Results of Proficiency Test
Base Oil
May 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 2013 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Base Oil every year. During the annual proficiency testing program 2020/2021 it was decided to continue the round robin for the analysis of Base Oil.

In this interlaboratory study 68 laboratories in 33 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of the Base Oil proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
It was decided to send one sample of Base Oil in a 1 liter bottle labelled #21065.
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 Base Oil was obtained from a local supplier. After homogenization 100 amber glass bottles of 1L were filled and labelled #21065.
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 #21065-1	0.86487
Sample #21065-2	0.86487
Sample #21065-3	0.86487
Sample #21065-4	0.86488
Sample #21065-5	0.86488
Sample #21065-6	0.86488
Sample #21065-7	0.86487
Sample #21065-8	0.86488

Table 1: homogeneity test results of subsamples #21065

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)	0.00001
reference test method	ISO12185:96
0.3 x R (reference test method)	0.00015

Table 2: evaluation of the repeatability of subsamples #21065

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 sample Base Oil labelled #21065 was sent on April 21, 2021. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Base 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, Air Release time at 50°C, Color ASTM, Conradson Carbon Residue, Ramsbottom Carbon Residue, Density at 15°C, Evaporation loss by Noack, Flash Point C.O.C., Kinematic Viscosity at 40°C and 100°C, Viscosity Index, Kinematic Viscosity Stabinger at 40°C and 100°C, Pour Point (Manual and Automated), Rust prevention (proc. B, synthetic seawater), Sulfur, Water and Water Separability at 54°C.

It was explicitly requested to treat the sample as if it was a routine sample 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, e.g. ISO reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other 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 no problems were encountered with the dispatch of the samples. Nine participants reported test results after the final reporting date and one other participant did not report any test results. Not all participants were able to report all tests requested.
In total 67 participants reported 599 numerical test results. Observed were 15 outlying test results, which is 2.5%. 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. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM methods are referred to with a number (e.g. D1500) and an added designation for the year that the method was adopted or revised (e.g. D1500:12). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1500:12(2017)). In the test results tables of appendix 1 only the method number and year of adoption or revision (e.g. D1500:12) will be used.

Total Acid Number: 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 D974:21.

Air Release time: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D3427:19.

Color ASTM: This determination was not problematic. No statistical outliers were observed but one test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D1500:12(2017).

Conradson CR: This determination was not problematic. All reporting participants agreed on a test result of less than 0.1 %M/M. Therefore, no z-scores are calculated.

Ramsbottom CR: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D524:15(2019).

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

Evaporation loss by Noack: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D5800-B:20.

Flash Point C.O.C.: This determination was not problematic. No statistical outliers were observed but one test result was excluded. The calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of ASTM D92:18.

Kin. Viscosity at 40°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D445:21.

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

Viscosity Index: This determination was problematic. No statistical outliers were observed but one test result was excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D2270:10(2016).

Kin. Viscosity Stabinger at 40°C: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D7042:21.

Kin. 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 D7042:21.

Pour Point Manual: 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 D97:17b.

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

Rust prevention: This determination may not be problematic. Only five participants reported a test result. They agreed on the presence of rust (Fail/ Severe rusting).

Sulfur: This determination was not problematic. The majority of the reporting participants agreed on a concentration level of less than 17 mg/kg. Therefore, no z-scores are calculated.

Water: This determination was problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D6304:20 procedure A and C, but is in agreement with procedure B.

Water separability: This determination was not problematic. One statistical outlier was observed over three parameters. All calculated reproducibilities after rejection of the statistical outlier are in agreement with the requirements of ASTM D1401:19.

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 literature reference test methods (in casu ASTM and ISO standards) are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	25	0.007	0.010	0.04
Air Release time at 50°C	minutes	14	2.25	2.51	1.63
Color ASTM		58	0.22	0.23	1
Conradson Carbon Residue	%M/M	27	<0.1	n.e.	n.e.
Ramsbottom Carbon Residue	%M/M	6	0.036	0.034	0.025
Density at 15°C	kg/L	62	0.8649	0.0005	0.0005
Evaporation loss by Noack	%M/M	24	8.80	1.15	1.22
Flash Point C.O.C.	°C	50	234	18	18
Kinematic Viscosity at 40°C	mm^2/s	59	41.51	0.41	0.57
Kinematic Viscosity at 100°C	mm^2/s	58	6.413	0.060	0.122
Viscosity Index		56	103.3	2.6	2
Kin. Viscosity Stabinger at 40°C	mm^2/s	13	41.49	0.47	0.24
Kin. Viscosity Stabinger at 100°C	mm^2/s	11	6.431	0.079	0.033
Pour Point Manual	°C	38	-18.9	7.4	9
Pour Point Automated 1°C interval	°C	23	-20.3	6.8	4.5
Rust Prevention (synth.seawater)		5	Fail	n.a.	n.a.
Sulfur	mg/kg	36	<17	n.e.	n.e.
Water	mg/kg	45	18.9	25.8	18.6
Water Separability at 54°C					
Time to reach ≤ 3mL	minutes	17	3.4	7.3	20
Time to reach 37mL of water	minutes	16	3.2	7.7	20
Time complete break	minutes	17	3.6	5.3	20

Table 3: reproducibilities of tests on sample #21065

Without further statistical calculations, it can be concluded that for most 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 MAY 2021 WITH PREVIOUS PTS

	May 2021	May 2020	May 2019	May 2018	May 2017
Number of reporting laboratories	67	53	59	57	56
Number of test results	599	444	567	462	547
Number of statistical outliers	15	12	15	19	19
Percentage of statistical outliers	2.5%	2.7%	2.6%	4.1%	3.5%

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	May 2021	May 2020	May 2019	May 2018	May 2017
Total Acid Number	++	++	++	+/-	+
Air Release time at 50°C	-	n.e.	+/-	+/-	+
Color ASTM	++	++	++	n.e.	n.e.
Conradson Carbon Residue	n.e.	n.e.	+/-	++	+
Ramsbottom Carbon Residue	-	+	+/-	-	+/-
Density at 15°C	+/-	+	+	+/-	+/-
Evaporation loss by Noack	+/-	-	+/-	+/-	+
Flash Point C.O.C.	+/-	+	+	+	+/-
Kinematic Viscosity at 40°C	+	++	+	+	++
Kinematic Viscosity at 100°C	++	++	+	++	+
Viscosity Index	-	-	n.e.	+/-	-
Kin. Viscosity Stabinger at 40°C	-	+/-	+	+/-	-
Kin. Viscosity Stabinger at 100°C	--	--	-	-	-
Pour Point Manual	+	--	++	--	+
Pour Point Automated 1°C interval	-	--	+	-	-
Sulfur	n.e.	n.e.	+	n.e.	n.e.
Water	-	++	++	++	++
Water Separability at 54°C	++	++	++	++	++

Table 5: comparison determinations against the reference test methods

The following performance categories were used:

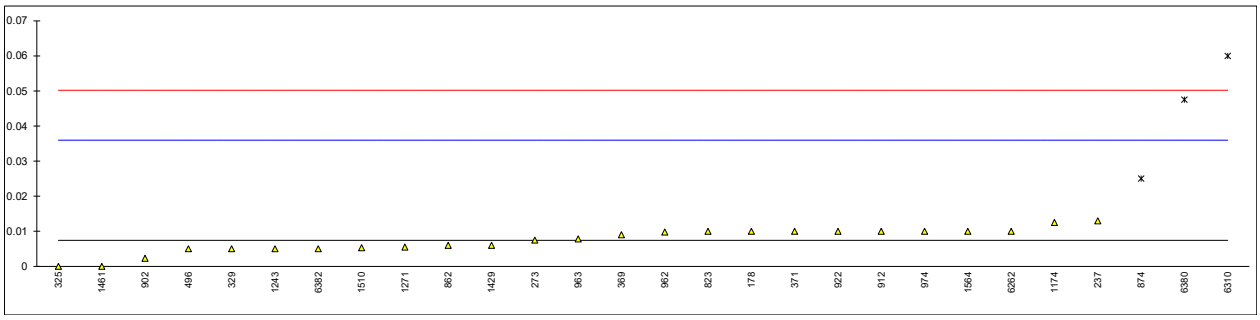
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test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

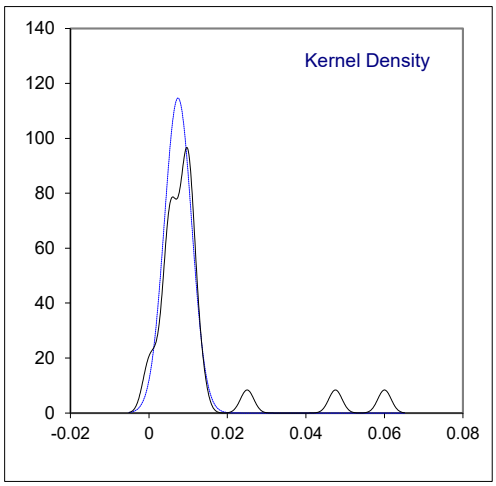
APPENDIX 1

Determination of Total Acid Number on sample #21065; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
150	D974	<0.02	C	-----	first reported 0.04
171	D974	<0.02		-----	
173		-----		-----	
178	D974	0.01		0.18	
179	D974	<0.02		-----	
237	D974	0.013		0.39	
273	D974	0.0075		0.01	
309	D664-A	<0.10		-----	
311		-----		-----	
323	D974	<0.02		-----	
325	D664-A	0.00		-0.52	
329	D974	0.005		-0.17	
333		-----		-----	
343		-----		-----	
349	D664-A	<0.01	C	-----	first reported 0.05
357		-----		-----	
369	D974	0.009		0.11	
371	D974	0.01		0.18	
396	D974	<0,02		-----	
432		-----		-----	
480		-----		-----	
496	D974	0.005		-0.17	
551	D974	<0.02		-----	
601		-----		-----	
603	D664-A	<0.05		-----	
614	D664-A	<0.02		-----	
657	D974	<0.02		-----	
751		-----		-----	
785		-----		-----	
823	D974	0.01		0.18	
862	D974	0.006		-0.10	
874	D664	0.025	R(0.01)	1.23	
875		-----		-----	
886		-----		-----	
902	D664-A	0.0023		-0.36	
912	D974	0.01		0.18	
913		-----		-----	
922	D664-A	0.010		0.18	
962	D974	0.0098		0.17	
963	D974	0.0078		0.03	
974	D974	0.01		0.18	
1011	D974	<0.02		-----	
1081		-----		-----	
1082		-----		-----	
1174		0.0125		0.36	
1191		-----		-----	
1243	ISO6618	0.005		-0.17	
1271	D974	0.0055		-0.13	
1349		-----		-----	
1389		-----		-----	
1409	D664-A	< 0.01		-----	
1429	D974	0.006		-0.10	
1461	BDS1752	0.0		-0.52	
1510	D974	0.0053		-0.15	
1564	D664-A	0.01		0.18	
1728		-----		-----	
1748		-----		-----	
1833	ISO6618	<0.1		-----	
1877		-----		-----	
6016	D664-A	<0.01		-----	
6048		<0.02		-----	
6113		-----		-----	
6262	D664-A	0.01		0.18	
6309		-----		-----	
6310	D664-A	0.06	R(0.01)	3.68	
6380	D664-A	0.047504	C,R(0.01)	2.81	first reported 0.056400
6382		0.005		-0.17	
6394		-----		-----	

normality	OK
n	25
outliers	3
mean (n)	0.0074
st.dev. (n)	0.00348
R(calc.)	0.0097
st.dev.(D974:21)	0.01429
R(D974:21)	0.04

