059	ISO3016	15		0.68	
1107	ISO3016	12		-0.72	
1134	ISO3016	12		-0.72	
1135	ISO3016	15		0.68	
1161	ISO3016	15		0.68	
1199		-----		-----	
1201	ISO3016	12		-0.72	
1203	ISO3016	12		-0.72	
1299		-----		-----	
1316	D5950	13.0		-0.25	
1320	ISO3016	15		0.68	
1389	ISO3016	12		-0.72	
1397		-----		-----	
1428		-----		-----	
1429		-----		-----	
1443		-----		-----	
1457	ISO3016	15		0.68	
1459	ISO3016	15.0		0.68	
1485		-----		-----	
1494		-----		-----	
1510	ISO3016	12		-0.72	
1586	ISO3016	9		-2.12	
1634		-----		-----	
1650		12		-0.72	
1656		-----		-----	
1706		-----		-----	
1710		-----		-----	
1721	D5950	12		-0.72	
1739		-----		-----	
1744	D97	12		-0.72	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	ISO3016	12		-0.72	
6144		-----		-----	
6146	ISO3016	12.5		-0.49	
	normality	OK			

n	36
outliers	0
mean (n)	13.54
st.dev. (n)	1.653
R(calc.)	4.63
st.dev.(ISO3016:94)	2.143
R(ISO3016:94)	6





Determination of Sulphated Ash on sample #17180; results in %M/M

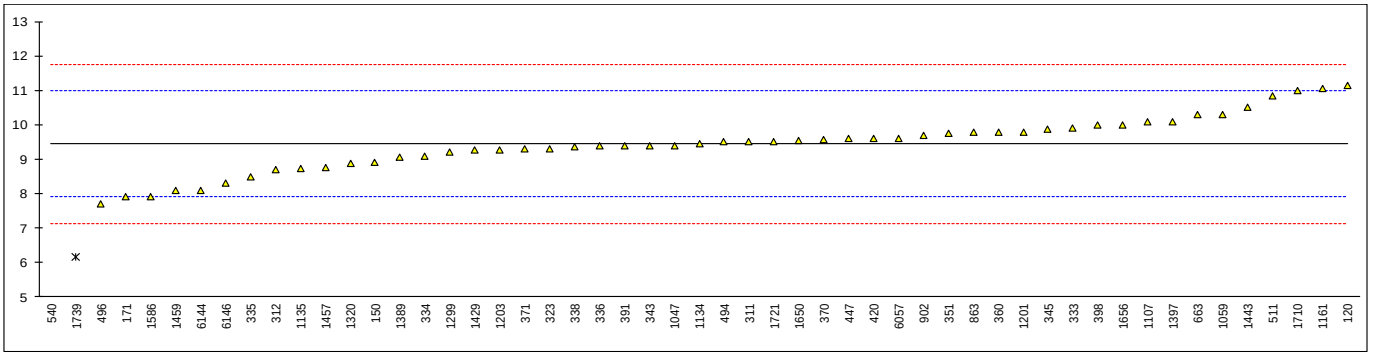
lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D874	<0.005		-----	
171	D874	<0.005		-----	
311		-----		-----	
312		-----		-----	
323	ISO3987	< 0.005		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	ISO3987	<0,005		-----	
344	D874	<0.005		-----	
345	ISO3987	<0.005		-----	
351	ISO3987	0.0001		-----	
360	ISO3987	0.001		-----	
370	ISO3987	<0.001		-----	
371	ISO3987	< 0.005		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420	ISO3987	<0,005		-----	
447		-----		-----	
494	ISO3987	0.0018		-----	
496	ISO3987	0.0005		-----	
511	D874	0.002		-----	
540	ISO3987	<0.005		-----	
603	D874	<0.005		-----	
663	D874	0.001		-----	
863	ISO3987	<0.005		-----	
902	ISO3987	<0,005		-----	
1011		-----		-----	
1033		-----		-----	
1047	ISO3987	<0,005		-----	
1059	ISO3987	<0,050		-----	
1107		-----		-----	
1134	ISO3987	0.00748		-----	
1135	ISO3987	0.0029		-----	
1161	ISO3987	0.0053		-----	
1199		-----		-----	
1201		-----		-----	
1203	ISO3987	<0,005		-----	
1299	ISO3987	<0.005		-----	
1316	D874	<0,001		-----	
1320	ISO3987	0.0005		-----	
1389	D874	<0.005		-----	
1397		-----		-----	
1428		-----		-----	
1429	ISO3987	<0.001		-----	
1443	ISO3987	0.0008		-----	
1457		-----		-----	
1459	In house	0.002		-----	
1485		-----		-----	
1494		-----		-----	
1510		-----		-----	
1586	D874	<0.005		-----	
1634		-----		-----	
1650	ISO3987	0.0004		-----	
1656	ISO3987	<0.01		-----	
1706		-----		-----	
1710	ISO3987	0.001		-----	
1721	ISO3987	<0,005		-----	
1739	ISO3987	< 0.01		-----	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057		-----		-----	
6144		-----		-----	
6146	ISO3987	0.0019		-----	
	normality	n.a.			

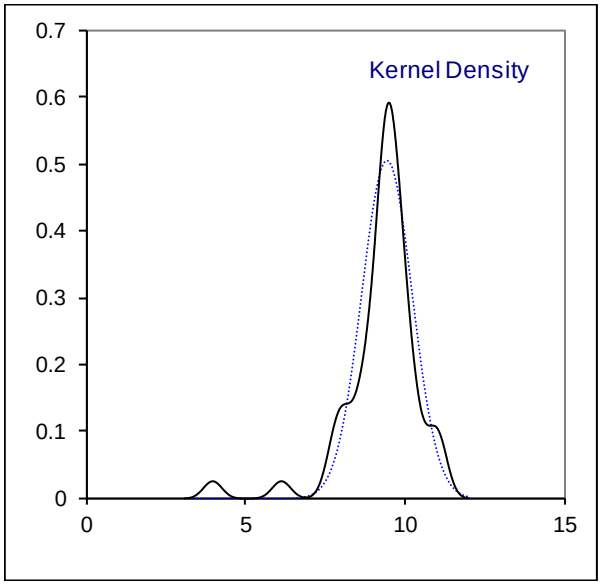
n	39
outliers	n.a.
mean (n)	<0.005
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(ISO14214:12+A1:14)	n.a.
R(ISO14214:12+A1:14)	n.a.

Determination of Sulphur conform EN spec. on sample #17180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO20846	11.14		2.18	
150	D5453	8.9		-0.70	
171	D5453	7.9		-1.99	
311	ISO20846	9.5		0.07	
312	D5453	8.7		-0.96	
323	ISO20846	9.3		-0.19	
333	ISO20846	9.9		0.58	
334	ISO20846	9.1		-0.45	
335	ISO20846	8.5		-1.22	
336	ISO20846	9.4		-0.06	
337		-----		-----	
338	ISO20846	9.36		-0.11	
343	ISO20846	9.4		-0.06	
344		-----		-----	
345	ISO20846	9.89		0.57	
351	ISO20846	9.76		0.40	
360	ISO20846	9.80		0.45	
370	ISO20846	9.58		0.17	
371	ISO20846	9.29		-0.20	
373		-----		-----	
391	ISO20846	9.4		-0.06	
398	ISO20846	10.0		0.71	
420	ISO20846	9.6		0.20	
447	D5453	9.59		0.18	
494	ISO20846	9.5		0.07	
496	ISO20846	7.70		-2.25	
511	D5453	10.84		1.79	
540	ISO20846	4.0	C,R(0.01)	-7.00	first reported: 7.03
603		-----		-----	
663	D5453	10.3		1.10	
863	ISO20846	9.78		0.43	
902	ISO20846	9.7		0.33	
1011		-----		-----	
1033		-----		-----	
1047	ISO20846	9.4		-0.06	
1059	ISO20884	10.3		1.10	
1107	D5453	10.1		0.84	
1134	IP490	9.44		-0.01	
1135	ISO20846	8.74		-0.91	
1161	ISO20846	11.05		2.06	
1199		-----		-----	
1201	ISO20846	9.8		0.45	
1203	ISO20846	9.28		-0.21	
1299	ISO20846	9.2		-0.32	
1316		-----		-----	
1320	ISO20846	8.88		-0.73	
1389	ISO20846	9.07		-0.48	
1397	ISO20846	10.10		0.84	
1428		-----		-----	
1429	ISO20846	9.26	C	-0.24	first reported: 7.09
1443	ISO20846	10.51		1.37	
1457	ISO20846	8.77		-0.87	
1459	In house	8.1		-1.73	
1485		-----		-----	
1494		-----		-----	
1510		-----		-----	
1586	ISO20846	7.9		-1.99	
1634		-----		-----	
1650	ISO20846	9.55		0.13	
1656	ISO20846	10.0		0.71	
1706		-----		-----	
1710	ISO20846	11.0		2.00	
1721	ISO20846	9.5		0.07	
1739	ISO13032	6.15	R(0.01)	-4.24	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	ISO20846	9.6		0.20	
6144	ISO20884	8.1		-1.73	
6146	ISO20846	8.32		-1.45	
	normality	OK			

n	51
outliers	2
mean (n)	9.447
st.dev. (n)	0.7885
R(calc.)	2.208
st.dev.(ISO20846:11)	0.7779
R(ISO20846:11)	2.178



