Institute for
Interlaboratory Studies

Results of Proficiency Test
Engine Oil (fresh)
June 2023

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. G.A. Oosterlaken-Buijs
Correctors: ing. M. Meijer & ing. R.J. Starink
Approved by: ing. A.S. Noordman-de Neef

Report: iis23L07

August 2023

CONTENTS

1 INTRODUCTION

Since 1997 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of fresh Engine Oil (Lubricating Oil) based on the latest version of SAE and ASTM D4485 every year. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of fresh Engine Oil.

In this interlaboratory study 92 laboratories in 46 countries registered for participation, see appendix 2 for the number of participants per country. In this report the results of the Engine Oil (fresh) proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
It was decided to send two identical samples of fresh Engine Oil in a 1 L bottle and a 0.5 L bottle both labelled #23080.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

A batch of approximately 200 liters of fresh Engine Oil was obtained from a local supplier. After homogenization 100 amber glass bottles of 1 L and 100 amber glass bottles of 0.5 L were filled and labelled #23080.
The homogeneity of the subsamples was checked by determination of Density at 15 °C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15 °C in kg/L
sample #23080-1	0.86695
sample #23080-2	0.86693
sample #23080-3	0.86695
sample #23080-4	0.86695
sample #23080-5	0.86695
sample #23080-6	0.86695
sample #23080-7	0.86695
sample #23080-8	0.86695

Table 1: homogeneity test results of subsamples #23080

From the above test results the repeatability was calculated and compared with 0.3 times the reproducibility of the reference test method in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Density at 15 °C in kg/L
r (observed)	0.00002
reference test method	ISO12185:96
0.3 x R (reference test method)	0.00015

Table 2: evaluation of the repeatability of subsamples #23080

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

To each of the participating laboratories one 1 L and one 0.5 L bottle of fresh Engine Oil labelled #23080 was sent on May 10, 2023. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of fresh Engine Oil packed in amber glass bottles was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYZES

The participants were requested to determine: Total Acid Number, Base Number ($HClO_4$ titration), Color ASTM, Conradson Carbon Residue, Ramsbottom Carbon Residue, Carbon Residue (micro method), Density at 15 °C, Evaporation loss by Noack, Flash Point C.O.C., Flash Point PMcc, Foaming Characteristics (Foaming Tendency and Foam Stability), Kinematic Viscosity (40 °C and 100 °C), Viscosity Index, Kinematic Viscosity Stabinger (40 °C and 100 °C), Viscosity Apparent (CCS) at -25 °C, Viscosity HTHS, Nitrogen, Pour Point (Manual and Automated), Sulfated Ash, Sulfur, Water, Calcium, Phosphorus and Zinc. Some additional questions were asked about Total Acid Number, Base Number and Foaming Characteristics.

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

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

3 RESULTS

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

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

3.1 STATISTICS

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

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

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

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT the criterion of ISO13528, paragraph 9.2.1, was met for all evaluated tests. Therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

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

Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements (derived from e.g. ISO or ASTM test methods), 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 target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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

The z-scores were calculated according to:

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

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

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

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. Eleven participants reported test results after the final reporting date and four other participants did not report any test results. Not all participants were able to report all tests requested.
In total 88 participants reported 1348 numerical test results. Observed were 42 outlying test results, which is 3.1%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER TEST

In this section the reported test results are discussed per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D189) and an added designation for the year that the test method was adopted or revised (e.g. D189:06). When a method has been reapproved an “R” will be added and the year of approval (e.g. D189:06R19).

Total Acid 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 ASTM D664-A:18e2 for all end point modes (IP at 60 mL or 125 mL nor with BEP at 60 mL or 125 mL).
When the test results for IP and BEP were evaluated separately the calculated reproducibilities are still not in agreement with the requirements of ASTM D664-A:18e2 for all end point modes.

Base Number ($HClO_4$ titration): The participants used different solvents (e.g. Chlorobenzene or the alternative solvent mixed Xylenes) therefore the reproducibility as described in Appendix X2 of ASTM D2896 is used for the statistical evaluation.
This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D2896:21 appendix X2.5.

Color ASTM: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1500:12R17.

Conradson Carbon Residue: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D189:06R19.

Ramsbottom Carbon Residue: Only four participants reported a test result. Therefore, no z-scores are calculated.

Carbon Residue (micro method): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D4530:15R20.

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

Evaporation loss by Noack: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D5800-B:21.

Flash Point C.O.C.: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D92:18.

Flash Point PMcc: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D93-A:20.

Foaming Tendency: This determination was very problematic. Five statistical outliers were observed over the three sequences. For sequence II is the calculated reproducibility after rejection of the statistical outliers not in agreement with the requirements of ASTM D892:18e1.
It was decided not to calculate z-scores for the sequences I and III due to the large difference between the calculated and target reproducibility.

Foam Stability: This determination was not problematic. All reporting participants agreed on a test result of 0 (Nil) for all three sequences. Therefore, no z-scores are calculated.

Kinematic Viscosity at 40 °C: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D445:21e2.

Kinematic Viscosity at 100 °C: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D445:21e2.

Viscosity Index: This determination was very problematic. No statistical outliers were observed but three test results were excluded. The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ASTM D2270:10R16.

Kinematic Viscosity Stabinger at 40 °C: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D7042:21a.

Kinematic Viscosity Stabinger at 100 °C: 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 ASTM D7042:21a.

Viscosity Apparent (CCS) at -25 °C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements ASTM D5293:20.

Viscosity HTHS: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements ASTM D4683:20.

Nitrogen: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5762:18a.

Pour Point Manual: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D97:17bR22.

Pour Point Automated: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of ASTM D5950:14R20.

Sulfated Ash: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D874:23.

Sulfur: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D4294:21.

Water: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with ASTM D6304:20 procedure B, nor with procedure A and C.

Calcium: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5185:18.

Phosphorus: This determination was problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5185:18.

Zinc: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5185:18.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	47	2.30	1.59	0.80
Base Number ($HClO_4$ titration)	mg KOH/g	58	9.47	0.88	1.23
Color ASTM		56	3.2	0.6	1
Conradson Carbon Residue	%M/M	23	1.00	0.16	0.24
Ramsbottom Carbon Residue	%M/M	4	n.e.	n.e.	n.e.
Carbon Residue (micro method)	%M/M	24	1.02	0.09	0.19
Density at 15 °C	kg/L	69	0.8670	0.0004	0.0005
Evaporation loss by Noack	%M/M	25	11.0	1.6	1.4
Flash Point C.O.C.	°C	65	229	19	18
Flash Point PMcc	°C	58	200	9	14
Foaming Tendency, Sequence I	mL	36	3.4	12.6	(2.9)
Foaming Tendency, Sequence II	mL	34	19.9	36.1	20.8
Foaming Tendency, Sequence III	mL	36	2.8	11.8	(5.4)
Foam Stability, Sequence I	mL	38	0	n.e.	n.e.
Foam Stability, Sequence II	mL	37	0	n.e.	n.e.
Foam Stability, Sequence III	mL	37	0	n.e.	n.e.
Kinematic Viscosity at 40 °C	mm^2/s	68	81.981	0.748	1.000
Kinematic Viscosity at 100 °C	mm^2/s	69	12.110	0.236	0.167
Viscosity Index		68	143.1	6.9	2
Kin. Viscosity Stabinger at 40 °C	mm^2/s	36	82.120	0.765	1.008
Kin. Viscosity Stabinger at 100 °C	mm^2/s	37	12.166	0.178	0.127
Visc. Apparent (CCS) at -25 °C	mPa·s	25	6112	216	446
Viscosity HTHS	mPa·s	7	3.61	0.08	0.15
Nitrogen	mg/kg	14	1190	269	317
Pour Point Manual	°C	40	-41.3	10.9	9
Pour Point Automated 1 °C int.	°C	27	-44.2	11.9	4.5
Sulfated Ash	%M/M	35	0.908	0.161	0.132
Sulfur	mg/kg	42	2221	484	275
Water	mg/kg	41	184	320	198
Calcium as Ca	mg/kg	50	1599	289	219
Phosphorus as P	mg/kg	48	783	147	120
Zinc as Zn	mg/kg	52	873	151	143

Table 3: reproducibilities of tests on sample #23080

For results between brackets no z-scores are calculated

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF JUNE 2023 WITH PREVIOUS PTS

	June 2023	May 2022	June 2021	June 2020	June 2019
Number of reporting laboratories	88	73	76	62	75
Number of test results	1348	1065	1156	961	1157
Number of statistical outliers	42	29	36	34	49
Percentage of statistical outliers	3.1%	2.7%	3.1%	3.5%	4.2%

Table 4: 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 to the requirements of the reference test methods. The conclusions are given in the following table.

Parameter	June 2023	May 2022	June 2021	June 2020	June 2019
Total Acid Number	-	-	-	--	--
Base Number ($HClO_4$ titration)	+	+/-	+/-	+	+
Color ASTM	+	+	+	+	+
Conradson Carbon Residue	+	+/-	+	+	+
Ramsbottom Carbon Residue	n.e.	n.e.	-	n.e.	(--)
Carbon Residue (micro method)	++	+/-	+	+	-
Density at 15 °C	+	+	+/-	+	+/-
Evaporation loss by Noack	-	+	-	+	--
Flash Point C.O.C.	+/-	+/-	-	+/-	+/-
Flash Point PMcc	+	+	++	+	+
Foaming Tendency	(--)	(--)	-	-	+/-
Kinematic Viscosity at 40 °C	+	+	-	+	+
Kinematic Viscosity at 100 °C	-	+	+	+	+/-
Viscosity Index	--	-	+/-	-	-
Kin. Viscosity Stabinger at 40 °C	+	-	-	+/-	+/-
Kin. Viscosity Stabinger at 100°C	-	-	+	+	+/-
Visc. Apparent (CCS) at -25 °C	+	+	n.e.	+	+
Viscosity HTHS	+	n.e.	-	-	+/-
Nitrogen	+	-	-	-	--
Pour Point Manual	-	-	+	+/-	+
Pour Point Automated 1 °C int.	--	-	-	--	+
Sulfated Ash	-	-	-	+/-	-
Sulfur	-	--	-	+-	(--)

Parameter	June 2023	May 2022	June 2021	June 2020	June 2019
Water	-	-	(--)	+	+
Calcium as Ca	-	+	-	-	+
Phosphorus as P	-	-	-	-	-
Zinc as Zn	+/-	-	-	+	+/-

Table 5: comparison of determinations to the reference test methods

For results between brackets no z-scores are calculated

The following performance categories were used:

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

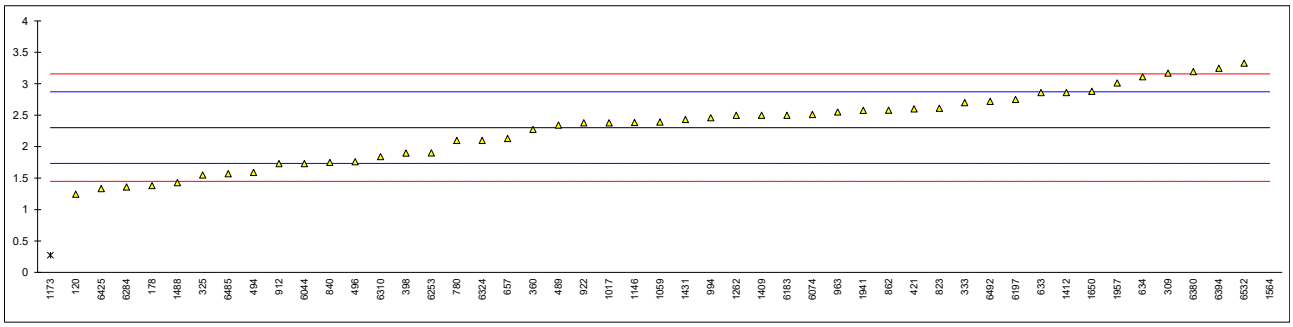
APPENDIX 1

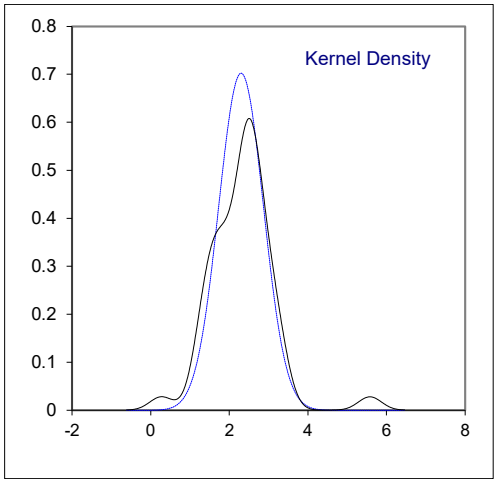
Determination of Total Acid Number on sample #23080; results in mg KOH/g

lab	method	value	mark	z(targ)	End point type	Titration volume	remarks
120	D664-A	1.2435		-3.72	Inflection Point	60 mL	
178	D664-A	1.38		-3.24	---	---	
179		-----		-----	---	---	
211		-----		-----	---	---	
219		-----		-----	---	---	
237		-----		-----	---	---	
254		-----		-----	---	---	
256		-----		-----	---	---	
257		-----		-----	---	---	
309	D664-A	3.17		3.05	Inflection Point	125 mL	
325	D664-A	1.55		-2.64	Buffer End Point pH 10	125 mL	
329		-----		-----	---	---	
333	D664-A	2.7		1.40	Inflection Point	125 mL	
339		-----		-----	---	---	
349		-----		-----	---	---	
360	D664-A	2.273		-0.10	Inflection Point	60 mL	
381		-----		-----	---	---	
398	D664-A	1.897		-1.42	Inflection Point	60 mL	
421	ISO6619	2.6		1.05	---	---	
432		-----		-----	---	---	
489	EN12634	2.345		0.15	Inflection Point	85 mL	
494	D664-A	1.59		-2.50	Buffer End Point pH 10	60 mL	
496	D664-A	1.761		-1.90	Buffer End Point pH 10	60 mL	
614		-----		-----	---	---	
633	D664-A	2.86		1.96	Inflection Point	125 mL	
634	D664-A	3.11		2.84	Inflection Point	60 mL	
657	D664-A	2.13		-0.60	Inflection Point	60 mL	
780	D664-A	2.1		-0.71	Buffer End Point pH 10	60 mL	
823	D664-A	2.61		1.08	Inflection Point	125 mL	
840	D664-A	1.75		-1.94	Buffer End Point pH 10	60 mL	
862	D664-A	2.58		0.98	Inflection Point	60 mL	
875		-----		-----	---	---	
912	D664-A	1.73		-2.01	---	---	
922	D664-A	2.38		0.27	Inflection Point	125 mL	
963	D664-B	2.55		0.87	Inflection Point	60 mL	
974		-----		-----	---	---	
994	D664-A	2.46		0.56	Inflection Point	125 mL	
1017	D974	2.38		0.27	---	---	
1059	ISO6619	2.39		0.31	---	---	
1146	D664-A	2.384		0.29	Buffer End Point pH 10	125 mL	
1173	In house	0.275	R(0.05)	-7.12	---	---	
1174		-----		-----	---	---	
1182		-----		-----	---	---	
1205		-----		-----	---	---	
1235		-----		-----	---	---	
1243		-----		-----	---	60 mL	
1262	ISO6618	2.50		0.70	Inflection Point	60 mL	
1320		-----		-----	---	---	
1324		-----		-----	---	---	
1326		-----		-----	---	---	
1409	D664-A	2.5		0.70	Buffer End Point pH 11	60 mL	
1412	D664-A	2.86		1.96	Inflection Point	125 mL	
1431	D664-A	2.4336		0.46	Inflection Point	60 mL	
1438		-----		-----	---	---	
1460		-----		-----	---	---	
1488	ISO6618	1.426		-3.08	Inflection Point	125 mL	
1564	D664-A	5.58	R(0.01)	11.52	Inflection Point	60 mL	
1650	D664-A	2.88		2.03	Inflection Point	125 mL	
1720		-----		-----	---	---	
1728		-----		-----	---	---	
1748		-----		-----	---	---	
1799		-----		-----	---	---	
1850		-----		-----	---	---	
1877		-----		-----	---	---	
1895		-----		-----	---	---	
1941	ISO6619	2.577		0.97	Buffer End Point pH 11	60 mL	
1957	D664-A	3.013		2.50	---	---	
1968		-----		-----	---	---	
1969		-----		-----	---	---	
6016		-----		-----	---	---	
6032		-----		-----	---	---	
6035		-----		-----	---	---	
6044	D664-A	1.73		-2.01	Inflection Point	60 mL	
6074	ISO6619	2.51		0.73	Inflection Point	125 mL	

lab	method	value	mark	z(targ)	End point type	Titration volume	remarks
6183	D664-A	2.50		0.70	Inflection Point	125 mL	
6197	D664-A	2.75		1.57	Buffer End Point pH 10	60 mL	
6253	ISO6618	1.9		-1.41	---	---	
6284	D974	1.36		-3.31	Buffer End Point pH 11	60 mL	
6310	D664-B	1.84		-1.62	Buffer End Point pH 10	60 mL	
6324	D664-A	2.1		-0.71	Buffer End Point pH 10	125 mL	
6344		-----		-----	---	---	
6380	D664-A	3.1941		3.13	Inflection Point	125 mL	
6394	D664-A	3.247		3.32	---	125 mL	
6425	ISO6618	1.332		-3.41	---	---	
6442		-----		-----	---	---	
6455		-----		-----	---	---	
6485	D974	1.57		-2.57	---	---	
6492	D664-A	2.72		1.47	Inflection Point	125 mL	
6521		-----		-----	---	---	
6528		-----		-----	---	---	
6532	D664-A	3.328		3.61	Buffer End Point pH 11	60 mL	
6535		-----		-----	---	---	

		IP only	BEP only
normality	OK	OK	OK
n	47	24	13
outliers	2	1	0
mean (n)	2.3020	2.4609	2.1223
st.dev. (n)	0.56820	0.49786	0.56328
R(calc.)	1.5910	1.3940	1.5772
st.dev.(D664-A:18e2, IP 60mL)	0.28456	0.30057	---
R(D664-A:18e2, IP 60mL)	0.7968	0.8416	---
compare			
(D664-A:18e2, IP 125mL)	0.5221	0.5598	---
(D664-A:18e2, BEP 60mL)	1.2503	---	1.1550
(D664-A:18e2, BEP 125mL)	0.7592	---	0.6970



