

**Results of Proficiency Test
Base Oil
May 2016**

Organised 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 test for Base Oil. During the annual proficiency testing program 2015/2016, it was decided to continue the round robin for the analysis of Base Oil. In this interlaboratory study 51 laboratories in 33 different countries have registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2016 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 were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send one bottle of 1L (labelled #16075) of Base Oil.

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

2.2 PROTOCOL

The protocol followed in the organisation was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

The necessary bulk material was obtained from a local supplier. The 200 litre bulk material (a Solvent Neutral 100 Base Oil) was homogenized and part of this bulk was transferred into 68 brown glass bottles of 1 litre (labelled #16075). The homogeneity of the subsamples #16075 was checked by determination of Density at 15°C in accordance with ASTM D4052 and Kinematic Viscosity at 40°C in accordance with ASTM D445 on 8 stratified randomly selected samples.

	Density at 15°C in kg/L	Kinematic Viscosity at 40°C in mm ² /s
Sample #16075-1	0.86702	21.08
Sample #16075-2	0.86703	21.10
Sample #16075-3	0.86703	21.08
Sample #16075-4	0.86703	21.08
Sample #16075-5	0.86703	21.08
Sample #16075-6	0.86703	21.08
Sample #16075-7	0.86703	21.08
Sample #16075-8	0.86703	21.08

Table 1: homogeneity test results of subsamples #16075

From the above test results, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the target test methods, in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Density at 15°C in kg/L	Kinematic Viscosity at 40°C in mm ² /s
r (sample #16075)	0.00001	0.02
reference test	ASTM D4052:15	ASTM D445:15a
0.3 x R(reference test)	0.00015	0.09

Table 2: evaluation of the repeatabilities of the subsamples #16075

The calculated repeatabilities were less than 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsample #16075 was assumed.

To each of the participating laboratories, one sample of 1 L in a brown glass bottle (labelled #16075) was sent on April 27, 2016.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYSES

The participants were requested to determine on sample #16075: Acid Number (Total), Air-release time at 50°C, Color ASTM, Conradson Carbon Residue, Ramsbottom Carbon Residue, Density at 15°C, Evaporation loss by Noack test, Flash Point COC, Kinematic Viscosity at 40°C and at 100°C, Viscosity Index, Viscosity Stabinger at 40°C and at 100°C, Pour Point (manual and automated), Rust prevention (proc. B), Sulphur, Water and Water Separability at 54°C.

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

3 RESULTS

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

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

Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyses). Additional or corrected test results are used for data analysis and original test results are placed under 'Remarks' in the test 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 April 2014 (iis-protocol, version 3.3).

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

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'.

After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the test results should be used with due care.

According to ISO 5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of 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. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualise 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 was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation of this interlaboratory study. The target standard deviation was calculated from the literature reproducibility by division with 2.8.

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

The z-scores were calculated according to:

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

The $z_{(\text{target})}$ 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.

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 during the execution. One participant reported the test results after the final reporting date and one other participant did not report any test results at all. Not all laboratories were able to report all analyses requested. In total 50 participants reported 542 test results. Observed were 22 outlying results, which is 4.1% of the numerical results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

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

In the iis PT reports, ASTM methods are referred to with a number (e.g. D189) and an added designation for the year that the method was adopted or revised (e.g. D189:06). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D189:06(2014)). In the results tables of Appendix 1 only the method number and year of adoption or revision e.g. D189:06 will be used.

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

- Acid Number (Total): This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D974:14e2.
- Air-release time: This determination was not problematic. No statistical outliers were observed and the calculated reproducibility is in agreement with the requirements of ASTM D3427:15.
- Color: This determination was not problematic. No statistical outliers were observed and the calculated reproducibility is in agreement with the requirements of ASTM D1500:12
- Conradson CR: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D189:06(2014).
- Ramsbottom CR: This determination may be problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D524:15. The small number (only 6) of reported test results may (partly) explain the large spread.
- Density at 15°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 D4052:15.
- Evaporation loss by Noack test: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5800:15a-proc B.
One participant reported to have used the method CEC L-040-93, which is equivalent to ASTM D5800, except this method uses a known correction factor.
- Flash Point C.O.C.: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D92:12b.
- Kin.Visco.at 40°C: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D445:15.

Kin.Visco.at 100°C: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D445:15.

Viscosity Index: This determination was very problematic. No statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is not at all in agreement with ASTM D2270:10(2016). Twenty-five reported test results were rounded to nearest whole number, as is described in the test method

Also iis calculated the Viscosity Index from the test results reported for the kinematic viscosities at 40°C and 100°C. These calculated test results were compared to the reported test results and separately statistically evaluated. The calculated reproducibility after rejection of two statistical outliers is again not in agreement with ASTM D2270:10(2016).