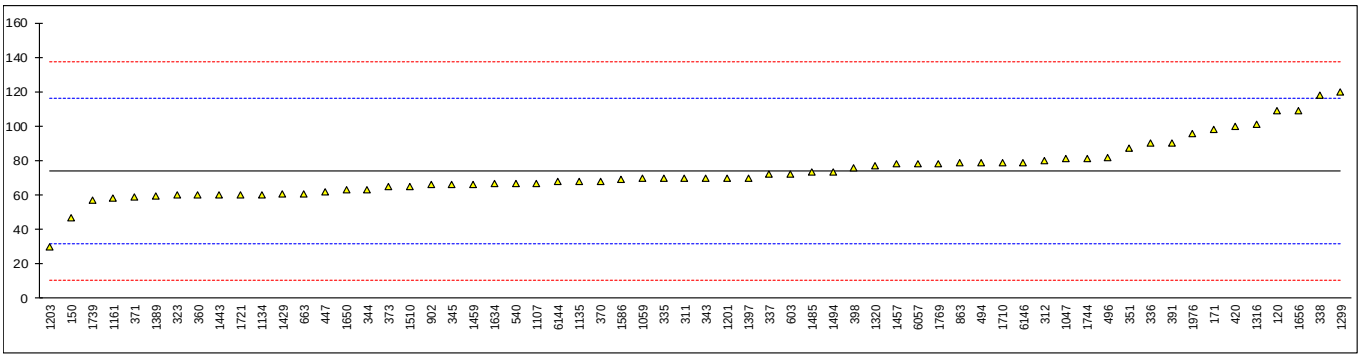


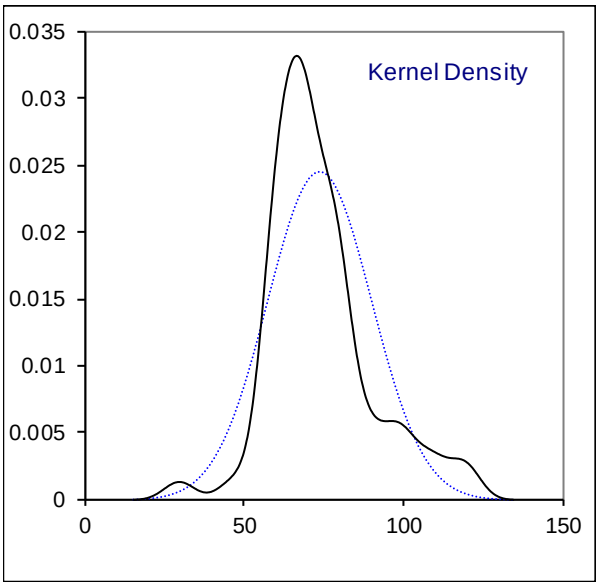
Determination of Water content by KF on sample #17180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO12937	109		1.67	
150	D6304	47	C	-1.27	first reported: 180
171	D6304	98		1.15	
311	ISO12937	70		-0.18	
312	ISO12937	80		0.29	
323	ISO12937	60		-0.66	
333		-----		-----	
334		-----		-----	
335	ISO12937	70		-0.18	
336	ISO12937	90		0.77	
337	ISO12937	72		-0.09	
338	ISO12937	118.09		2.10	
343	ISO12937	70		-0.18	
344	ISO12937	63		-0.51	
345	ISO12937	66		-0.37	
351	ISO12937	87		0.62	
360	ISO12937	60.0		-0.66	
370	ISO12937	68		-0.28	
371	ISO12937	58.95		-0.71	
373	ISO12937	65		-0.42	
391	ISO12937	90		0.77	
398	ISO12937	76		0.10	
420	ISO12937	99.9		1.24	
447	IP438	62		-0.56	
494	ISO12937	79		0.25	
496	ISO12937	82.0		0.39	
511		-----		-----	
540	ISO12937	67.0		-0.32	
603	D6304	72		-0.09	
663	E1064	60.9		-0.61	
863	ISO12937	79		0.25	
902	ISO12937	66		-0.37	
1011		-----		-----	
1033		-----		-----	
1047	ISO12937	81		0.34	
1059	ISO12937	70		-0.18	
1107	ISO12937	67		-0.32	
1134	IP386	60.32		-0.64	
1135	ISO12937	67.9		-0.28	
1161	ISO12937	58.025		-0.75	
1199		-----		-----	
1201	ISO12937	70		-0.18	
1203	ISO12937	30		-2.08	
1299	ISO12937	120	C	2.19	first reported: 160
1316	E1064	101		1.29	
1320	ISO12937	77		0.15	
1389	ISO12937	59.5		-0.68	
1397	ISO12937	70		-0.18	
1428		-----		-----	
1429	ISO12937	60.4		-0.64	
1443	ISO12937	60	C	-0.66	first reported: 225
1457	ISO12937	78		0.20	
1459	ISO12937	66		-0.37	
1485	ISO12937	73.2		-0.03	
1494	ISO12937	73.65		-0.01	
1510	IP438	65	C	-0.42	first reported: 231
1586	D6304	69		-0.23	
1634	ISO12937	66.6		-0.34	
1650	ISO12937	62.9		-0.52	
1656	ISO12937	109		1.67	
1706		-----		-----	
1710	ISO12937	79		0.25	
1721	ISO12937	60.2		-0.65	
1739	ISO12937	57.1		-0.79	
1744	E203	81		0.34	
1769	ISO12937	78.480		0.22	
1976	ISO12937	95.60		1.03	
1989		-----		-----	
1994		-----		-----	
6057	ISO12937	78		0.20	
6144	ISO12937	67.7		-0.29	
6146	ISO12937	79		0.25	

	normality	suspect			

n	62
outliers	0
mean (n)	73.829
st.dev. (n)	16.2445
R(calc.)	45.485
st.dev.(ISO12937:00)	21.1035
R(ISO12937:00)	59.090





Determination of Calorific Value on sample #17180; results in kJ/kg

lab	method	Gross at constant vol.	mark	Net at constant vol.	mark	Net at constant press.
120		-----	-----	-----		-----
150		-----	-----	-----		-----
171		-----	-----	-----		-----
311		-----	-----	-----		-----
312		-----	-----	-----		-----
323		-----	-----	-----		-----
333		-----	-----	-----		-----
334		-----	-----	-----		-----
335		-----	-----	-----		-----
336		-----	-----	-----		-----
337		-----	-----	-----		-----
338		-----	-----	-----		-----
343		-----	-----	-----		-----
344		-----	-----	-----		-----
345		-----	-----	-----		-----
351		-----	-----	-----		-----
360		-----	-----	-----		-----
370		-----	-----	-----		-----
371		-----	-----	-----		-----
373		-----	-----	-----		-----
391		-----	-----	-----		-----
398		-----	-----	-----		-----
420		-----	-----	-----		-----
447		-----	-----	-----		-----
494		-----	-----	-----		-----
496		-----	-----	-----		-----
511		-----	-----	-----		-----
540		-----	-----	-----		-----
603		-----	-----	-----		-----
663		-----	-----	-----		-----
863		-----	-----	-----		-----
902		-----	-----	-----		-----
1011		-----	-----	-----		-----
1033		-----	-----	-----		-----
1047		-----	-----	-----		-----
1059	DIN51900-1	40006	0.66	-----		-----
1107		-----	-----	-----		-----
1134		-----	-----	-----		-----
1135		-----	-----	-----		-----
1161	DIN51900-2	39812	-0.70	37332		-----
1199		-----	-----	-----		-----
1201		-----	-----	-----		-----
1203		-----	-----	-----		-----
1299		-----	-----	-----		-----
1316		-----	-----	-----		-----
1320		-----	-----	-----		-----
1389		-----	-----	-----		-----
1397		-----	-----	-----		-----
1428		-----	-----	-----		-----
1429		-----	-----	-----		-----
1443		-----	-----	-----		-----
1457		-----	-----	-----		-----
1459		-----	-----	-----		-----
1485		-----	-----	-----		-----
1494		-----	-----	-----		-----
1510		-----	-----	-----		-----
1586		-----	-----	-----		-----
1634		-----	-----	-----		-----
1650		-----	-----	-----		-----
1656		-----	-----	-----		-----
1706		-----	-----	-----		-----
1710		-----	-----	-----		-----
1721		-----	-----	-----		-----
1739		-----	-----	-----		-----
1744		-----	-----	-----		-----
1769		-----	-----	-----		-----
1976		-----	-----	-----		-----
1989		-----	-----	-----		-----
1994		-----	-----	-----		-----
6057		-----	-----	-----		-----
6144		-----	-----	-----		-----
6146	D240	39916.5	0.04	-----		-----

Lab 6146 probably unit error. Reported 39.9165 kJ/kg

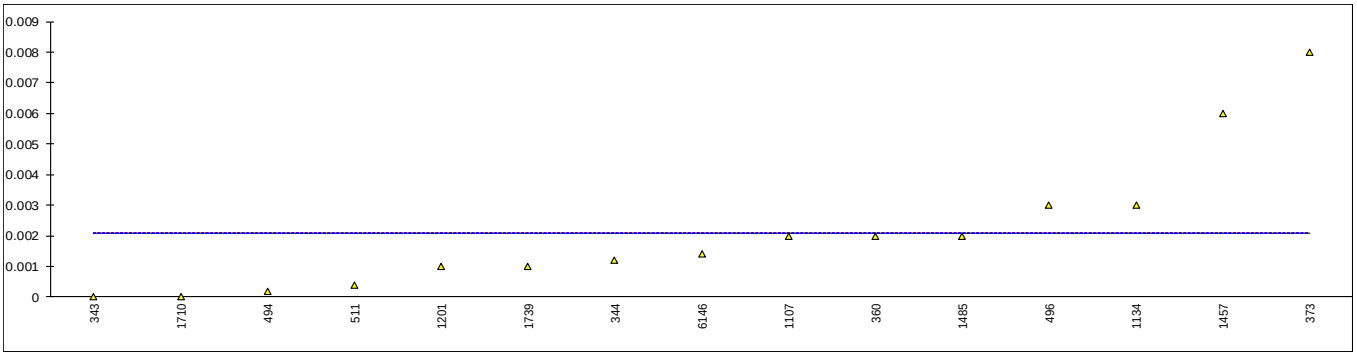
	normality	unknown	unknown	

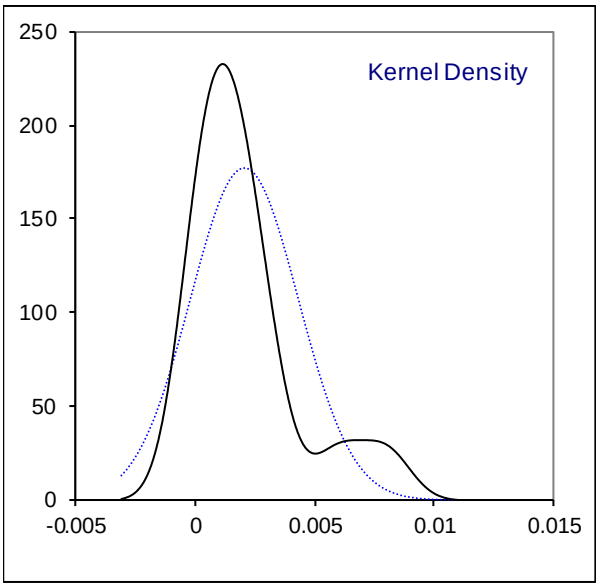
n	3	1
outliers	n.a.	n.a.
mean (n)	39911.5	n.a.
st.dev. (n)	97.10	n.a.
R(calc.)	271.8	n.a.
st.dev.(DIN51900-1:00)	142.86	n.a.
R(DIN51900-1:00)	400	n.a.

Determination of Methanol on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14110	<0.01		-----	
311	EN14110	<0.01		-----	
312	EN14110	<0.01		-----	
323	EN14110	< 0.01		-----	
333		-----		-----	
334	EN14110	<0.01		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14110	0.000		-----	
344	EN14110	0.0012		-----	
345	EN14110	<0.01		-----	
351		-----		-----	
360	EN14110	0.002		-----	
370		-----		-----	
371		-----		-----	
373	EN14110	0.008		-----	
391		-----		-----	
398		-----		-----	
420	EN14110	<0,005		-----	
447		-----		-----	
494	EN14110	0.0002		-----	
496	EN14110	0.003		-----	
511	EN14110	0.0004		-----	
540	EN14110	<0.01		-----	
603		-----		-----	
663		-----		-----	
863	EN14110	<0.01		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14110	<0,01		-----	
1059	EN14110	<0,01		-----	
1107	EN14110	0.002		-----	
1134	EN14110	0.003		-----	
1135	EN14110	<0.01		-----	
1161	EN14110	<0,01		-----	
1199		-----		-----	
1201	EN14110	0.001		-----	
1203	EN14110	<0,005		-----	
1299	EN14110	<0.01		-----	
1316		-----		-----	
1320	EN14110	<0,01		-----	
1389		-----		-----	
1397		-----		-----	
1428		-----		-----	
1429	EN14110	<0.01		-----	
1443	EN14110	<0.01		-----	
1457	EN14110	0.006		-----	
1459		-----		-----	
1485	EN14110	0.002		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14110	< 0.01		-----	
1656	EN14110	<0.01		-----	
1706		-----		-----	
1710	EN14110	0.00		-----	
1721	EN14110	<0,01		-----	
1739	EN14110	0.001		-----	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989	EN14110	<0.010		-----	
1994		-----		-----	
6057	EN14110	<0,01		-----	
6144		-----		-----	
6146	EN14110	0.0014		-----	

normality	OK
n	38
outliers	n.a.
mean (n)	<0.01
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(EN14110:03)	n.a.
R(EN14110:03)	n.a.