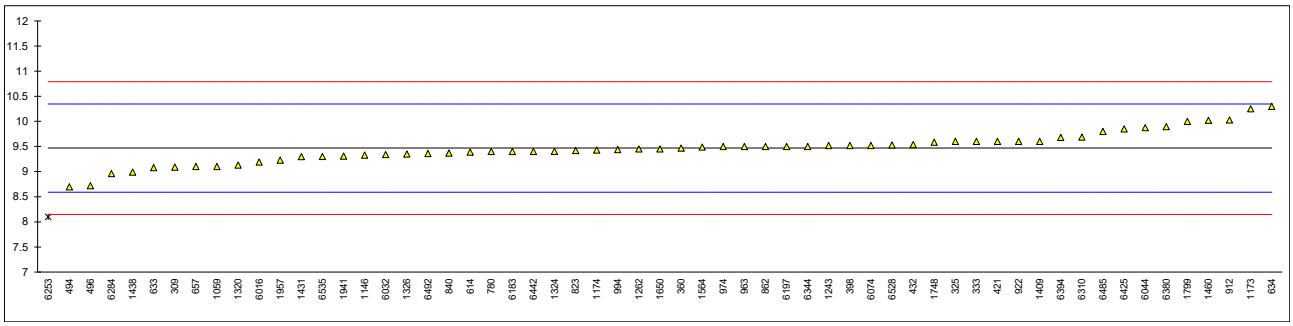


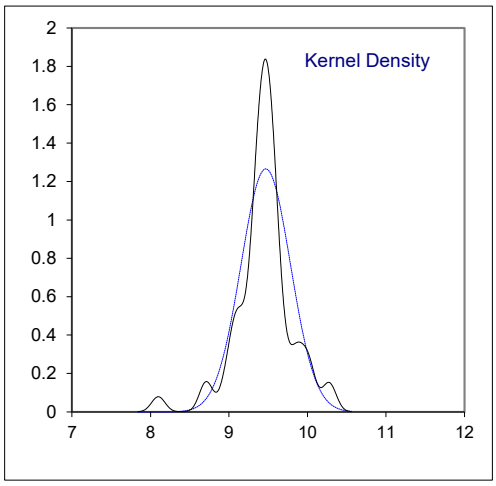
Determination of Base Number ($HClO_4$ titration) on sample #23080; results in mg KOH/g

lab	method	value	mark	z(targ)	solvent	remarks
120		-----		-----	---	
178		-----		-----	---	
179		-----		-----	---	
211		-----		-----	---	
219		-----		-----	---	
237		-----		-----	---	
254		-----		-----	---	
256		-----		-----	---	
257		-----		-----	---	
309	D2896-B forward	9.09		-0.86	Xylenes, mixed	
325	D2896-B forward	9.6		0.30	Xylenes, mixed	
329		-----		-----	---	
333	D2896-A back	9.6		0.30	---	
339		-----		-----	---	
349		-----		-----	---	
360	D2896-B forward	9.47		0.00	Chlorobenzene:glacial acetic acid (2:1)	
381		-----		-----	---	
398	D2896-A forward	9.52		0.12	Chlorobenzene	
421	ISO3771	9.6		0.30	---	
432	D2896-B back	9.54		0.16	Chlorobenzene	
489		-----		-----	---	
494	D2896-A forward	8.7		-1.75	Chlorobenzene	
496	D2896-B back	8.72		-1.70	Xylene : Acetic Acid : Aceton = 20 : 10 : 3	
614	D2896-B forward	9.39		-0.18	Chlorobenzene	
633	D2896-A forward	9.08		-0.88	Xylenes, mixed	
634	D2896-B forward	10.3		1.89	Xylenes, mixed	
657	D2896-B forward	9.1		-0.84	Xylenes, mixed	
780	D2896-B forward	9.4		-0.16	Chlorobenzene	
823	D2896-A back	9.42		-0.11	Chlorobenzene	
840	D2896-B forward	9.37		-0.23	Chlorobenzene	
862	D2896	9.5		0.07	---	
875		-----		-----	---	
912	D2896	10.03		1.28	---	
922	D2896-B forward	9.6		0.30	---	
963	D2896-B forward	9.50		0.07	Chlorobenzene	
974	D2896-A forward	9.50		0.07	---	
994	D2896-A forward	9.44		-0.07	Chlorobenzene	
1017		-----		-----	---	
1059	ISO3771	9.1		-0.84	---	
1146	D2896-B forward	9.329		-0.32	Chlorobenzene	
1173	In house	10.25		1.78	---	
1174		9.43		-0.09	Chlorobenzene	
1182		-----		-----	---	
1205		-----		-----	---	
1235		-----		-----	---	
1243	ISO3771	9.52		0.12	Chlorobenzene	
1262	D2896-B forward	9.45		-0.04	Chlorobenzene	
1320	D2896-B forward	9.13		-0.77	Chlorobenzene	
1324	D2896-A forward	9.405		-0.15	Chlorobenzene	
1326	D2896-B forward	9.35		-0.27	---	
1409	D2896-B forward	9.6		0.30	Chlorobenzene	
1412		-----		-----	---	
1431	D2896-B forward	9.2996		-0.39	Chlorobenzene	
1438	D2896-A back	8.99	C	-1.09	---	fr. 14.22
1460	D2866	10.02		1.25	Chlorobenzene	
1488		-----		-----	---	
1564	D2896-B forward	9.49		0.05	---	
1650	D2896-A forward	9.45		-0.04	Chlorobenzene	
1720		-----		-----	---	
1728		-----		-----	---	
1748	D2896-A back	9.586		0.27	Chlorobenzene	
1799	D2896-B back	10.0		1.21	Chlorobenzene	
1850		-----		-----	---	
1877		-----		-----	---	
1895		-----		-----	---	
1941	ISO3771	9.31		-0.36	Toluene:Acetic Acid:Acetone = 6:3:1 (vol.)	
1957	D2896-A back	9.231		-0.54	---	
1968		-----		-----	---	
1969		-----		-----	---	
6016	D2896-B forward	9.192		-0.63	Chlorobenzene: Acetic acid glacial (2:1)	
6032	D2896-B forward	9.34		-0.29	Chlorobenzene	
6035		-----		-----	---	
6044	D2896-B forward	9.875		0.92	Xylenes, mixed	
6074	ISO3771	9.52		0.12	Chlorobenzene	
6183	D2896-A forward	9.40		-0.16	Chlorobenzene	

lab	method	value	mark	z(targ)	solvent	remarks
6197	D2896-B forward	9.5		0.07	Chlorobenzene	
6253	ISO6618	8.1	R(0.01)	-3.11	---	
6284	D2896-B forward	8.96		-1.16	Chlorobenzene	
6310	D2896-B forward	9.69		0.50	Chlorobenzene	
6324		-----		-----	---	
6344	D2896-B forward	9.50		0.07	Chlorobenzene	
6380	D2896-B forward	9.89468		0.97	Chlorobenzene	
6394	D2896-A forward	9.68	C	0.48	Chlorobenzene	fr. 8.81
6425	ISO3771	9.85		0.87	---	
6442	D2896-A forward	9.4		-0.16	Chlorobenzene	
6455		-----		-----	---	
6485	D2896-A forward	9.80		0.75	---	
6492	D2896-A forward	9.36		-0.25	Chlorobenzene	
6521		-----		-----	---	
6528	D2896-A forward	9.53		0.14	Chlorobenzene	
6532		-----		-----	---	
6535	D2896	9.3		-0.38	Chlorobenzene	

normality	suspect
n	58
outliers	1
mean (n)	9.469
st.dev. (n)	0.3150
R(calc.)	0.882
st.dev.(D2896-X2.5:21)	0.4396
R(D2896-X2.5:21)	1.231





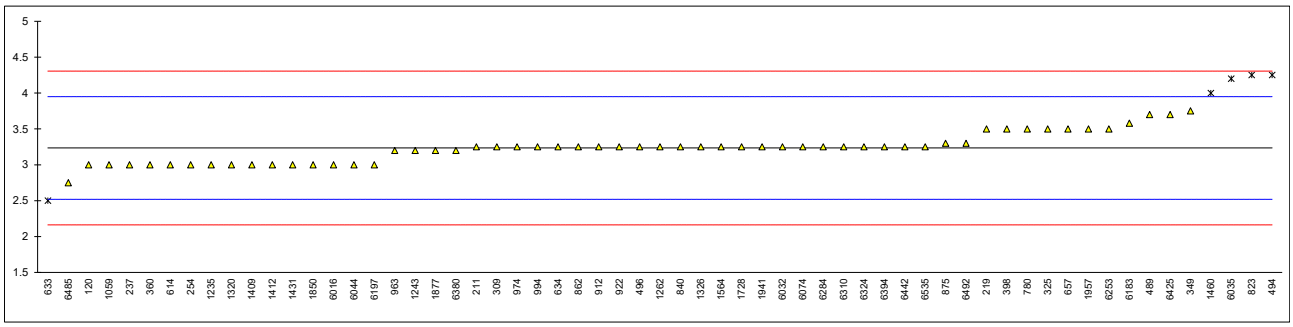
Determination of Color ASTM on sample #23080

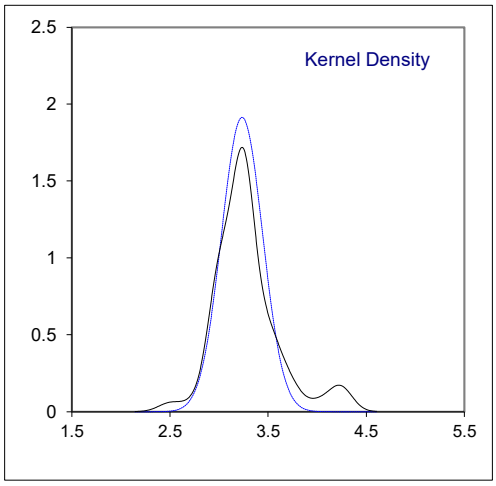
lab	method	value	iis conversion *)	mark	z(targ)	remarks
120	D1500	3	3		-0.66	
178		-----	-----		-----	
179		-----	-----		-----	
211	D1500	L3.5	3.25		0.04	
219	D1500	3.5	3.5		0.74	
237	D1500	3.0	3.0		-0.66	
254	D1500	3.0	3.0		-0.66	
256		-----	-----		-----	
257		-----	-----		-----	
309	D1500	L3,5	3.25		0.04	
325	D6045	3.5	3.5		0.74	
329		-----	-----		-----	
333		-----	-----		-----	
339		-----	-----		-----	
349	D6045	<4,0	3.75		1.44	
360	ISO2049	3.0	3.0		-0.66	
381		-----	-----		-----	
398	D1500	3.5	3.5		0.74	
421		-----	-----		-----	
432		-----	-----		-----	
489	ISO2049	3.7	3.7		1.30	
494	D1500	L4,5	4.25	R(0.05)	2.84	
496	D1500	L3.5	3.25		0.04	
614	D1500	3.0	3.0		-0.66	
633	D1500	2.5	2.5	R(0.05)	-2.06	
634	D1500	<3.5	3.25		0.04	
657	D1500	3.5	3.5		0.74	
780	D1500	3.5	3.5		0.74	
823	D1500	<4.5	4.25	R(0.05)	2.84	
840	D1500	L 3.5	3.25		0.04	
862	D1500	L3.5	3.25		0.04	
875	D6045	3.3	3.3		0.18	
912	D1500	<3.5	3.25		0.04	
922	D1500	L3.5	3.25		0.04	
963	D1500	3.2	3.2		-0.10	
974	D1500	L3.5	3.25		0.04	
994	D1500	L3.5	3.25		0.04	
1017		-----	-----		-----	
1059	D1500	3.0	3.0		-0.66	
1146		-----	-----		-----	
1173		-----	-----		-----	
1174		-----	-----		-----	
1182		-----	-----		-----	
1205		-----	-----		-----	
1235	ISO2049	3.0	3.0		-0.66	
1243	D1500	3.2	3.2		-0.10	
1262	ISO2049	L 3.5	3.25		0.04	
1320	D1500	3	3		-0.66	
1324		-----	-----		-----	
1326	D1500	L3.5	3.25		0.04	
1409	D1500	3.0	3.0		-0.66	
1412	D1500	3.0	3.0		-0.66	
1431	D1500	3.0	3.0		-0.66	
1438		-----	-----		-----	
1460	D6045	4.0	4.0	R(0.05)	2.14	
1488		-----	-----		-----	
1564	D1500	L3.5	3.25		0.04	
1650		-----	-----		-----	
1720		-----	-----		-----	
1728	D1500	L3.5	3.25		0.04	
1748		-----	-----		-----	
1799		-----	-----		-----	
1850	ISO2049	3.0	3.0		-0.66	
1877	D6045	3.2	3.2		-0.10	
1895		-----	-----		-----	
1941	ISO2049	L3.5	3.25		0.04	
1957	D1500	3.5	3.5		0.74	
1968		-----	-----		-----	
1969		-----	-----		-----	
6016	D1500	3	3		-0.66	
6032	D1500	3.25	3.25		0.04	
6035	D6045	4.2	4.2	R(0.05)	2.70	
6044	D1500	3	3		-0.66	
6074	D6045	L3.5	3.25		0.04	
6183	D6045	3.58	3.58		0.97	

lab	method	value	iis conversion *)	mark	z(targ)	remarks
6197	D1500	3.0	3.0		-0.66	
6253	ISO2049	3.5	3.5		0.74	
6284	D1500	<3.5	3.25		0.04	
6310	D1500	L3.5	3.25		0.04	
6324	D1500	L3.5	3.25		0.04	
6344		-----	-----		-----	
6380	D1500	3.2	3.2		-0.10	
6394	D1500	L3,5	3.25		0.04	
6425	D1500	3.7	3.7	C	1.30	first reported 4.7
6442	D6045	L3.5	3.25		0.04	
6455		-----	-----		-----	
6485	D1500	L3.0	2.75		-1.36	
6492	D1500	3.30	3.30		0.18	
6521		-----	-----		-----	
6528		-----	-----		-----	
6532		-----	-----		-----	
6535	D1500	L3.5	3.25		0.04	

normality	OK
n	56
outliers	5
mean (n)	3.23
st.dev. (n)	0.208
R(calc.)	0.58
st.dev.(D1500:12R17)	0.357
R(D1500:12R17)	1

*) In the calculation of the mean, standard deviation and the reproducibility in this column, a reported value of 'L y' is changed tot y-0.25 (for example L3.5 into 3.25)



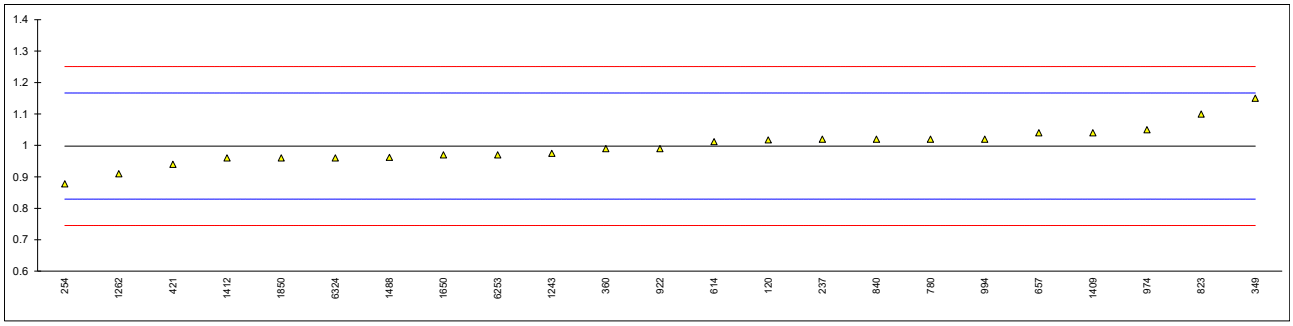


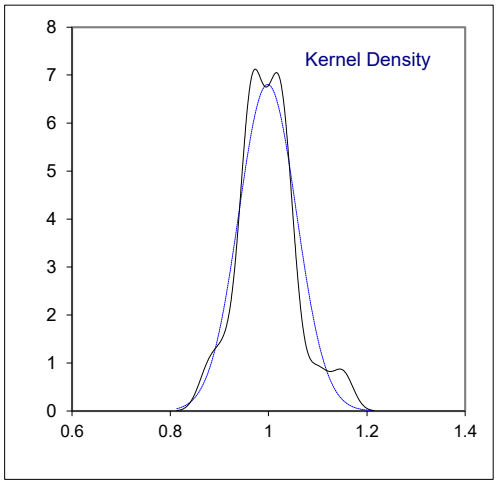
Determination of Conradson Carbon Residue on sample #23080; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D189	1.0175		0.23	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237	D189	1.02		0.26	
254	D189	0.878		-1.42	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349	D189	1.15		1.80	
360	D189	0.99		-0.10	
381		-----		-----	
398		-----		-----	
421	ISO6615	0.94		-0.69	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496		-----		-----	
614	D189	1.0119		0.16	
633		-----		-----	
634		-----		-----	
657	D189	1.04		0.50	
780	D189	1.02		0.26	
823	D189	1.10		1.21	
840	D189	1.020		0.26	
862		-----		-----	
875		-----		-----	
912		-----		-----	
922	D189	0.99		-0.10	
963		-----		-----	
974	D189	1.05		0.62	
994	D189	1.02		0.26	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	ISO6615	0.975		-0.27	
1262	ISO6615	0.91		-1.04	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409	ISO10370	1.04		0.50	
1412	D189	0.96		-0.45	
1431		-----		-----	
1438		-----		-----	
1460		-----		-----	
1488	ISO6615	0.962		-0.43	
1564		-----		-----	
1650	D189	0.97		-0.33	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850	D189	0.96		-0.45	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074		-----		-----	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253	ISO6615	0.97		-0.33	
6284		-----		-----	
6310		-----		-----	
6324	D189	0.96		-0.45	
6344		-----		-----	
6380		-----		-----	
6394		-----		-----	
6425		-----		-----	
6442		-----		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	

normality	suspect
n	23
outliers	0
mean (n)	0.998
st.dev. (n)	0.0586
R(calc.)	0.164
st.dev.(D189:06R19)	0.0842
R(D189:06R19)	0.236





Determination of Ramsbottom Carbon Residue on sample #23080; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D524	0.71495		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D524	0.98		-----	
780		-----		-----	
823		-----		-----	
840		-----		-----	
862		-----		-----	
875		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974	D524	0.99		-----	
994		-----		-----	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243		-----		-----	
1262		-----		-----	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409		-----		-----	
1412		-----		-----	
1431		-----		-----	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564		-----		-----	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074		-----		-----	
6183		-----		-----	

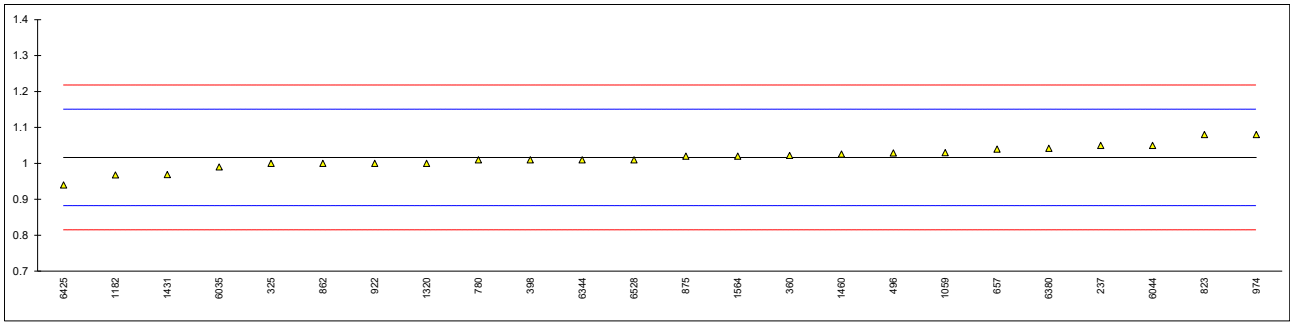
lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380		-----		-----	
6394		-----		-----	
6425		-----		-----	
6442	D524	0.86		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	
	n	4			