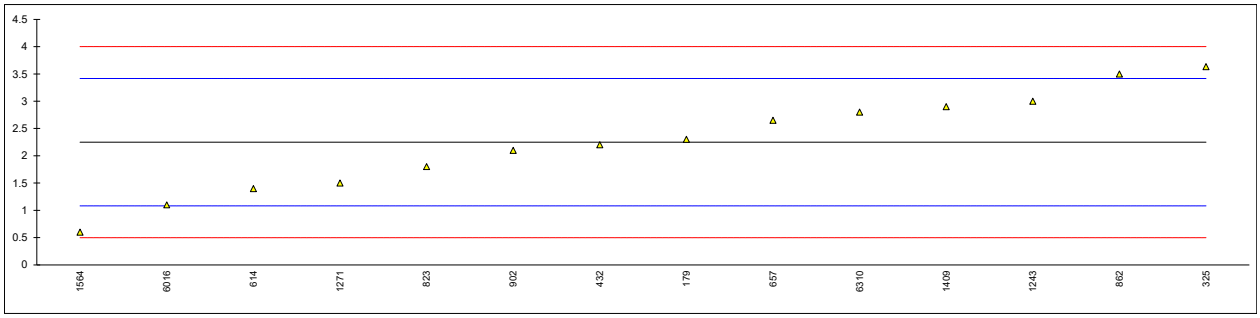


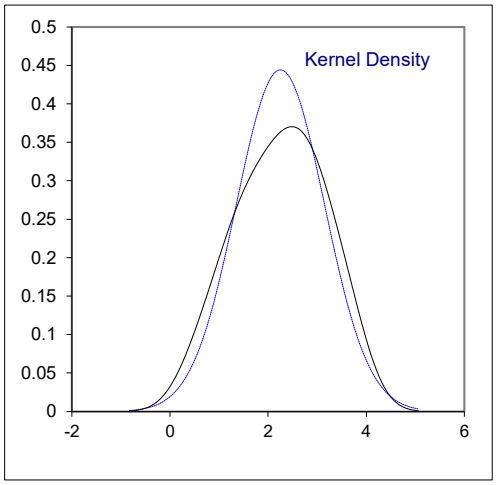


Determination of Air Release time at 50°C on sample #21065; results in minutes

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
173		-----		-----	
178		-----		-----	
179	D3427	2.3		0.09	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323		-----		-----	
325	D3427	3.63333		2.37	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396		-----		-----	
432	ISO9120	2.2		-0.08	
480		-----		-----	
496		-----		-----	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614	D3427	1.4		-1.45	
657	D3427	2.65		0.69	
751		-----		-----	
785		-----		-----	
823	D3427	1.8		-0.77	
862	D3427	3.5		2.14	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902	D3427	2.1		-0.25	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
1011		-----		-----	
1081		-----		-----	
1082	D3427	<1		-----	
1174		-----		-----	
1191		-----		-----	
1243	ISO9120	3.0		1.29	
1271	ISO9120	1.5		-1.28	
1349		-----		-----	
1389		-----		-----	
1409	D3427	2.9		1.12	
1429		-----		-----	
1461		-----		-----	
1510		-----		-----	
1564	D3427	0.6		-2.83	
1728		-----		-----	
1748		-----		-----	
1833		-----		-----	
1877		-----		-----	
6016	D3427	1.1		-1.97	
6048		-----		-----	
6113		-----		-----	
6262		-----		-----	
6309		-----		-----	
6310	D3427	2.8		0.94	
6380		-----		-----	
6382		-----		-----	
6394		-----		-----	

normality	OK
n	14
outliers	0
mean (n)	2.249
st.dev. (n)	0.8980
R(calc.)	2.514
st.dev.(D3427:19)	0.5836
R(D3427:19)	1.634





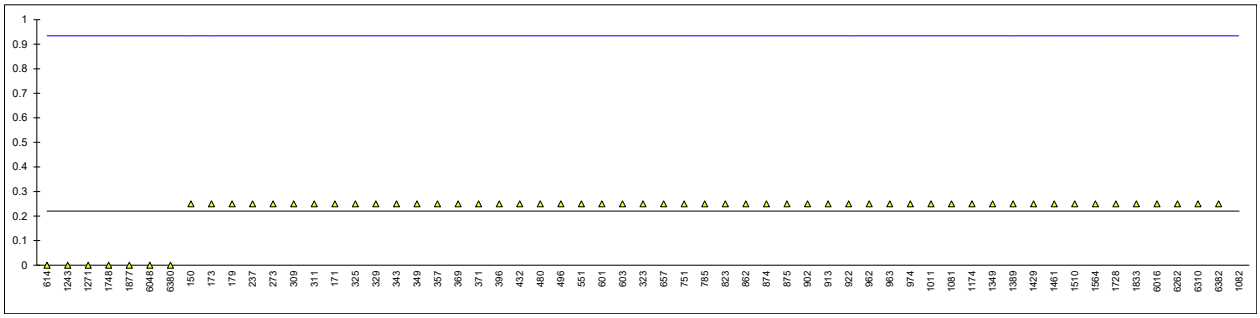
Determination of Color ASTM on sample #21065;

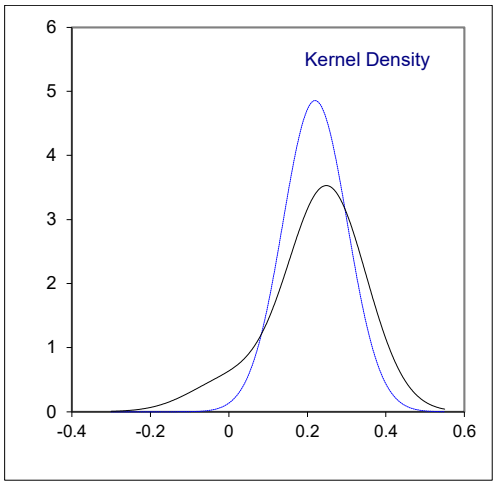
lab	method	reported test value	iis conversion *	mark	z(targ)	remarks
150	D6045	<0.5	0.25		0.08	
171	D1500	L0.5	0.25		0.08	
173	D1500	L0.5	0.25		0.08	
178		-----	-----		-----	
179	D1500	L0.5	0.25		0.08	
237	D1500	L0.5	0.25		0.08	
273	D1500	L0.5	0.25		0.08	
309	D1500	L0.5	0.25		0.08	
311	D1500	L0.5	0.25		0.08	
323	D1500	<0.5	0.25		0.08	
325	D6045	L0.5	0.25		0.08	
329	D1500	L0.5	0.25		0.08	
333		-----	-----		-----	
343	D1500	L 0.5	0.25		0.08	
349	D1500	<0,5	0.25		0.08	
357	D6045	L0,5	0.25		0.08	
369	D1500	<0.5	0.25		0.08	
371	D6045	<0.5	0.25		0.08	
396	D1500	L 0,5	0.25		0.08	
432	D1500	L0,5	0.25		0.08	
480	D1500	L 0.5	0.25		0.08	
496	D1500	L0.5	0.25		0.08	
551	D1500	L0.5	0.25		0.08	
601	D1500	L0.5	0.25		0.08	
603	D1500	L0.5	0.25		0.08	
614	D1500	0.0	0.0		-0.62	
657	D1500	<0.5	0.25		0.08	
751	D1500	L0.5	0.25		0.08	
785	D6045	<0.5	0.25		0.08	
823	D1500	L0.5	0.25		0.08	
862	D1500	L0.5	0.25		0.08	
874	D1500	<0.5	0.25		0.08	
875	D6045	<0.5	0.25		0.08	
886		-----	-----		-----	
902	D1500	L0,5	0.25		0.08	
912		-----	-----		-----	
913	D1500	L0.5	0.25		0.08	
922	D1500	L0.5	0.25		0.08	
962	D1500	L0.5	0.25		0.08	
963	D1500	L0.5	0.25		0.08	
974	D1500	L0.5	0.25		0.08	
1011	D6045	L0.5	0.25		0.08	
1081	D6045	L0.5	0.25		0.08	
1082	D6045	30	30	ex	83.38	value not in terms of Color ASTM
1174	ISO2049	L0.5	0.25		0.08	
1191	D6045	>30	>30		>83.38	value not in terms of Color ASTM
1243	D1500	0.0	0.0		-0.62	
1271	D6045	0	0		-0.62	
1349	D6045	L0.5	0.25		0.08	
1389	D1500	L0.5	0.25		0.08	
1409		-----	-----		-----	
1429	D1500	<0.5	0.25		0.08	
1461		L0,5	0.25		0.08	
1510	D1500	L0.5	0.25		0.08	
1564	D1500	L0.5	0.25		0.08	
1728	D6045	L0.5	0.25		0.08	
1748	D1500	0	0		-0.62	
1833	D1500	<0.5	0.25		0.08	
1877	D6045	0.0	0.0		-0.62	
6016	D1500	<0.5	0.25		0.08	
6048		0.0	0.0		-0.62	
6113		-----	-----		-----	
6262	D1500	<0.5	0.25		0.08	
6309		-----	-----		-----	
6310	D1500	L0.5	0.25		0.08	
6380	D1500	0	0		-0.62	
6382	ISO2049	L0,5	0.25		0.08	
6394		-----	-----		-----	

normality	not OK	

n	58
outliers	0 +1ex
mean (n)	0.22
st.dev. (n)	0.082
R(calc.)	0.23
st.dev.(D1500:12)	0.357
R(D1500:12)	1

* In the calculation of the mean, standard deviation and the reproducibility of this column, a reported value of ‘L y’ is converted by iis into y-0.25 (for example L0.5 into 0.25)





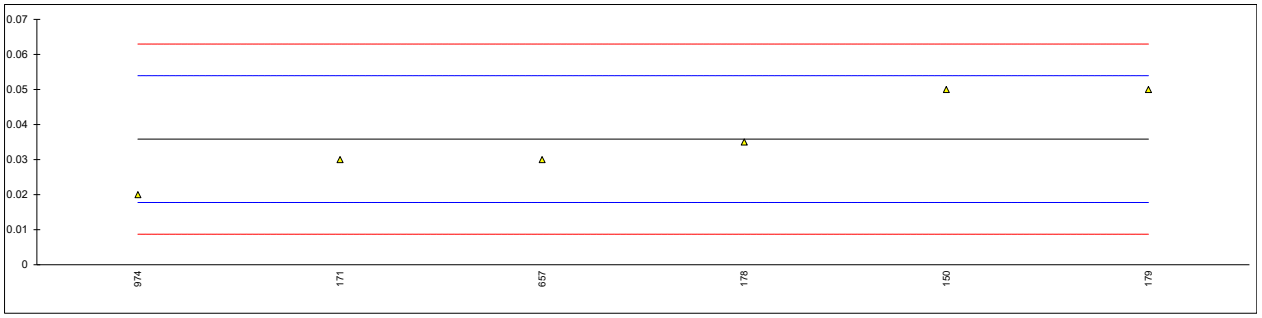
Determination of Conradson Carbon Residue on sample #21065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150	D4530	<0.10		-----	
171	D189	<0.01		-----	
173		-----		-----	
178		-----		-----	
179		-----		-----	
237	D189	<0.10		-----	
273	D189	0.0040		-----	
309		-----		-----	
311		-----		-----	
323	D4530	0.01		-----	
325	D4530	0.0		-----	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349	D189	0.01		-----	
357		-----		-----	
369	D4530	<0.01		-----	
371	D189	0.001		-----	
396	D189	<0,01		-----	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551	D189	0.0		-----	
601		-----		-----	
603		-----		-----	
614	D189	0.050		-----	
657	D4530	<0.10		-----	
751		-----		-----	
785	D4530	<0.01		-----	
823	D189	0.01		-----	
862	D4530	<0.10		-----	
874	D4530	0.013		-----	
875		-----		-----	
886		-----		-----	
902	D4530	0.033		-----	
912		-----		-----	
913		-----		-----	
922	D189	<0.01		-----	
962		-----		-----	
963		-----		-----	
974	D189	<0.01		-----	
1011		-----		-----	
1081		-----		-----	
1082		-----		-----	
1174		-----		-----	
1191		-----		-----	
1243		-----		-----	
1271	D4530	<0,1		-----	
1349		-----		-----	
1389	D4530	0.0		-----	
1409	ISO10370	0.01		-----	
1429		-----		-----	
1461	ISO6615	0.00		-----	
1510		-----		-----	
1564		-----		-----	
1728		-----		-----	
1748		-----		-----	
1833	D4530	0.01		-----	
1877		-----		-----	
6016		-----		-----	
6048		-----		-----	
6113		-----		-----	
6262	D4530	0.01		-----	
6309		-----		-----	
6310		-----		-----	
6380	D4530	0.00		-----	
6382		-----		-----	
6394		-----		-----	
	n	27			
	mean (n)	<0.1			