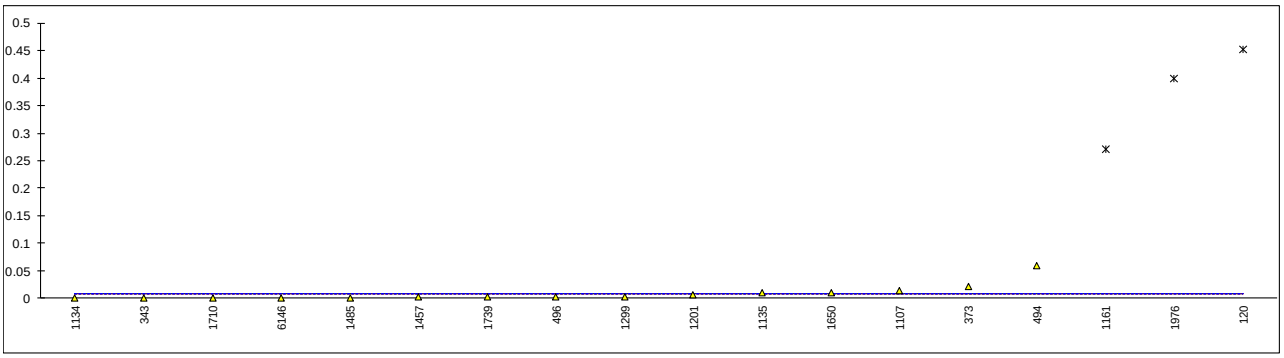


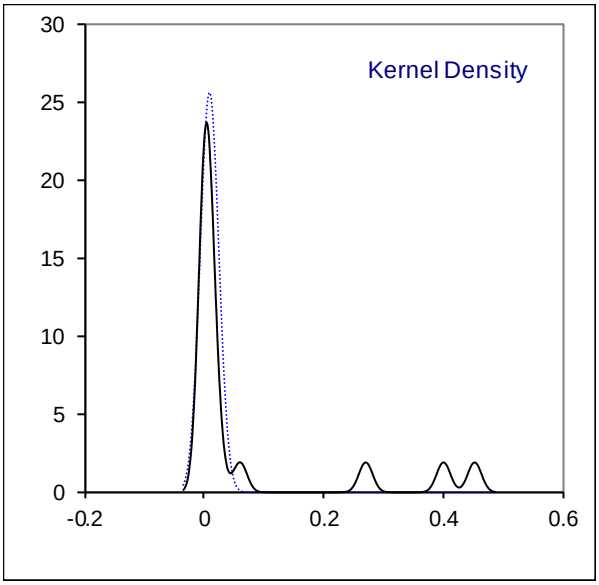


Determination of mono-Glycerides on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.452		-----	False positive test result?
150		-----		-----	
171		-----		-----	
311	EN14105	<0.10		-----	
312	EN14105	<0,10		-----	
323	EN14105	< 0.10		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.00		-----	
344	EN14105	<0.25		-----	
345	EN14105	<10		-----	Possible unit error?
351		-----		-----	
360	EN14105	< 0.10		-----	
370		-----		-----	
371		-----		-----	
373	EN14105	0.022		-----	
391		-----		-----	
398	EN14105	<0,10		-----	
420	EN14105	<0,05		-----	
447		-----		-----	
494	EN14105	0.06		-----	
496	EN14105	0.0030		-----	
511		-----		-----	
540	EN14105	<0.25		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14105	<0,10		-----	
1059	EN14105	<0,10		-----	
1107	EN14105	0.015		-----	
1134	EN14105	0.000		-----	
1135	EN14105	0.01		-----	
1161	EN14105	0.27		-----	False positive test result?
1199		-----		-----	
1201	EN14105	0.006		-----	
1203	EN14105	<0,05		-----	
1299	EN14105	0.003		-----	
1316		-----		-----	
1320	EN14105	<0,10		-----	
1389	EN14105	<0.05		-----	
1397	EN14105	<0,01		-----	
1428		-----		-----	
1429	EN14105	<0.01		-----	
1443	EN14105	<0.10		-----	
1457	EN14105	0.002		-----	
1459		-----		-----	
1485	EN14105	0.001		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14105	0.01		-----	
1656	EN14105	<0.01		-----	
1706		-----		-----	
1710	EN14105	0.00		-----	
1721	EN14105	<o,1		-----	
1739	EN14105	0.0027		-----	
1744		-----		-----	
1769		-----		-----	
1976	EN14105	0.40	C	-----	first reported 0.36. False positive test result?
1989		-----		-----	
1994		-----		-----	
6057	EN14105	<0,10		-----	
6144		-----		-----	
6146	EN14105	0		-----	
	normality	n.a.			

n	35
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(EN14105:11)	n.a.
R(EN14105:11)	n.a.

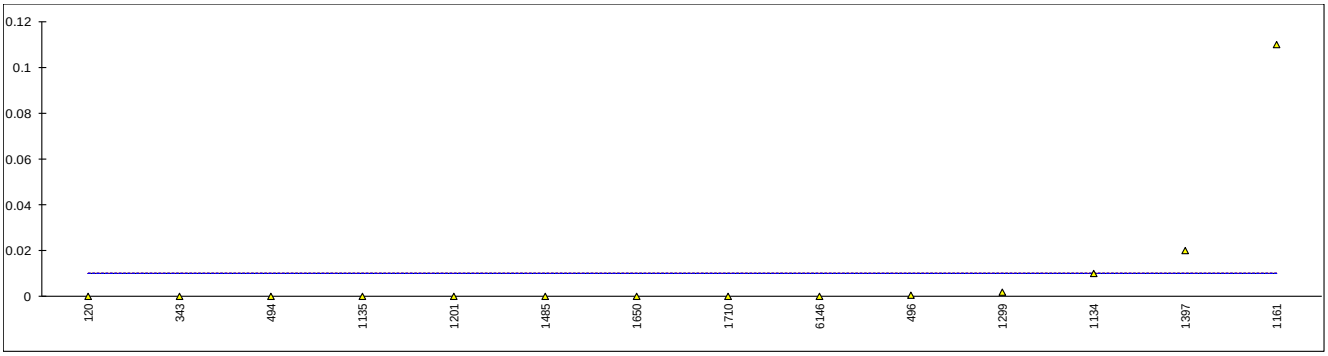


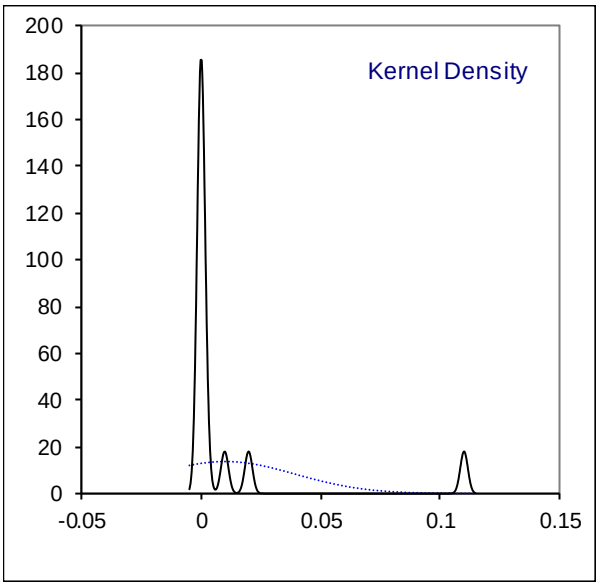


Determination of di-Glycerides on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0		-----	
150		-----		-----	
171		-----		-----	
311	EN14105	<0.10		-----	
312	EN14105	<0.10		-----	
323	EN14105	< 0.10		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.00		-----	
344	EN14105	<0.05		-----	
345	EN14105	<10		-----	Possible unit error?
351		-----		-----	
360	EN14105	< 0.10		-----	
370		-----		-----	
371		-----		-----	
373	EN14105	<0.02		-----	
391		-----		-----	
398	EN14105	<0,10		-----	
420	EN14105	<0,05		-----	
447		-----		-----	
494	EN14105	0.00		-----	
496	EN14105	0.0007		-----	
511		-----		-----	
540	EN14105	<0.05		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14105	<0,10		-----	
1059	EN14105	<0,10		-----	
1107	EN14105	<0.01		-----	
1134	EN14105	0.010		-----	
1135	EN14105	0.00		-----	
1161	EN14105	0.11		-----	
1199		-----		-----	
1201	EN14105	0.0		-----	
1203	EN14105	<0,05		-----	
1299	EN14105	0.002		-----	
1316		-----		-----	
1320	EN14105	<0,10		-----	
1389	EN14105	<0.02		-----	
1397	EN14105	0.02		-----	
1428		-----		-----	
1429	EN14105	<0.01		-----	
1443	EN14105	<0.10		-----	
1457	EN14105	<0.01		-----	
1459		-----		-----	
1485	EN14105	0.000		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14105	0		-----	
1656	EN14105	<0.01		-----	
1706		-----		-----	
1710	EN14105	0.00		-----	
1721	EN14105	<0,1		-----	
1739	EN14105	<0.10[LQ]		-----	
1744		-----		-----	
1769		-----		-----	
1976	EN14105	<0,10		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN14105	<0,10		-----	
6144		-----		-----	
6146	EN14105	0		-----	
	normality	n.a.			

n	38
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(EN14105:11)	n.a.
R(EN14105:11)	n.a.

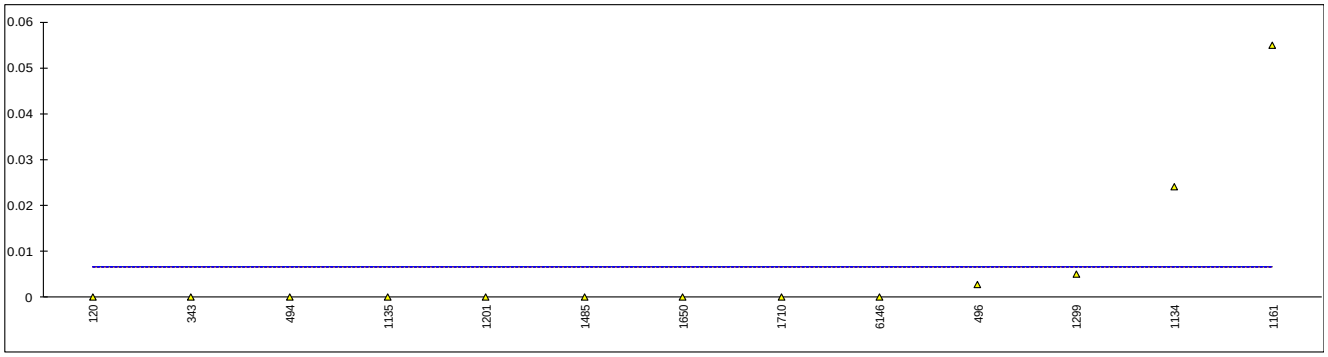


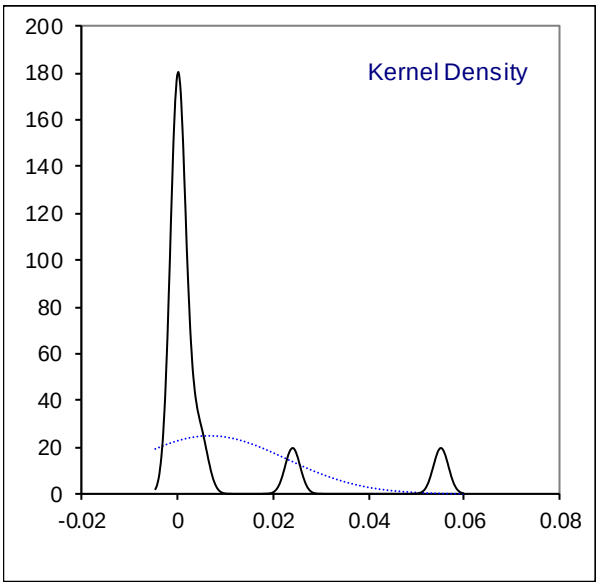


Determination of tri-Glycerides on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0		-----	
150		-----		-----	
171		-----		-----	
311	EN14105	<0.10		-----	
312	EN14105	<0.10		-----	
323	EN14105	< 0.10		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.00		-----	
344	EN14105	<0.05		-----	
345	EN14105	<10		-----	Possible unit error?
351		-----		-----	
360	EN14105	< 0.10		-----	
370		-----		-----	
371		-----		-----	
373	EN14105	<0.02		-----	
391		-----		-----	
398	EN14105	<0,10		-----	
420	EN14105	<0,05		-----	
447		-----		-----	
494	EN14105	0.00		-----	
496	EN14105	0.0028		-----	
511		-----		-----	
540	EN14105	<0.05		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14105	<0,10		-----	
1059	EN14105	<0,10		-----	
1107	EN14105	<0.01		-----	
1134	EN14105	0.024		-----	
1135	EN14105	0.00		-----	
1161	EN14105	0.055		-----	
1199		-----		-----	
1201	EN14105	0.0		-----	
1203	EN14105	<0,01		-----	
1299	EN14105	0.005		-----	
1316		-----		-----	
1320	EN14105	<0,10		-----	
1389	EN14105	<0.03		-----	
1397	EN14105	<0,01		-----	
1428		-----		-----	
1429	EN14105	<0.01		-----	
1443	EN14105	<0.10		-----	
1457	EN14105	<0.01		-----	
1459		-----		-----	
1485	EN14105	0.000		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14105	0		-----	
1656	EN14105	<0.01		-----	
1706		-----		-----	
1710	EN14105	0.00		-----	
1721	EN14105	<0,1		-----	
1739	EN14105	<0.10[LQ]		-----	
1744		-----		-----	
1769		-----		-----	
1976	EN14105	<0,10		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN14105	<0,10		-----	
6144		-----		-----	
6146	EN14105	0		-----	
	normality	n.a.			

n	38
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(EN14105:11)	n.a
R(EN14105:11)	n.a.