Visco. Stabinger at 40°C: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with ASTM D7042:14.

Visco. Stabinger 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 ASTM D7042:14.

Pour Point: manual This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D97:16.

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

Rust prevention: Regretfully, only six participants reported a test result. All six reported the presence of rust (Fail / Severe rusting).

Sulphur: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D2622:10.

Water: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D6304:16.

Water separability: This determination was not problematic. Two statistical outliers were observed. However, both calculated reproducibilities after rejection of the statistical outliers are in good agreement with the requirements of ASTM D1401:12e1. ASTM D1401 describes complete break only as '40-40-0', whereas a complete break also was interpreted as 'no emulsion layer present'. Most participants reported the complete break as 40-40-0. One participant reported the complete break as 40-39-1. Another participant reported 41-39-1 and a third participant reported 40-40-80 (!).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	Unit	n	Average	2.8 * sd	R(lit)
Acid Number, Total	mg KOH/g	23	0.010	0.014	0.040
Air-release time at 50°C	min	8	1.0	1.3	1.3
Color ASTM		18	0.8	0.5	1.0
Conradson Carbon Residue	%M/M	15	0.005	0.009	0.019
Ramsbottom Carbon Residue	%M/M	6	0.05	0.03	0.03
Density at 15 °C	kg/L	47	0.8671	0.0004	0.0005
Evaporation loss by Noack	%M/M	15	25.8	2.1	2.7
Flash Point C.O.C.	°C	41	209	15	18
Kinematic Viscosity at 40 °C	mm ² /s	42	21.10	0.15	0.29
Kinematic Viscosity at 100 °C	mm ² /s	42	4.156	0.024	0.079
Viscosity Index		38	95.91	4.42	2.00
Stabinger Viscosity at 40 °C	mm ² /s	16	21.15	0.19	0.12
Stabinger Viscosity at 100 °C	mm ² /s	15	4.175	0.037	0.027
Pour Point manual	°C	32	-12.3	2.6	9.0
Pour Point automated (Δ 1°C)	°C	20	-13.3	3.5	4.5
Rust Prevention (proc. B)		6	fail	n.a.	n.a.
Sulphur	mg/kg	28	0.70	0.05	0.05
Water	mg/kg	37	61.2	70.5	199.4
Water Separability at 54°C					
- Time to reach 3 ml or less emulsion	Min	9	3.7	5.8	20.0
- Time to reach 37 of water	Min	9	3.2	6.1	20.0

Table 3: reproducibilities of results of sample #16075

Without further statistical calculations it can be concluded that for a number of tests there is a good compliance of the group of participants with the relevant standards. The tests that are problematic have been discussed in paragraph 4.1.

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

	May 2016	May 2015	May 2014	May 2013
Number of reporting labs	50	43	43	28
Number of results reported	542	397	408	260
Statistical outliers	22	11	19	17
Percentage outliers	4.1%	2.8%	4.7%	6.5%

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 respective standards.

The conclusions are given in the following table:

Determination	May 2016	May 2015	May 2014	May 2013
Acid Number, Total	++	+	+/-	+/-
Air-release time at 50°C	+/-	+	-	n.e.
Color ASTM	+	n.e.	+	++
Conradson Carbon Residue	++	+	++	-
Ramsbottom Carbon Residue	+/-	-	--	n.e.
Density at 15 °C	+	-	++	--
Evaporation loss by Noack	+	+	--	--
Flash Point COC	+	+	+/-	+
Kinematic Viscosity at 40 °C	++	+	--	--
Kinematic Viscosity at 100 °C	++	++	--	-
Viscosity Index	--	-	--	+
Stabinger Viscosity at 40 °C	-	--	--	--
Stabinger Viscosity at 100 °C	-	--	--	--
Pour Point manual	++	++	-	-
Pour Point automated	+	+/-	n.e.	n.e.
Rust Prevention	n.e.	n.e.	n.e.	n.e.
Sulphur	+/-	n.e.	+	+/-
Water	++	++	++	+
Water Separability at 54°C	++	++	++	++