Determination of Ramsbottom Carbon Residue on sample #21065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150	D524	0.05		1.57	
171	D524	0.03		-0.65	
173		-----		-----	
178	D524	0.035		-0.09	
179	D524	0.05		1.57	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D524	0.03		-0.65	
751		-----		-----	
785		-----		-----	
823		-----		-----	
862		-----		-----	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974	D524	0.02		-1.75	
1011	D524	<0.06		-----	
1081		-----		-----	
1082		-----		-----	
1174		-----		-----	
1191		-----		-----	
1243		-----		-----	
1271		-----		-----	
1349		-----		-----	
1389		-----		-----	
1409		-----		-----	
1429		-----		-----	
1461		-----		-----	
1510		-----		-----	
1564		-----		-----	
1728		-----		-----	
1748		-----		-----	
1833		-----		-----	
1877		-----		-----	
6016		-----		-----	
6048		-----		-----	
6113		-----		-----	
6262		-----		-----	
6309		-----		-----	
6310		-----		-----	
6380		-----		-----	
6382		-----		-----	
6394		-----		-----	

normality	unknown
n	6
outliers	0
mean (n)	0.0358
st.dev. (n)	0.01201
R(calc.)	0.0336
st.dev.(D524:15)	0.00904
R(D524:15)	0.0253

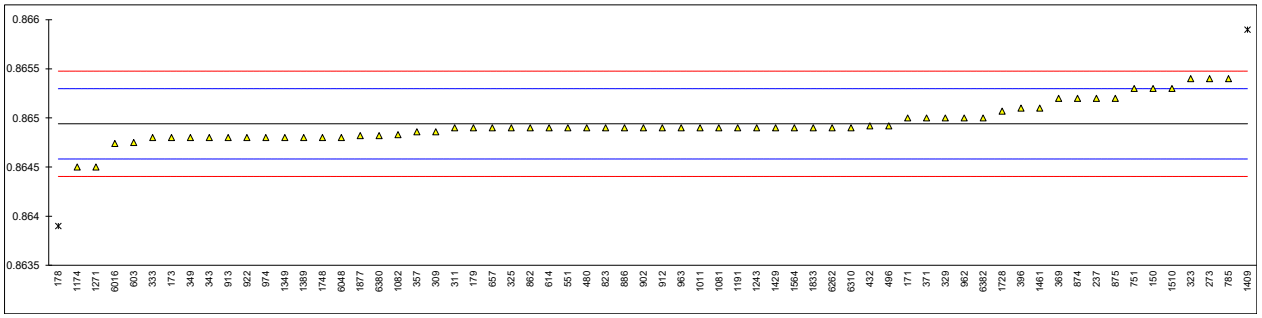


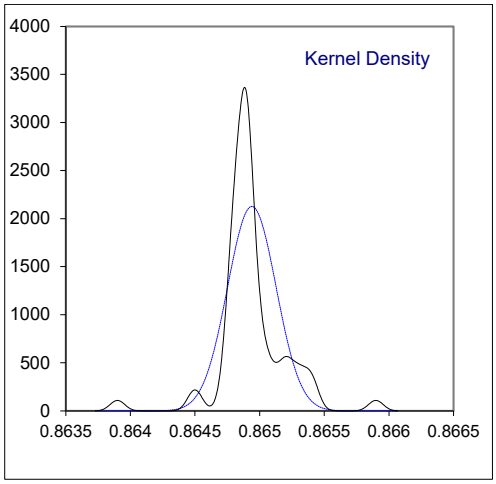
Determination of Density at 15°C on sample #21065; results in kg/L

lab	method	value	mark	z(targ)	remarks
150	D4052	0.8653		2.01	
171	D4052	0.8650		0.33	
173	D4052	0.8648		-0.79	
178	D4052	0.8639	R(0.01)	-5.83	
179	D4052	0.8649		-0.23	
237	D4052	0.8652		1.45	
273	D4052	0.8654		2.57	
309	D4052	0.86486	C	-0.45	first reported 0.86486 kg/m^3
311	ISO12185	0.8649		-0.23	
323	ISO12185	0.8654		2.57	
325	D4052	0.8649		-0.23	
329	D4052	0.8650		0.33	
333	D4052	0.8648	C	-0.79	first reported 854.8 kg/m^3
343	D4052	0.8648		-0.79	
349	D4052	0.8648		-0.79	
357	D4052	0.86486		-0.45	
369	ISO12185	0.8652		1.45	
371	D4052	0.8650		0.33	
396	D4052	0.8651		0.89	
432	D4052	0.86492		-0.11	
480	D4052	0.8649		-0.23	
496	ISO12185	0.86492		-0.11	
551	D4052	0.8649		-0.23	
601		-----		-----	
603	D4052	0.86475		-1.07	
614	D4052	0.8649		-0.23	
657	D4052	0.8649		-0.23	
751	ISO12185	0.8653		2.01	
785	ISO12185	0.8654		2.57	
823	D4052	0.8649		-0.23	
862	D4052	0.8649		-0.23	
874	ISO12185	0.8652		1.45	
875	ISO12185	0.8652		1.45	
886	D4052	0.8649		-0.23	
902	D4052	0.8649		-0.23	
912	ISO12185	0.86490		-0.23	
913	D4052	0.8648	C	-0.79	reported 864.8 kg/L
922	D4052	0.8648		-0.79	
962	ISO12185	0.8650		0.33	
963	D4052	0.8649		-0.23	
974	D4052	0.8648		-0.79	
1011	D4052	0.8649		-0.23	
1081	D4052	0.86490		-0.23	
1082	ISO12185	0.86483		-0.62	
1174	ISO3675	0.8645		-2.47	
1191	ISO12185	0.86490		-0.23	
1243	ISO12185	0.8649		-0.23	
1271	D4052	0.8645	C	-2.47	first reported 865.7 kg/m^3
1349	IP365	0.8648		-0.79	
1389	D4052	0.8648		-0.79	
1409	ISO12185	0.8659	C,R(0.01)	5.37	first reported 865.9 without unit
1429	D4052	0.8649		-0.23	
1461	ISO3675	0.8651	C	0.89	first reported 853.8 kg/m^3
1510	IP365	0.8653		2.01	
1564	D4052	0.8649		-0.23	
1728	D4052	0.86507		0.73	
1748	D4052	0.8648		-0.79	
1833	ISO12185	0.8649		-0.23	
1877	D4052	0.86482		-0.67	
6016	D4052	0.864740		-1.12	
6048		0.8648		-0.79	
6113		-----		-----	
6262	ISO12185	0.8649		-0.23	
6309		-----		-----	
6310	D4052	0.8649	C	-0.23	first reported 864.9 kg/L
6380	D4052	0.86482		-0.67	
6382		0.865		0.33	
6394		-----		-----	

	normality	suspect

n	62
outliers	2
mean (n)	0.86494
st.dev. (n)	0.000188
R(calc.)	0.00053
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005



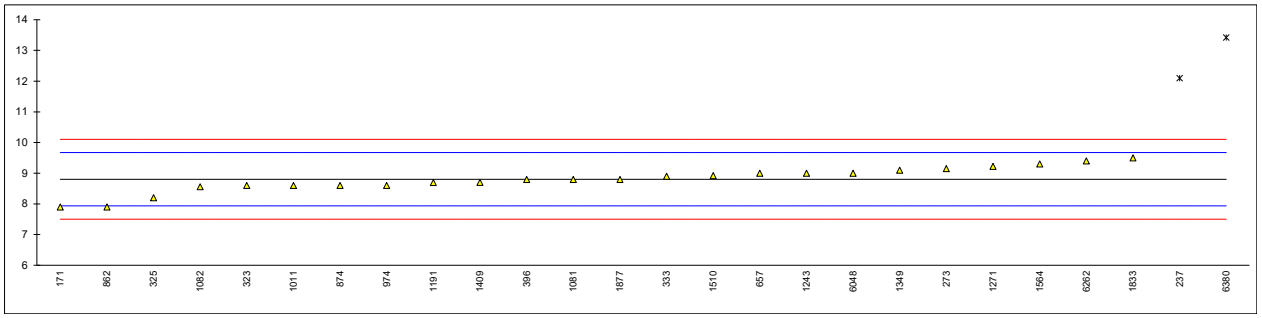


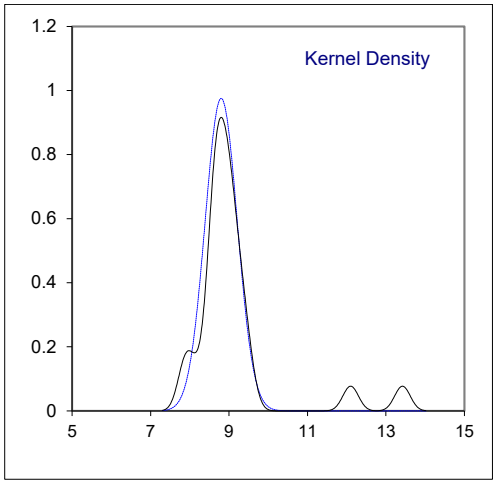
Determination of Evaporation loss by Noack on sample #21065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D5800-B	7.9		-2.08	
173		-----		-----	
178		-----		-----	
179		-----		-----	
237	D5800-B	12.1	R(0.01)	7.59	
273	D5800-A	9.15		0.80	
309		-----		-----	
311		-----		-----	
323	D5800-A	8.6		-0.46	
325	CEC L-40-93	8.2		-1.38	
329		-----		-----	
333	CEC L-40-93	8.9		0.23	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396	D5800-B	8.8		0.00	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D5800-B	9.0		0.46	
751		-----		-----	
785		-----		-----	
823		-----		-----	
862	D5800-B	7.9		-2.08	
874	D5800-B	8.6		-0.46	
875		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974	D5800-B	8.6		-0.46	
1011	CEC L-40-93	8.6		-0.46	
1081	D5800-B	8.8		0.00	
1082	CEC L-40-93	8.558		-0.56	
1174		-----		-----	
1191	CEC L-40-93	8.695		-0.25	
1243	DIN51581	9.00		0.46	
1271	DIN51581	9.22	C	0.96	first reported 5.95
1349	D5800-B	9.1		0.69	
1389		-----	W	-----	first reported 7.2
1409	D5800-B	8.7		-0.23	
1429		-----		-----	
1461		-----		-----	
1510	D5800-B	8.92		0.27	
1564	D5800-B	9.3		1.15	
1728		-----		-----	
1748		-----		-----	
1833	D5800-B	9.5		1.61	
1877	D5800-B	8.8		0.00	
6016		-----		-----	
6048	DIN51581	9.0		0.46	
6113		-----		-----	
6262	D5800-B	9.4		1.38	
6309		-----		-----	
6310		-----		-----	
6380	D5800-B	13.42	R(0.01)	10.63	
6382		-----		-----	
6394		-----		-----	

	normality	OK

n	24
outliers	2
mean (n)	8.802
st.dev. (n)	0.4093
R(calc.)	1.146
st.dev.(D5800-B:20)	0.4346
R(D5800-B:20)	1.217