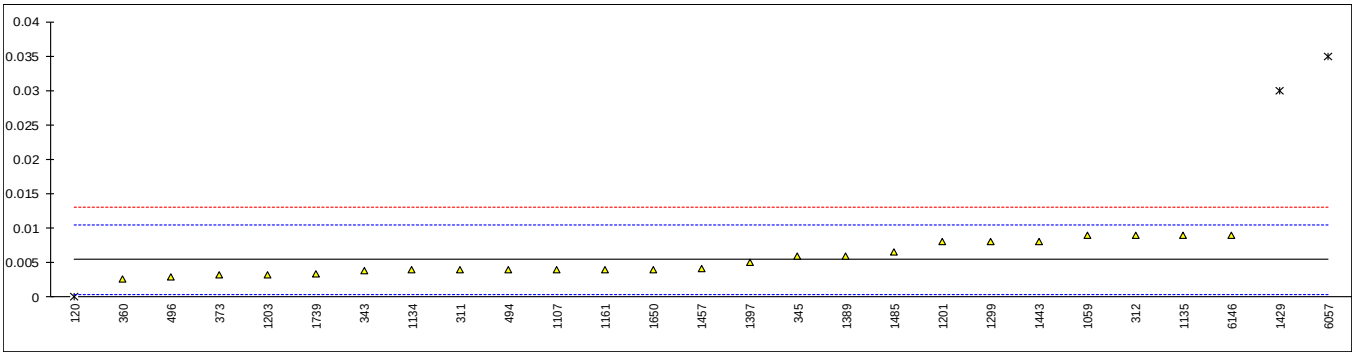


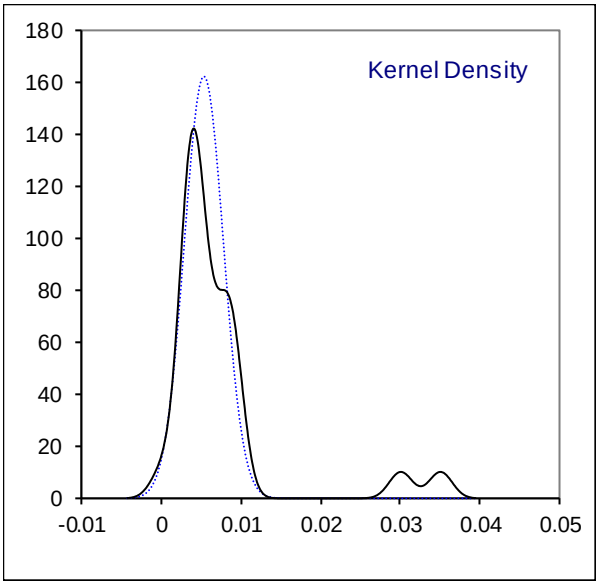


Determination of Free Glycerol on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0	ex	-2.15	Result excluded because zero is no real test result
150		-----		-----	
171		-----		-----	
311	EN14105	0.004		-0.58	
312	EN14105	0.009		1.39	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.0038		-0.66	
344	EN14105	<0.005		-----	
345	EN14105	0.006		0.21	
351		-----		-----	
360	EN14105	0.0027		-1.09	
370		-----		-----	
371		-----		-----	
373	EN14105	0.0033		-0.85	
391		-----		-----	
398		-----		-----	
420	EN14105	<0,005		-----	
447		-----		-----	
494	EN14105	0.004		-0.58	
496	EN14105	0.0029		-1.01	
511		-----		-----	
540	EN14105	<0.01		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	EN14105	0.009	C	1.39	first reported 0.040
1107	EN14105	0.004		-0.58	
1134	EN14105	0.0040		-0.58	
1135	EN14105	0.009		1.39	
1161	EN14105	0.0040		-0.58	
1199		-----		-----	
1201	EN14105	0.008		1.00	
1203	EN14105	0.0033		-0.85	
1299	EN14105	0.008		1.00	
1316		-----		-----	
1320	EN14105	<0,006		-----	
1389	EN14105	0.006		0.21	
1397	EN14105	0.005		-0.18	
1428		-----		-----	
1429	EN14105	0.03	R(0.01)	9.67	
1443	EN14105	0.008	C	1.00	first reported 0.0211
1457	EN14105	0.0042	C	-0.50	first reported 0.0265
1459		-----		-----	
1485	EN14105	0.0065		0.41	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14105	0.004	C	-0.58	first reported 0.028
1656	EN14105	<0.01		-----	
1706		-----		-----	
1710		-----	W	-----	first reported 0.03
1721	EN14105	<0,001		-----	
1739	EN14105	0.00345		-0.79	
1744		-----		-----	
1769		-----		-----	
1976	EN14105	<0,005		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN14105	0.035	R(0.01)	11.65	
6144		-----		-----	
6146	EN14105	0.0090		1.39	
	normality	OK			

n	24
outliers	2 + 1ex
mean (n)	0.0055
st.dev. (n)	0.00225
R(calc.)	0.0063
st.dev.(EN14105:11)	0.00254
R(EN14105:11)	0.0071

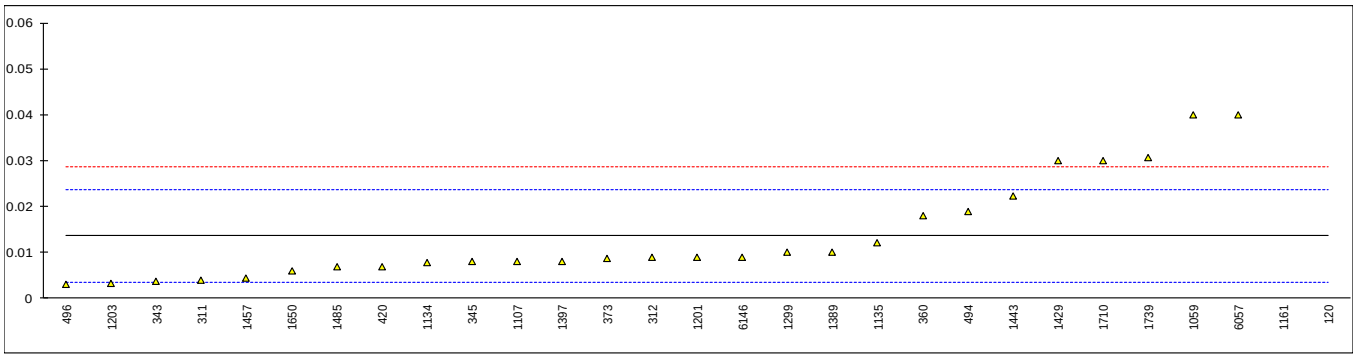


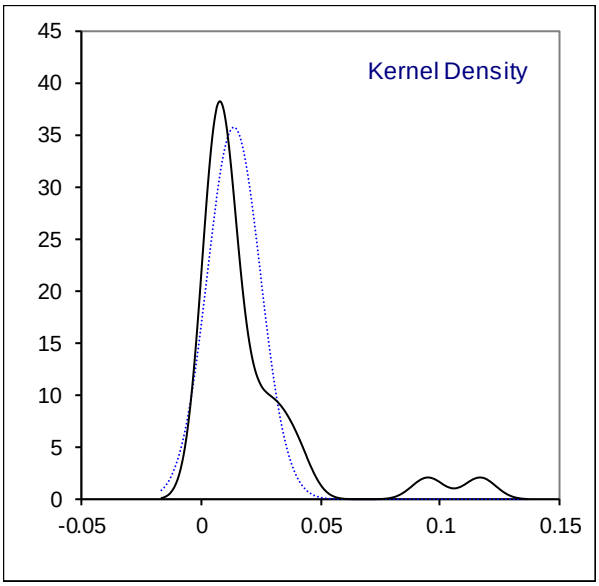


Determination of Total Glycerol on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.117	R(0.01)	20.54	
150		-----		-----	
171		-----		-----	
311	EN14105	0.004		-1.91	
312	EN14105	0.009		-0.92	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.0038		-1.95	
344	EN14105	<0.08		-----	
345	EN14105	0.008		-1.12	
351		-----		-----	
360	EN14105	0.018		0.87	
370		-----		-----	
371		-----		-----	
373	EN14105	0.0086		-1.00	
391		-----		-----	
398		-----		-----	
420	EN14105	0.007		-1.32	
447		-----		-----	
494	EN14105	0.019		1.07	
496	EN14105	0.0030		-2.11	
511		-----		-----	
540	EN14105	<0.08		-----	
603		-----		-----	
663		-----		-----	
863		-----		-----	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	EN14105	0.040		5.24	
1107	EN14105	0.008		-1.12	
1134	EN14105	0.0079		-1.14	
1135	EN14105	0.012		-0.32	
1161	EN14105	0.095	R(0.01)	16.17	
1199		-----		-----	
1201	EN14105	0.009		-0.92	
1203	EN14105	0.0033		-2.05	
1299	EN14105	0.010		-0.72	
1316		-----		-----	
1320	EN14105	<0,006		-----	
1389	EN14105	0.01		-0.72	
1397	EN14105	0.008		-1.12	
1428		-----		-----	
1429	EN14105	0.03		3.26	
1443	EN14105	0.0224		1.75	
1457	EN14105	0.0043	C	-1.85	first reported 0.0270
1459		-----		-----	
1485	EN14105	0.0068		-1.35	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650	EN14105	0.006	C	-1.51	first reported 0.29
1656	EN14105	<0.01		-----	
1706		-----		-----	
1710	EN14105	0.03		3.26	
1721		-----		-----	
1739	EN14105	0.0306		3.37	
1744		-----		-----	
1769		-----		-----	
1976	EN14105	<0,05		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN14105	0.040		5.24	
6144		-----		-----	
6146	EN14105	0.009		-0.92	
	normality	suspect			

n	27
outliers	2
mean (n)	0.0136
st.dev. (n)	0.01115
R(calc.)	0.0312
st.dev.(EN14105:11)	0.00503
R(EN14105:11)	0.0141

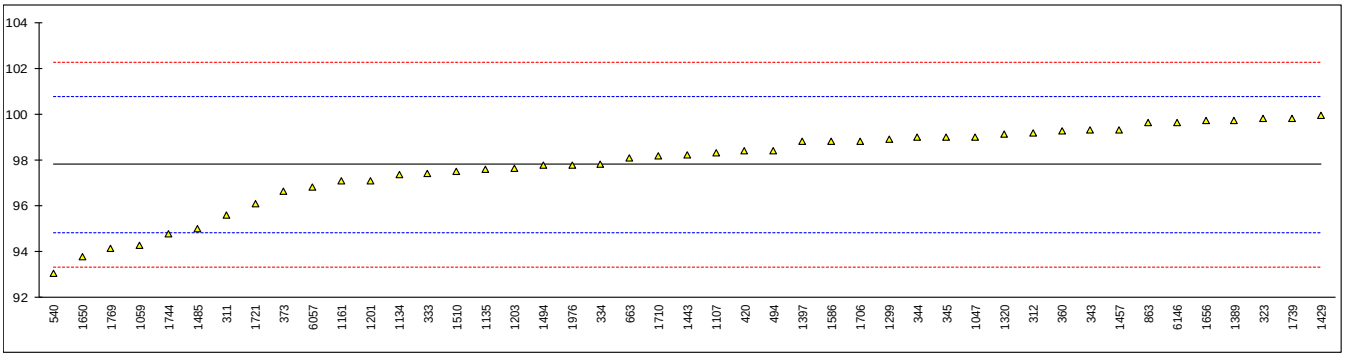


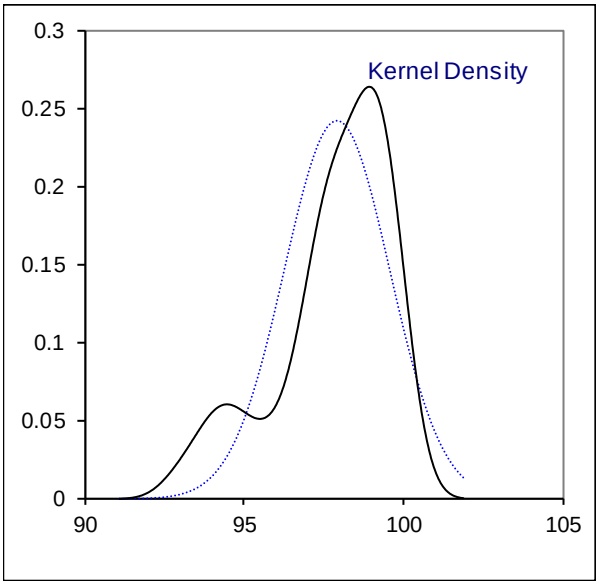


Determination of Total Ester content (FAME) on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171		-----		-----	
311	EN14103	95.6		-1.49	
312	EN14103	99.2		0.93	
323	EN14103	99.8		1.34	
333	EN14103	97.4		-0.28	
334	EN14103	97.8		-0.01	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14103	99.3		1.00	
344	EN14103	99.0		0.80	
345	EN14103	99.0		0.80	
351		-----		-----	
360	EN14103	99.25		0.97	
370		-----		-----	
371		-----		-----	
373	EN14103	96.62		-0.80	
391		-----		-----	
398		-----		-----	
420	EN14103	98.4		0.40	
447		-----		-----	
494	EN14103	98.4		0.40	
496		-----		-----	
511		-----		-----	
540	EN14103	93.06		-3.20	
603		-----		-----	
663	EN14103	98.09		0.19	
863	EN14103	99.61		1.21	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14103	99.0		0.80	
1059	EN14103	94.3		-2.36	
1107	EN14103	98.3		0.33	
1134	EN14103	97.348		-0.31	
1135	EN14103	97.60		-0.14	
1161	EN14103	97.1		-0.48	
1199		-----		-----	
1201	EN14103	97.11		-0.47	
1203	EN14103	97.62		-0.13	
1299	EN14103	98.9		0.73	
1316		-----		-----	
1320	EN14103	99.13		0.89	
1389	EN14103	99.71		1.28	
1397	EN14103	98.8		0.66	
1428		-----		-----	
1429	EN14103	99.93		1.43	
1443	EN14103	98.22		0.27	
1457	EN14103	99.32		1.01	
1459		-----		-----	
1485	EN14103	94.99		-1.90	
1494	EN14103	97.76		-0.04	
1510	EN14103	97.5		-0.21	
1586	EN14103	98.8		0.66	
1634		-----		-----	
1650	EN14103	93.8	C	-2.70	first reported 90.6
1656	EN14103	99.7		1.27	
1706	EN14103	98.81		0.67	
1710	EN14103	98.2		0.26	
1721	EN14103	96.1		-1.15	
1739	EN14103	99.83		1.36	
1744	EN14103	94.78		-2.04	
1769	EN14103	94.165		-2.45	
1976	EN14103	97.78		-0.02	
1989		-----		-----	
1994		-----		-----	
6057	EN14103	96.8		-0.68	
6144		-----		-----	
6146	EN14103	99.61		1.21	