Table 5: comparison determinations against the standard

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

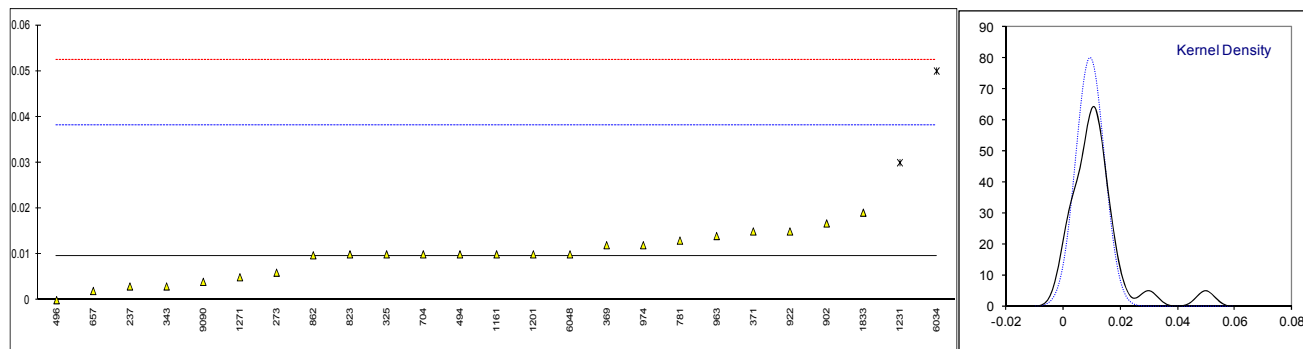
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- : group performed worse than the standard
- : group performed much worse than the standard
- n.e.: not evaluated

APPENDIX 1

Determination of Acid Number (Total) on sample #16075; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
171	D974	<0.02		----	
237	D974	0.003		-0.46	
273	D974	0.006		-0.25	
311	D974	<0.02		----	
315		----		----	
323	D974	<0.02		----	
325	D664	0.01		0.03	
333		----		----	
340	D974	<0.02		----	
343	D664	0.003	C	-0.46	First reported 0.13
349		----		----	
357	D664	<0.05		----	
369	D974	0.012		0.17	
371	D974	0.015		0.38	
396		----		----	
432		----		----	
445	D974	<0.02		----	
446		----		----	
485		----		----	
494	D974	0.01		0.03	
496	D974	0.00		-0.67	
541	D974	<0.1		----	
601		----		----	
621	D664	<0.1		----	
657	D974	0.002		-0.53	
704	D974	0.01		0.03	
781	D974	0.013		0.24	
823	D974	0.01		0.03	
862	D664	0.0098		0.02	
875		----		----	
902	D664	0.01675		0.50	
922	D664	0.015		0.38	
963	D974	0.014		0.31	
974	D974	0.012		0.17	
982		----		----	
1011	D974	<0.02		----	
1066		----		----	
1161	D664	0.01		0.03	
1201	D664	0.01		0.03	
1231	D664	0.03	R(0.05)	1.43	
1271	ISO6618	0.005		-0.32	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833	D664	0.0191		0.67	
1877		----		----	
4043		----		----	
6034	D974	0.05	R(0.01)	2.83	
6048	D974	0.01		0.03	
9090	D974	0.004		-0.39	

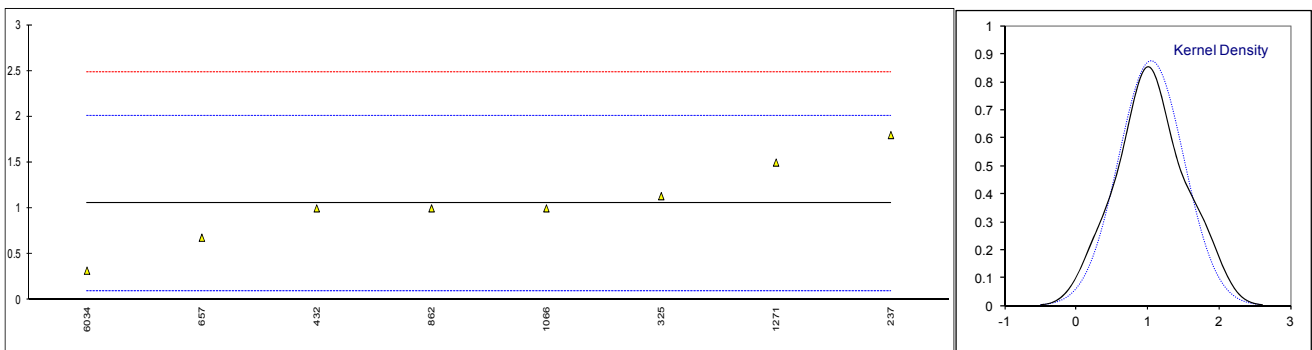
normality OK
n 23
outliers 2
mean (n) 0.0096
st.dev. (n) 0.00498
R(calc.) 0.0139
R(D974:14e2) 0.0400