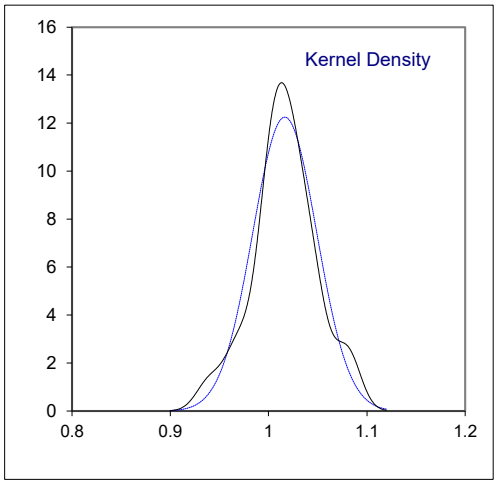
Determination of Carbon Residue (micro method) on sample #23080; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237	D4530	1.05		0.50	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	D4530	1.00		-0.25	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D4530	1.022		0.08	
381		-----		-----	
398	D4530	1.01		-0.10	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D4530	<0.3		<-10.67	possibly a false negative test result?
496	D4530	1.029		0.19	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D4530	1.04		0.35	
780	D4530	1.01		-0.10	
823	ISO10370	1.08		0.95	
840		-----		-----	
862	D4530	1.00		-0.25	
875	D4530	1.02		0.05	
912		-----		-----	
922	D4530	1.00		-0.25	
963		-----		-----	
974	D4530	1.08		0.95	
994		-----		-----	
1017		-----		-----	
1059	ISO10370	1.03		0.20	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182	ISO10370	0.968		-0.72	
1205		-----		-----	
1235		-----		-----	
1243		-----		-----	
1262		-----		-----	
1320	D4530	1.00		-0.25	
1324		-----		-----	
1326		-----		-----	
1409		-----		-----	
1412		-----		-----	
1431	D4530	0.969		-0.71	
1438		-----		-----	
1460	D4530	1.026		0.14	
1488		-----		-----	
1564	D4530	1.02		0.05	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035	ISO10370	0.99		-0.39	
6044	D4530	1.05		0.50	
6074		-----		-----	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344	ISO10370	1.01		-0.10	
6380	D4530	1.0421		0.38	
6394		-----		-----	
6425	ISO10370	0.94		-1.14	
6442		-----		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528	D4530	1.010		-0.10	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	24
outliers	0
mean (n)	1.017
st.dev. (n)	0.0326
R(calc.)	0.091
st.dev.(D4530:15R20)	0.0671
R(D4530:15R20)	0.188



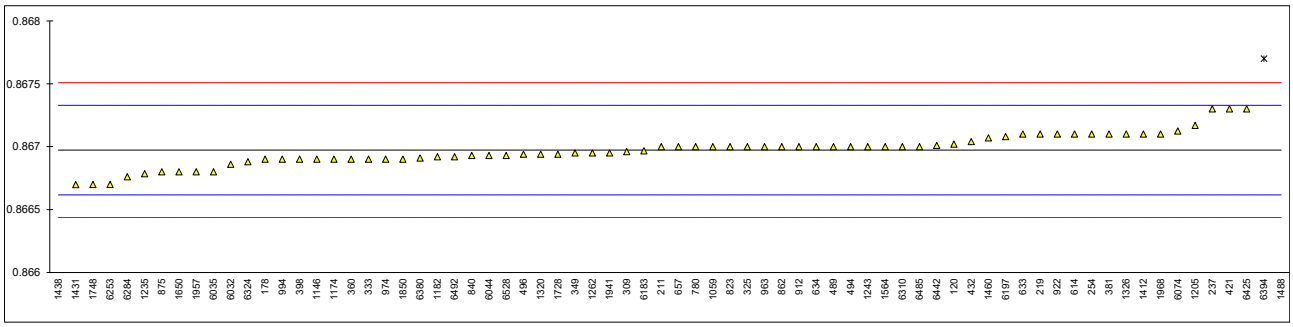


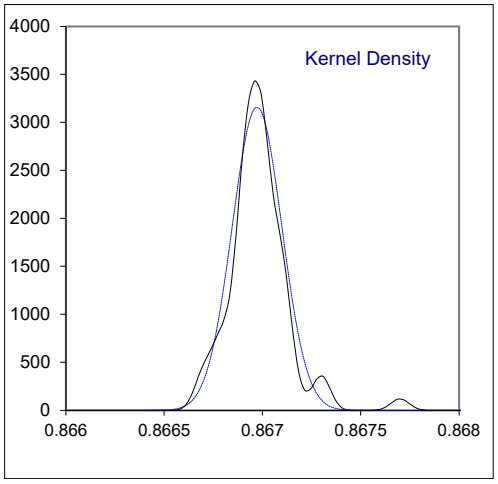
Determination of Density at 15 °C on sample #23080; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	0.86702		0.26	
178	D4052	0.8669		-0.41	
179		-----		-----	
211	D4052	0.8670		0.15	
219	D1298	0.8671	C	0.71	first reported 0.8659
237	D4052	0.8673		1.83	
254	D4052	0.8671		0.71	
256		-----		-----	
257		-----		-----	
309	D4052	0.86696		-0.07	
325	D4052	0.8670		0.15	
329		-----		-----	
333	D4052	0.8669	C	-0.41	first reported 0.8675
339		-----		-----	
349	D4052	0.86695		-0.13	
360	ISO12185	0.8669		-0.41	
381	ISO12185	0.8671	C	0.71	first reported 0.8677
398	ISO12185	0.8669		-0.41	
421	ISO12185	0.8673		1.83	
432	ISO12185	0.86704		0.38	
489	DIN51757	0.86700		0.15	
494	ISO12185	0.8670		0.15	
496	ISO12185	0.86694		-0.18	
614	D4052	0.8671		0.71	
633	D4052	0.8671		0.71	
634	D4052	0.8670		0.15	
657	D4052	0.8670		0.15	
780	ISO12185	0.8670		0.15	
823	D4052	0.8670		0.15	
840	D4052	0.86693		-0.24	
862	D4052	0.8670		0.15	
875	D1298	0.8668		-0.97	
912	ISO12185	0.8670		0.15	
922	D4052	0.8671		0.71	
963	D4052	0.8670		0.15	
974	D4052	0.8669		-0.41	
994	ISO12185	0.8669		-0.41	
1017		-----		-----	
1059	ISO12185	0.8670		0.15	
1146	D4052	0.8669		-0.41	
1173		-----		-----	
1174	ISO3675	0.8669	C	-0.41	first reported 0.8665
1182	ISO12185	0.86692		-0.30	
1205	ISO12185	0.86717		1.10	
1235	ISO12185	0.866785		-1.05	
1243	ISO12185	0.8670		0.15	
1262	D4052	0.86695		-0.13	
1320	ISO12185	0.86694		-0.18	
1324		-----		-----	
1326	D4052	0.8671		0.71	
1409		-----		-----	
1412	D4052	0.8671		0.71	
1431	D4052	0.866698		-1.54	
1438	D1298	0.862	C,R(0.01)	-27.85	first reported 0.868
1460	D4052	0.86707		0.54	
1488	ISO3675	0.86980	C,R(0.01)	15.83	first reported 0.86877
1564	D4052	0.8670		0.15	
1650	D4052	0.8668		-0.97	
1720		-----		-----	
1728	D4052	0.86694		-0.18	
1748	D4052	0.8667		-1.53	
1799		-----		-----	
1850	D4052	0.8669		-0.41	
1877		-----		-----	
1895		-----		-----	
1941	D4052	0.86695		-0.13	
1957	D4052	0.8668		-0.97	
1968	ISO3675	0.8671		0.71	
1969		-----		-----	
6016		-----		-----	
6032	D4052	0.86686		-0.63	
6035	ISO12185	0.8668		-0.97	
6044	D4052	0.86693		-0.24	
6074	ISO12185	0.867125		0.85	
6183	D4052	0.866967		-0.03	

lab	method	value	mark	z(targ)	remarks
6197	D4052	0.86708		0.60	
6253	ISO3675	0.8667	C	-1.53	reported 866.7 kg/L
6284	D4052	0.86676		-1.19	
6310	D4052	0.867		0.15	
6324	D4052	0.86688		-0.52	
6344		-----		-----	
6380	D4052	0.86691		-0.35	
6394	D4052	0.86770	C,R(0.01)	4.07	first reported 0.86750
6425	D7042	0.8673		1.83	
6442	D4052	0.86701		0.21	
6455		-----		-----	
6485	D4052	0.8670		0.15	
6492	D4052	0.86692		-0.30	
6521		-----		-----	
6528	D4052	0.86693		-0.24	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	69
outliers	3
mean (n)	0.86697
st.dev. (n)	0.000126
R(calc.)	0.00035
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005



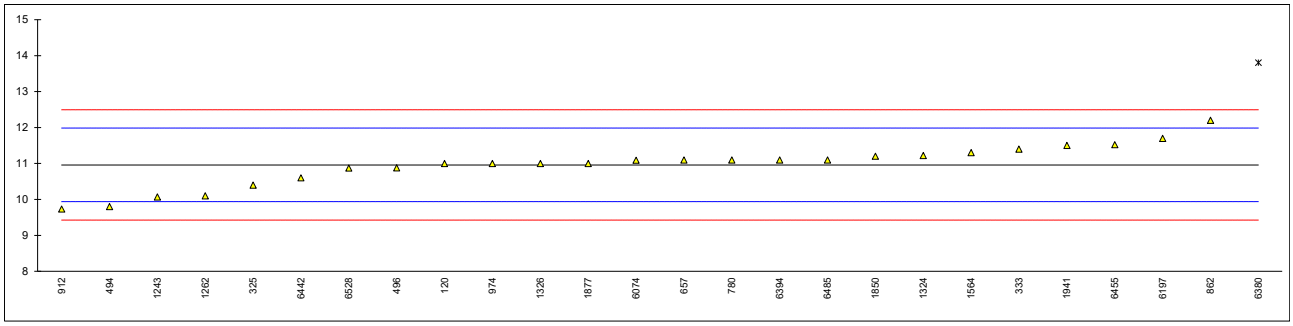


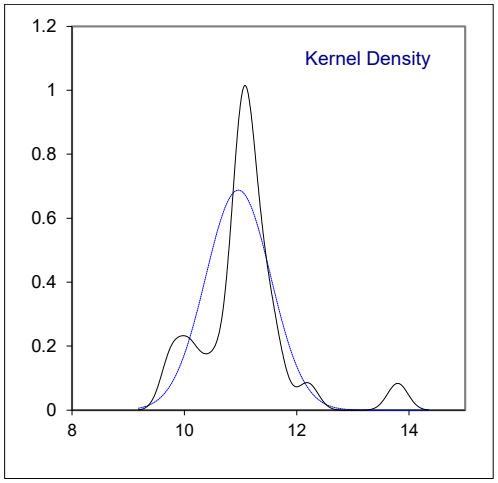
Determination of Evaporation loss by Noack on sample #23080; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	CEC L-40-93	11.0		0.08	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	CEC L-40-93	10.4		-1.09	
329		-----		-----	
333	CEC L-40-93	11.4		0.86	
339		-----		-----	
349		-----		-----	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D5800-A	9.8		-2.27	
496	D5800-B	10.88		-0.15	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D5800-B	11.1		0.28	
780	D5800-B	11.1		0.28	
823		-----		-----	
840		-----		-----	
862	D5800-B	12.2		2.43	
875		-----		-----	
912	D5800-A	9.73		-2.40	
922		-----		-----	
963		-----		-----	
974	D5800-B	11.0		0.08	
994		-----		-----	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	DIN51581	10.07		-1.74	
1262	D5800-A	10.1	C	-1.68	first reported 9.60
1320		-----		-----	
1324	D5800-B	11.22		0.51	
1326	D5800-B	11.0		0.08	
1409		-----		-----	
1412		-----		-----	
1431		-----		-----	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564	DIN51581	11.3		0.67	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850	D5800-B	11.2		0.47	
1877	D5800-B	11.0		0.08	
1895		-----		-----	
1941	D5800-A	11.50		1.06	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074	D5800-D	11.0906		0.26	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D5800-B	11.7		1.45	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380	D5800-B	13.8	R(0.01)	5.55	
6394	D5800-D	11.1		0.28	
6425		-----		-----	
6442	CEC L-40-93	10.6		-0.70	
6455	D5800	11.52		1.10	
6485	D5800-B	11.1		0.28	
6492		-----		-----	
6521		-----		-----	
6528	D5800-B	10.87		-0.17	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	25
outliers	1
mean (n)	10.959
st.dev. (n)	0.5800
R(calc.)	1.624
st.dev.(D5800-B:21)	0.5116
R(D5800-B:21)	1.433



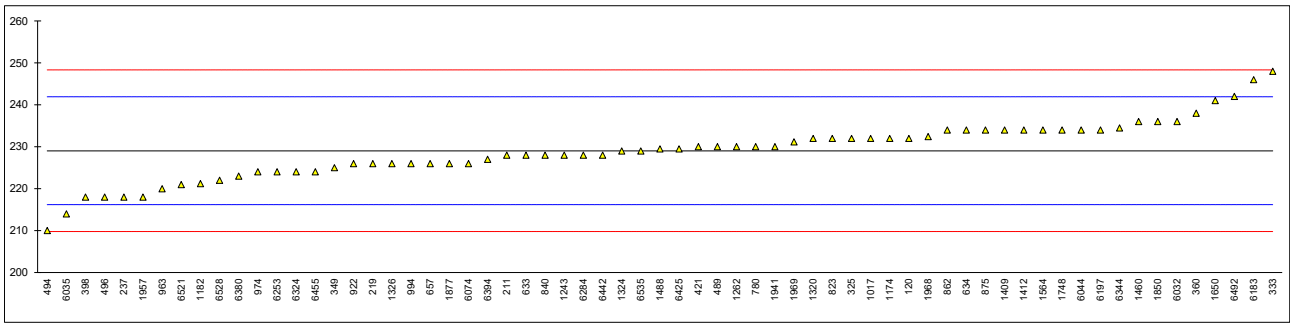


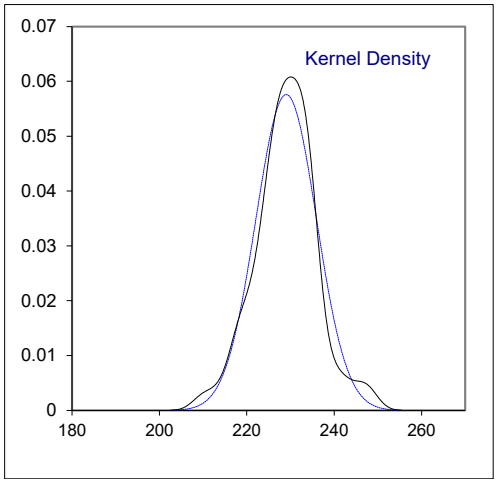
Determination of Flash Point C.O.C. on sample #23080; results in °C

lab	method	value	mark	z(targ)	remarks
120	D92	232		0.46	
178		-----		-----	
179		-----		-----	
211	D92	228		-0.16	
219	D92	226	C	-0.47	first reported 180.0
237	D92	218		-1.72	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	D92	232		0.46	
329		-----		-----	
333	D92	248		2.95	
339		-----		-----	
349	D92	225		-0.63	
360	D92	238		1.39	
381		-----		-----	
398	D92	218		-1.72	
421	ISO2592	230		0.15	
432		-----		-----	
489	ISO2592	230		0.15	
494	D92	210.0		-2.96	
496	D92	218.0	C	-1.72	first reported 92.0
614		-----		-----	
633	D92	228		-0.16	
634	D92	234		0.77	
657	D92	226		-0.47	
780	D92	230		0.15	
823	D92	232		0.46	
840	D92	228		-0.16	
862	D92	234		0.77	
875	D92	234		0.77	
912		-----		-----	
922	D92	226		-0.47	
963	D92	220.0		-1.41	
974	D92	224		-0.78	
994	D92	226.0		-0.47	
1017	D92	232		0.46	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174	ISO2592	232		0.46	
1182	D92	221.2		-1.22	
1205		-----		-----	
1235		-----		-----	
1243	ISO2592	228		-0.16	
1262	ISO2592	230		0.15	
1320	D92	232		0.46	
1324	D92	229		-0.01	
1326	D92	226		-0.47	
1409	ISO2592	234		0.77	
1412	D92	234.0		0.77	
1431		-----		-----	
1438		-----		-----	
1460	D92	236.0		1.08	
1488	ISO2592	229.5		0.07	
1564	D92	234		0.77	
1650	D92	241.0		1.86	
1720		-----		-----	
1728		-----		-----	
1748	D92	234		0.77	
1799		-----		-----	
1850	ISO2592	236		1.08	
1877	D92	226		-0.47	
1895		-----		-----	
1941	ISO2592	230		0.15	
1957	D92	218		-1.72	
1968	D92	232.4		0.52	
1969	ISO2592	231.16		0.33	
6016		-----		-----	
6032	D92	236		1.08	
6035	ISO2592	214		-2.34	
6044	D92	234		0.77	
6074	ISO2592	226		-0.47	
6183	D92	246.0		2.64	

lab	method	value	mark	z(targ)	remarks
6197	D92	234		0.77	
6253	ISO2592	224		-0.78	
6284	D92	228		-0.16	
6310		-----		-----	
6324	D92	224		-0.78	
6344	ISO2592	234.5		0.85	
6380	D92	223.0		-0.94	
6394	D92	227		-0.32	
6425	ISO2592	229.5		0.07	
6442	D92	228		-0.16	
6455	D92	224		-0.78	
6485		-----		-----	
6492	D92	242.0		2.02	
6521	ISO2592	221		-1.25	
6528	D92	222.0		-1.09	
6532		-----		-----	
6535	D92	229		-0.01	

normality	OK
n	65
outliers	0
mean (n)	229.03
st.dev. (n)	6.928
R(calc.)	19.40
st.dev.(D92:18)	6.429
R(D92:18)	18