normality	OK
n	45
outliers	0
mean (n)	97.812
st.dev. (n)	1.7797
R(calc.)	4.983
st.dev.(EN14103:11)	1.4857
R(EN14103:11)	4.16

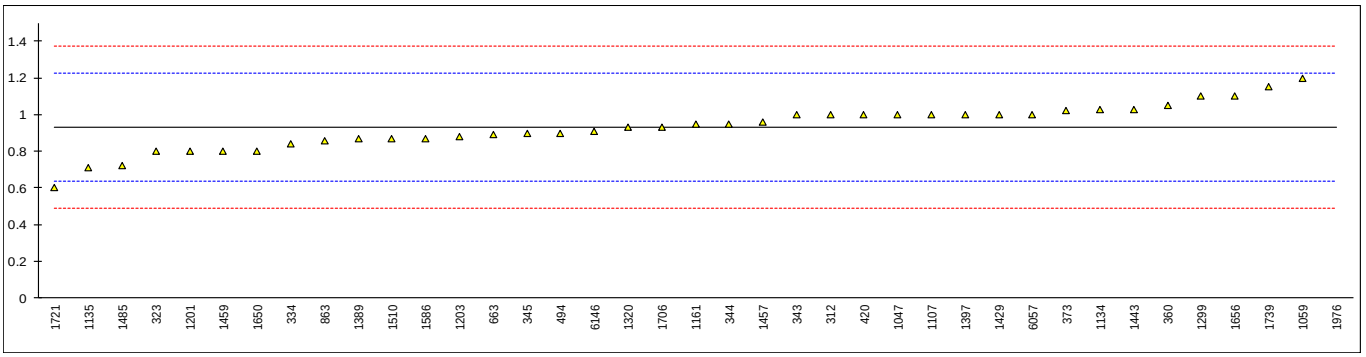


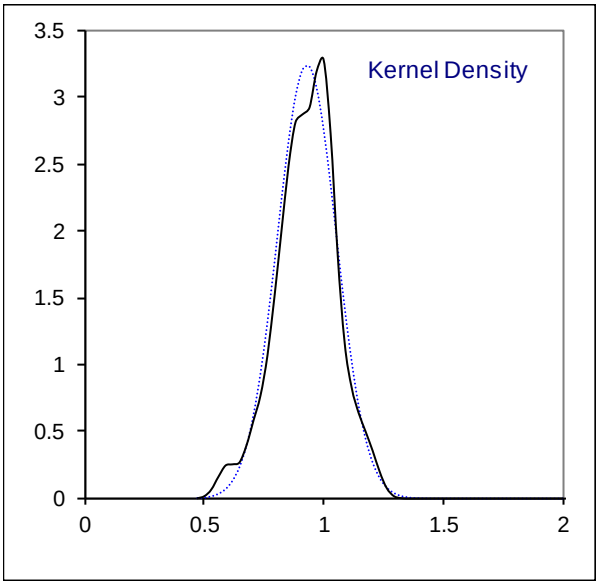


Determination of Linolenic Acid Methyl Ester content on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171		-----		-----	
311	EN14103	<1		-----	
312	EN14103	1.0		0.46	
323	EN14103	0.8		-0.89	
333	EN14103	< 1.0		-----	
334	EN14103	0.84		-0.62	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14103	1.0		0.46	
344	EN14103	0.95		0.12	
345	EN14103	0.9		-0.22	
351		-----		-----	
360	EN14103	1.05		0.80	
370		-----		-----	
371		-----		-----	
373	EN14103	1.0196		0.59	
391		-----		-----	
398		-----		-----	
420	EN14103	1.0		0.46	
447		-----		-----	
494	EN14103	0.9		-0.22	
496		-----		-----	
511		-----		-----	
540	EN14103	<1.0		-----	
603		-----		-----	
663	EN14103	0.89		-0.29	
863	EN14103	0.86		-0.49	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN14103	1.0		0.46	
1059	EN14103	1.2		1.81	
1107	EN14103	1.0		0.46	
1134	EN14103	1.030		0.66	
1135	EN14103	0.71		-1.50	
1161	EN14103	0.95		0.12	
1199		-----		-----	
1201	EN14103	0.80		-0.89	
1203	EN14103	0.88		-0.35	
1299	EN14103	1.1		1.14	
1316		-----		-----	
1320	EN14103	0.93		-0.01	
1389	EN14103	0.87		-0.42	
1397	EN14103	1.0		0.46	
1428		-----		-----	
1429	EN14103	1.0		0.46	
1443	EN14103	1.03		0.66	
1457	EN14103	0.962		0.20	
1459	EN14103	0.8	C	-0.89	first reported 1.4
1485	EN14103	0.72		-1.44	
1494		-----		-----	
1510	EN14103	0.87		-0.42	
1586	EN14103	0.87		-0.42	
1634		-----		-----	
1650	EN14103	0.8		-0.89	
1656	EN14103	1.1		1.14	
1706	EN14103	0.93		-0.01	
1710		-----	W	-----	Test result withdrawn. Reported was 1.5
1721	EN14103	0.60		-2.25	
1739	EN14103	1.15		1.47	
1744		-----		-----	
1769		-----		-----	
1976	EN14103	7.825	C,R(0.01)	46.64	first reported 7.56
1989		-----		-----	
1994		-----		-----	
6057	EN14103	1.0		0.46	
6144		-----		-----	
6146	EN14103	0.91		-0.15	
	normality	OK			

n	38
outliers	1
mean (n)	0.932
st.dev. (n)	0.1232
R(calc.)	0.345
st.dev.(EN14103:11)	0.1478
R(EN14103:11)	0.414

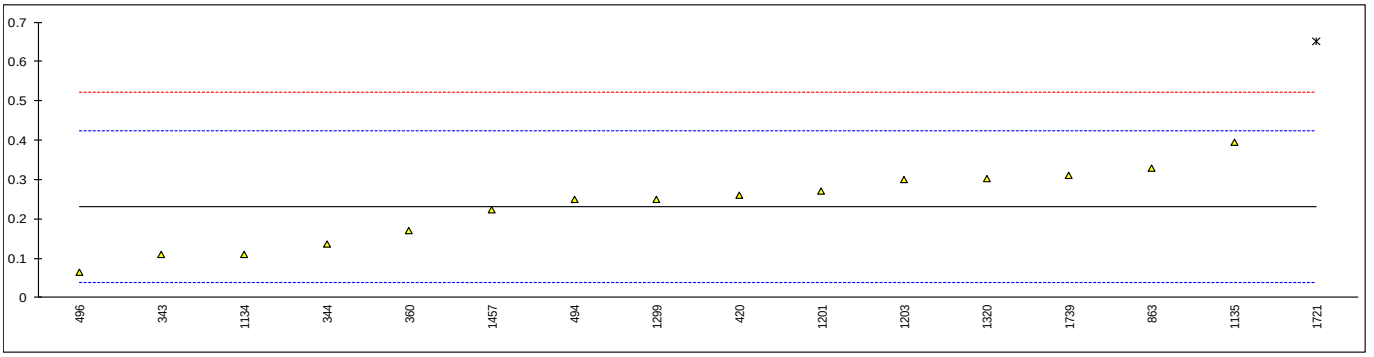


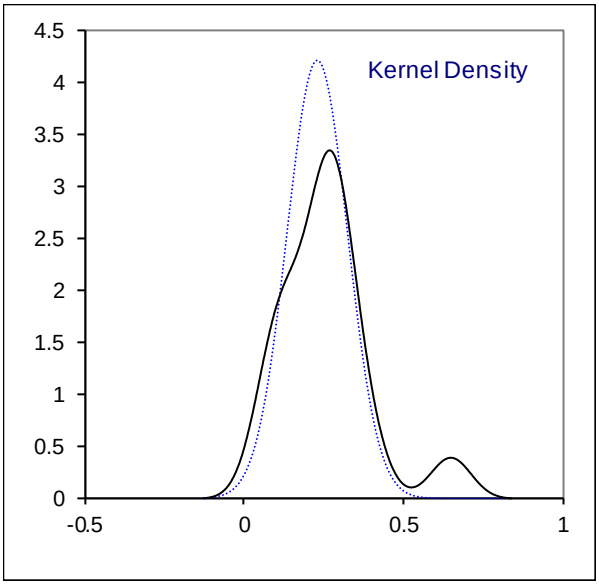


Determination of Polyunsaturated Methyl Esters content on sample #17180; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171		-----		-----	
311		-----		-----	
312	EN15779	<0.6		-----	
323	EN15779	< 0.6		-----	
333	EN15779	< 0.6		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN15779	0.11		-1.27	
344	EN15779	0.136		-1.00	
345	EN15779	<0.3		-----	
351		-----		-----	
360	EN15779	0.17		-0.64	
370		-----		-----	
371		-----		-----	
373	EN15779	<0.6		-----	
391		-----		-----	
398		-----		-----	
420	EN15779	0.26		0.29	
447		-----		-----	
494	EN15779	0.25		0.19	
496	EN15779	0.065		-1.73	
511		-----		-----	
540		-----		-----	
603		-----		-----	
663		-----		-----	
863	EN15779	0.33		1.02	
902		-----		-----	
1011		-----		-----	
1033		-----		-----	
1047	EN15779	<0,6		-----	
1059	EN15779	<0,3		-----	
1107		-----		-----	
1134	EN14103	0.110		-1.27	
1135	EN15779	0.3951		1.69	
1161	EN15779	<0,2		-----	
1199		-----		-----	
1201	EN15779	0.27		0.39	
1203	EN15779	0.299		0.69	
1299	EN15779	0.25		0.19	
1316		-----		-----	
1320	EN15779	0.303		0.74	
1389	EN15779	<0.6		-----	
1397		-----		-----	
1428		-----		-----	
1429		-----		-----	
1443		-----		-----	
1457	EN15779	0.222		-0.10	
1459		-----		-----	
1485		-----		-----	
1494		-----		-----	
1510		-----		-----	
1586		-----		-----	
1634		-----		-----	
1650		-----		-----	
1656		-----		-----	
1706		-----		-----	
1710		-----		-----	
1721	EN15779	0.65	G(0.05)	4.33	
1739	EN15779	0.31		0.81	
1744		-----		-----	
1769		-----		-----	
1976		-----		-----	
1989		-----		-----	
1994		-----		-----	
6057	EN15779	<0,6		-----	
6144		-----		-----	
6146		-----		-----	

normality	OK
n	15
outliers	1
mean (n)	0.232
st.dev. (n)	0.0947
R(calc.)	0.265
st.dev.(EN15779:09+A1:13)	0.0964
R(EN15779:09+A1:13)	0.27