Determination of Air-release time at 50°C on sample #16075; results in min

lab	method	value	mark	z(targ)	remarks
171		----		----	
237	D3427	1.8		1.56	
273		----		----	
311		----		----	
315		----		----	
323		----		----	
325	D3427	1.1333333		0.17	
333		----		----	
340		----		----	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432	ISO9120	1.0		-0.11	
445		----		----	
446		----		----	
485		----		----	
494		----		----	
496		----		----	
541		----		----	
601		----		----	
621		----		----	
657	D3427	0.68		-0.78	
704		----		----	
781		----		----	
823		----		----	
862	D3427	1		-0.11	
875		----		----	
902		----		----	
922		----		----	
963		----		----	
974		----		----	
982		----		----	
1011		----		----	
1066	D3427	1		-0.11	
1161		----		----	
1201		----		----	
1231		----		----	
1271	ISO9120	1.5		0.94	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833		----		----	
1877		----		----	
4043		----		----	
6034	D3427	0.32		-1.54	
6048		----		----	
9090		----		----	

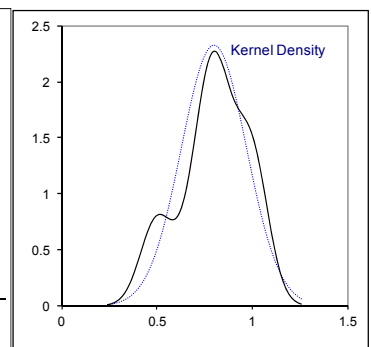
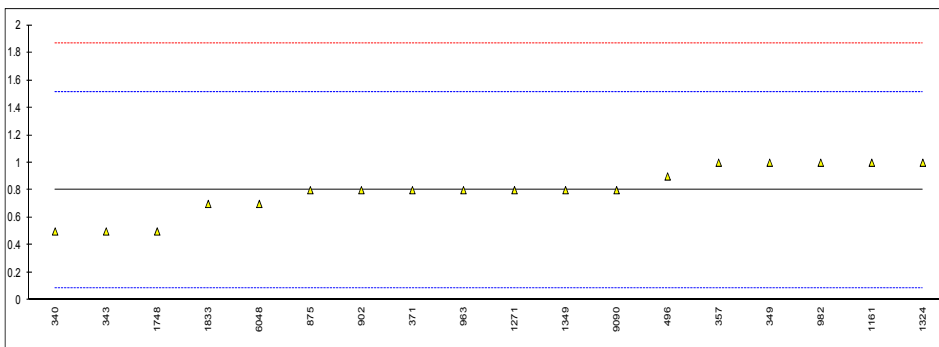
normality unknown
n 8
outliers 0
mean (n) 1.054
st.dev. (n) 0.4550
R(calc.) 1.274
R(D3427:15) 1.335



Determination of Color ASTM on sample #16075

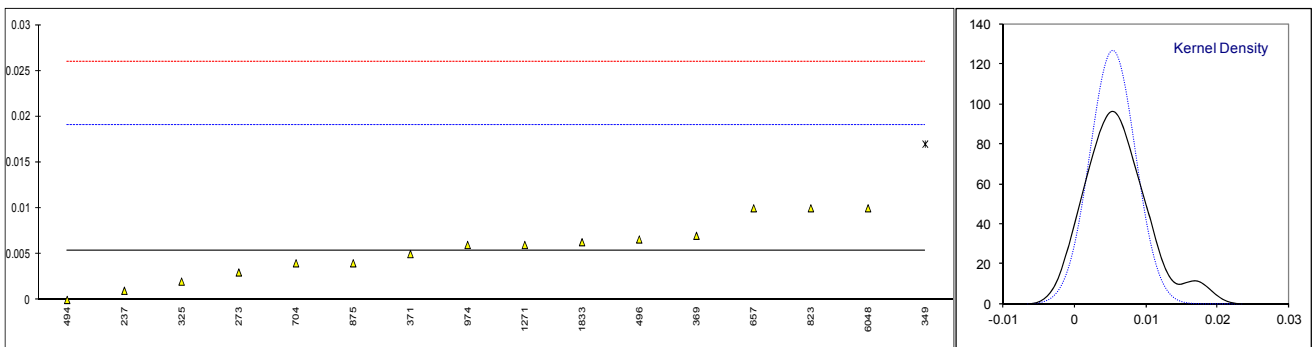
lab	method	value	mark	z(targ)	remarks
171	D1500	<1.0		----	
237	D1500	L1.0		----	
273	D1500	L0.5		----	
311	D1500	L0.5		----	
315	D1500	<1.0		----	
323	D1500	L1.0		----	
325	D6045	L1.0		----	
333		----		----	
340	D1500	0.5		-0.84	
343	D1500	0.5		-0.84	
349	D6045	1.0		0.56	
357	D1500	1.0		0.56	
369	D1500	<1.0		----	
371	D6045	0.8		0.00	
396	D1500	L 1.0		----	
432	D1500	L1.0		----	
445	D1500	<1.0		----	
446	D1500	L1.0		----	
485	D1500	L 1.0		----	
494	D1500	L1		----	
496	D6045	0.9		0.28	
541		----		----	
601	D1500	L1.0		----	
621	D1500	L 0.5		----	
657	D1500	L1.0		----	
704	D1500	L1.0		----	
781	D1500	<1.0		----	
823	D1500	L1.0		----	
862	D1500	L1.0		----	
875	D6045	0.8		0.00	
902	D1500	0.8		0.00	
922	D1500	L1.0		----	
963	D1500	0.8		0.00	
974	D1500	L1.0		----	
982	D1500	1.0		0.56	
1011	D1500	L1.0		----	
1066		----		----	
1161	D1500	1.0		0.56	
1201		----		----	
1231	D1500	L1.0		----	
1271	D6045	0.8		0.00	
1324	D1500	1.0		0.56	
1349	D6045	0.8		0.00	
1682		----		----	
1748	D1500	0.5		-0.84	
1833	D1500	0.7		-0.28	
1877	D6045	L1.0		----	
4043		----		----	
6034	D1500	L1		----	
6048	D1500	0.7		-0.28	
9090	D1500	0.8		0.00	