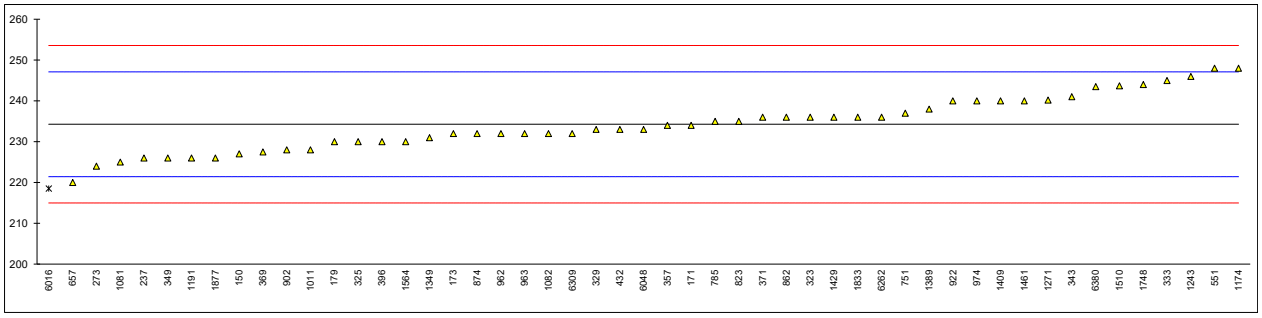


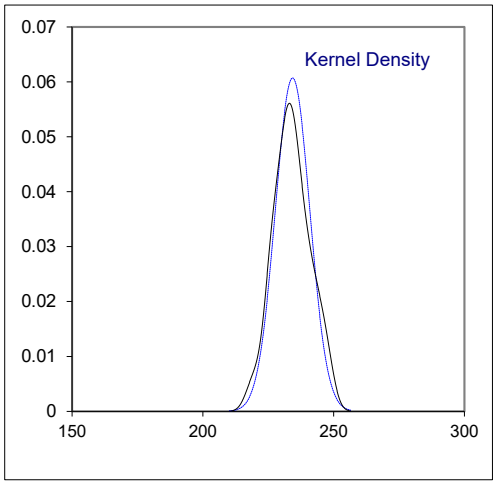


Determination of Flash Point C.O.C. on sample #21065; results in °C

lab	method	value	mark	z(targ)	remarks
150	D92	227		-1.13	
171	D92	234		-0.04	
173	D92	232		-0.35	
178		-----		-----	
179	D92	230		-0.67	
237	D92	226		-1.29	
273	D92	224		-1.60	
309		-----		-----	
311		-----		-----	
323	D92	236		0.27	
325	D92	230		-0.67	
329	D92	233		-0.20	
333	D92	245.0	C	1.67	first reported 255.0
343	D92	241		1.05	
349	D92	226		-1.29	
357	D92	234.0		-0.04	
369	D92	227.5		-1.05	
371	D92	236		0.27	
396	D92	230		-0.67	
432	D92	233		-0.20	
480		-----		-----	
496		-----		-----	
551	D92	248.0		2.13	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D92	220		-2.22	
751	D92	237		0.42	
785	D92	235		0.11	
823	D92	235		0.11	
862	D92	236		0.27	
874	D92	232		-0.35	
875		-----		-----	
886		-----		-----	
902	D92	228.0		-0.98	
912		-----		-----	
913		-----		-----	
922	D92	240		0.89	
962	D92	232.0		-0.35	
963	D92	232.0		-0.35	
974	D92	240		0.89	
1011	D92	228		-0.98	
1081	D92	225.0		-1.44	
1082	ISO2592	232		-0.35	
1174	ISO2592	248		2.13	
1191	ISO2592	226		-1.29	
1243	ISO2592	246		1.82	
1271	ISO2592	240.2		0.92	
1349	D92	231		-0.51	
1389	D92	238		0.58	
1409	D92	240		0.89	
1429	D92	236		0.27	
1461	ISO2592	240		0.89	
1510	D92	243.7		1.47	
1564	D92	230		-0.67	
1728		-----		-----	
1748	D92	244		1.51	
1833	ISO2592	236		0.27	
1877	D92	226		-1.29	
6016	D93	218.5	ex	-2.45	Flash point was performed by Pensky-Martens closed cup method
6048		233		-0.20	
6113		-----		-----	
6262	D92	236		0.27	
6309	ISO2592	232.0		-0.35	
6310		-----		-----	
6380	D92	243.5		1.43	
6382		-----		-----	
6394		-----		-----	

normality	OK
n	50
outliers	0 +1ex
mean (n)	234.28
st.dev. (n)	6.572
R(calc.)	18.40
st.dev.(D92:18)	6.429
R(D92:18)	18



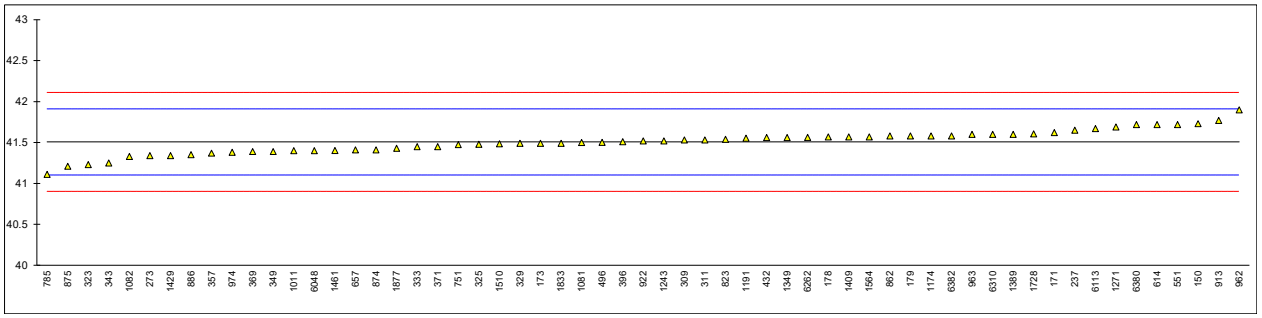


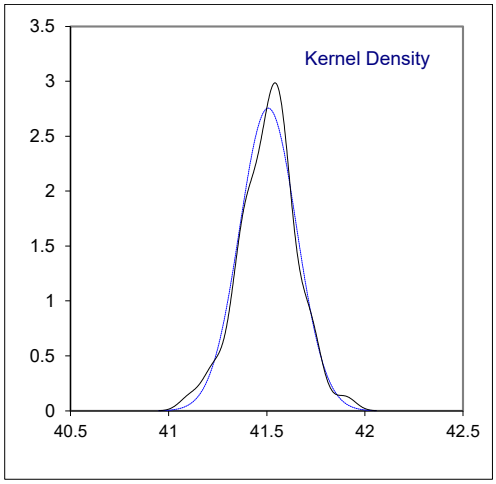
Determination of Kinematic Viscosity at 40°C on sample #21065; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D445	41.73		1.10	
171	D445	41.62		0.56	
173	D445	41.49		-0.09	
178	D445	41.57		0.31	
179	D445	41.58	C	0.36	first reported 318.2
237	D445	41.65		0.70	
273	D445	41.34		-0.83	
309	D445	41.53		0.11	
311	D445	41.53		0.11	
323	D445	41.23		-1.38	
325	D445	41.48		-0.14	
329	D445	41.49		-0.09	
333	D445	41.45		-0.29	
343	D445	41.25		-1.28	
349	D445	41.39		-0.58	
357	D445	41.37		-0.68	
369	D445	41.39		-0.58	
371	D445	41.45		-0.29	
396	D445	41.51		0.01	
432	D445	41.56		0.26	
480		-----		-----	
496	D445	41.503		-0.02	
551	D445	41.72		1.05	
601		-----		-----	
603		-----		-----	
614	D7042	41.72		1.05	
657	D445	41.41		-0.49	
751	D445	41.475		-0.16	
785	D445	41.11		-1.97	
823	D445	41.54		0.16	
862	D445	41.58		0.36	
874	D445	41.41		-0.49	
875	D445	41.21		-1.48	
886	D445	41.35		-0.78	
902		-----		-----	
912		-----		-----	
913	D445	41.77		1.30	
922	D445	41.52		0.06	
962	D445	41.90		1.94	
963	D445	41.60		0.46	
974	D445	41.38		-0.63	
1011	D445	41.40		-0.54	
1081	D445	41.50		-0.04	
1082	ISO3104	41.330		-0.88	
1174	ISO3104	41.58		0.36	
1191	ISO3104	41.553		0.22	
1243	D7279 corrected to D445	41.5205		0.06	
1271	ISO3104	41.69		0.90	
1349	D445	41.56		0.26	
1389	D445	41.6002		0.46	
1409	D445	41.57		0.31	
1429	D445	41.34		-0.83	
1461	ISO3104	41.4011		-0.53	
1510	D445	41.485		-0.11	
1564	D445	41.57		0.31	
1728	D445	41.607		0.49	
1748		-----		-----	
1833	ISO3104	41.49		-0.09	
1877	D445	41.43		-0.39	
6016		-----		-----	
6048		41.40		-0.54	
6113	D445	41.67		0.80	
6262	D445	41.562		0.27	
6309		-----		-----	
6310	D7279 corrected to D445	41.6		0.46	
6380	D445	41.719		1.05	
6382		41.58		0.36	
6394		-----		-----	

	normality	OK

n	59
outliers	0
mean (n)	41.508
st.dev. (n)	0.1448
R(calc.)	0.405
st.dev.(D445:21)	0.2016
R(D445:21)	0.565