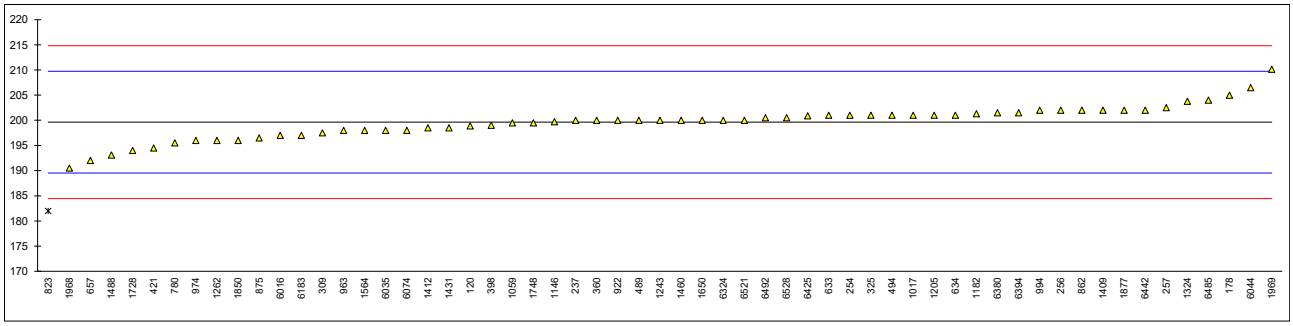


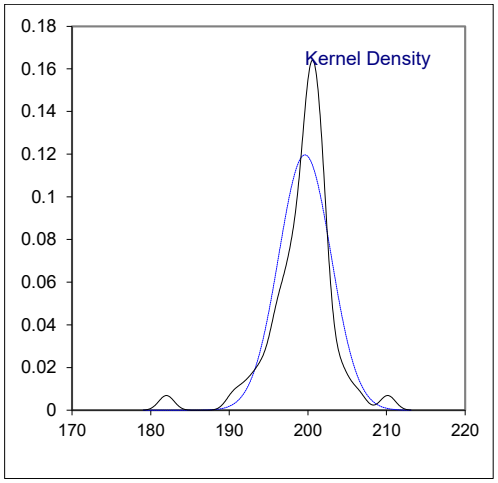
Determination of Flash Point PMcc on sample #23080; results in °C

lab	method	value	mark	z(targ)	remarks
120	D93-A	198.9		-0.14	
178	D93-A	205		1.06	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237	D93-A	200.0		0.07	
254	D93-A	201.0		0.27	
256	D3828	202.0		0.47	
257	D3828	202.5		0.57	
309	D93-A	197.5		-0.42	
325	D93-A	201		0.27	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D93-A	200.0		0.07	
381		-----		-----	
398	D93-A	199		-0.12	
421	ISO2719-A	194.5		-1.01	
432		-----		-----	
489	ISO2719	200.0		0.07	
494	D93-A	201.0		0.27	
496		-----		-----	
614		-----		-----	
633	D93-B	201		0.27	
634	D93-A	201.0		0.27	
657	D93-A	192		-1.51	
780	D93-A	195.5		-0.82	
823	ISO2719-B	182	R(0.01)	-3.48	
840		-----		-----	
862	D93	202		0.47	
875	D93-A	196.5		-0.62	
912		-----		-----	
922	D93-A	200		0.07	
963	D93-A	198.0		-0.32	
974	D93-A	196		-0.72	
994	D93-A	202.0		0.47	
1017	D93-A	201.0		0.27	
1059	ISO2719-A	199.5		-0.03	
1146	D93-A	199.7		0.01	
1173		-----		-----	
1174		-----		-----	
1182	D93-A	201.3		0.33	
1205	D93-A	201.0		0.27	
1235		-----		-----	
1243	ISO2719-A	200		0.07	
1262	ISO2719-A	196.0		-0.72	
1320		-----		-----	
1324	D93-A	203.8		0.82	
1326		-----		-----	
1409	ISO2719-A	202		0.47	
1412	D93-A	198.5		-0.22	
1431	D93-A	198.5		-0.22	
1438		-----		-----	
1460	D93-A	200.0		0.07	
1488	ISO2719-A	193.1		-1.29	
1564	D93-A	198		-0.32	
1650	D93-A	200.0		0.07	
1720		-----		-----	
1728	D93-A	194		-1.11	
1748	D93-A	199.5		-0.03	
1799		-----		-----	
1850	ISO2719-A	196		-0.72	
1877	D93-A	202.0		0.47	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968	D93-B	190.5		-1.80	
1969	ISO2719-A	210.16		2.08	
6016	D93-B	197		-0.52	
6032		-----		-----	
6035	ISO2719-A	198.0		-0.32	
6044	D93-A	206.5		1.36	
6074	ISO2719-A	198.0		-0.32	
6183	D93-A	197.0		-0.52	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324	D93-A	200		0.07	
6344		-----		-----	
6380	D93-A	201.5		0.37	
6394	D6450	201.5	C	0.37	first reported 212.5
6425	ISO2719-A	200.9		0.25	
6442	D93-A	202		0.47	
6455		-----		-----	
6485	D93-A	204		0.86	
6492	D93-A	200.5		0.17	
6521	ISO2719-A	200		0.07	
6528	D93-A	200.5		0.17	
6532		-----		-----	
6535		-----		-----	

normality	suspect
n	58
outliers	1
mean (n)	199.63
st.dev. (n)	3.334
R(calc.)	9.34
st.dev.(D93-A:20)	5.062
R(D93-A:20)	14.17





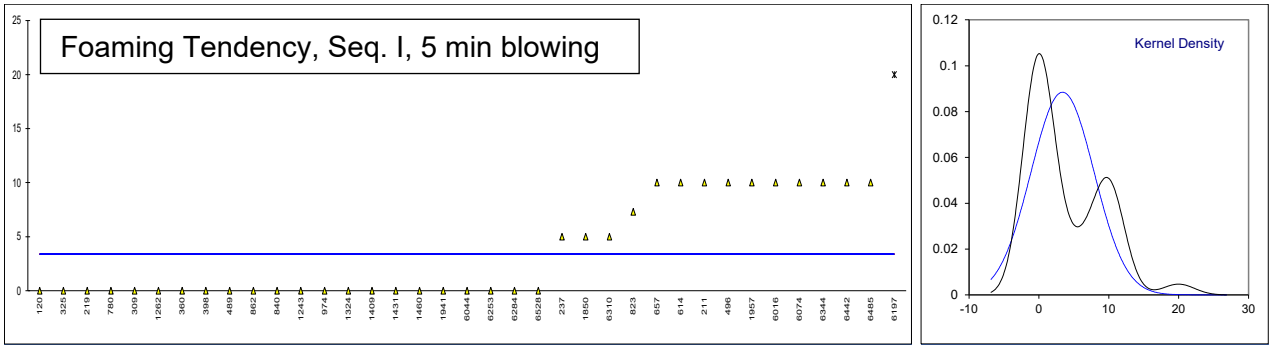
Determination of Foaming Tendency, 5 min blowing period on sample #23080; results in mL

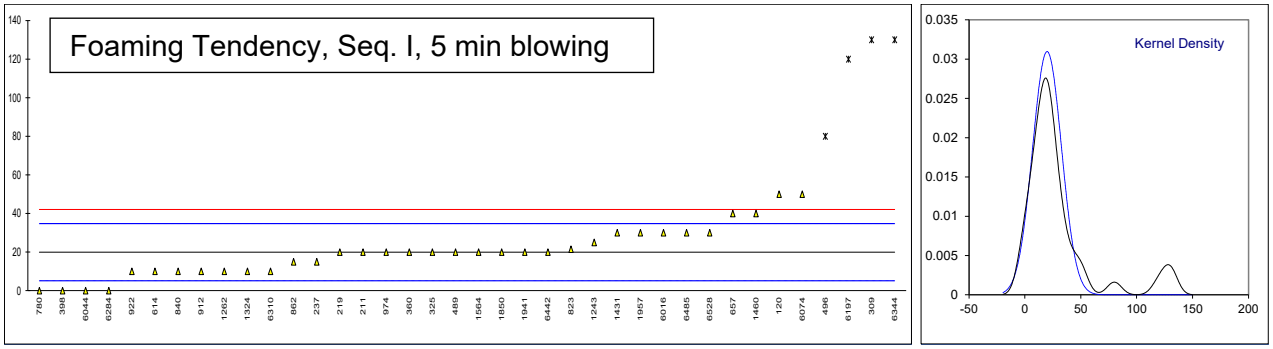
lab	method	sample used	diffuser	Seq I	mark	z(targ)	Seq II	mark	z(targ)	Seq III	mark	z(targ)
120	D892	As received	Stone	0		-----	50		4.06	0		-----
178		---	---	-----		-----	-----		-----	-----		-----
179		---	---	-----		-----	-----		-----	-----		-----
211	D892	As received	Stone	10		-----	20		0.01	0		-----
219	D892	---	---	0		-----	20		0.01	0		-----
237	D892	---	---	5		-----	15		-0.66	5		-----
254		---	---	-----		-----	-----		-----	-----		-----
256		---	---	-----		-----	-----		-----	-----		-----
257		---	---	-----		-----	-----		-----	-----		-----
309	D892	heat+agitation	Metal	0		-----	130	R1	14.85	0		-----
325	D892	As received	Stone	0		-----	20		0.01	0		-----
329		---	---	-----		-----	-----		-----	-----		-----
333		---	---	-----		-----	-----		-----	-----		-----
339		---	---	-----		-----	-----		-----	-----		-----
349		---	---	-----		-----	-----		-----	-----		-----
360	ISO6247	As received	Stone	0		-----	20		0.01	0		-----
381		---	---	-----		-----	-----		-----	-----		-----
398	D892	As received	Stone	0		-----	0		-2.68	0		-----
421		---	---	-----		-----	-----		-----	-----		-----
432		---	---	-----		-----	-----		-----	-----		-----
489	ISO6247	gently swirled	Metal	0		-----	20		0.01	0		-----
494		---	---	-----		-----	-----		-----	-----		-----
496	D892	After agitation	Metal	10		-----	80	R1	8.11	10		-----
614	IP146 (Alternative)	As received	Metal	10		-----	10		-1.34	10		-----
633		---	---	-----		-----	-----		-----	-----		-----
634		---	---	-----		-----	-----		-----	-----		-----
657	D892	As received	Stone	10		-----	40		2.71	0		-----
780	D892	As received	Stone	0		-----	0		-2.68	0		-----
823	D892	As received	Stone	7.3		-----	21.5		0.22	0		-----
840	D892	As received	Metal	0		-----	10		-1.34	0		-----
862	D892	As received	Metal	0		-----	15		-0.66	0		-----
875		---	---	-----		-----	-----		-----	-----		-----
912	D892	---	---	Nil		-----	10		-1.34	Nil		-----
922	D892	As received	Stone	<10		-----	10		-1.34	<10		-----
963		---	---	-----		-----	-----		-----	-----		-----
974	D892	---	---	0		-----	20		0.01	0		-----
994		---	---	-----		-----	-----		-----	-----		-----
1017		---	---	-----		-----	-----		-----	-----		-----
1059		---	---	-----		-----	-----		-----	-----		-----
1146		---	---	-----		-----	-----		-----	-----		-----
1173		---	---	-----		-----	-----		-----	-----		-----
1174		---	---	-----		-----	-----		-----	-----		-----
1182		---	---	-----		-----	-----		-----	-----		-----
1205		---	---	-----		-----	-----		-----	-----		-----
1235		---	---	-----		-----	-----		-----	-----		-----
1243	D892	As received	Stone	0		-----	25		0.69	0		-----
1262	ISO6247	As received	Stone	0		-----	10		-1.34	0		-----
1320		---	---	-----		-----	-----		-----	-----		-----
1324	D892 (Alternative)	After agitation	Metal	0		-----	10		-1.34	0		-----
1326		---	---	-----		-----	-----		-----	-----		-----
1409	ISO6247	---	---	0		-----	-----		-----	-----		-----
1412		---	---	-----		-----	-----		-----	-----		-----
1431	D892	As received	Stone	0		-----	30		1.36	0		-----
1438		---	---	-----		-----	-----		-----	-----		-----
1460	D892	As received	Metal	0		-----	40		2.71	0		-----
1488		---	---	-----		-----	-----		-----	-----		-----
1564	D892	As received	Metal	-----		-----	20		0.01	10		-----
1650		---	---	-----		-----	-----		-----	-----		-----
1720		---	---	-----		-----	-----		-----	-----		-----
1728		---	---	-----		-----	-----		-----	-----		-----
1748		---	---	-----		-----	-----		-----	-----		-----
1799		---	---	-----		-----	-----		-----	-----		-----
1850	ISO6247	As received	Stone	5		-----	20		0.01	5		-----
1877		---	---	-----		-----	-----		-----	-----		-----
1895		---	---	-----		-----	-----		-----	-----		-----
1941	ISO6247	As received	Metal	0		-----	20		0.01	0		-----
1957	D892	---	---	10		-----	30		1.36	10		-----
1968		---	---	-----		-----	-----		-----	-----		-----
1969		---	---	-----		-----	-----		-----	-----		-----
6016	D892	As received	Stone	10		-----	30		1.36	5		-----
6032		---	---	-----		-----	-----		-----	-----		-----
6035		---	---	-----		-----	-----		-----	-----		-----
6044	D892	As received	Stone	0		-----	0		-2.68	0		-----
6074	D892	As received	Metal	10		-----	50		4.06	10		-----
6183		---	---	-----		-----	-----		-----	-----		-----

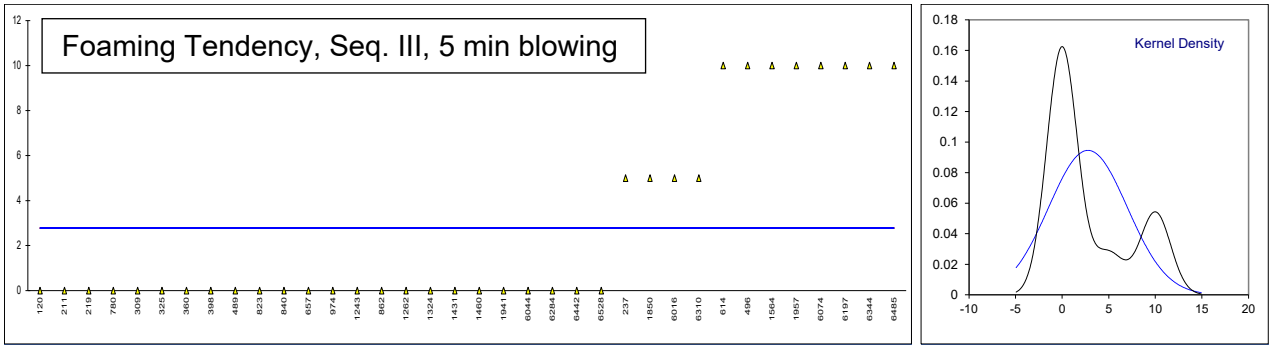
lab	method	sample used	diffuser	Seq I	mark	z(targ)	Seq II	mark	z(targ)	Seq III	mark	z(targ)
6197	D892	As received	Metal	20	R5	-----	120	C,R1	13.50	10		-----
6253	ISO6247	As received	Stone	0		-----	-----		-----	-----		-----
6284	D892	As received	Stone	0		-----	0		-2.68	0		-----
6310	D892	After agitation	Metal	5		-----	10		-1.34	5		-----
6324		---	---	-----		-----	-----		-----	-----		-----
6344	D892	As received	Metal	10		-----	130	C,R1	14.85	10		-----
6380		---	---	-----		-----	-----		-----	-----		-----
6394		---	---	-----		-----	-----		-----	-----		-----
6425		---	---	-----		-----	-----		-----	-----		-----
6442	D892 (Alternative)	After agitation	Metal	10		-----	20		0.01	0		-----
6455		---	---	-----		-----	-----		-----	-----		-----
6485	D892	---	---	10		-----	30		1.36	10		-----
6492		---	---	-----		-----	-----		-----	-----		-----
6521		---	---	-----		-----	-----		-----	-----		-----
6528		As received	Metal	0		-----	30		1.36	0		-----
6532		---	---	-----		-----	-----		-----	-----		-----
6535		---	---	-----		-----	-----		-----	-----		-----
	normality			OK			OK			suspect		
	n			36			34			36		
	outliers			1			4			0		
	mean (n)			3.4			19.9			2.8		
	st.dev. (n)			4.51			12.88			4.22		
	R(calc.)			12.6			36.1			11.8		
	st.dev.(D892:18e1)			(1.05)			7.41			(1.95)		
	R(D892:18e1)			(2.9)			20.8			(5.4)		

Lab 6197 first reported 80

Lab 6344 first reported 80







Determination of Foam Stability, 10 min settling point on sample #23080; results in mL

lab	method	Seq I	mark	z(targ)	Seq II	mark	z(targ)	Seq III	mark	z(targ)
120	D892	0		-----	0		-----	0		-----
178		-----		-----	-----		-----	-----		-----
179		-----		-----	-----		-----	-----		-----
211	D892	0		-----	0		-----	0		-----
219	D892	0		-----	0		-----	0		-----
237	D892	0		-----	0		-----	0		-----
254		-----		-----	-----		-----	-----		-----
256		-----		-----	-----		-----	-----		-----
257		-----		-----	-----		-----	-----		-----
309	D892	0		-----	0		-----	0		-----
325	D892	0		-----	0		-----	0		-----
329		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
339		-----		-----	-----		-----	-----		-----
349		-----		-----	-----		-----	-----		-----
360	ISO6247	0		-----	0		-----	0		-----
381		-----		-----	-----		-----	-----		-----
398	D892	0		-----	0		-----	0		-----
421		-----		-----	-----		-----	-----		-----
432		-----		-----	-----		-----	-----		-----
489	ISO6247	0		-----	0		-----	0		-----
494		-----		-----	-----		-----	-----		-----
496	D892	0		-----	0		-----	0		-----
614	IP146 (Alternative)	0		-----	0		-----	0		-----
633		-----		-----	-----		-----	-----		-----
634		-----		-----	-----		-----	-----		-----
657	D892	0		-----	0		-----	0		-----
780	D892	0		-----	0		-----	0		-----
823	D892	0		-----	0		-----	0		-----
840	D892	0		-----	0		-----	0		-----
862	D892	0		-----	0		-----	0		-----
875		-----		-----	-----		-----	-----		-----
912	D892	Nil		-----	Nil		-----	Nil		-----
922	D892	0		-----	0		-----	0		-----
963		-----		-----	-----		-----	-----		-----
974	D892	0		-----	0		-----	0		-----
994		-----		-----	-----		-----	-----		-----
1017		-----		-----	-----		-----	-----		-----
1059		-----		-----	-----		-----	-----		-----
1146		-----		-----	-----		-----	-----		-----
1173		-----		-----	-----		-----	-----		-----
1174		-----		-----	-----		-----	-----		-----
1182		-----		-----	-----		-----	-----		-----
1205		-----		-----	-----		-----	-----		-----
1235		-----		-----	-----		-----	-----		-----
1243	D892	0		-----	0		-----	0		-----
1262	ISO6247	0		-----	0		-----	0		-----
1320		-----		-----	-----		-----	-----		-----
1324	D892 (Alternative)	0		-----	0		-----	0		-----
1326		-----		-----	-----		-----	-----		-----
1409	ISO6247	0		-----	-----		-----	-----		-----
1412		-----		-----	-----		-----	-----		-----
1431	D892	0		-----	0		-----	0		-----
1438		-----		-----	-----		-----	-----		-----
1460	D892	0		-----	0		-----	0		-----
1488		-----		-----	-----		-----	-----		-----
1564	D892	-----		-----	0		-----	0		-----
1650		-----		-----	-----		-----	-----		-----
1720		-----		-----	-----		-----	-----		-----
1728		-----		-----	-----		-----	-----		-----
1748		-----		-----	-----		-----	-----		-----
1799		-----		-----	-----		-----	-----		-----
1850	ISO6247	0		-----	0		-----	0		-----
1877		-----		-----	-----		-----	-----		-----
1895		-----		-----	-----		-----	-----		-----
1941	ISO6247	0		-----	0		-----	0		-----
1957	D892	0		-----	0		-----	0		-----
1968		-----		-----	-----		-----	-----		-----
1969		-----		-----	-----		-----	-----		-----
6016	D892	0		-----	0		-----	0		-----
6032		-----		-----	-----		-----	-----		-----
6035		-----		-----	-----		-----	-----		-----
6044	D892	0		-----	0		-----	0		-----
6074	D892	0		-----	0		-----	0		-----
6183		-----		-----	-----		-----	-----		-----