normality OK
n 18
outliers 0
mean (n) 0.80
st.dev. (n) 0.171
R(calc.) 0.48
R(D1500:12) 1.00



Determination of Conradson Carbon Residue on sample #16075; results in %M/M

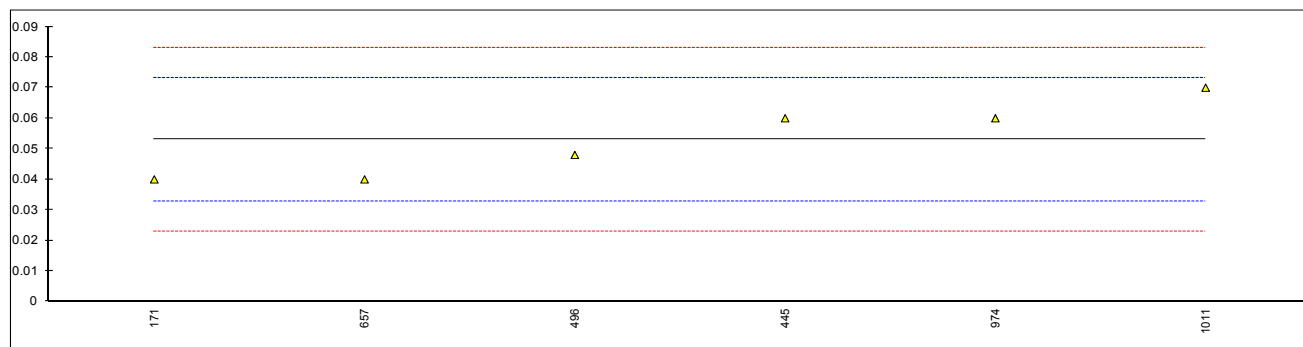
lab	method	value	mark	z(targ)	remarks
171		----		----	
237	D189	0.001		-0.64	
273	D4530	0.003		-0.35	
311	D4530	<0.10		----	
315		----		----	
323	D4530	<0.10		----	
325	D4530	0.002		-0.50	
333		----		----	
340		----		----	
343		----		----	
349	D189	0.017	G(0.05)	1.69	
357		----		----	
369	D4530	0.007		0.23	
371	D189	0.005		-0.06	
396		----		----	
432		----		----	
445	D189	<0.01		----	
446		----		----	
485		----		----	
494	D4530	0.0		-0.79	
496	D4530	0.0066		0.18	
541		----		----	
601		----		----	
621	D189	< 0.1		----	
657	D4530	0.01		0.67	
704	D189	0.004		-0.20	
781	D4530	<0.10		----	
823	D189	0.01		0.67	
862	D4530	<0.10		----	
875	D4530	0.004		-0.20	
902		----		----	
922	D189	<0.01		----	
963		----		----	
974	D189	0.006	C	0.09	First reported 0.04
982		----		----	
1011		----		----	
1066		----		----	
1161		----		----	
1201		----		----	
1231		----		----	
1271	ISO6615	0.006		0.09	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833	D4530	0.0063		0.13	
1877		----		----	
4043		----		----	
6034		----		----	
6048	D4530	0.01		0.67	
9090		----		----	
normality		OK			
n		15			
outliers		1			
mean (n)		0.0054			
st.dev. (n)		0.00315			
R(calc.)		0.0088			
R(D189:06)		0.0192			