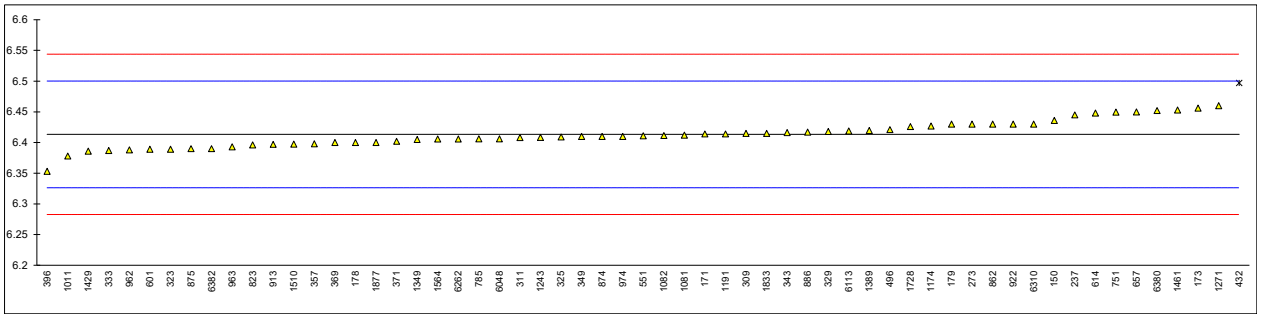


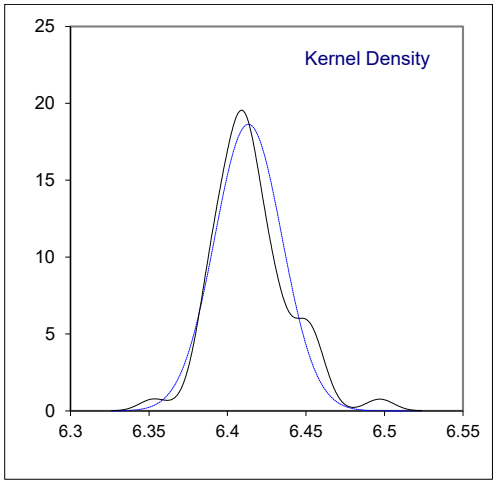
Determination of Kinematic Viscosity at 100°C on sample #21065; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D445	6.436		0.52	
171	D445	6.414		0.02	
173	D445	6.456		0.98	
178	D445	6.40		-0.31	
179	D445	6.43		0.38	
237	D445	6.445		0.73	
273	D445	6.430		0.38	
309	D445	6.415		0.04	
311	D445	6.408		-0.12	
323	D445	6.389		-0.56	
325	D445	6.409		-0.10	
329	D445	6.418		0.11	
333	D445	6.387		-0.61	
343	D445	6.416		0.06	
349	D445	6.410		-0.08	
357	D445	6.398		-0.35	
369	D445	6.400		-0.31	
371	D445	6.402		-0.26	
396	D445	6.353		-1.39	
432	D445	6.497	R(0.05)	1.92	
480		-----		-----	
496	D445	6.4211		0.18	
551	D445	6.411		-0.05	
601	D445	6.389		-0.56	
603		-----		-----	
614	D7042	6.448		0.80	
657	D445	6.450		0.84	
751	D445	6.4495		0.83	
785	D445	6.406		-0.17	
823	ISO3104	6.396		-0.40	
862	D445	6.430		0.38	
874	D445	6.410		-0.08	
875	D445	6.39		-0.54	
886	D445	6.417		0.08	
902		-----		-----	
912		-----		-----	
913	D445	6.397		-0.38	
922	D445	6.430		0.38	
962	D445	6.388		-0.58	
963	D445	6.393		-0.47	
974	D445	6.410		-0.08	
1011	D445	6.378		-0.81	
1081	D445	6.412		-0.03	
1082	ISO3104	6.4114		-0.04	
1174	ISO3104	6.427		0.31	
1191	ISO3104	6.41405		0.02	
1243	D7279 corrected to D445	6.4083		-0.12	
1271	ISO3104	6.46		1.07	
1349	D445	6.405		-0.19	
1389	D445	6.4197		0.15	
1409		-----		-----	
1429	D445	6.386		-0.63	
1461	ISO3104	6.4531		0.91	
1510	D445	6.3975		-0.36	
1564	D445	6.4058		-0.17	
1728	D445	6.426		0.29	
1748		-----		-----	
1833	ISO3104	6.415		0.04	
1877	D445	6.400		-0.31	
6016		-----		-----	
6048		6.406		-0.17	
6113	D445	6.419		0.13	
6262	D445	6.4058		-0.17	
6309		-----		-----	
6310	D7279 corrected to D445	6.43	C	0.38	first reported 41.6
6380	D445	6.452		0.89	
6382		6.39		-0.54	
6394		-----		-----	

	normality	OK

n	58
outliers	1
mean (n)	6.4133
st.dev. (n)	0.02142
R(calc.)	0.0600
st.dev.(D445:21)	0.04352
R(D445:21)	0.1219

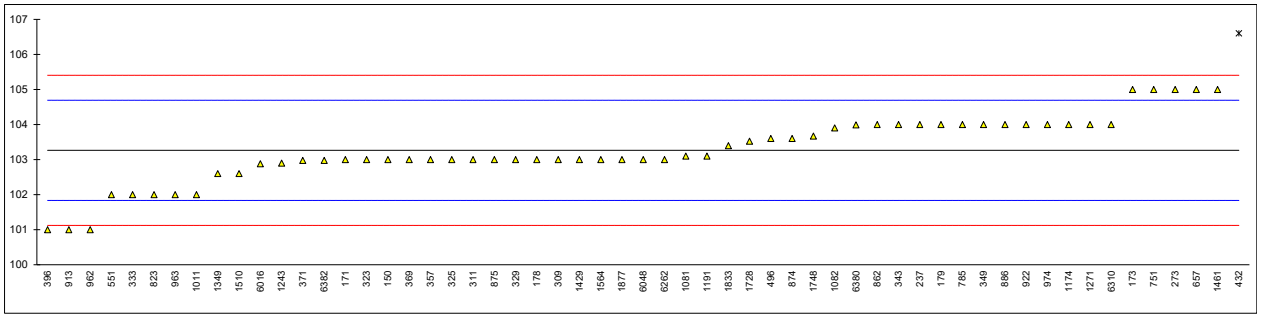


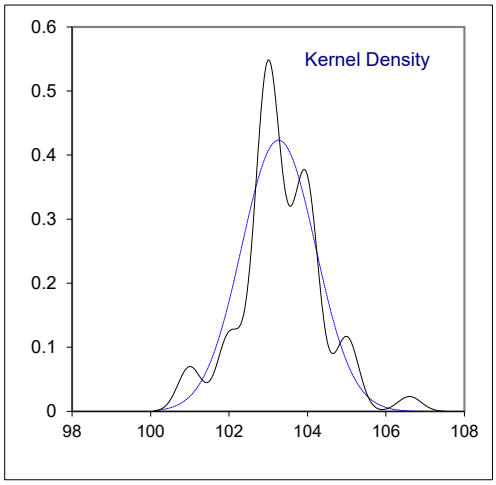


Determination of Viscosity Index on sample #21065

lab	method	value	mark	z(targ)	remarks
150	D2270	103		-0.37	
171	D2270	103		-0.37	
173	D2270	105		2.43	
178	D2270	103		-0.37	
179	D2270	104	C	1.03	first reported -1083
237	D2270	104		1.03	
273	D2270	105		2.43	
309	D2270	103		-0.37	
311	D2270	103		-0.37	
323	D2270	103		-0.37	
325	D2270	103		-0.37	
329	D2270	103		-0.37	
333	D2270	102		-1.77	
343	D2270	104		1.03	
349	D2270	104		1.03	
357	D2270	103		-0.37	
369	D2270	103		-0.37	
371	D2270	102.98		-0.40	
396	D2270	101		-3.17	
432	D2270	106.6	ex	4.67	test result excluded as statistical outlier in KV 100°C
480		-----		-----	
496	D2270	103.6		0.47	
551	D2270	102		-1.77	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D2270	105		2.43	
751	D2270	105		2.43	
785	D2270	104		1.03	
823	D2270	102		-1.77	
862	D2270	104		1.03	
874	D2270	103.6		0.47	
875	D2270	103		-0.37	
886	D2270	104		1.03	
902		-----		-----	
912		-----		-----	
913	D2270	101		-3.17	
922	D2270	104		1.03	
962	D2270	101		-3.17	
963	D2270	102		-1.77	
974	D2270	104		1.03	
1011	D2270	102		-1.77	
1081	D2270	103.1		-0.23	
1082	D2270	103.9044		0.90	
1174	ISO2909	104		1.03	
1191	D2270	103.1		-0.23	
1243	ISO2909	102.9		-0.51	
1271	ISO2909	104		1.03	
1349	D2270	102.6		-0.93	
1389		-----		-----	
1409		-----		-----	
1429	D2270	103		-0.37	
1461	ISO2909	105		2.43	
1510	D2270	102.6		-0.93	
1564	D2270	103		-0.37	
1728	D2270	103.525		0.36	
1748	D2270	103.67	C	0.57	first reported 99.8
1833	ISO2909	103.4		0.19	
1877	D2270	103		-0.37	
6016	D2270	102.88		-0.54	
6048		103	C	-0.37	first reported 2480
6113		-----		-----	
6262	D2270	103		-0.37	
6309		-----		-----	
6310	D2270	104		1.03	
6380	D2270	103.99		1.02	
6382	ISO2909	102.98	E	-0.40	iis calculated 101.92
6394		-----		-----	

normality	OK
n	56
outliers	0 +1ex
mean (n)	103.26
st.dev. (n)	0.942
R(calc.)	2.64
st.dev.(D2270:10)	0.714
R(D2270:10)	2

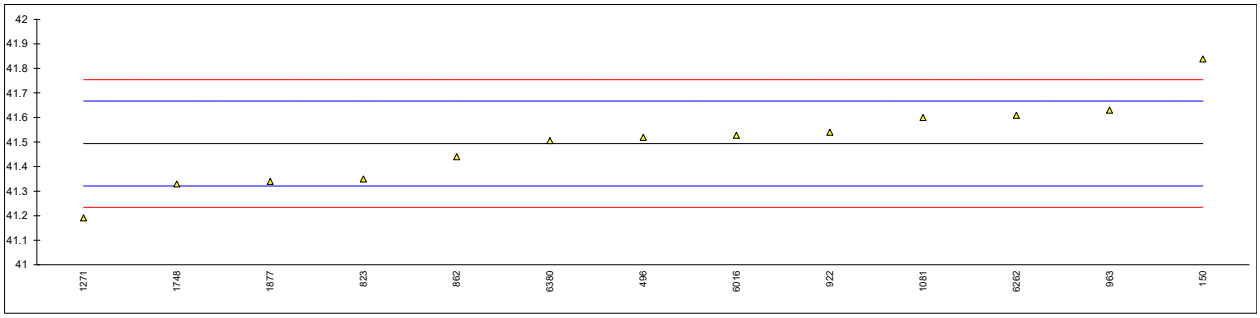


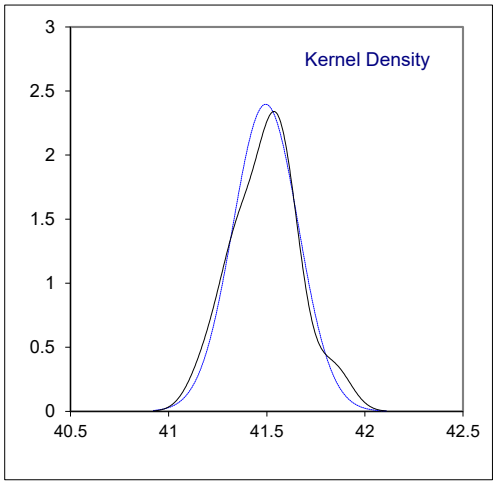


Determination of Kinematic Viscosity Stabinger at 40°C on sample #21065; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D7042	41.839	C	3.99	first reported 42.07
171		-----		-----	
173		-----		-----	
178		-----		-----	
179		-----		-----	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496	D7042	41.519		0.29	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657		-----		-----	
751		-----		-----	
785		-----		-----	
823	D7042	41.35		-1.66	
862	D7042	41.44		-0.62	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922	D7042	41.54		0.53	
962		-----		-----	
963	D7042	41.63		1.57	
974		-----		-----	
1011		-----		-----	
1081	D7042	41.60		1.23	
1082		-----		-----	
1174		-----		-----	
1191		-----		-----	
1243		-----		-----	
1271	D7042	41.191		-3.50	
1349		-----		-----	
1389		-----		-----	
1409		-----		-----	
1429		-----		-----	
1461		-----		-----	
1510		-----		-----	
1564		-----		-----	
1728		-----		-----	
1748	D7042	41.329		-1.91	
1833		-----		-----	
1877	D7042	41.34		-1.78	
6016	D7042	41.528		0.39	
6048		-----		-----	
6113		-----		-----	
6262	D7042	41.609	C	1.33	first reported 35.342 dynamic viscosity
6309		-----		-----	
6310		-----		-----	
6380	D7042	41.506	C	0.14	first reported 6.1130
6382		-----		-----	
6394		-----		-----	

normality	OK
n	13
outliers	0
mean (n)	41.494
st.dev. (n)	0.1664
R(calc.)	0.466
st.dev.(D7042:21)	0.0865
R(D7042:21)	0.242