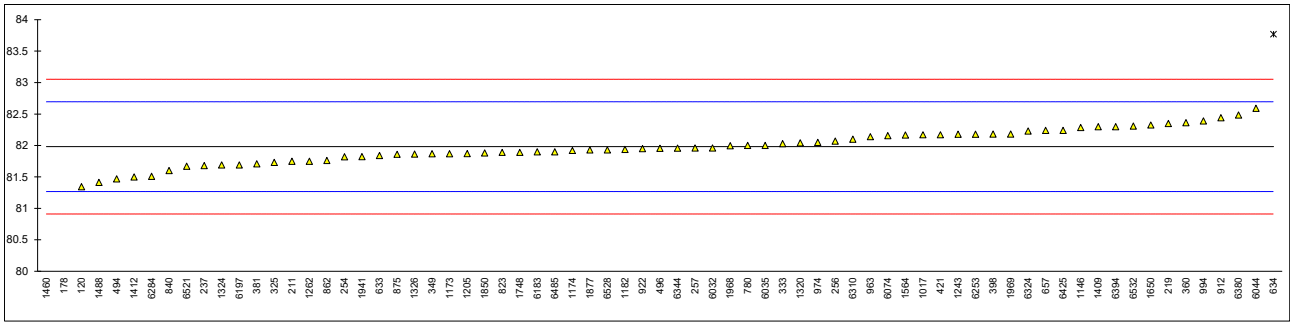
lab	method	Seq I	mark	z(targ)	Seq II	mark	z(targ)	Seq III	mark	z(targ)
6197	D892	0		-----	0		-----	0		-----
6253	ISO6247	0		-----	-----		-----	-----		-----
6284	D892	0		-----	0		-----	0		-----
6310	D892	0		-----	0		-----	0		-----
6324		-----		-----	-----		-----	-----		-----
6344	D892	-----		-----	-----		-----	-----		-----
6380		-----		-----	-----		-----	-----		-----
6394		-----		-----	-----		-----	-----		-----
6425		-----		-----	-----		-----	-----		-----
6442	D892 (Alternative)	0		-----	0		-----	0		-----
6455		-----		-----	-----		-----	-----		-----
6485	D892	0		-----	0		-----	0		-----
6492		-----		-----	-----		-----	-----		-----
6521		-----		-----	-----		-----	-----		-----
6528		0		-----	0		-----	0		-----
6532		-----		-----	-----		-----	-----		-----
6535		-----		-----	-----		-----	-----		-----
	n	38			37			37		
	mean (n)	0			0			0		

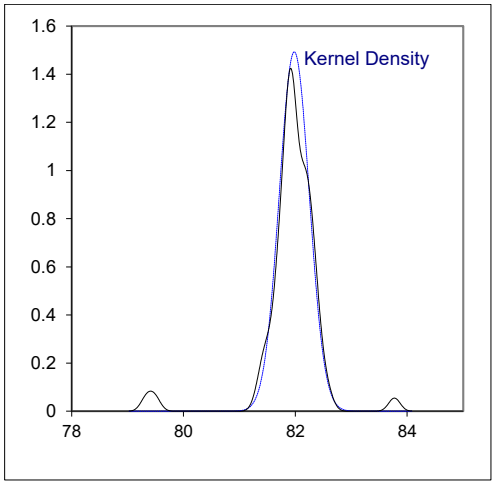
Determination of Kinematic Viscosity at 40 °C on sample #23080; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	81.34485		-1.78	
178	D7279 corrected to D445	79.49	C,R(0.01)	-6.97	first reported 83.96
179		-----		-----	
211	D445	81.75		-0.65	
219	D7279 corrected to D445	82.35		1.03	
237	D445	81.68		-0.84	
254	D445	81.82		-0.45	
256	D7279 corrected to D445	82.07		0.25	
257	D7279 corrected to D445	81.96		-0.06	
309		-----		-----	
325	D445	81.73		-0.70	
329		-----		-----	
333	D445	82.03		0.14	
339		-----		-----	
349	D445	81.87		-0.31	
360	D445	82.363		1.07	
381	ISO3104	81.71		-0.76	
398	D445	82.181		0.56	
421	ISO3104	82.17		0.53	
432		-----		-----	
489		-----		-----	
494	D445	81.47		-1.43	
496	D445	81.957		-0.07	
614		-----		-----	
633	D445	81.84		-0.39	
634	D445	83.77	R(0.01)	5.01	
657	D445	82.24		0.73	
780	D445	82.00		0.05	
823	D445	81.89		-0.25	
840	D445	81.600		-1.07	
862	D445	81.76		-0.62	
875	D445	81.86		-0.34	
912	D445	82.44		1.28	
922	D445	81.95		-0.09	
963	D445	82.14		0.45	
974	D445	82.05		0.19	
994	D445	82.39		1.15	
1017	D445	82.17		0.53	
1059		-----		-----	
1146	D445	82.285		0.85	
1173	D445	81.87		-0.31	
1174	ISO3104	81.92		-0.17	
1182	D7042	81.937	C	-0.12	first reported 142.993
1205	D445	81.8712		-0.31	
1235		-----		-----	
1243	D7279 corrected to D445	82.18		0.56	
1262	ISO3104	81.75		-0.65	
1320	D445	82.04		0.17	
1324	D445	81.69		-0.81	
1326	D445	81.865		-0.32	
1409	D445	82.30		0.89	
1412	D445	81.50		-1.35	
1431		-----		-----	
1438		-----		-----	
1460	D445	79.339	R(0.01)	-7.40	
1488	ISO3104	81.4118		-1.59	
1564	D445	82.165		0.52	
1650	D445	82.325		0.96	
1720		-----		-----	
1728		-----		-----	
1748	D7042	81.89		-0.25	
1799		-----		-----	
1850	ISO3104	81.88		-0.28	
1877	D445	81.93		-0.14	
1895		-----		-----	
1941	ISO3104	81.823		-0.44	
1957		-----		-----	
1968	ISO3104	81.995		0.04	
1969	ISO3104	82.1827		0.56	
6016		-----		-----	
6032	D7279 corrected to D445	81.96		-0.06	
6035	ISO3104	82.00		0.05	
6044	D445	82.59		1.70	
6074	D445	82.155		0.49	
6183	D445	81.9		-0.23	

lab	method	value	mark	z(targ)	remarks
6197	D445	81.69		-0.81	
6253	ISO3104	82.18		0.56	
6284	D445	81.51		-1.32	
6310	D7279 corrected to D445	82.1		0.33	
6324	D445	82.23		0.70	
6344	ISO3104	81.959		-0.06	
6380	D445	82.486		1.41	
6394	D445	82.3		0.89	
6425	ISO3104	82.24		0.73	
6442		-----		-----	
6455		-----		-----	
6485	D445	81.9		-0.23	
6492		-----		-----	
6521	ISO3104	81.67		-0.87	
6528	D445	81.931		-0.14	
6532	D445	82.31		0.92	
6535		-----		-----	

normality	OK
n	68
outliers	3
mean (n)	81.981
st.dev. (n)	0.2672
R(calc.)	0.748
st.dev.(D445:21e2)	0.3572
R(D445:21e2)	1.000



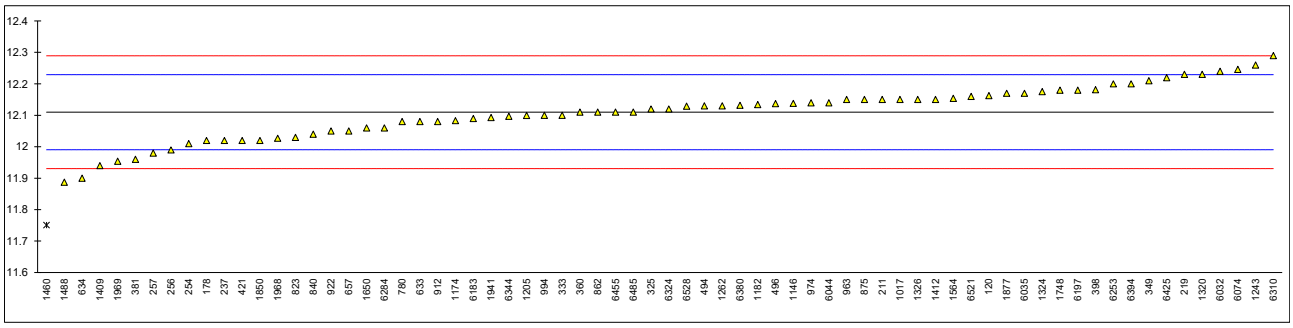


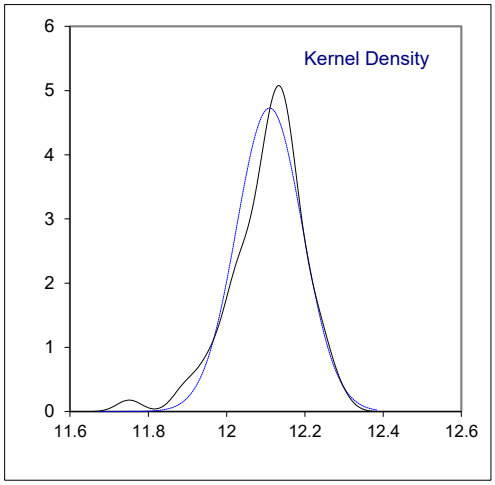
Determination of Kinematic Viscosity at 100 °C on sample #23080; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	12.1625		0.88	
178	D7279 corrected to D445	12.02		-1.50	
179		-----		-----	
211	D445	12.15		0.68	
219	D7279 corrected to D445	12.23		2.02	
237	D445	12.02		-1.50	
254	D445	12.01		-1.67	
256	D7279 corrected to D445	11.99		-2.01	
257	D7279 corrected to D445	11.98		-2.17	
309		-----		-----	
325	D445	12.12		0.17	
329		-----		-----	
333	D445	12.10		-0.16	
339		-----		-----	
349	D445	12.21		1.68	
360	D445	12.110		0.01	
381	D445	11.96		-2.51	
398	D445	12.181		1.19	
421	ISO3104	12.02		-1.50	
432		-----		-----	
489		-----		-----	
494	D445	12.13		0.34	
496	D445	12.137		0.46	
614		-----		-----	
633	D445	12.08		-0.50	
634	D445	11.90		-3.51	
657	D445	12.05		-1.00	
780	D445	12.08		-0.50	
823	ISO3104	12.03		-1.34	
840	D445	12.040		-1.17	
862	D445	12.11		0.01	
875	D445	12.15		0.68	
912	D445	12.08		-0.50	
922	D445	12.05		-1.00	
963	D445	12.15		0.68	
974	D445	12.14		0.51	
994	D445	12.10		-0.16	
1017	D445	12.15		0.68	
1059		-----		-----	
1146	D445	12.138		0.47	
1173		-----		-----	
1174	ISO3104	12.0828		-0.45	
1182	D7042	12.134		0.41	
1205	D445	12.0995		-0.17	
1235		-----		-----	
1243	D7279 corrected to D445	12.26		2.52	
1262	ISO3104	12.13		0.34	
1320	D445	12.23		2.02	
1324	D445	12.175		1.09	
1326	D445	12.15		0.68	
1409	D445	11.94		-2.84	
1412	D445	12.15		0.68	
1431		-----		-----	
1438		-----		-----	
1460	D445	11.751	R(0.01)	-6.01	
1488	ISO3104	11.8875	C	-3.72	first reported 11.8805
1564	D445	12.154		0.74	
1650	D445	12.060		-0.83	
1720		-----		-----	
1728		-----		-----	
1748	D7042	12.18		1.18	
1799		-----		-----	
1850	ISO3104	12.02		-1.50	
1877	D445	12.17		1.01	
1895		-----		-----	
1941	ISO3104	12.093		-0.28	
1957		-----		-----	
1968	ISO3104	12.027		-1.39	
1969	ISO3104	11.9539		-2.61	
6016		-----		-----	
6032	D7279 corrected to D445	12.24		2.18	
6035	ISO3104	12.17		1.01	
6044	D445	12.14		0.51	
6074	D445	12.246		2.28	
6183	D445	12.09		-0.33	

lab	method	value	mark	z(targ)	remarks
6197	D445	12.18		1.18	
6253	ISO3104	12.20		1.51	
6284	D445	12.06		-0.83	
6310	D7279 corrected to D445	12.29		3.02	
6324	D445	12.12		0.17	
6344	ISO3104	12.097		-0.21	
6380	D445	12.132		0.37	
6394	D445	12.2		1.51	
6425	ISO3104	12.22		1.85	
6442		-----		-----	
6455	D445	12.11		0.01	
6485	D445	12.11		0.01	
6492		-----		-----	
6521	ISO3104	12.16		0.84	
6528	D445	12.129		0.32	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	69
outliers	1
mean (n)	12.110
st.dev. (n)	0.0844
R(calc.)	0.236
st.dev.(D445:21e2)	0.0597
R(D445:21e2)	0.167



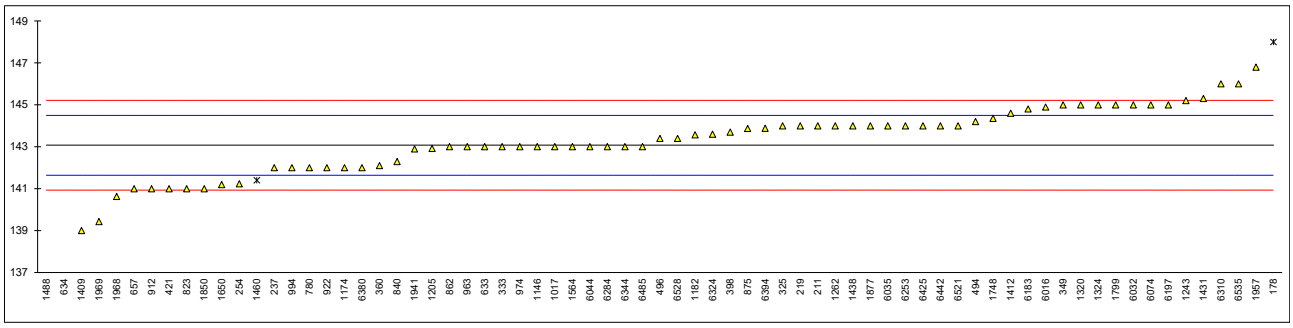


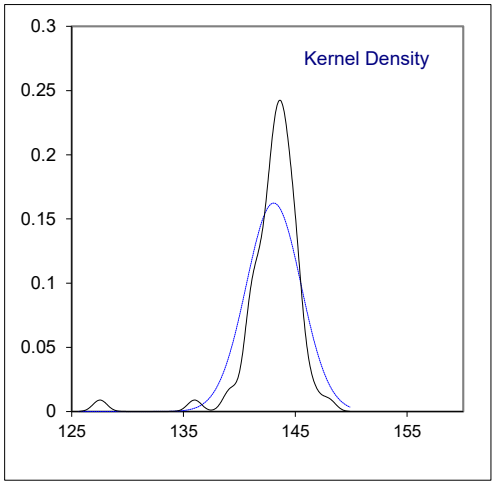
Determination of Viscosity Index on sample #23080;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
178	D2270	148	E,ex,C	6.90	iis calc. 146; test result excluded, outlier in KV 40 °C; fr. 139
179		-----		-----	
211	D2270	144		1.30	
219		144		1.30	
237	D2270	142		-1.50	
254	D2270	141.23		-2.58	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	D2270	144		1.30	
329		-----		-----	
333	D2270	143		-0.10	
339		-----		-----	
349	D2270	145		2.70	
360	ISO2909	142.1		-1.36	
381		-----		-----	
398	D2270	143.7		0.88	
421	ISO2909	141		-2.90	
432		-----		-----	
489		-----		-----	
494	D2270	144.2		1.58	
496	D2270	143.4		0.46	
614		-----		-----	
633	D2270	143		-0.10	
634	D2270	136	E,ex	-9.90	iis calculated 135; test result excluded, outlier in KV 40 °C
657	D2270	141		-2.90	
780	D2270	142		-1.50	
823	D2270	141		-2.90	
840	D2270	142.3		-1.08	
862	D2270	143		-0.10	
875	D2270	143.87		1.12	
912	D2270	141		-2.90	
922	D2270	142		-1.50	
963	D2270	143		-0.10	
974	D2270	143		-0.10	
994	D2270	142		-1.50	
1017	D2270	143		-0.10	
1059		-----		-----	
1146	D2270	143		-0.10	
1173		-----		-----	
1174	ISO2909	142		-1.50	
1182	D2270	143.567		0.69	
1205	ISO2909	142.92		-0.21	
1235		-----		-----	
1243	ISO2909	145.2		2.98	
1262	ISO2909	144		1.30	
1320	D2270	145		2.70	
1324	D2270	145		2.70	
1326		-----		-----	
1409	D2270	139		-5.70	
1412	D2270	144.6		2.14	
1431	D2270	145.3		3.12	
1438	D2270	144		1.30	
1460	D2270	141.4	ex	-2.34	test result excluded, outlier in KV 40 °C and 100 °C
1488	ISO2909	127.54	E,C	-21.74	iis calculated 139.76; first reported 127.2
1564	D2270	143		-0.10	
1650	D2270	141.2		-2.62	
1720		-----		-----	
1728		-----		-----	
1748	D2270	144.36		1.80	
1799	D2270	145		2.70	
1850	ISO2909	141		-2.90	
1877	D2270	144		1.30	
1895		-----		-----	
1941	ISO2909	142.9		-0.24	
1957	D2270	146.8		5.22	
1968	D2270	140.63	E	-3.42	iis calculated 141.21
1969	ISO2909	139.43		-5.10	
6016	D2270	144.89		2.55	
6032	D2270	145		2.70	
6035	ISO2909	144		1.30	
6044	D2270	143	E	-0.10	iis calculated 142 with D445, iis calculated 143 with Stabinger
6074	D2270	145		2.70	
6183	D2270	144.8		2.42	

lab	method	value	mark	z(targ)	remarks
6197	D2270	145		2.70	
6253	ISO2909	144		1.30	
6284	D2270	143		-0.10	
6310	D2270	146		4.10	
6324	D2270	143.6	E	0.74	iis calculated 142.6 with D445, iis calc. 144.4 with Stabinger
6344	STN65 6218	143		-0.10	
6380	D2270	142		-1.50	
6394	D2270	143.881		1.13	
6425	D2270	144		1.30	
6442	D2270	144		1.30	
6455		-----		-----	
6485	D2270	143		-0.10	
6492		-----		-----	
6521	ISO2909	144		1.30	
6528	D2270	143.4		0.46	
6532		-----		-----	
6535	D2270	146		4.10	

normality	not OK
n	68
outliers	0 + 3ex
mean (n)	143.07
st.dev. (n)	2.456
R(calc.)	6.88
st.dev.(D2270:10R16)	0.714
R(D2270:10R16)	2