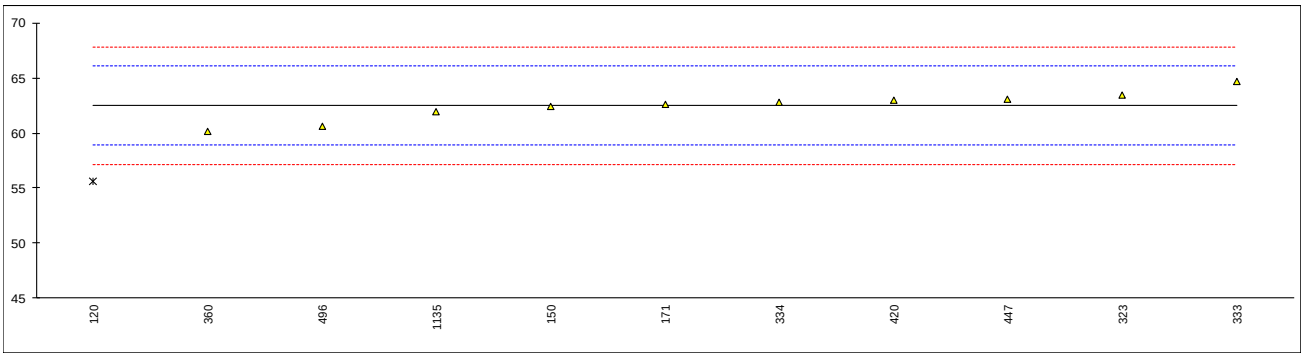
--- Empty page ---

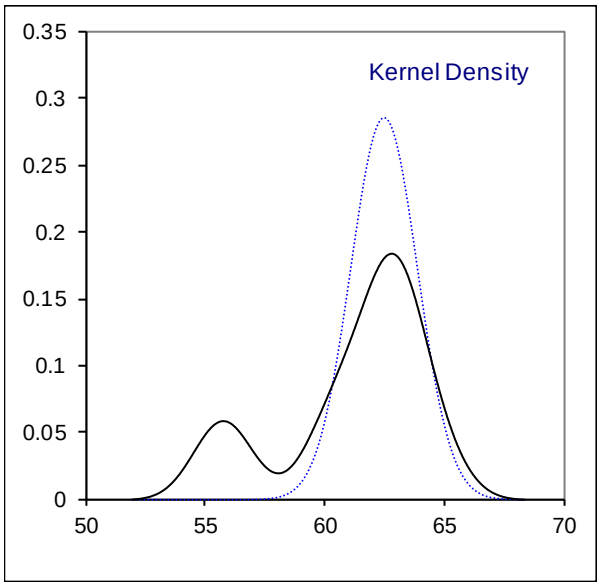
Determination of Cetane Number (ISO5165) of sample #17181

lab	method	value	mark	z(targ)	remarks
120	D613	55.6	G(0.01)	-3.85	
150	D613	62.4	C	-0.04	first reported 55.9
171	D613	62.6		0.07	
323	ISO5165	63.4		0.52	
333	ISO5165	64.7		1.25	
334	ISO5165	62.8		0.18	
336		-----		-----	
343		-----		-----	
360	ISO5165	60.17		-1.29	
420	ISO5165	63.0		0.30	
447	IP41	63.1		0.35	
494		-----		-----	
496	ISO5165	60.65		-1.02	
1059		-----		-----	
1107		-----		-----	
1134		-----		-----	
1135	IP617	61.9		-0.32	
1161		-----		-----	
1201		-----		-----	
1251		-----		-----	
1299		-----		-----	
1457		-----		-----	
6057		-----		-----	
6075		-----		-----	

	normality	OK
	n	10
	outliers	1
	mean (n)	62.472
	st.dev. (n)	1.3154
	R(calc.)	3.683
	st.dev.(EN14214:+A1:14)	1.7857
	R(EN14214:+A1:14)	5

Compare R(ISO5165:98) = 4.8
Compare R(D613:16a) = 4.8



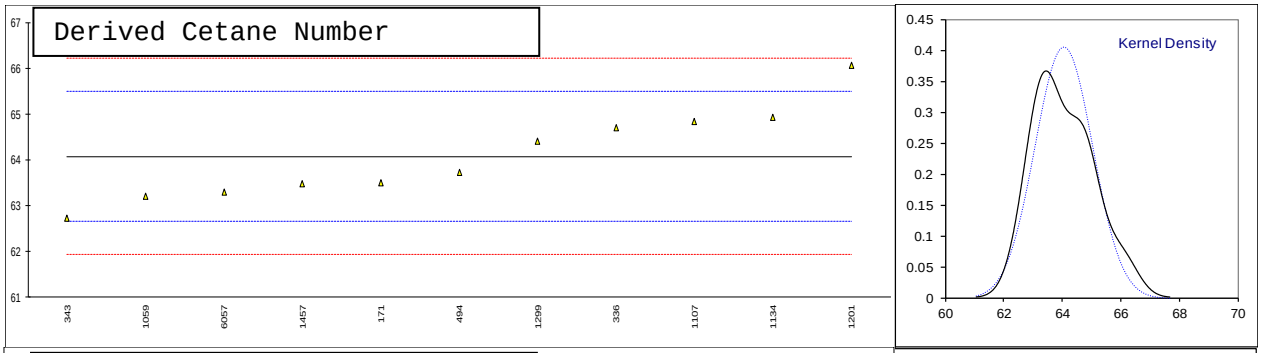


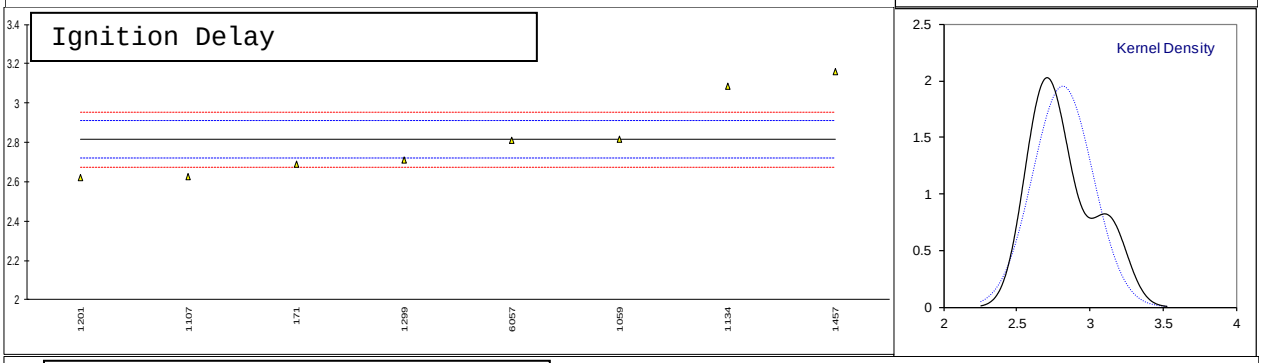
Determination of Derived Cetane Number (D7668) of sample #17181

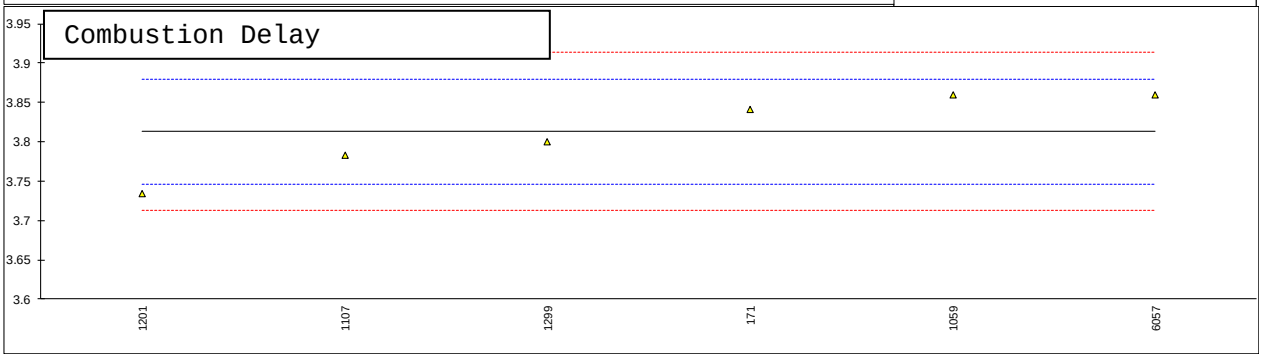
lab	method	DCN	mark	z(targ)	ID	mark	z(targ)	CD	mark	z(targ)	W.T.
120		-----		-----	-----		-----	-----		-----	-----
150		-----		-----	-----		-----	-----		-----	-----
171	D7668	63.5		-0.81	2.6904		-2.66	3.8413		0.85	20.03
323		-----		-----	-----		-----	-----		-----	-----
333		-----		-----	-----		-----	-----		-----	-----
334		-----		-----	-----		-----	-----		-----	-----
336	D7668	64.7		0.87	-----		-----	-----		-----	-----
343	D7668	62.73	C	-1.89	-----		-----	-----		-----	-----
360		-----		-----	-----		-----	-----		-----	-----
420		-----		-----	-----		-----	-----		-----	-----
447		-----		-----	-----		-----	-----		-----	-----
494	D7668	63.72		-0.50	-----		-----	-----		-----	-----
496		-----		-----	-----		-----	-----		-----	-----
1059	D7668	63.2		-1.23	2.816		0.02	3.859		1.38	603.2
1107	D7668	64.83		1.06	2.6271		-4.01	3.7830		-0.89	605.18
1134	IP498	64.93		1.20	3.086		5.79	-----		-----	584.0
1135		-----		-----	-----		-----	-----		-----	-----
1161		-----		-----	-----		-----	-----		-----	-----
1201	D7668	66.05		2.77	2.6201		-4.16	3.7337		-2.37	605.19
1251		-----		-----	-----		-----	-----		-----	-----
1299	D7668	64.4		0.45	2.71		-2.24	3.80		-0.38	592.6
1457	D7668	63.49		-0.82	3.161		7.39	-----		-----	581.4
6057	D7668	63.3		-1.09	2.81		-0.11	3.86		1.41	593
6075		-----		-----	-----		-----	-----		-----	-----
	normality	OK			unknown			unknown			
	n	11			8			6			
	outliers	0			0			0			
	mean (n)	64.077			2.815			3.813			
	st.dev. (n)	0.9835			0.2046			0.0500			
	R(calc.)	2.754			0.573			0.140			
	st.dev.(D7668:14a)	0.7145			0.0468			0.0334			
	R(D7668:14a)	2.001			0.131			0.094			

W.T. = Chamber Wall Temperature

Lab 343 first reported: 61.3


Derived Cetane Number
67
66
65
64
63
62
61
343
1059
6057
1457
171
494
1299
336
1107
1134
1201
Kernel Density
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
60
62
64
66
68
70


Ignition Delay
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1201
1107
171
1299
6057
1059
1134
1457
Kernel Density
2.5
2
1.5
1
0.5
0
2
2.5
3
3.5
4


Combustion Delay
3.95
3.9
3.85
3.8
3.75
3.7
3.65
3.6
1201
1107
1299
171
1059
6057

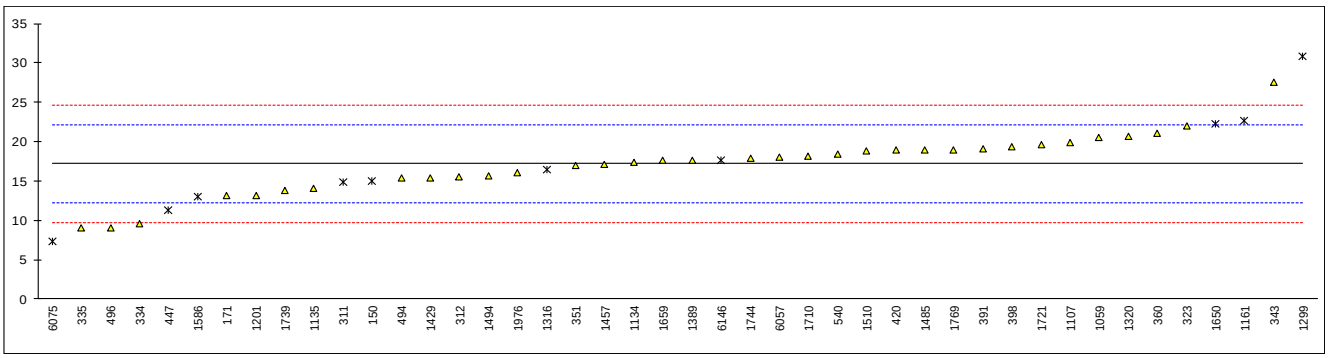
Determination of Total Contamination EN12662:2008/1998 on sample #17183; results in mg/kg