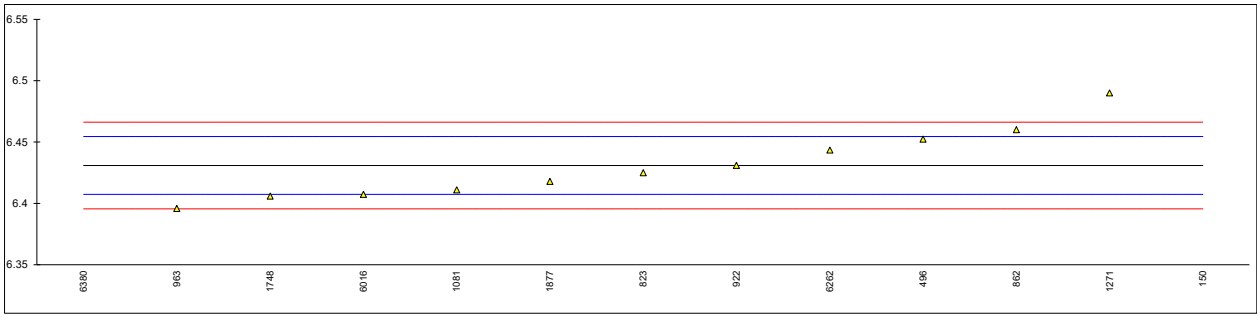


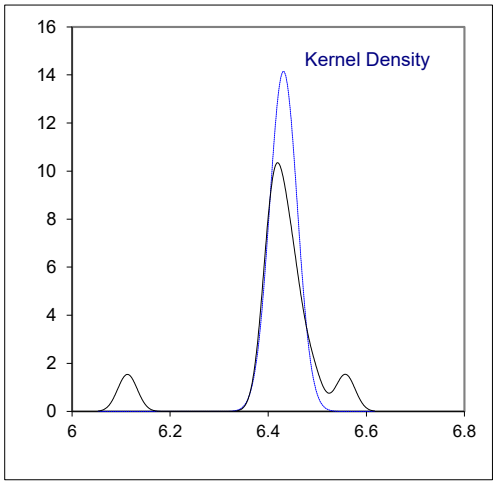


Determination of Kinematic Viscosity Stabinger at 100°C on sample #21065; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D7042	6.557	C,G(0.05)	10.69	first reported 6.478
171		-----		-----	
173		-----		-----	
178		-----		-----	
179		-----		-----	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496	D7042	6.4524		1.82	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657		-----		-----	
751		-----		-----	
785		-----		-----	
823	D7042	6.425		-0.50	
862	D7042	6.46		2.47	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922	D7042	6.431		0.01	
962		-----		-----	
963	D7042	6.396		-2.96	
974		-----		-----	
1011		-----		-----	
1081	D7042	6.411		-1.69	
1082		-----		-----	
1174		-----		-----	
1191		-----		-----	
1243		-----		-----	
1271	D7042	6.49	C	5.01	first reported 6.356
1349		-----		-----	
1389		-----		-----	
1409		-----		-----	
1429		-----		-----	
1461		-----		-----	
1510		-----		-----	
1564		-----		-----	
1728		-----		-----	
1748	D7042	6.406	C	-2.11	first reported 6.3144
1833		-----		-----	
1877	D7042	6.418		-1.10	
6016	D7042	6.4074		-1.99	
6048		-----		-----	
6113		-----		-----	
6262	D7042	6.4434	C	1.06	first reported 5.2366 dynamic viscosity
6309		-----		-----	
6310		-----		-----	
6380	D7042	6.1130	G(0.01)	-26.96	
6382		-----		-----	
6394		-----		-----	

normality	OK
n	11
outliers	2
mean (n)	6.4309
st.dev. (n)	0.02819
R(calc.)	0.0789
st.dev.(D7042:21)	0.01179
R(D7042:21)	0.0330



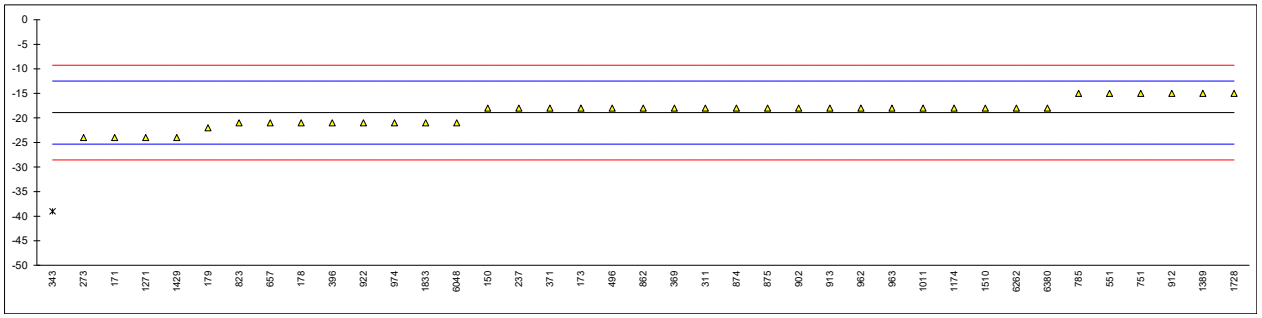


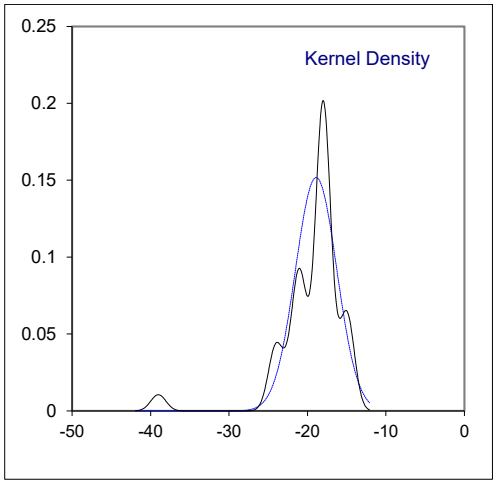
Determination of Pour Point Manual on sample #21065; results in °C

lab	method	value	mark	z(targ)	remarks
150	D97	-18		0.28	
171	D97	-24		-1.59	
173	D97	-18		0.28	
178	D97	-21		-0.65	
179	D97	-22		-0.97	
237	D97	-18		0.28	
273	D97	-24		-1.59	
309		-----		-----	
311	D97	-18		0.28	
323		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343	D97	-39	C,R(0.01)	-6.25	first reported -42
349		-----		-----	
357		-----		-----	
369	D97	-18		0.28	
371	D97	-18		0.28	
396	D97	-21		-0.65	
432		-----		-----	
480		-----		-----	
496	D97	-18		0.28	
551	D97	-15		1.21	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D97	-21		-0.65	
751	D97	-15		1.21	
785	D97	-15		1.21	
823	ISO3016	-21		-0.65	
862	D97	-18		0.28	
874	D97	-18		0.28	
875	D97	-18		0.28	
886		-----		-----	
902	D97	-18		0.28	
912	D97	-15		1.21	
913	D97	-18		0.28	
922	D97	-21		-0.65	
962	D97	-18		0.28	
963	D97	-18		0.28	
974	D97	-21		-0.65	
1011	D97	-18		0.28	
1081		-----		-----	
1082		-----		-----	
1174	ISO3016	-18		0.28	
1191		-----		-----	
1243		-----		-----	
1271	ISO3016	-24		-1.59	
1349		-----		-----	
1389	D97	-15		1.21	
1409		-----		-----	
1429	D97	-24		-1.59	
1461		-----		-----	
1510	D97	-18		0.28	
1564		-----		-----	
1728	D97	-15		1.21	
1748		-----		-----	
1833	ISO3016	-21		-0.65	
1877		-----		-----	
6016		-----		-----	
6048		-21		-0.65	
6113		-----		-----	
6262	D97	-18		0.28	
6309		-----		-----	
6310		-----		-----	
6380	D97	-18		0.28	
6382		-----		-----	
6394		-----		-----	

normality	OK

n	38
outliers	1
mean (n)	-18.89
st.dev. (n)	2.628
R(calc.)	7.36
st.dev.(D97:17b)	3.214
R(D97:17b)	9



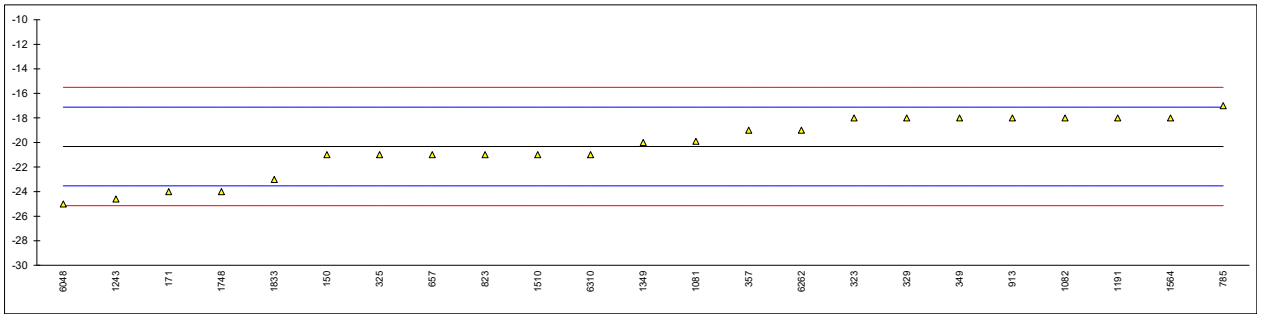


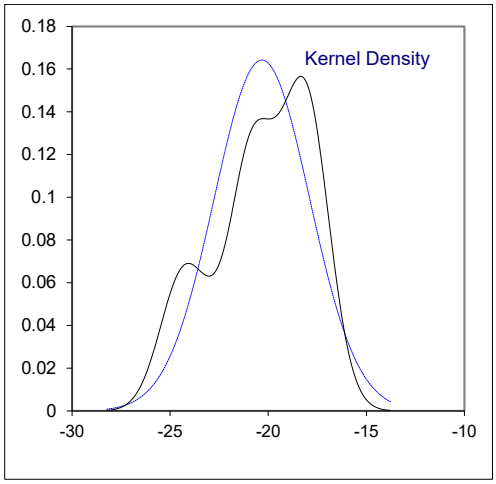
Determination of Pour Point Automated 1°C interval on sample #21065; results in °C

lab	method	value	mark	z(targ)	remarks
150	D5950	-21		-0.42	
171	D5950	-24		-2.29	
173		-----		-----	
178		-----		-----	
179		-----		-----	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323	D5950	-18		1.45	
325	D5950	-21		-0.42	
329	D5950	-18		1.45	
333		-----		-----	
343		-----		-----	
349	D5950	-18		1.45	
357	D5950	-19	C	0.83	first reported -59
369		-----		-----	
371		-----		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657	D5950	-21		-0.42	
751		-----		-----	
785	D6749	-17		2.07	
823	D5950	-21		-0.42	
862		-----		-----	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902		-----		-----	
912		-----		-----	
913	D6749	-18		1.45	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
1011		-----		-----	
1081	In house	-19.9		0.27	
1082	D5950	-18		1.45	
1174		-----		-----	
1191	D5950	-18		1.45	
1243	D7346	-24.6		-2.66	
1271		-----		-----	
1349	D5950	-20		0.20	
1389		-----		-----	
1409		-----		-----	
1429		-----		-----	
1461		-----		-----	
1510	D5950	-21		-0.42	
1564	D5949	-18		1.45	
1728		-----		-----	
1748	D7346	-24		-2.29	
1833	D5950	-23		-1.66	
1877		-----		-----	
6016		-----		-----	
6048		-25		-2.91	
6113		-----		-----	
6262	D5950	-19		0.83	
6309		-----		-----	
6310	D5950	-21		-0.42	
6380		-----		-----	
6382		-----		-----	
6394		-----		-----	

	normality	OK

n	23
outliers	0
mean (n)	-20.33
st.dev. (n)	2.428
R(calc.)	6.80
st.dev.(D5950:14)	1.607
R(D5950:14)	4.5