Determination of Ramsbottom Carbon Residue on sample #16075; results in %M/M

lab	method	value	mark	z(targ)	remarks
171	D524	0.04		-1.29	
237		----		----	
273		----		----	
311		----		----	
315		----		----	
323		----		----	
325		----		----	
333		----		----	
340		----		----	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432		----		----	
445	D524	0.06		0.70	
446		----		----	
485		----		----	
494		----		----	
496	D524	0.048		-0.50	
541		----		----	
601		----		----	
621		----		----	
657	D524	0.04		-1.29	
704		----		----	
781		----		----	
823		----		----	
862		----		----	
875		----		----	
902		----		----	
922		----		----	
963		----		----	
974	D524	0.06		0.70	
982		----		----	
1011	D524	0.07		1.69	
1066		----		----	
1161		----		----	
1201		----		----	
1231		----		----	
1271		----		----	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833		----		----	
1877		----		----	
4043		----		----	
6034		----		----	
6048		----		----	
9090		----		----	

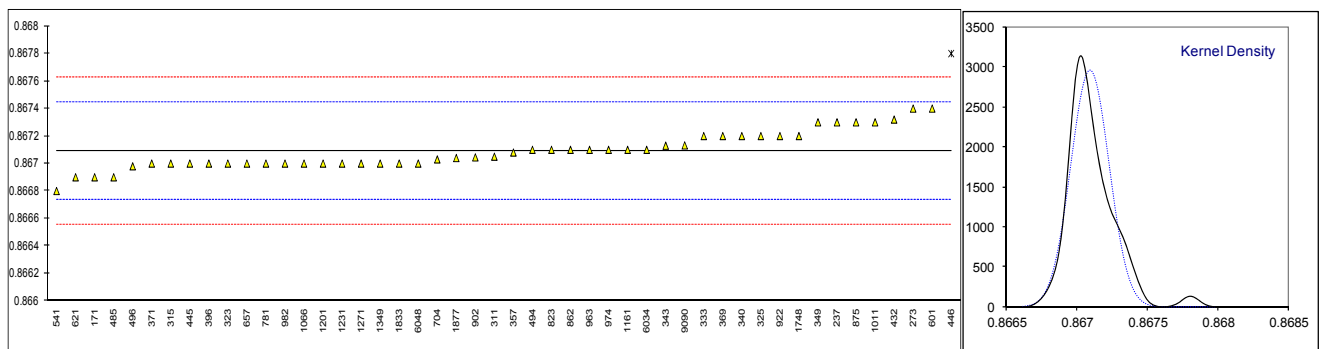
normality unknown
n 6
outliers 0
mean (n) 0.053
st.dev. (n) 0.0122
R(calc.) 0.034
R(D524:15) 0.028



Determination of Density at 15°C on sample #16075; results in kg/L

lab	method	value	mark	z(targ)	remarks
171	D4052	0.8669		-1.06	
237	D4052	0.8673		1.18	
273	D4052	0.8674		1.74	
311	D4052	0.86705		-0.22	
315	D4052	0.8670		-0.50	
323	D4052	0.8670		-0.50	
325	D4052	0.8672		0.62	
333	D4052	0.8672		0.62	
340	D4052	0.8672		0.62	
343	D4052	0.86713		0.23	
349	D4052	0.8673		1.18	
357	D4052	0.86708		-0.05	
369	D4052	0.8672		0.62	
371	D4052	0.8670		-0.50	
396	D4052	0.8670		-0.50	
432	D4052	0.86732		1.29	
445	D4052	0.8670		-0.50	
446	D4052	0.8678	R(0.01)	3.98	
485	D4052	0.8669		-1.06	
494	D4052	0.8671		0.06	
496	D4052	0.86698		-0.61	
541	D4052	0.8668		-1.62	
601	D1298	0.8674	C	1.74	First reported 0.8678
621	D4052	0.8669		-1.06	
657	D4052	0.8670		-0.50	
704	D4052	0.86703		-0.33	
781	D4052	0.8670		-0.50	
823	D4052	0.8671		0.06	
862	D4052	0.8671		0.06	
875	D4052	0.8673		1.18	
902	D4052	0.867045		-0.25	
922	D4052	0.8672		0.62	
963	D4052	0.8671		0.06	
974	D4052	0.8671		0.06	
982	D4052	0.8670		-0.50	
1011	D4052	0.8673	C	1.18	First reported 0.8665
1066	D4052	0.8670		-0.50	
1161	ISO12185	0.86710		0.06	
1201	ISO12185	0.8670		-0.50	
1231	D4052	0.8670		-0.50	
1271	D4052	0.867		-0.50	
1324		----		----	
1349	IP365	0.8670		-0.50	
1682		----		----	
1748	D4052	0.8672		0.62	
1833	D4052	0.8670		-0.50	
1877	D4052	0.86704		-0.28	
4043		----		----	
6034	D4052	0.8671		0.06	
6048	ISO3675	0.8670		-0.50	
9090	D4052	0.86713		0.24	