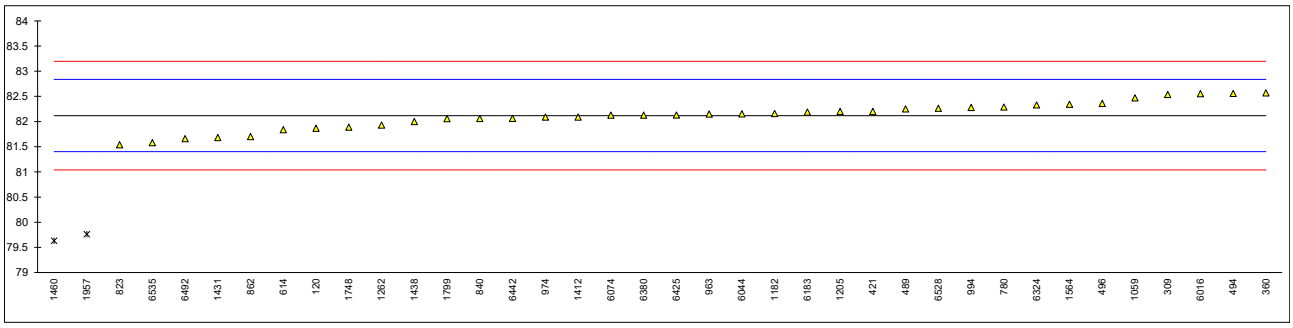


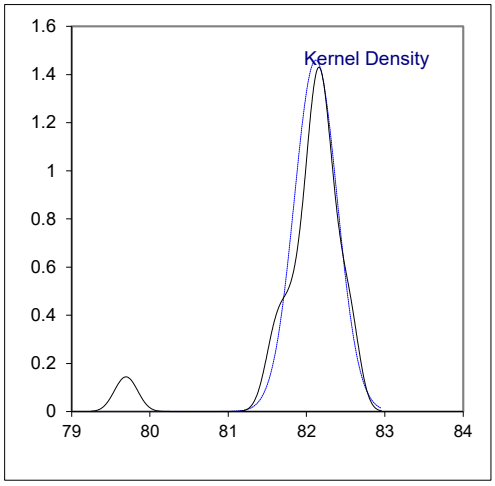
Determination of Kinematic Viscosity Stabinger at 40 °C on sample #23080; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D7042	81.868		-0.70	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D7042	82.54		1.17	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D7042	82.571		1.25	
381		-----		-----	
398		-----		-----	
421	D7042	82.20		0.22	
432		-----		-----	
489	DIN51659-2	82.254		0.37	
494	D7042	82.56		1.22	
496	D7042	82.358		0.66	
614	D7042	81.840		-0.78	
633		-----		-----	
634		-----		-----	
657		-----		-----	
780	D7042	82.29		0.47	
823	D7042	81.54		-1.61	
840	D7042	82.062		-0.16	
862	D7042	81.70		-1.17	
875		-----		-----	
912		-----		-----	
922		-----		-----	
963	D7042	82.15		0.08	
974	D7042	82.09		-0.08	
994	D7042	82.28		0.45	
1017		-----		-----	
1059	D7042	82.47		0.97	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182	D7042	82.16		0.11	
1205	D7042	82.200		0.22	
1235		-----		-----	
1243		-----		-----	
1262	D7042	81.93		-0.53	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409		-----		-----	
1412	D7042	82.09		-0.08	
1431	D7042	81.684		-1.21	
1438	D7042	82.00		-0.33	
1460	D7042	79.632	R(0.01)	-6.91	
1488		-----		-----	
1564	D7042	82.344		0.62	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748	D7042	81.89		-0.64	
1799	D7042	82.06		-0.17	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957	D7042	79.76	C,R(0.01)	-6.56	first reported 80.268
1968		-----		-----	
1969		-----		-----	
6016	D7042	82.553		1.20	
6032		-----		-----	
6035		-----		-----	
6044	D7042	82.154		0.10	
6074	D7042	82.126		0.02	
6183	D7042	82.19		0.20	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324	D7042	82.33		0.58	
6344		-----		-----	
6380	D7042	82.126		0.02	
6394		-----		-----	
6425	D7042	82.13		0.03	
6442	D7042	82.064		-0.15	
6455		-----		-----	
6485		-----		-----	
6492	D7042	81.66		-1.28	
6521		-----		-----	
6528	D7042	82.264		0.40	
6532		-----		-----	
6535	D7042	81.58		-1.50	

normality	OK
n	36
outliers	2
mean (n)	82.1197
st.dev. (n)	0.27320
R(calc.)	0.7650
st.dev.(D7042:21a)	0.35995
R(D7042:21a)	1.0079



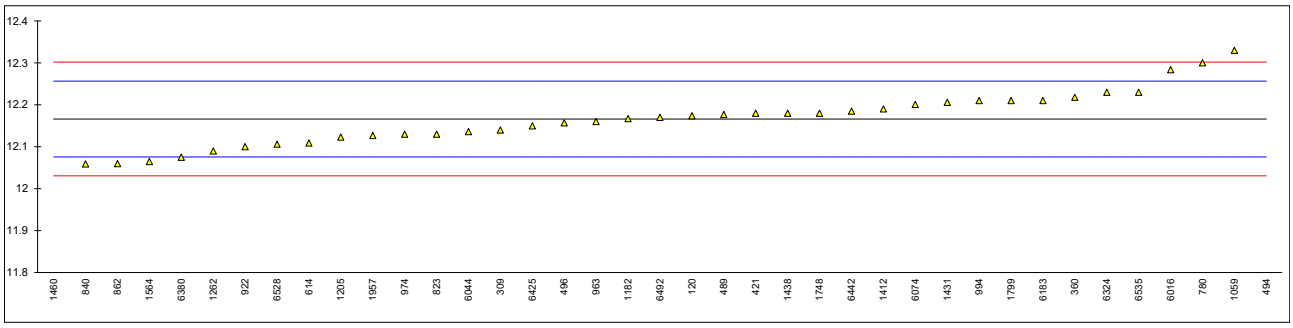


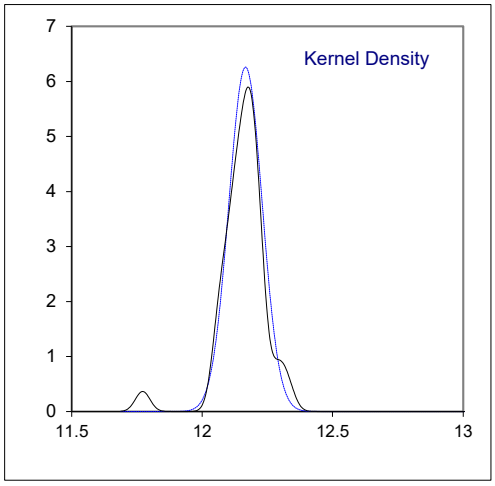
Determination of Kinematic Viscosity Stabinger at 100 °C on sample #23080; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D7042	12.174		0.17	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D7042	12.14		-0.58	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D7042	12.218		1.15	
381		-----		-----	
398		-----		-----	
421	D7042	12.18		0.31	
432		-----		-----	
489	DIN51659-2	12.177		0.24	
494	D7042	13.28	R(0.01)	24.65	
496	D7042	12.157		-0.20	
614	D7042	12.109		-1.27	
633		-----		-----	
634		-----		-----	
657		-----		-----	
780	D7042	12.30		2.96	
823	D7042	12.13		-0.80	
840	D7042	12.059		-2.37	
862	D7042	12.06		-2.35	
875		-----		-----	
912		-----		-----	
922	D7042	12.10		-1.46	
963	D7042	12.16		-0.14	
974	D7042	12.13		-0.80	
994	D7042	12.21		0.97	
1017		-----		-----	
1059	D7042	12.33		3.63	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182	D7042	12.167		0.02	
1205	D7042	12.123		-0.96	
1235		-----		-----	
1243		-----		-----	
1262	D7042	12.09		-1.69	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409		-----		-----	
1412	D7042	12.19		0.53	
1431	D7042	12.206		0.88	
1438	D7042	12.18		0.31	
1460	D7042	11.772	R(0.01)	-8.72	
1488		-----		-----	
1564	D7042	12.065		-2.24	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748	D7042	12.18		0.31	
1799	D7042	12.21		0.97	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957	D7042	12.127		-0.87	
1968		-----		-----	
1969		-----		-----	
6016	D7042	12.284		2.61	
6032		-----		-----	
6035		-----		-----	
6044	D7042	12.136		-0.67	
6074	D7042	12.201		0.77	
6183	D7042	12.21		0.97	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324	D7042	12.23		1.41	
6344		-----		-----	
6380	D7042	12.075		-2.02	
6394		-----		-----	
6425	D7042	12.15		-0.36	
6442	D7042	12.1848		0.41	
6455		-----		-----	
6485		-----		-----	
6492	D7042	12.17		0.08	
6521		-----		-----	
6528	D7042	12.106		-1.33	
6532		-----		-----	
6535	D7042	12.23		1.41	

normality	OK
n	37
outliers	2
mean (n)	12.1662
st.dev. (n)	0.06370
R(calc.)	0.1784
st.dev.(D7042:21a)	0.04518
R(D7042:21a)	0.1265



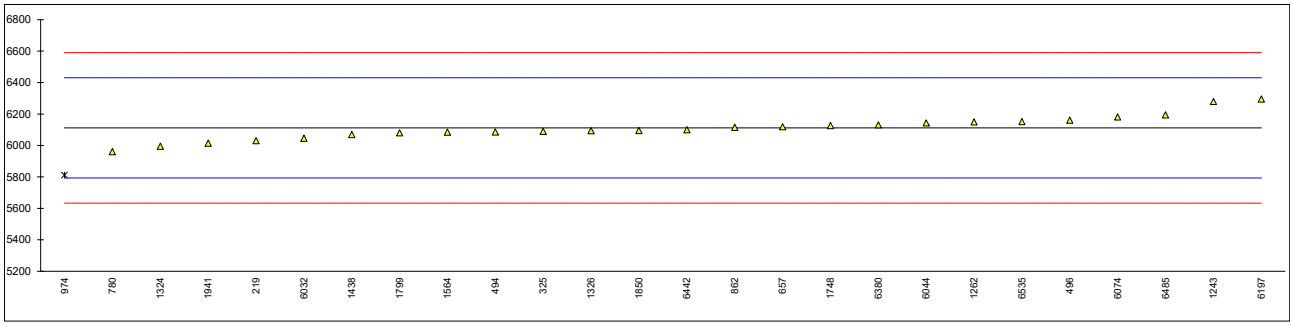


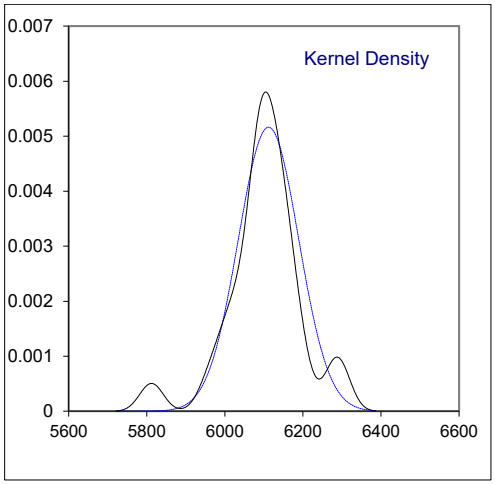
Determination of Viscosity Apparent (CCS) at -25 °C on sample #23080; results in mPa·s

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219	D5293	6030		-0.51	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	D5293	6090		-0.14	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D5293	6086		-0.16	
496	D5293	6161.0		0.31	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D5293	6119		0.04	
780	D5293	5961		-0.95	
823		-----		-----	
840		-----		-----	
862	D5293	6115		0.02	
875		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974	D5293	5812	R(0.05)	-1.88	
994		-----		-----	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	D5293	6280		1.05	
1262	D5293	6150		0.24	
1320		-----		-----	
1324	D5293	5996		-0.73	
1326	D5293	6094.5		-0.11	
1409		-----		-----	
1412		-----		-----	
1431		-----		-----	
1438	D5293	6070		-0.26	
1460		-----		-----	
1488		-----		-----	
1564	D5293	6085		-0.17	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748	D5293	6126		0.09	
1799	D5293	6080		-0.20	
1850	D5293	6095		-0.11	
1877		-----		-----	
1895		-----		-----	
1941	D5293	6014		-0.61	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032	D5293	6046		-0.41	
6035		-----		-----	
6044	D5293	6143		0.20	
6074	D5293	6182		0.44	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D5293	6296		1.16	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380	D5293	6131.25		0.12	
6394		-----		-----	
6425		-----		-----	
6442	D5293	6100		-0.07	
6455		-----		-----	
6485	D5293	6195		0.52	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535	D5293	6152		0.25	

normality	OK
n	25
outliers	1
mean (n)	6111.91
st.dev. (n)	77.259
R(calc.)	216.33
st.dev.(D5293:20)	159.346
R(D5293:20)	446.17



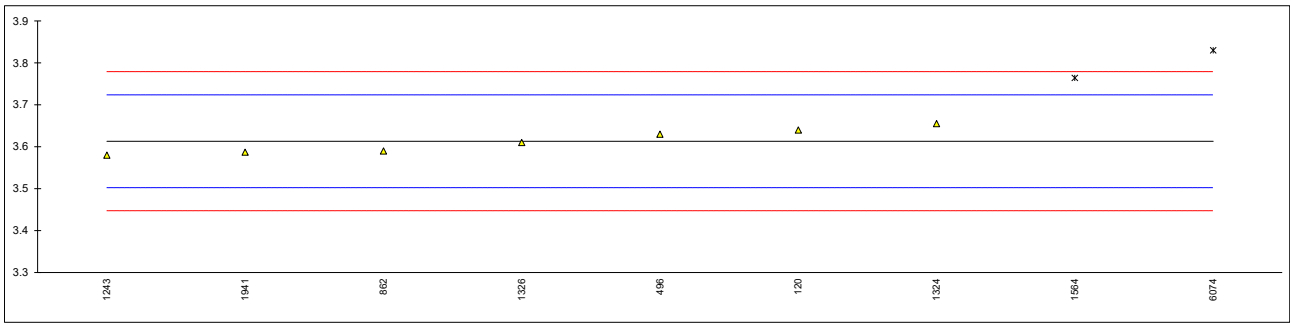


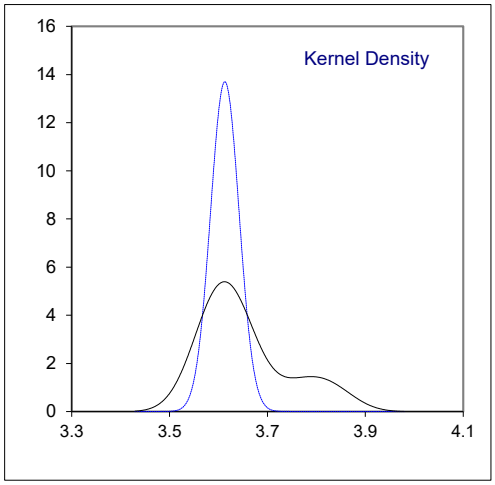
Determination of Viscosity HTHS on sample #23080; results in mPa·s

lab	method	value	mark	z(targ)	remarks
120	D4683	3.64		0.49	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496	D4683	3.63		0.30	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657		-----		-----	
780		-----		-----	
823		-----		-----	
840		-----		-----	
862	D4683	3.59		-0.42	
875		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	D4741	3.58		-0.60	
1262		-----		-----	
1320		-----		-----	
1324	D4683	3.655		0.76	
1326	D5481	3.61		-0.06	
1409		-----		-----	
1412		-----		-----	
1431		-----		-----	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564	D4683	3.764	DG(0.01)	2.73	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941	D4683	3.587		-0.47	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074	D4683	3.83	DG(0.01)	3.92	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380		-----		-----	
6394		-----		-----	
6425		-----		-----	
6442		-----		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	7
outliers	2
mean (n)	3.613
st.dev. (n)	0.0291
R(calc.)	0.082
st.dev.(D4683:20)	0.0553
R(D4683:20)	0.155



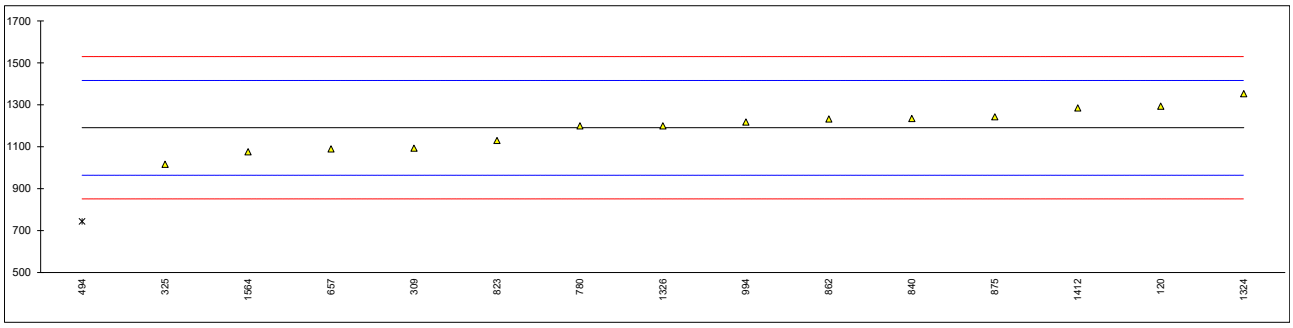


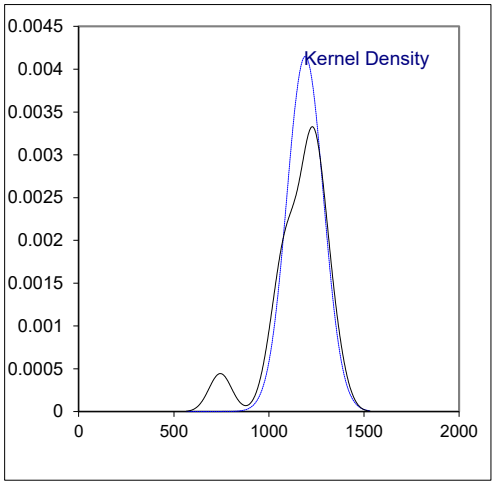
Determination of Nitrogen on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D3228	1293.766		0.91	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D5762	1093		-0.86	
325	D5762	1016		-1.54	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D5762	744	D(0.05)	-3.95	
496		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D5762	1090		-0.89	
780	D5762	1200		0.09	
823	D5762	1130		-0.53	
840	D3228	1235		0.39	
862	D5762	1232		0.37	
875	D5762	1243		0.47	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994	D5762	1218		0.24	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243		-----		-----	
1262		-----		-----	
1320		-----		-----	
1324	D5762	1353		1.44	
1326	D5762	1200		0.09	
1409		-----		-----	
1412	D5762	1285		0.84	
1431		-----		-----	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564	D5762	1076		-1.01	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		-----		-----	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074		-----		-----	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380		-----		-----	
6394		-----		-----	
6425		-----		-----	
6442		-----		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	14
outliers	1
mean (n)	1190.34
st.dev. (n)	96.166
R(calc.)	269.26
st.dev.(D5762:18a)	113.082
R(D5762:18a)	316.63