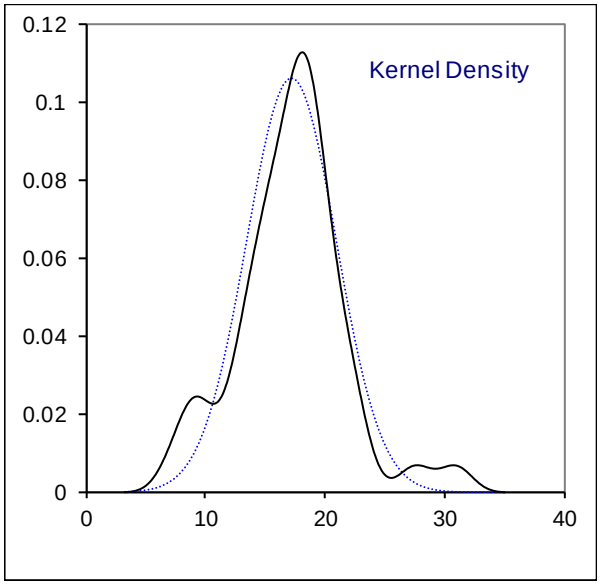
lab	method	Total C.	mark	z(targ)	Incomplete	Vol. filtered	stopped	remarks
150	EN12662:2014	15	ex	-0.88	-----	300	-----	*), also see §4.1
171	EN12662:2008	13.1		-1.65	-----	300	-----	
311	EN12662:2014	14.9	ex	-0.92	-----	300	-----	*), also see §4.1
312	EN12662:1998	15.5		-0.68	-----	300	-----	
323	EN12662:1998	22		1.95	-----	-----	-----	
334	EN12662:1998	9.6		-3.06	-----	308	-----	
335	EN12662:1998	9		-3.30	-----	-----	-----	
343	EN12662:1998	27.5		4.17	-----	-----	-----	
345		-----		-----	-----	-----	-----	
351	EN12662:1998	16.99		-0.08	-----	300	-----	
360	EN12662:1998	21.1		1.58	-----	300	-----	
391	EN12662:1998	19.1		0.77	-----	-----	-----	
398	EN12662:1998	19.3		0.86	-----	-----	-----	
420	EN12662:1998	18.94		0.71	-----	-----	-----	
447	EN12662:2014	11.3	ex	-2.37	-----	360	-----	*), also see §4.1
494	EN12662:1998	15.35		-0.74	-----	-----	-----	
496	EN12662:1998	9.04		-3.29	-----	-----	-----	
540	EN12662:1998	18.40		0.49	-----	400	12	
663		-----		-----	-----	-----	-----	
902		-----		-----	-----	-----	-----	
1033		-----		-----	-----	-----	-----	
1059	EN12662:1998	20.5	C	1.34	-----	292.4	-----	
1107	EN12662:1998	19.9		1.10	-----	-----	-----	
1134	EN12662:1998	17.4		0.09	-----	-----	-----	
1135	EN12662:1998	14.1		-1.24	-----	-----	-----	
1161	EN12662:2014	22.7	ex	2.23	-----	-----	-----	*), also see §4.1
1201	EN12662:1998	13.1		-1.65	-----	-----	-----	
1251		-----		-----	-----	-----	-----	
1299	EN12662:1998	30.9	R(0.05)	5.54	-----	300	-----	
1316	EN12662:2014	16.5	ex	-0.27	-----	300	-----	*), also see §4.1
1320	EN12662:1998	20.7		1.42	-----	-----	-----	
1389	EN12662:1998	17.6		0.17	-----	300	-----	
1397		-----		-----	-----	-----	-----	
1429	EN12662:1998	15.4		-0.72	-----	338.06	n/a	
1457	EN12662:1998	17.1	C	-0.03	-----	400	-----	
1485	EN12662:1998	18.94		0.71	400.0	-----	-----	
1494	EN12662:2008	15.64		-0.62	-----	800	-----	
1510	EN12662:1998	18.8		0.65	-----	-----	-----	
1586	EN12662:2014	13.0	ex	-1.69	-----	-----	-----	*), also see §4.1
1650	EN12662:2014	22.25	ex	2.05	-----	-----	-----	*), also see §4.1
1659	EN12662:1998	17.59		0.17	-----	-----	-----	
1710	EN12662:2008	18.1		0.37	-----	800	-----	
1721	EN12662:2008	19.65		1.00	-----	800	-----	
1739	EN12662:1998	13.79		-1.37	-----	-----	-----	
1744	EN12662:2008	17.85		0.27	-----	800	-----	
1769	EN12662:2008	18.970		0.72	-----	800	-----	
1976	EN12662:1998	16.09		-0.44	-----	300	-----	
6057	EN12662:1998	18.0		0.33	-----	-----	-----	
6075	EN12662:2014	7.34	ex, C	-3.97	-----	-----	-----	*), also see §4.1
6146	EN12662:2014	17.62	ex	0.18	-----	300	-----	

			Only 1998	Only 2008	Only 2014
	normality	suspect	Suspect	OK	OK
	n	34	28	6	9
	outliers	1+ 9ex	1	0	0
	mean (n)	17.181	17.173	17.218	15.623
	st.dev. (n)	3.7494	4.0106	2.4335	4.9225
	R(calc.)	10.498	11.230	6.814	13.783
	st.dev.(EN14214:12+A1:14)	2.4770	1.8400	1.8448	2.3855
	R(EN14214:12+A1:14)	6.936	5.152	5.165	6.679
Compare					
	R(EN12662:98 or 08)	5.154	Spike 15.05 mg/kg	Recovery < 114%	

*) EN12662:2014 is not applicable to FAME (B100) according to CEN/TC 19 Committee, instead either method EN12662:1998 or EN 12662:2008 should be used.

Lab 1059 first reported: 28
Lab 1457 first reported: 7.63
Lab 6075 first reported 45.19

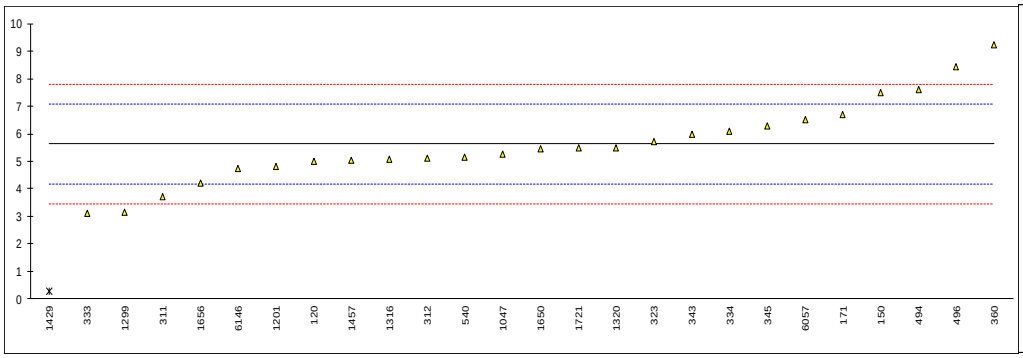

35
30
25
20
15
10
5
0
6075 335 496 334 447 1586 171 1201 1739 1135 311 150 494 1429 312 1494 1976 1316 351 1457 1134 1659 1389 6146 1744 6057 1710 540 1510 420 1485 1769 391 398 1721 1107 1059 1320 360 323 1650 1161 343 1299

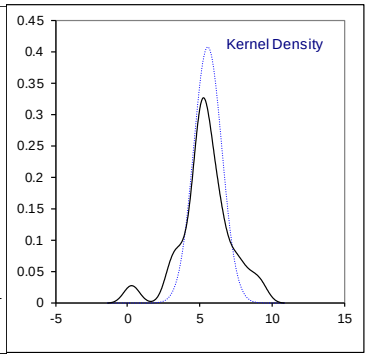

Kernel Density
0.12
0.1
0.08
0.06
0.04
0.02
0
0
10
20
30
40

Determination of sum of Calcium and Magnesium as Ca + Mg on sample #17182; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14538	5.00		-0.87	
150	EN14538	7.5		2.58	
171	EN14538	6.7		1.48	
311	EN14538	3.7		-2.67	
312	EN14538	5.1		-0.73	
323	EN14538	5.7		0.10	
333	EN14538	3.1		-3.50	
334	EN14538	6.1		0.65	
336		-----		-----	
343	EN14538	6.0		0.51	
345	EN14538	6.3		0.92	
351		-----		-----	
360	EN14538	9.21		4.95	
398		-----		-----	
447		-----		-----	
494	EN14538	7.61		2.74	
496	EN14538	8.44		3.88	
540	EN14538	5.15		-0.67	
663		-----		-----	
1047	EN14538	5.278		-0.49	
1134		-----		-----	
1135		-----		-----	
1201	EN14538	4.8		-1.15	
1299	EN14538	3.15		-3.43	
1316	In house	5.07		-0.78	
1320	D4628	5.50		-0.18	
1389		-----	W	-----	Test result withdrawn. Reported 12
1429	EN14538	0.3	R(0.05)	-7.37	
1457	EN14538	5.03		-0.83	
1539		-----		-----	
1650	EN14538	5.44		-0.26	
1656	EN14538	4.2		-1.98	
1721	EN14538	5.48		-0.21	
1739		-----		-----	
6057	EN14538	6.5		1.20	
6146	EN14538	4.72		-1.26	

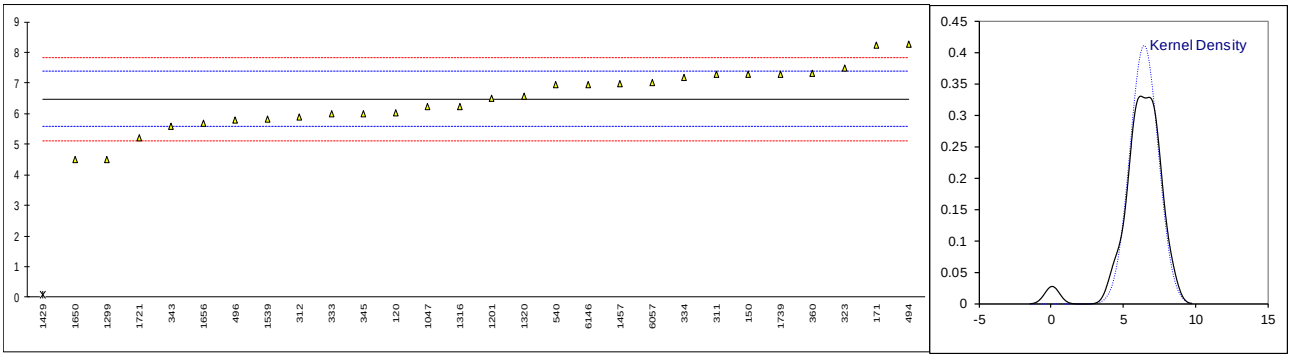
	normality	OK		
	n	25		
	outliers	1	Spike	
	mean (n)	5.631	4.61	Ca only. Recovery < 122%
	st.dev. (n)	1.4785		
	R(calc.)	4.140		
	st.dev.(EN14538:06)	0.7084		
	R(EN14538:06)	1.984		Application range: 1-10 mg/kg