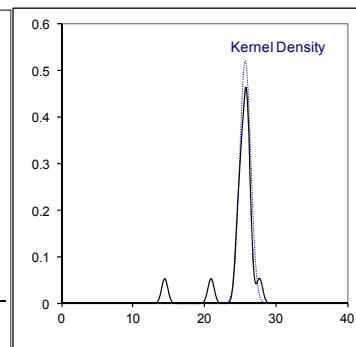
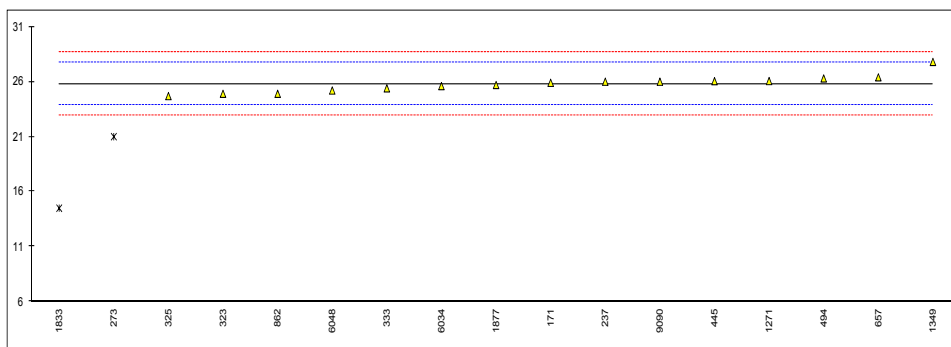
normality OK
n 47
outliers 1
mean (n) 0.86709
st.dev. (n) 0.000135
R(calc.) 0.00038
R(D4052:15) 0.00050



Determination of Evaporation loss by Noack test on sample #16075; results in %M/M

lab	method	value	mark	z(targ)	remarks
171	D5800 - B	25.9		0.11	
237	D5800 - B	26.0		0.21	
273	D5800 - B	21.0	G(0.01)	-4.95	
311		----		----	
315		----		----	
323	D5800 - B	24.9		-0.92	
325	CEC L-40-93	24.69		-1.14	
333	D5800 - B	25.4		-0.41	
340		----		----	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432		----		----	
445	D5800 - B	26.05		0.27	
446		----		----	
485		----		----	
494	D5800 - B	26.3		0.52	
496		----		----	
541		----		----	
601		----		----	
621		----		----	
657	D5800 - B	26.4		0.63	
704		----		----	
781		----		----	
823		----		----	
862	D5800 - B	24.9		-0.92	
875		----		----	
902		----		----	
922		----		----	
963		----		----	
974		----		----	
982		----		----	
1011		----		----	
1066		----		----	
1161		----		----	
1201		----		----	
1231		----		----	
1271	DIN 51581	26.058		0.27	
1324		----		----	
1349	D5800 - B	27.8		2.07	
1682		----		----	
1748		----		----	
1833	D5800 - A	14.5	C,G(0.01)	-11.67	First reported 19.7
1877	D5800 - B	25.7		-0.10	
4043		----		----	
6034		25.6		-0.20	
6048	DIN 51581	25.2		-0.61	
9090	D5800 - B	26.0		0.21	

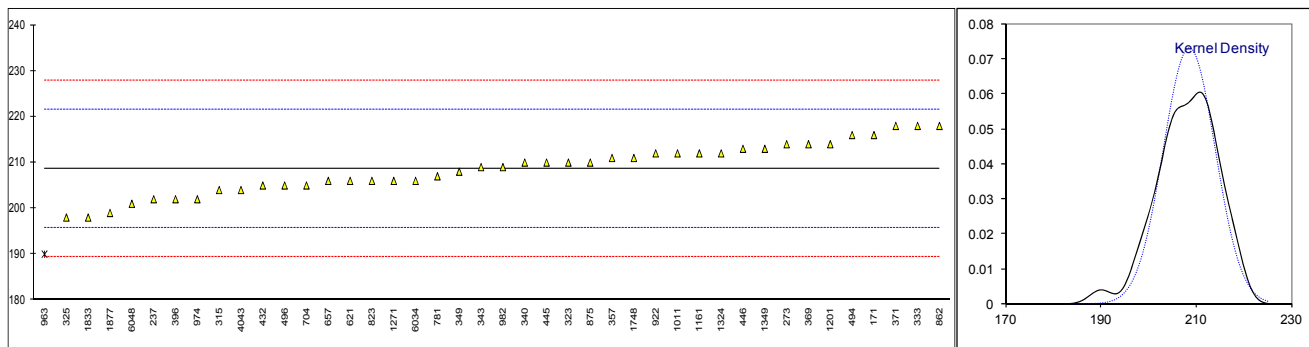
normality not OK
n 15
outliers 2
mean (n) 25.793
st.dev. (n) 0.7677
R(calc.) 2.149
R(D5800B:15a) 2.709