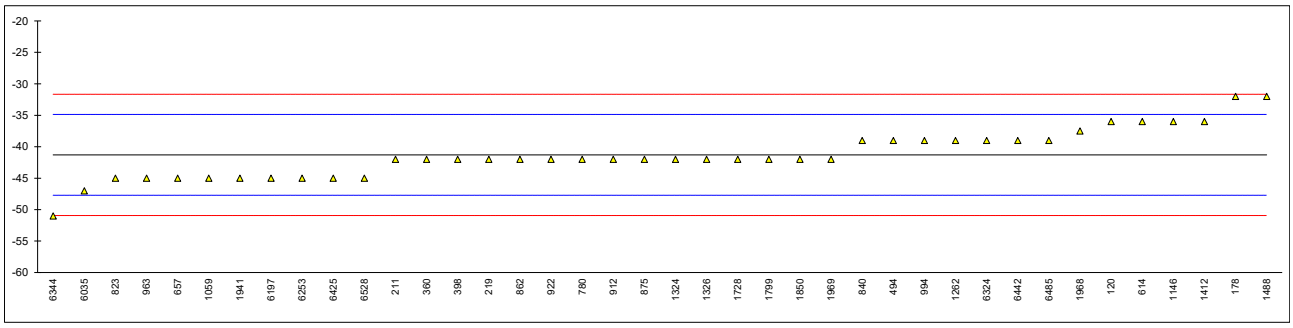


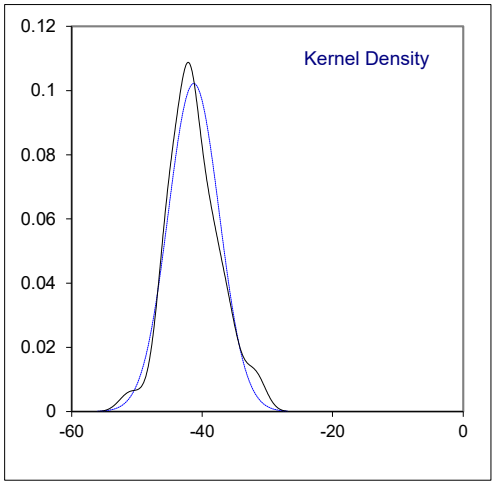
Determination of Pour Point Manual on sample #23080; results in °C

lab	method	value	mark	z(targ)	remarks
120	D97	-36		1.64	
178	D97	-32		2.89	
179		-----		-----	
211	D97	-42		-0.22	
219	D97	-42		-0.22	
237	D97	<-21		-----	
254	D97	<-18.0		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D97	-42		-0.22	
381		-----		-----	
398	D97	-42		-0.22	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D97	-39		0.71	
496		-----		-----	
614	D97	-36		1.64	
633		-----		-----	
634	D97	<-24		-----	
657	D97	-45		-1.16	
780	D97	-42		-0.22	
823	ISO3016	-45		-1.16	
840	D97	-39		0.71	
862	D97	-42		-0.22	
875	D97	-42		-0.22	
912	D97	-42		-0.22	
922	D97	-42		-0.22	
963	D97	-45		-1.16	
974	D97	<-36		-----	
994	D97	-39		0.71	
1017		-----		-----	
1059	ISO3016	-45		-1.16	
1146	D97	-36		1.64	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243		-----		-----	
1262	ISO3016	-39		0.71	
1320		-----		-----	
1324	D97	-42		-0.22	
1326	D97	-42		-0.22	
1409		-----		-----	
1412	D97	-36		1.64	
1431		-----		-----	
1438	D97	<-36		-----	
1460		-----		-----	
1488	ISO3016	-32.0		2.89	
1564		-----		-----	
1650		-----		-----	
1720		-----		-----	
1728	D97	-42		-0.22	
1748		-----		-----	
1799	D97	-42		-0.22	
1850	ISO3016	-42		-0.22	
1877		-----		-----	
1895		-----		-----	
1941	ISO3016	-45		-1.16	
1957		-----		-----	
1968	ISO3016	-37.5		1.18	
1969	ISO3016	-42		-0.22	
6016		-----		-----	
6032		-----		-----	
6035	D97	-47		-1.78	
6044		-----		-----	
6074		-----		-----	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D97	-45		-1.16	
6253	NF T60-105	-45		-1.16	
6284		-----		-----	
6310		-----		-----	
6324	D97	-39		0.71	
6344	D97	-51		-3.02	
6380		-----		-----	
6394		-----		-----	
6425	D7346	-45		-1.16	
6442	D97	-39		0.71	
6455		-----		-----	
6485	D97	-39		0.71	
6492		-----		-----	
6521		-----		-----	
6528	ISO3016	-45		-1.16	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	40
outliers	0
mean (n)	-41.29
st.dev. (n)	3.902
R(calc.)	10.93
st.dev.(D97:17bR22)	3.214
R(D97:17bR22)	9



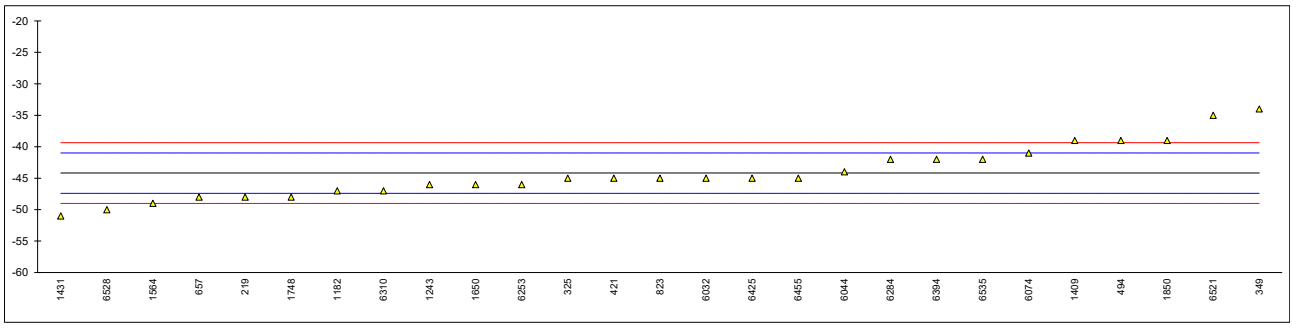


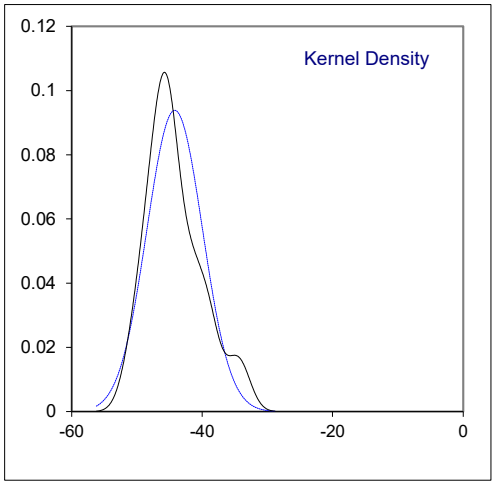
Determination of Pour Point Automated 1 °C interval on sample #23080; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219	D5950	-48		-2.37	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309		-----		-----	
325	D5950	-45		-0.51	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349	D5950	-34		6.34	
360		-----		-----	
381		-----		-----	
398		-----		-----	
421	D6749	-45		-0.51	
432		-----		-----	
489		-----		-----	
494	D5950	-39		3.23	
496		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D5950	-48		-2.37	
780	D5950	<-42		-----	
823	D5950	-45		-0.51	
840		-----		-----	
862		-----		-----	
875		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182	D5949	-47		-1.75	
1205		-----		-----	
1235		-----		-----	
1243	D7346	-46		-1.13	
1262		-----		-----	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409	NF T60-105	-39		3.23	
1412		-----		-----	
1431	D5950	-51		-4.24	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564	D5950	-49		-3.00	
1650	D5950	-46.0		-1.13	
1720		-----		-----	
1728		-----		-----	
1748	D7346	-48		-2.37	
1799		-----		-----	
1850		-39		3.23	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032	D5950	-45		-0.51	
6035		-----		-----	
6044	D5950	-44		0.12	
6074	D5950	-41		1.98	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253	NF T60-105	-46		-1.13	
6284	D5949	-42		1.36	
6310	D5950	-47		-1.75	
6324		-----		-----	
6344		-----		-----	
6380		-----		-----	
6394	D5950	-42		1.36	
6425	D7346	-45		-0.51	
6442		-----		-----	
6455	D7346	-45		-0.51	
6485		-----		-----	
6492		-----		-----	
6521		-35		5.72	
6528	D5950	-50.0		-3.62	
6532		-----		-----	
6535	D5950	-42		1.36	

normality	OK
n	27
outliers	0
mean (n)	-44.19
st.dev. (n)	4.252
R(calc.)	11.91
st.dev.(D5950:14R20)	1.607
R(D5950:14R20)	4.5



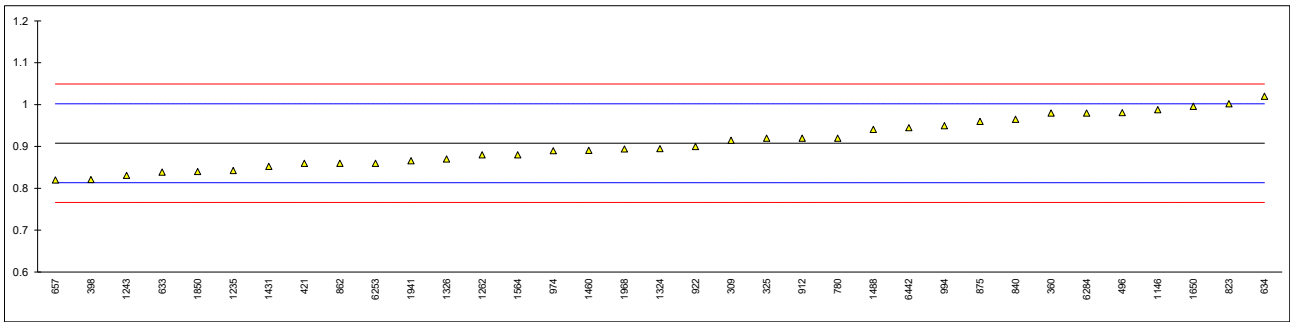


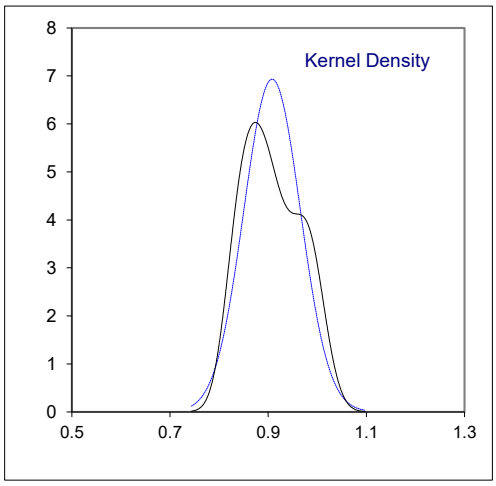
Determination of Sulfated Ash on sample #23080; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237		-----		-----	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D874	0.915		0.15	
325	D874	0.92		0.26	
329		-----		-----	
333		-----		-----	
339		-----		-----	
349		-----		-----	
360	D874	0.980		1.53	
381		-----		-----	
398	D874	0.821		-1.84	
421	ISO3987	0.86		-1.01	
432		-----		-----	
489		-----		-----	
494	D874	<0.002		<-19.21	possibly a false negative test result?
496	ISO3987	0.981		1.55	
614		-----		-----	
633	D874	0.8386		-1.47	
634	D874	1.02		2.38	
657	D874	0.82		-1.86	
780	D874	0.92		0.26	
823	D874	1.002		2.00	
840	D874	0.965		1.21	
862	D874	0.860		-1.01	
875	D874	0.96		1.11	
912	D874	0.92		0.26	
922	D874	0.90		-0.17	
963		-----		-----	
974	D874	0.890		-0.38	
994	D874	0.95		0.89	
1017		-----		-----	
1059		-----		-----	
1146	D874	0.988		1.70	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235	ISO3987	0.8425		-1.39	
1243	ISO3987	0.831		-1.63	
1262	ISO3987	0.88		-0.59	
1320		-----		-----	
1324	D874	0.895		-0.27	
1326	D874	0.87		-0.80	
1409		-----		-----	
1412		-----		-----	
1431	D874	0.8525		-1.17	
1438		-----		-----	
1460	D874	0.891		-0.36	
1488	ISO3987	0.941		0.70	
1564	D874	0.88		-0.59	
1650	D874	0.996		1.87	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850	ISO3987	0.84		-1.44	
1877		-----		-----	
1895		-----		-----	
1941	ISO3987	0.866		-0.89	
1957		-----		-----	
1968	D874	0.894		-0.29	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044		-----		-----	
6074		-----		-----	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253	ISO3987	0.86		-1.01	
6284	D874	0.98		1.53	
6310		-----		-----	
6324		-----		-----	
6344		-----		-----	
6380		-----		-----	
6394		-----		-----	
6425		-----		-----	
6442	D874	0.945		0.79	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	35
outliers	0
mean (n)	0.9078
st.dev. (n)	0.05756
R(calc.)	0.1612
st.dev.(D874:23)	0.04717
R(D874:23)	0.1321



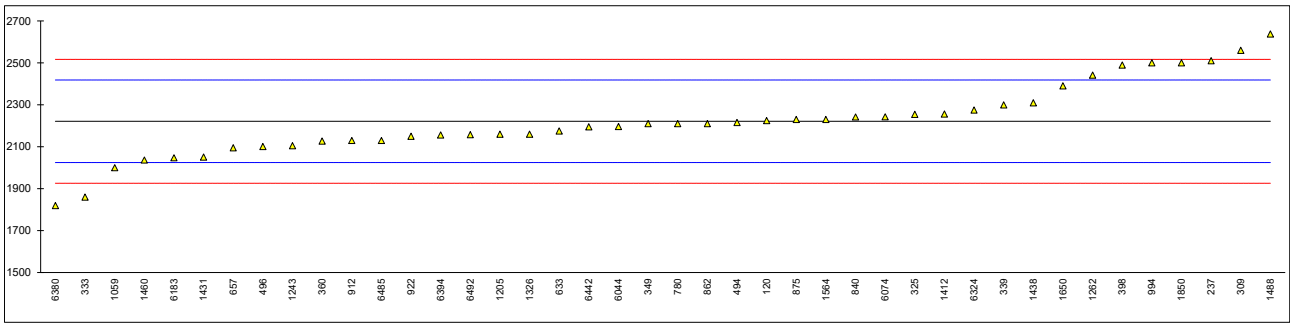


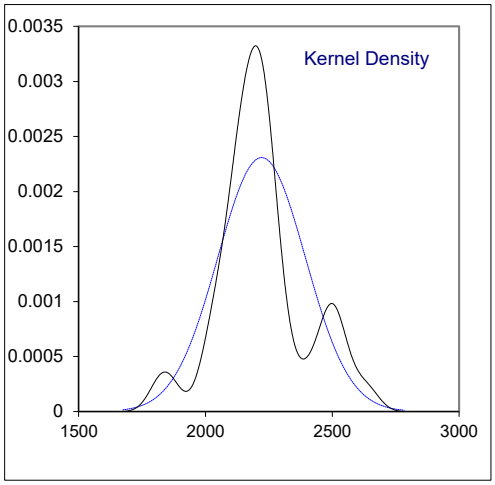
Determination of Sulfur on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4294	2225.25		0.04	
178		-----		-----	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237	D4294	2510		2.93	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D4294	2560		3.44	
325	D5185	2255		0.34	
329		-----		-----	
333	D4294	1860		-3.67	
339	INH-024	2300		0.80	
349	D2622	2210		-0.11	
360	D4294	2127		-0.96	
381		-----		-----	
398	D4294	2490		2.73	
421		-----		-----	
432		-----		-----	
489		-----		-----	
494	D4294	2216		-0.05	
496	D5185	2101		-1.22	
614		-----		-----	
633	D4294	2175		-0.47	
634		-----		-----	
657	D4294	2095		-1.28	
780	D4294	2210		-0.11	
823		-----		-----	
840	D4294	2242		0.21	
862	D2622	2210		-0.11	
875	D4294	2230	C	0.09	reported 0.223 mg/kg
912	D4294	2130		-0.93	
922	D4294	2150	C	-0.72	first reported 0.215 mg/kg
963		-----		-----	
974		-----		-----	
994	D4294	2500		2.83	
1017		-----		-----	
1059	ISO14596Mod.	2000		-2.25	
1146		-----		-----	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205	ISO14596	2160.0		-0.62	
1235		-----		-----	
1243	ISO8754	2105		-1.18	
1262	D4294	2442		2.24	
1320		-----		-----	
1324		-----		-----	
1326	D4294	2160		-0.62	
1409		-----		-----	
1412	D4294	2256		0.35	
1431	D4294	2051	C	-1.73	first reported 1725
1438	D4294	2310		0.90	
1460	D4294	2037		-1.87	
1488	ISO8754	2638		4.24	
1564	D4294	2230	C	0.09	first reported 0.223 mg/kg
1650	D4294	2390		1.71	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850	ISO8754	2500		2.83	
1877		-----		-----	
1895		-----		-----	
1941		-----		-----	
1957		-----		-----	
1968		-----		-----	
1969		-----		-----	
6016		-----		-----	
6032		-----		-----	
6035		-----		-----	
6044	D4294	2197		-0.25	
6074	ISO8754	2242.4		0.21	
6183	D2622	2047.35		-1.77	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284		-----		-----	
6310		-----		-----	
6324	D4294	2275		0.55	
6344		-----		-----	
6380	D5185	1819.426		-4.08	
6394	D5453	2156	C	-0.66	first reported 1534
6425		-----		-----	
6442	D6481	2195		-0.27	
6455		-----		-----	
6485	D7751	2130		-0.93	
6492	D7039	2157.06		-0.65	
6521		-----		-----	
6528		-----		-----	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	42
outliers	0
mean (n)	2221.3
st.dev. (n)	172.88
R(calc.)	484.1
st.dev.(D4294:21)	98.39
R(D4294:21)	275.5



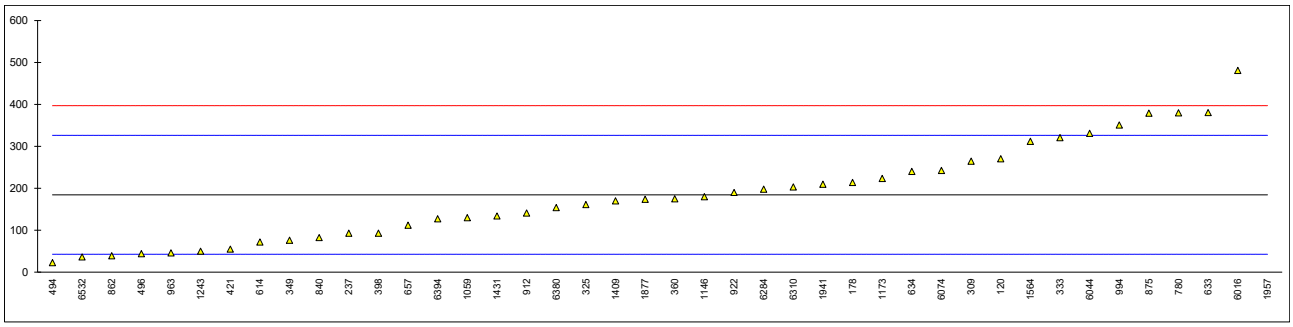


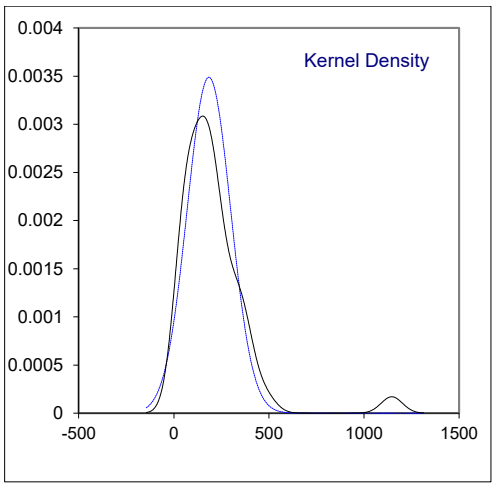
Determination of Water on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D6304-A:20	270.5		1.21	
178	D6304-A:20	214		0.42	
179		-----		-----	
211		-----		-----	
219		-----		-----	
237	D6304-C:16e1	93		-1.29	
254		-----		-----	
256		-----		-----	
257		-----		-----	
309	D6304-C:20	265		1.14	
325	D6304-C:20	161		-0.33	
329		-----		-----	
333	D6304-B:20	321		1.93	
339		-----		-----	
349	D6304-C:20	76		-1.53	
360	D6304-B:20	174.8		-0.14	
381		-----		-----	
398	D6304-C:20	93		-1.29	
421	D6304-B:20	55		-1.83	
432		-----		-----	
489		-----		-----	
494	ISO12937	23		-2.28	
496	D6304-B:16e1	44.0		-1.98	
614	D6304-B:20	72		-1.59	
633	D6304-B:20	380.46		2.77	
634	D6304-B:20	240		0.78	
657	D6304-B:20	112		-1.02	
780	D6304-A:20	380		2.76	
823		-----		-----	
840	D6304-B:20	82.5		-1.44	
862	D6304-B	39		-2.05	
875	D6304-A:20	379		2.75	
912	D6304-A	141		-0.61	
922	D6304-A:20	190		0.08	
963	D6304-C:20	46		-1.95	
974		-----		-----	
994	D6304-C:20	351		2.35	
1017		-----		-----	
1059	D6304-B:20	130		-0.77	
1146	D6304-B:20	180		-0.06	
1173	In house	223.7		0.55	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	ISO12937	50		-1.90	
1262		-----		-----	
1320		-----		-----	
1324		-----		-----	
1326		-----		-----	
1409	D6304-B:20	170		-0.20	
1412		-----		-----	
1431	D6304-A:20	134		-0.71	
1438		-----		-----	
1460		-----		-----	
1488		-----		-----	
1564	D6304-B:20	312.1		1.80	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		-----		-----	
1877	D6304-C:20	174		-0.15	
1895		-----		-----	
1941	D6304-B	210		0.36	
1957	D6304-C:16e1	1146	C,R(0.01)	13.57	first reported 1232.0
1968		-----		-----	
1969		-----		-----	
6016	D6304-A:16e1	481.2		4.19	
6032		-----		-----	
6035		-----		-----	
6044	D6304-C:16e1	331		2.07	
6074	D6304-C:16e1	242.688		0.82	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197		-----		-----	
6253		-----		-----	
6284	D6304-A:20	198		0.19	
6310	D6304-C:16e1	203		0.26	
6324		-----		-----	
6344		-----		-----	
6380	D6304-A:16e1	153.99		-0.43	
6394	D6304-B:20	127.4		-0.80	
6425		-----		-----	
6442		-----		-----	
6455		-----		-----	
6485		-----		-----	
6492		-----		-----	
6521		-----		-----	
6528		-----		-----	
6532	ISO12937	36.15		-2.09	
6535		-----		-----	

normality	OK
n	41
outliers	1
mean (n)	184.40
st.dev. (n)	114.346
R(calc.)	320.17
st.dev.(D6304-B:20)	70.877
R(D6304-B:20)	198.46
compare	
R(D6304-A:20)	92.68
R(D6304-C:20)	73.12