Determination of Phosphorus as P on sample #17182; results in mg/kg

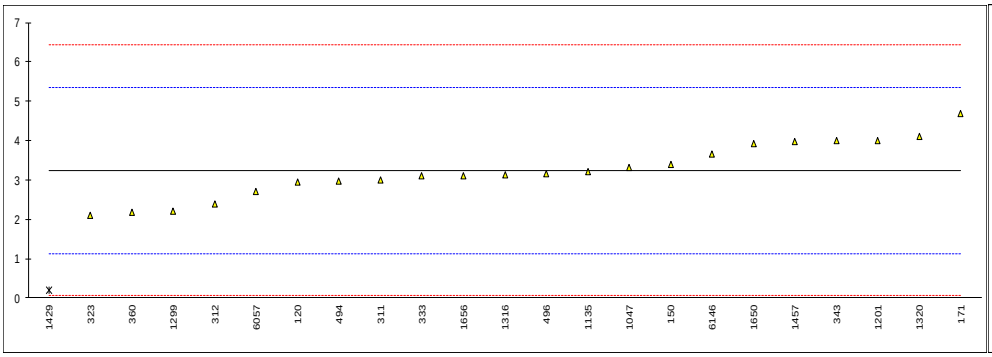
lab	method	value	mark	z(targ)	remarks
120	EN14107	6.031		-0.98	
150	EN14107	7.3		1.82	
171	EN14107	8.2	C	3.85	first reported 9.6
311	EN14107	7.3		1.82	
312	EN14107	5.9		-1.27	
323	EN14107	7.5		2.26	
333	EN14107	6.0		-1.05	
334	EN14107	7.2		1.60	
336		-----		-----	
343	EN14107	5.6		-1.93	
345	EN14107	6.0		-1.05	
351		-----		-----	
360	EN14107	7.33		1.88	
398		-----		-----	
447		-----		-----	
494	EN14107	8.27		3.96	
496	EN14107	5.79		-1.52	
540	EN14107	6.95		1.04	
663		-----		-----	
1047	EN14107	6.237		-0.53	
1134		-----		-----	
1135		-----		-----	
1201	EN14107	6.5		0.05	
1299	EN14107	4.5	C	-4.36	first reported 9.69
1316	In house	6.24		-0.52	
1320	In house	6.56		0.18	
1389		-----	W	-----	Test result withdrawn. Reported 6
1429	EN14107	0.1	R(0.01)	-14.08	
1457	EN14107	6.97		1.09	
1539	EN16294	5.82		-1.45	
1650	EN14107	4.49	C	-4.39	first reported 4.23
1656	EN14107	5.7		-1.71	
1721	EN14107	5.2		-2.82	
1739	EN14107	7.3		1.82	
6057	EN14107	7.0		1.16	
6146	EN14538	6.96		1.07	
	normality	OK			
	n	27			
	outliers	1	Spike		
	mean (n)	6.477	7.00		Recovery <93%
	st.dev. (n)	0.9693			
	R(calc.)	2.714			
	st.dev.(EN14107:03)	0.4530			
	R(EN14107:03)	1.269			Application range: 4 - 20 mg/kg

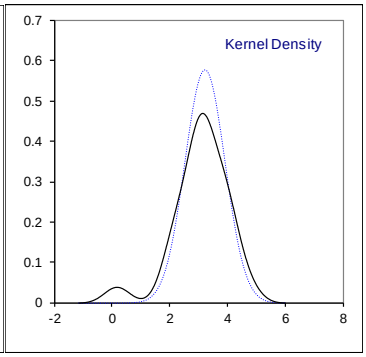


Determination of Potassium as K on sample #17182; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14109	2.952		-0.27	
150	EN14538	3.4	C	0.15	first reported 3.6
171	EN14109	4.7		1.38	
311	EN14538	3.0		-0.23	
312	EN14109	2.4		-0.79	
323	EN14538	2.1		-1.08	
333	EN14538	3.1		-0.13	
334		-----		-----	
336		-----		-----	
343	EN14538	4.0		0.72	
345		-----		-----	
351		-----		-----	
360	EN14538	2.17		-1.01	
398		-----		-----	
447		-----		-----	
494	EN14538	2.97		-0.25	
496	EN14538	3.16		-0.08	
540		-----		-----	
663		-----		-----	
1047	EN14538	3.321		0.08	
1134		-----		-----	
1135	EN14109	3.2		-0.04	
1201	EN14109	4.0		0.72	
1299	EN14538	2.20		-0.98	
1316	In house	3.13		-0.10	
1320	EN14109	4.12		0.83	
1389		-----	W	-----	Test result withdrawn. Reported 2
1429	EN14109	0.2	R(0.01)	-2.87	
1457	EN14538	3.98		0.70	
1539		-----		-----	
1650	EN14109	3.93		0.65	
1656	EN14109	3.1		-0.13	
1721	EN14109	<1,0		-----	
1739		-----		-----	
6057	EN14109	2.7		-0.51	
6146	EN14109	3.65		0.39	

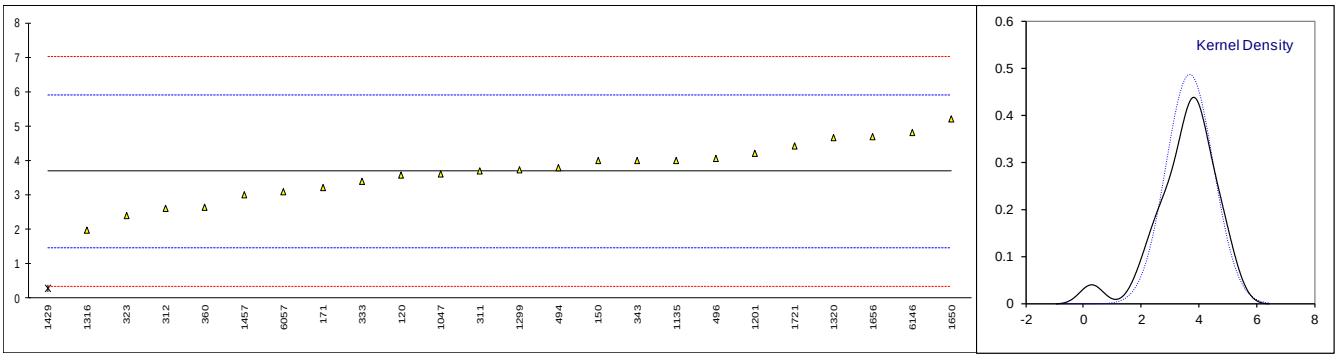
normality	OK
n	22
outliers	1
mean (n)	3.240
st.dev. (n)	0.6929
R(calc.)	1.940
st.dev.(EN14109:03)	1.0601
R(EN14109:03)	2.968





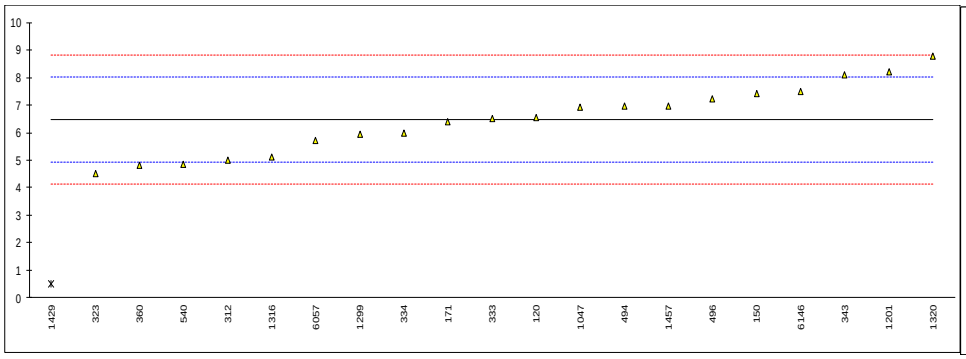
Determination of Sodium as Na on sample #17182; results in mg/kg

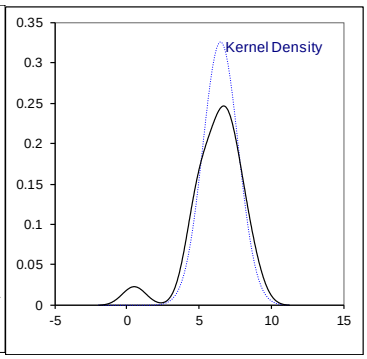
lab	method	value	mark	z(targ)	remarks
120	EN14108	3.581		-0.09	
150	EN14538	4.0	C	0.28	first reported 6.9
171	EN14108	3.2		-0.44	
311	EN14538	3.7		0.01	
312	EN14108	2.6		-0.98	
323	EN14538	2.4		-1.16	
333	EN14538	3.4		-0.26	
334		-----		-----	
336		-----		-----	
343	EN14538	4.0		0.28	
345		-----		-----	
351		-----		-----	
360	EN14538	2.65		-0.93	
398		-----		-----	
447		-----		-----	
494	EN14538	3.78		0.08	
496	EN14538	4.05		0.33	
540		-----		-----	
663		-----		-----	
1047	EN14538	3.614		-0.06	
1134		-----		-----	
1135	EN14108	4.0		0.28	
1201	EN14108	4.2		0.46	
1299	EN14538	3.73		0.04	
1316	In house	1.99		-1.53	
1320	EN14108	4.66		0.88	
1389		-----	W	-----	Test result withdrawn. Reported 2
1429	EN14108	0.3	R(0.05)	-3.05	
1457	EN14538	2.99		-0.63	
1539		-----		-----	
1650	EN14108	5.20		1.37	
1656	EN14108	4.7		0.91	
1721	EN14108	4.42		0.66	
1739		-----		-----	
6057	EN14108	3.1		-0.53	
6146	EN14108	4.81		1.01	
	normality	OK			
	n	23			
	outliers	1			
	mean (n)	3.686			
	st.dev. (n)	0.8180			
	R(calc.)	2.290			
	st.dev.(EN14214:12+A1:14)	1.1086			
	R(EN14214:12+A1:14)	3.104			Compare R(EN14108:03) = 2.324



Determination of Sum of Potassium and Sodium as K + Na on sample #17182; results in mg/kg

lab	method	value	mark	z(targ)	remarks	Sum K+ Na (iis calc.)
120	EN14538	6.533		0.08		6.533
150	EN14538	7.4	C	1.20	first reported 10.5	7.4
171	EN14538	6.4	E	-0.09	Calculation error?	7.9
311		-----		-----		6.7
312	EN14538	5.0		-1.89		5.0
323	EN14538	4.5		-2.53		4.5
333	EN14538	6.5		0.04		6.5
334	EN14538	6.0		-0.60		6.0
336		-----		-----		
343	EN14538	8.1	E	2.10	Calculation error?	8.0
345		-----		-----		
351		-----		-----		
360	EN14538	4.82		-2.12		4.82
398		-----		-----		
447		-----		-----		
494	EN14538	6.96	E	0.63	Calculation error?	6.75
496	EN14538	7.21		0.95		7.21
540	EN14538	4.85		-2.08		4.85
663		-----		-----		
1047	EN14538	6.935		0.60		6.935
1134		-----		-----		
1135		-----		-----		7.2
1201	EN14538	8.2		2.23		8.2
1299	EN14538	5.93		-0.69		5.93
1316	In house	5.12		-1.74		5.12
1320	In house	8.78		2.97		8.78
1389		-----	W	-----	Test result withdrawn. Reported 4	
1429	EN14538	0.5	R(0.01)	-7.68		0.5
1457	EN14538	6.98		0.66		6.97
1539		-----		-----		
1650		-----		-----		9.13
1656		-----		-----		7.8
1721		-----		-----		4.42
1739		-----		-----		
6057	EN14538	5.7	E	-0.99	Calculation error?	5.8
6146	EN14538	7.48	E	1.30	Calculation error?	8.46
	normality	OK				OK
	n	20				25
	outliers	1				1
	mean (n)	6.467				6.676
	st.dev. (n)	1.2239				1.3750
	R(calc.)	3.427				3.850
	st.dev.(EN14214:12+A1:14)	0.7580				0.7774
	R(EN14214:12+A1:14)	2.122				2.177
Compare						
	R(EN14538:06	2.122				2.177





APPENDIX 2

Number of participants per country in main sample

2 labs in	ARGENTINA
1 lab in	AUSTRIA
3 labs in	BELGIUM
3 labs in	BULGARIA
1 lab in	CHINA, People's Republic
3 labs in	COLOMBIA
1 lab in	CROATIA
1 lab in	CZECH REPUBLIC
1 lab in	ESTONIA
7 labs in	FRANCE
3 labs in	GERMANY
1 lab in	HONG KONG
2 labs in	HUNGARY
2 labs in	ITALY
2 labs in	LATVIA
2 labs in	LITHUANIA
1 lab in	MACEDONIA
1 lab in	MALAYSIA
1 lab in	MALTA
4 labs in	NETHERLANDS
1 lab in	PERU
2 labs in	POLAND
5 labs in	PORTUGAL
1 lab in	SLOVAKIA
1 lab in	SLOVENIA
5 labs in	SPAIN
1 lab in	SWEDEN
1 lab in	THAILAND
3 labs in	TURKEY
7 labs in	UNITED KINGDOM
3 labs in	UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations:

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

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, March 2017
2 ASTM E178:16
3 ASTM E1301:95(2003)
4 ISO 5725:86 (1994)
5 ISO 5725, parts 1-6, 1994
6 ISO 13528:05
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, No 4 January 2001
14 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst 2002, 127, 1359-1364, (2002)
15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), 165-172, (1983)
16 Horwitz, W and Albert, R, J. AOAC Int, 79, 3, 589, (1996)
17 Letter of CEN: CEN/TC 19 explanation on total contamination test result and applicability for FAME, dated 16-9-2015 and issued by Ortwin Costenoble on behalf of Liesbeth Jansen (CEN/TC 19 Chairman) and Nigel Elliot (CEN/TC 19/WG 24 Convenor)