Determination of Rust prevention (proc. B) (synthetic seawater) on sample #21065

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
173		-----		-----	
178		-----		-----	
179	D665	Fail		-----	
237		-----		-----	
273		-----		-----	
309		-----		-----	
311		-----		-----	
323		-----		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
357		-----		-----	
369		-----		-----	
371		-----		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551		-----		-----	
601		-----		-----	
603		-----		-----	
614		-----		-----	
657		-----		-----	
751		-----		-----	
785		-----		-----	
823		-----		-----	
862	D665	severe		-----	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902	D665	Fail		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
1011		-----		-----	
1081		-----		-----	
1082		-----		-----	
1174		-----		-----	
1191		-----		-----	
1243		-----		-----	
1271		-----		-----	
1349		-----		-----	
1389		-----		-----	
1409		-----		-----	
1429		-----		-----	
1461		-----		-----	
1510		-----		-----	
1564	D665	not pass		-----	
1728		-----		-----	
1748		-----		-----	
1833		-----		-----	
1877		-----		-----	
6016	D665	fail		-----	
6048		-----		-----	
6113		-----		-----	
6262		-----		-----	
6309		-----		-----	
6310		-----		-----	
6380		-----		-----	
6382		-----		-----	
6394		-----		-----	
	n	5			
	mean (n)	Fail			

Determination of Sulfur on sample #21065; results in mg/kg

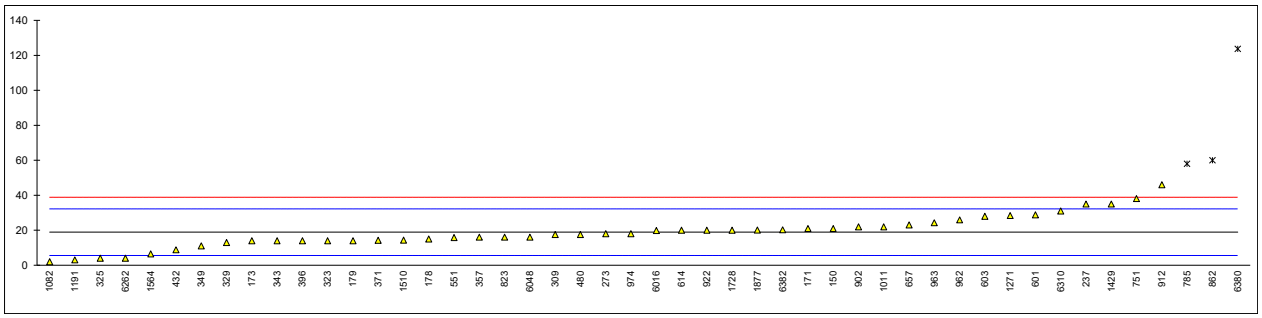
lab	method	value	mark	z(targ)	remarks
150	D4294	<17		-----	
171	D2622	1.6		-----	
173		-----		-----	
178		-----		-----	
179	D4294	<0.0020		-----	
237	D4294	<17		-----	
273	D5453	<1		-----	
309	D4294	<300	C	-----	first reported 150
311	D2622	<3		-----	
323	D2622	<3.0		-----	
325		-----		-----	
329		-----		-----	
333		-----		-----	
343	IP336	<300		-----	
349	D2622	<3		-----	
357		-----		-----	
369	D4294	<10		-----	
371	D4294	1.58		-----	
396		-----		-----	
432		-----		-----	
480		-----		-----	
496		-----		-----	
551	D4294	14.8		-----	
601		-----		-----	
603	D4294	<50		-----	
614		-----		-----	
657	D5453	2.4		-----	
751	D4294	<17		-----	
785	ISO20884	2.2		-----	
823	D5453	1.6		-----	
862	D2622	4.9		-----	
874	D2622	<3		-----	
875	D2622	2.4		-----	
886		-----		-----	
902	D4294	<300		-----	
912	D4294	1.5		-----	
913	D5453	1.01		-----	
922	D4294	<17		-----	
962		-----		-----	
963		-----		-----	
974	D4294	<17		-----	
1011	IP336	<66		-----	
1081	D2622	1.4		-----	
1082		-----		-----	
1174		-----		-----	
1191	ISO8754	10		-----	
1243		-----		-----	
1271	D4294	3.154		-----	
1349	D7039	1.3		-----	
1389		-----		-----	
1409		-----		-----	
1429	D4294	430	C, f+?	-----	first reported 720 / possibly a false positive test result?
1461	ISO8754	2		-----	
1510	D4294	2.7		-----	
1564	D4294	3		-----	
1728	D4294	2.03		-----	
1748		-----		-----	
1833	D5453	1.32		-----	
1877		-----		-----	
6016		-----		-----	
6048		<5		-----	
6113		-----		-----	
6262	D2622	0.265		-----	
6309		-----		-----	
6310		1		-----	
6380	D5185	0		-----	
6382	ISO8754	0		-----	
6394		-----		-----	
	n	36			Application range D4294: 17 mg/kg - 4.6%M/M
	mean (n)	<17			Application range D2622: 3 mg/kg - 4.6%M/M

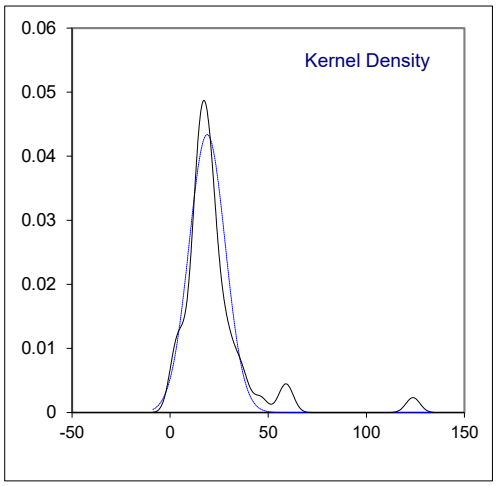
Determination of Water on sample #21065; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D6304-A	21		0.32	
171	D6304-A	21		0.32	
173	D6304-C	14		-0.74	
178	D6304-C	15		-0.59	
179	D6304-A	14		-0.74	
237	D6304-C	35		2.43	
273	EN60814	18		-0.13	
309	D6304-A	17.5		-0.21	
311	D6304-A	<30		-----	
323	D6304-A	14		-0.74	
325	D6304-C	4		-2.25	
329	D6304-A	13		-0.89	
333		-----		-----	
343	D6304-A	14		-0.74	
349	D6304-A	11		-1.19	
357	D6304-A	16		-0.44	
369	ISO12937	<30		-----	
371	D6304-A	14.2		-0.71	
396	D6304-A	14		-0.74	
432	D6304-C	8.8		-1.52	
480	D6304-A	17.5		-0.21	
496		-----		-----	
551	D6304	15.8		-0.47	
601	D6304	28.8		1.49	
603	D6304-A	28		1.37	
614	D6304-B	20		0.17	
657	D6304-A	23		0.62	
751	D6304-A	38.1		2.89	
785	D6304	58	R(0.01)	5.89	
823	D6304-A	16		-0.44	
862	D6304-A	60	R(0.01)	6.20	
874		-----		-----	
875		-----		-----	
886		-----		-----	
902	D6304-A	22		0.47	
912	D6304-C	46		4.09	
913		-----		-----	
922	D6304-A	20		0.17	
962	D6304-C	25.95		1.06	
963	D6304-A	24.3		0.81	
974	D6304-A	18		-0.13	
1011	D6304-A	22		0.47	
1081		-----		-----	
1082	D6304-C	2.0		-2.55	
1174		-----		-----	
1191	D6304-C	3		-2.40	
1243	ISO12937	<1		-----	
1271	ISO12937	28.4	C	1.43	first reported 0.0077 %M/M
1349		-----		-----	
1389		-----		-----	
1409		-----		-----	
1429	IP438	35		2.43	
1461		-----		-----	
1510	D6304-B	14.3		-0.69	
1564	D6304-C	6.5		-1.87	
1728	D6304-A	20		0.17	
1748		-----		-----	
1833	ISO12937	<30		-----	
1877	D6304-C	20.1		0.18	
6016	D6304-A	19.80		0.14	
6048		16		-0.44	
6113		-----		-----	
6262	D6304-A	4		-2.25	
6309		-----		-----	
6310	D6304-C	31		1.82	
6380	D6304-A	123.7	R(0.01)	15.80	
6382	EN60814	20.2		0.20	
6394		-----		-----	

	normality	OK

n	45	
outliers	3	
mean (n)	18.89	
st.dev. (n)	9.200	
R(calc.)	25.76	
st.dev.(D6304-A:20)	6.634	
R(D6304-A:20)	18.58	range 20 - 25000 mg/kg
Compare		
R(D6304-B:20)	79.36	range 30 - 2100 mg/kg
R(D6304-C:20)	11.67	range 20 - 360 mg/kg



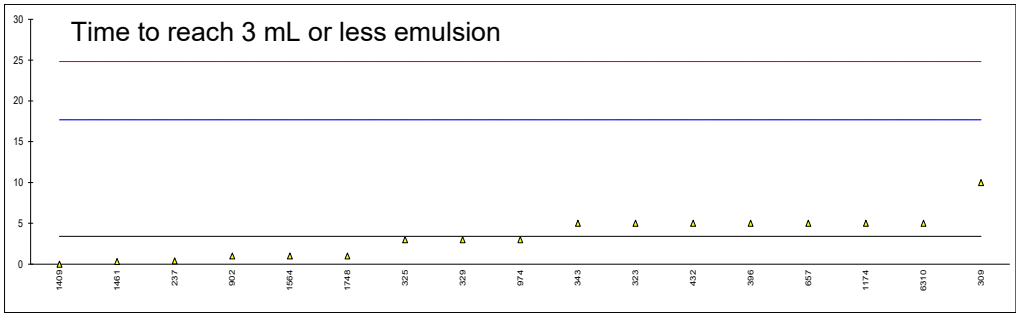


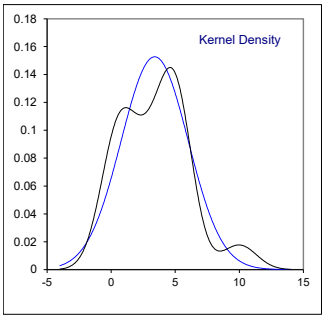
Determination of Water Separability at 54°C, distilled water on sample #21065; results in minutes