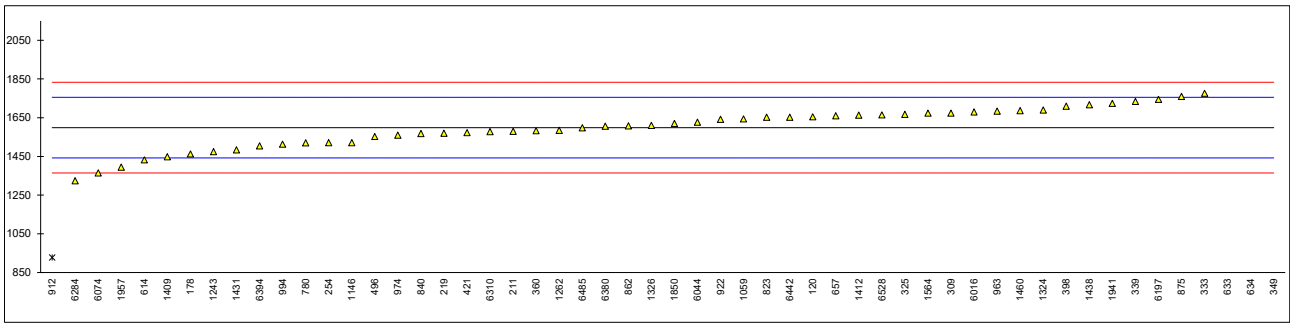


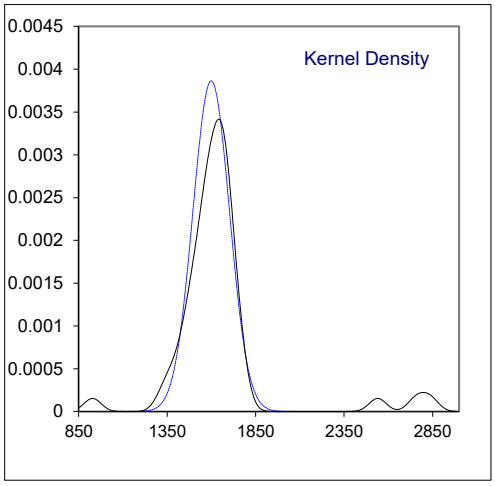
Determination of Calcium as Ca on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4951	1655		0.72	
178	D5185	1463	C	-1.73	first reported 1941
179		-----		-----	
211	D6595	1580		-0.24	
219	D5185	1570		-0.37	
237		-----		-----	
254	D5185	1520.888		-0.99	
256		-----		-----	
257		-----		-----	
309	D5185	1674		0.96	
325	D5185	1668		0.88	
329		-----		-----	
333	D5185	1776		2.26	
339	INH-047	1734		1.73	
349	D5185	2836	R(0.01)	15.80	
360	D5185	1583		-0.20	
381		-----		-----	
398	D5185	1710		1.42	
421	D5185	1573		-0.33	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496	D5185	1553		-0.58	
614	D5185	1432		-2.13	
633	D6595	2539.9	C,R(0.01)	12.02	first reported 2206
634	D6595	2759	R(0.01)	14.81	
657	D5185	1660		0.78	
780	D5185	1520		-1.01	
823	D5185	1652		0.68	
840	D5185	1568		-0.39	
862	D5185	1608		0.12	
875	D5185	1760		2.06	
912	D5185	928	R(0.01)	-8.57	
922	D5185	1642		0.55	
963		1684.00		1.09	
974	D5185	1560		-0.50	
994	D5185	1513		-1.10	
1017		-----		-----	
1059	In house	1644		0.58	
1146		1520.9		-0.99	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	DIN51399-1	1475		-1.58	
1262	D5185	1585		-0.18	
1320		-----		-----	
1324	D5185	1690		1.16	
1326		1610		0.14	
1409	NF T60-106	1448		-1.93	
1412	D5185	1663		0.82	
1431	D5185	1484.0		-1.47	
1438	D6595	1717		1.51	
1460	D5185	1687		1.13	
1488		-----		-----	
1564	D4951	1673.8		0.96	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		1620		0.27	
1877		-----		-----	
1895		-----		-----	
1941	D5185	1724		1.60	
1957	D5185	1395		-2.60	
1968		-----		-----	
1969		-----		-----	
6016	D6595	1680	C	1.04	first reported 1338
6032		-----		-----	
6035		-----		-----	
6044	D5185	1627		0.36	
6074	D6595	1365		-2.99	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D4951	1745		1.87	
6253		-----		-----	
6284	D5185	1324.133	C	-3.51	first reported 1163.67
6310		1578		-0.27	
6324		-----		-----	
6344		-----		-----	
6380	D5185	1606.713		0.10	
6394		1505	C	-1.20	first reported 1906
6425		-----		-----	
6442	D5185	1652		0.68	
6455		-----		-----	
6485	D7751	1598		-0.01	
6492		-----		-----	
6521		-----		-----	
6528		1664.3		0.84	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	50
outliers	4
mean (n)	1598.81
st.dev. (n)	103.253
R(calc.)	289.11
st.dev.(D5185:18)	78.320
R(D5185:18)	219.30



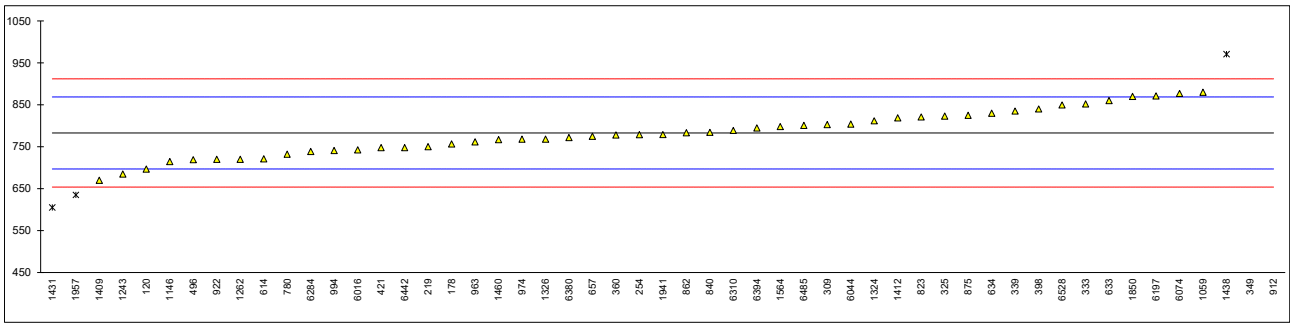


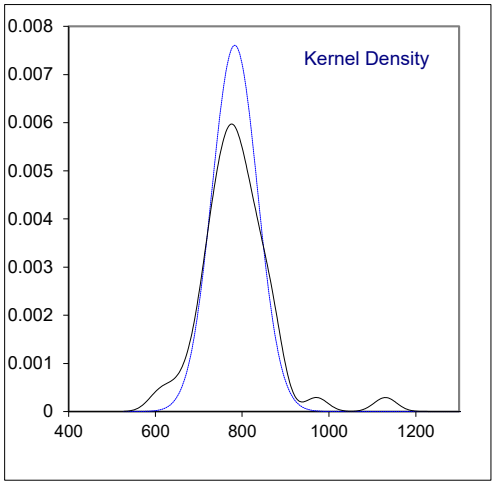
Determination of Phosphorus as P on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4951	696.75		-2.00	
178	D5185	757		-0.60	
179		-----		-----	
211		-----		-----	
219	D5185	750		-0.76	
237		-----		-----	
254	D5185	778.705		-0.10	
256		-----		-----	
257		-----		-----	
309	D5185	803		0.47	
325	D5185	823		0.94	
329		-----		-----	
333	D5185	852		1.61	
339	INH-047	835		1.21	
349	D5185	1130	R(0.01)	8.08	
360	D5185	778		-0.11	
381		-----		-----	
398	D5185	840		1.33	
421	D5185	748		-0.81	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496	D5185	719.1		-1.48	
614	D5185	721.3		-1.43	
633	D6595	860		1.80	
634	D6595	830		1.10	
657	D5185	775		-0.18	
780	D5185	732		-1.18	
823	D5185	821		0.89	
840	D5185	784.5		0.04	
862	D5185	783.3		0.01	
875	D5185	825		0.98	
912	D5185	1700	R(0.01)	21.35	
922	D5185	720		-1.46	
963		761.70		-0.49	
974	D5185	768		-0.34	
994	D5185	741		-0.97	
1017		-----		-----	
1059	In house	880		2.26	
1146		714.7		-1.58	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	DIN51399-1	685		-2.28	
1262	D5185	720		-1.46	
1320		-----		-----	
1324	D5185	812		0.68	
1326		768		-0.34	
1409	NF T60-106	670		-2.63	
1412	D5185	819		0.84	
1431	D5185	605.0	R(0.05)	-4.14	
1438	D6595	971	R(0.05)	4.38	
1460	D5185	767		-0.37	
1488		-----		-----	
1564	D4951	798		0.35	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		870		2.03	
1877		-----		-----	
1895		-----		-----	
1941	D5185	779		-0.09	
1957	D5185	635	R(0.05)	-3.44	
1968		-----		-----	
1969		-----		-----	
6016	D6595	742.6		-0.94	
6032		-----		-----	
6035		-----		-----	
6044	D5185	804		0.49	
6074	D6595	877		2.19	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D4951	871		2.05	
6253		-----		-----	
6284	D5185	739.011		-1.02	
6310		789		0.14	
6324		-----		-----	
6344		-----		-----	
6380	D5185	771.913		-0.25	
6394		795		0.28	
6425		-----		-----	
6442	D5185	748		-0.81	
6455		-----		-----	
6485	D7751	801		0.42	
6492		-----		-----	
6521		-----		-----	
6528		849.6		1.55	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	48
outliers	5
mean (n)	782.80
st.dev. (n)	52.434
R(calc.)	146.82
st.dev.(D5185:18)	42.967
R(D5185:18)	120.31



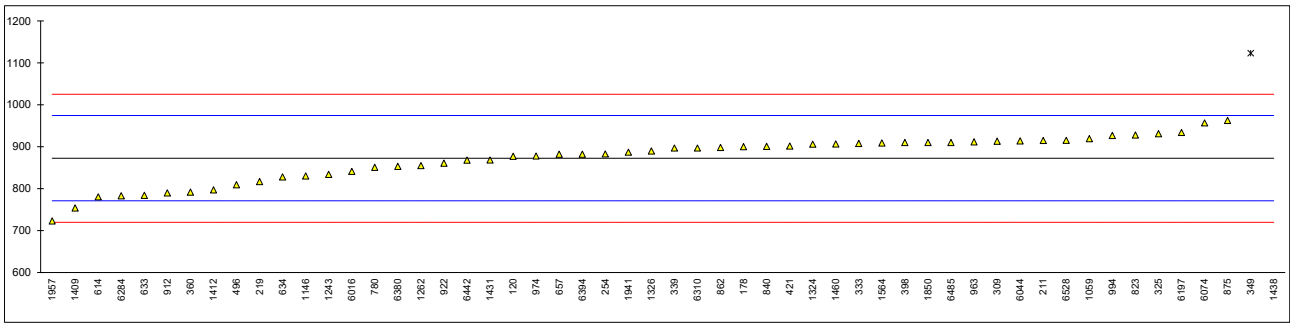


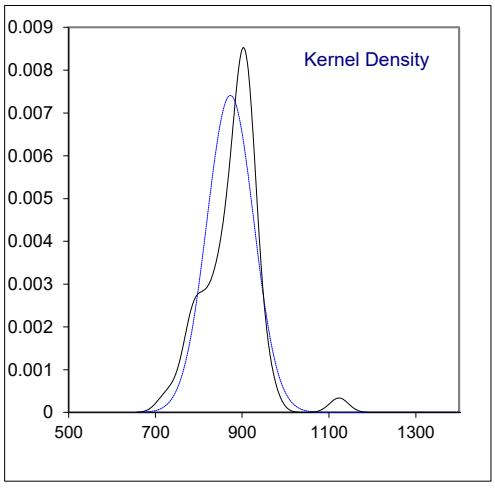
Determination of Zinc as Zn on sample #23080; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4951	877.05		0.08	
178	D5185	900		0.54	
179		-----		-----	
211	D6595	915		0.83	
219	D5185	817		-1.09	
237		-----		-----	
254	D5185	882.99		0.20	
256		-----		-----	
257		-----		-----	
309	D5185	913		0.79	
325	D5185	931		1.14	
329		-----		-----	
333	D5185	908		0.69	
339	INH-047	897		0.48	
349	D5185	1123	R(0.01)	4.91	
360	D5185	792		-1.59	
381		-----		-----	
398	D5185	910		0.73	
421	D5185	902		0.57	
432		-----		-----	
489		-----		-----	
494		-----		-----	
496	D5185	809.5		-1.24	
614	D5185	780.5		-1.81	
633	D6595	784		-1.74	
634	D6595	828		-0.88	
657	D5185	882		0.18	
780	D5185	851		-0.43	
823	D5185	928		1.09	
840	D5185	900.9		0.55	
862	D5185	898.4		0.50	
875	D5185	963		1.77	
912	D5185	790		-1.63	
922	D5185	861		-0.23	
963		911.81		0.77	
974	D5185	878		0.10	
994	D5185	927		1.07	
1017		-----		-----	
1059	In house	919		0.91	
1146		830.4		-0.83	
1173		-----		-----	
1174		-----		-----	
1182		-----		-----	
1205		-----		-----	
1235		-----		-----	
1243	DIN51399-1	834		-0.76	
1262	D5185	855		-0.35	
1320		-----		-----	
1324	D5185	906		0.65	
1326		890		0.34	
1409	NF T60-106	754	C	-2.33	first reported 736
1412	D5185	797		-1.49	
1431	D5185	868.5		-0.08	
1438	D6595	1540	C,R(0.01)	13.10	first reported 1324
1460	D5185	907		0.67	
1488		-----		-----	
1564	D4951	909		0.71	
1650		-----		-----	
1720		-----		-----	
1728		-----		-----	
1748		-----		-----	
1799		-----		-----	
1850		910		0.73	
1877		-----		-----	
1895		-----		-----	
1941	D5185	887		0.28	
1957	D5185	723	C	-2.94	first reported 715
1968		-----		-----	
1969		-----		-----	
6016	D6595	841.35		-0.62	
6032		-----		-----	
6035		-----		-----	
6044	D5185	914		0.81	
6074	D6595	957		1.65	
6183		-----		-----	

lab	method	value	mark	z(targ)	remarks
6197	D4951	934		1.20	
6253		-----		-----	
6284	D5185	782.923		-1.76	
6310		897		0.48	
6324		-----		-----	
6344		-----		-----	
6380	D5185	853.11		-0.39	
6394		882		0.18	
6425		-----		-----	
6442	D5185	868		-0.09	
6455		-----		-----	
6485	D7751	910		0.73	
6492		-----		-----	
6521		-----		-----	
6528		915.4		0.84	
6532		-----		-----	
6535		-----		-----	

normality	OK
n	52
outliers	2
mean (n)	872.75
st.dev. (n)	53.843
R(calc.)	150.76
st.dev.(D5185:18)	50.921
R(D5185:18)	142.58





APPENDIX 2

Number of participants per country

1 lab in AUSTRALIA
1 lab in AUSTRIA
2 labs in AZERBAIJAN
7 labs in BELGIUM
1 lab in BOSNIA and HERZEGOVINA
4 labs in BULGARIA
3 labs in CHINA, People's Republic
1 lab in CROATIA
1 lab in CZECH REPUBLIC
3 labs in FRANCE
5 labs in GERMANY
4 labs in GREECE
1 lab in INDIA
1 lab in ISRAEL
2 labs in ITALY
1 lab in JORDAN
1 lab in KAZAKHSTAN
1 lab in KENYA
2 labs in KOREA, Republic of
2 labs in MALAYSIA
3 labs in MOROCCO
2 labs in NETHERLANDS
1 lab in NIGERIA
1 lab in NORTH MACEDONIA, Republic of
1 lab in OMAN
3 labs in PAKISTAN
1 lab in PERU
2 labs in PHILIPPINES
2 labs in POLAND
1 lab in PORTUGAL
3 labs in ROMANIA
2 labs in RUSSIAN FEDERATION
3 labs in SAUDI ARABIA
2 labs in SERBIA
2 labs in SINGAPORE
2 labs in SLOVAKIA
1 lab in SLOVENIA
2 labs in SPAIN
2 labs in SUDAN
2 labs in TANZANIA
1 lab in TUNISIA
1 lab in TURKEY
1 lab in UNITED ARAB EMIRATES
3 labs in UNITED KINGDOM
3 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

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)\R1	= outlier in Rosner's outlier test
R(0.05)\R5	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ISO5725:86
3 ISO5725 parts 1-6:94
4 ISO13528:05
5 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
6 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
8 J.N. Miller, Analyst, 118, 455, (1993)
9 Analytical Methods Committee, Technical Brief, No 4, January 2001
10 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
11 W. Horwitz and R. Albert, J. AOAC Int, 79.3, 589-621, (1996)
12 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)