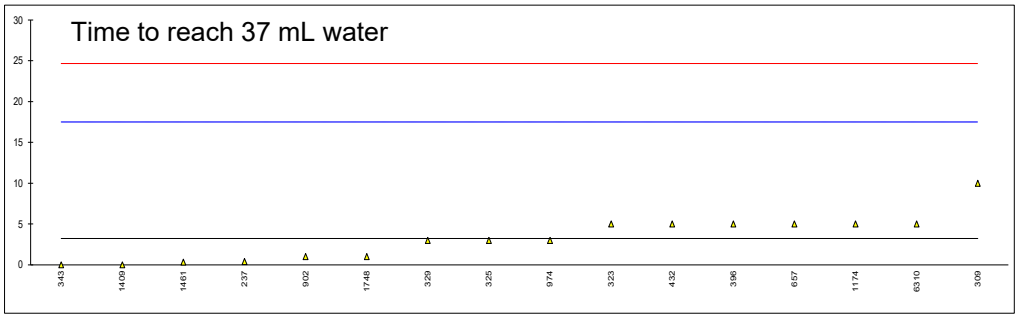
lab	method	3mL or less emulsion		z(targ)	37mL of water		z(targ)	complete break (40-40-0)		z(targ)	test aborted	time test aborted	
150		-----		-----	-----		-----	-----		-----	No	-----	
171		-----		-----	-----		-----	5		0.20	No	-----	
173		-----		-----	-----		-----	-----		-----	-----	-----	
178		-----		-----	-----		-----	-----		-----	-----	-----	
179		-----		-----	-----		-----	5		0.20	-----	-----	
237	D1401	0.4		-0.42	0.4		-0.40	0.9		-0.38	No	-----	
273		-----		-----	-----		-----	-----		-----	-----	-----	
309	D1401	10	C	0.92	10	C	0.95	10	C,D(5)	0.90	Yes	10	C
311		-----		-----	-----		-----	-----		-----	-----	-----	
323	D1401	5		0.22	5		0.25	5		0.20	-----	5	
325	D1401	3		-0.06	3		-0.03	5		0.20	No	-----	
329	D1401	3		-0.06	3		-0.03	4		0.06	No	-----	
333		-----		-----	-----		-----	-----		-----	-----	-----	
343	D1401	5		0.22	0		-0.45	5		0.20	No	-----	
349		-----		-----	-----		-----	-----		-----	-----	-----	
357		-----		-----	-----		-----	-----		-----	-----	-----	
369		-----		-----	-----		-----	-----		-----	-----	-----	
371		-----		-----	-----		-----	-----		-----	-----	-----	
396	D1401	5		0.22	5		0.25	5		0.20	No	-----	
432	D1401	5		0.22	5		0.25	5		0.20	No	-----	
480		-----		-----	-----		-----	-----		-----	-----	-----	
496		-----		-----	-----		-----	-----		-----	-----	-----	
551		-----		-----	-----		-----	-----		-----	-----	-----	
601		-----		-----	-----		-----	-----		-----	-----	-----	
603		-----		-----	-----		-----	-----		-----	-----	-----	
614		-----		-----	-----		-----	-----		-----	-----	-----	
657	D1401	5		0.22	5		0.25	5		0.20	No	-----	
751		-----		-----	-----		-----	-----		-----	-----	-----	
785		-----		-----	-----		-----	-----		-----	-----	-----	
823	D1401	<1		-----	<!		-----	<1		-----	No	-----	
862		-----		-----	-----		-----	-----		-----	-----	-----	
874		-----		-----	-----		-----	-----		-----	-----	-----	
875		-----		-----	-----		-----	-----		-----	-----	-----	
886		-----		-----	-----		-----	-----		-----	-----	-----	
902	D1401	1		-0.34	1		-0.31	40-40-0		-----	Yes	5	
912		-----		-----	-----		-----	-----		-----	-----	-----	
913		-----		-----	-----		-----	-----		-----	-----	-----	
922		-----		-----	-----		-----	-----		-----	-----	-----	
962		-----		-----	-----		-----	-----		-----	-----	-----	
963		-----		-----	-----		-----	-----		-----	-----	-----	
974	D1401	3		-0.06	3		-0.03	5		0.20	No	-----	
1011		-----		-----	-----		-----	-----		-----	-----	-----	
1081		-----		-----	-----		-----	-----		-----	No	-----	
1082		-----		-----	-----		-----	-----		-----	-----	-----	
1174	ISO6614	5		0.22	5		0.25	-----		-----	No	-----	
1191		-----		-----	-----		-----	-----		-----	-----	-----	
1243	ISO6614	<1		-----	<1		-----	2.5		-0.15	No	-----	
1271		-----		-----	-----		-----	1		-0.36	-----	-----	
1349		-----		-----	-----		-----	-----		-----	-----	-----	
1389		-----		-----	-----		-----	-----		-----	-----	-----	
1409	ISO6614	0		-0.48	0		-0.45	40-40-0		-----	No	-----	
1429		-----		-----	-----		-----	-----		-----	-----	-----	
1461	ISO6614	0.333		-0.43	0.333		-0.41	1		-0.36	-----	-----	
1510		-----		-----	-----		-----	-----		-----	-----	-----	
1564	D1401	1		-0.34	-----		-----	-----		-----	-----	-----	
1728		-----		-----	-----		-----	-----		-----	-----	-----	
1748		1		-0.34	1		-0.31	1		-0.36	Yes	1	
1833		-----		-----	-----		-----	-----		-----	-----	-----	
1877		-----		-----	-----		-----	-----		-----	-----	-----	
6016		-----		-----	-----		-----	0.57		-0.42	No	-----	
6048		-----		-----	-----		-----	-----		-----	-----	-----	
6113		-----		-----	-----		-----	-----		-----	-----	-----	
6262		-----		-----	-----		-----	-----		-----	-----	-----	
6309		-----		-----	-----		-----	-----		-----	-----	-----	
6310		5		0.22	5		0.25	5		0.20	No	-----	
6380		-----		-----	-----		-----	-----		-----	-----	-----	
6382		-----		-----	-----		-----	-----		-----	-----	-----	
6394		-----		-----	-----		-----	-----		-----	-----	-----	
	normality	OK			OK			OK					

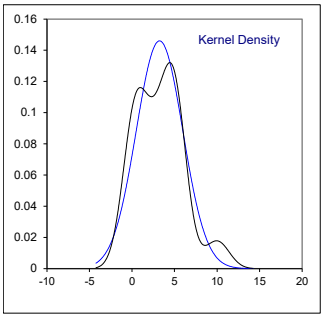
n	17	16	17
outliers	0	0	1
mean (n)	3.40	3.23	3.59
st.dev. (n)	2.613	2.733	1.899
R(calc.)	7.32	7.65	5.32
st.dev.(D1401:19)	7.143	7.143	7.143
R(D1401:19)	20	20	20

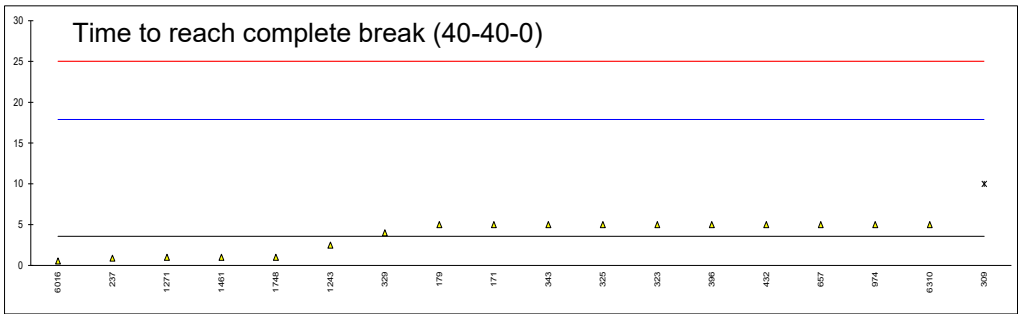
Lab 309 first reported >30 for: time to reach 3 mL or less emulsion/37 mL of water/complete break and 30 for time test aborted

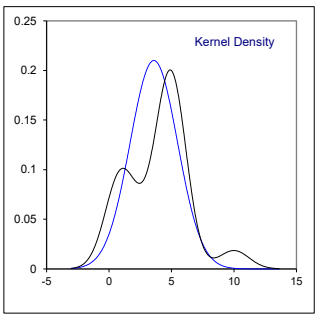












Determination of Water Separability at 54°C, distilled water sample #21065; results in mL

lab	method	oil phase	mark	water phase	mark	emulsion phase	mark
150		-----		-----		-----	
171	D1401	41		39		0	
173		-----		-----		-----	
178		-----		-----		-----	
179	D1401	40		40		0	
237	D1401	40		40		0	
273		-----		-----		-----	
309	D1401	40	C	40	C	0	C
311		-----		-----		-----	
323	D1401	40		40		0	
325		-----		-----		-----	
329		-----		-----		-----	
333		-----		-----		-----	
343	D1401	40		40		0	
349		-----		-----		-----	
357		-----		-----		-----	
369		-----		-----		-----	
371		-----		-----		-----	
396		-----		-----		-----	
432		-----		-----		-----	
480		-----		-----		-----	
496		-----		-----		-----	
551		-----		-----		-----	
601		-----		-----		-----	
603		-----		-----		-----	
614		-----		-----		-----	
657	D1401	40		40		0	
751		-----		-----		-----	
785		-----		-----		-----	
823		-----		-----		-----	
862		-----		-----		-----	
874		-----		-----		-----	
875		-----		-----		-----	
886		-----		-----		-----	
902	D1401	40		40		0	
912		-----		-----		-----	
913		-----		-----		-----	
922		-----		-----		-----	
962		-----		-----		-----	
963		-----		-----		-----	
974	D1401	40		40		0	
1011		-----		-----		-----	
1081	D1401	40		40		0	
1082		-----		-----		-----	
1174	ISO6614	40		39		1	
1191		-----		-----		-----	
1243		-----		-----		-----	
1271		-----		-----		-----	
1349		-----		-----		-----	
1389		-----		-----		-----	
1409		-----		-----		-----	
1429		-----		-----		-----	
1461		-----		-----		-----	
1510		-----		-----		-----	
1564		-----		-----		-----	
1728		-----		-----		-----	
1748		40		40		0	
1833		-----		-----		-----	
1877		-----		-----		-----	
6016		-----		-----		-----	
6048		-----		-----		-----	
6113		-----		-----		-----	
6262		-----		-----		-----	
6309		-----		-----		-----	
6310		40		40		0	
6380		-----		-----		-----	
6382		-----		-----		-----	
6394		-----		-----		-----	

Lab 309 first reported 30 for oil phase, 39 for water phase and 6 for emulsion phase

APPENDIX 2

Number of participants per country

1 lab in	AUSTRALIA
1 lab in	AUSTRIA
7 labs in	BELGIUM
1 lab in	BOSNIA and HERZEGOVINA
1 lab in	BRAZIL
2 labs in	BULGARIA
1 lab in	CHINA, People's Republic
3 labs in	FINLAND
1 lab in	FRANCE
4 labs in	GERMANY
2 labs in	INDIA
1 lab in	ITALY
1 lab in	JORDAN
1 lab in	KAZAKHSTAN
2 labs in	LATVIA
3 labs in	MALAYSIA
3 labs in	NETHERLANDS
1 lab in	NIGERIA
1 lab in	PAKISTAN
1 lab in	POLAND
1 lab in	PORTUGAL
1 lab in	ROMANIA
4 labs in	RUSSIAN FEDERATION
2 labs in	SAUDI ARABIA
1 lab in	SINGAPORE
1 lab in	SOUTH AFRICA
1 lab in	SOUTH KOREA
6 labs in	SPAIN
1 lab in	TAIWAN
3 labs in	TURKEY
1 lab in	UNITED ARAB EMIRATES
3 labs in	UNITED KINGDOM
5 labs in	UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= 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

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