Determination of Flash Point C.O.C. on sample #16075; results in °C

lab	method	value	mark	z(targ)	remarks
171	D92	216		1.15	
237	D92	202		-1.02	
273	D92	214.0		0.84	
311		----		----	
315	D92	204		-0.71	
323	D92	210		0.22	
325	D92	198.0		-1.65	
333	D92	218		1.46	
340	D92	210		0.22	
343	D92	209		0.06	
349	D92	208		-0.09	
357	D92	211.0		0.38	
369	D92	214		0.84	
371	D92	218		1.46	
396	D92	202		-1.02	
432	D92	205		-0.56	
445	D92	210		0.22	
446	D92	213		0.69	
485		----		----	
494	D92	216		1.15	
496	D92	205.0		-0.56	
541		----		----	
601		----		----	
621	D92	206.0		-0.40	
657	D92	206		-0.40	
704	D92	205		-0.56	
781	D92	207		-0.25	
823	D92	206		-0.40	
862	D92	218		1.46	
875	D92	210		0.22	
902		----		----	
922	D92	212		0.53	
963	D92	190	R(0.05)	-2.89	
974	D92	202		-1.02	
982	D92	209.0		0.06	
1011	D92	212		0.53	
1066		----		----	
1161	ISO2592	212.0		0.53	
1201	D92	214.0		0.84	
1231		----		----	
1271	ISO2592	206		-0.40	
1324	D92	212		0.53	
1349	D92	213		0.69	
1682		----		----	
1748	D92	211		0.38	
1833	D92	198		-1.65	
1877	D92	199		-1.49	
4043	ISO15267	204		-0.71	
6034	D92	206		-0.40	
6048	ISO2592	201		-1.18	
9090		----		----	

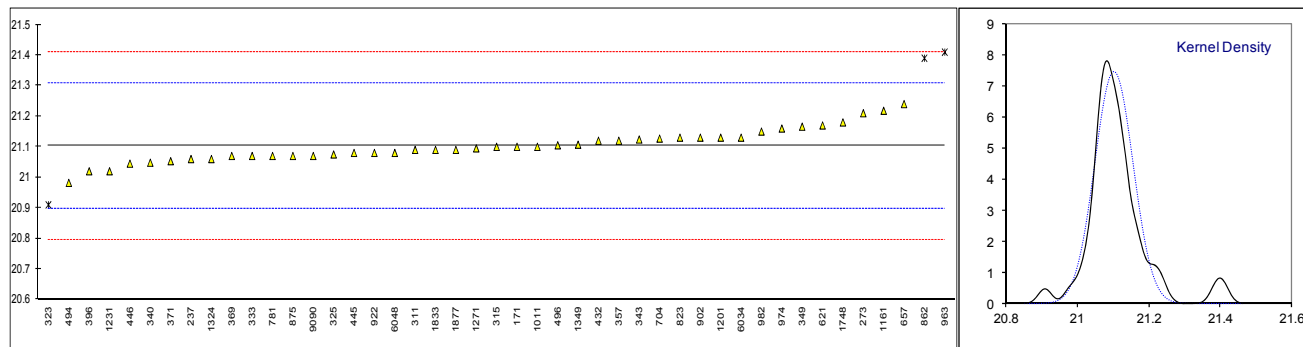
normality OK
n 41
outliers 1
mean (n) 208.59
st.dev. (n) 5.454
R(calc.) 15.27
R(D92:12b) 18.00



Determination of Kinematic Viscosity at 40°C on sample #16075; results in mm²/s

lab	method	value	mark	z(targ)	remarks
171	D445	21.1		-0.03	
237	D445	21.06		-0.42	
273	D445	21.21		1.04	
311	D445	21.09		-0.13	
315	D445	21.10		-0.03	
323	D445	20.91	R(0.05)	-1.89	
325	D445	21.075		-0.28	
333	D445	21.07		-0.32	
340	D445	21.048		-0.54	
343	D445	21.124		0.20	
349	D445	21.166		0.61	
357	D445	21.12		0.16	
369	D445	21.07		-0.32	
371	D445	21.053		-0.49	
396	D445	21.02		-0.81	
432	D445	21.12		0.16	
445	D445	21.08		-0.23	
446	D445	21.045		-0.57	
485		----		----	
494	D445	20.982		-1.18	
496	D445	21.105		0.02	
541		----		----	
601		----		----	
621	D445	21.17		0.65	
657	D445	21.24		1.33	
704	D445	21.127		0.23	
781	D445	21.07		-0.32	
823	D445	21.13		0.26	
862	D445	21.39	R(0.01)	2.80	
875	D445	21.07		-0.32	
902	D445	21.13		0.26	
922	D445	21.08		-0.23	
963	D445	21.41	R(0.01)	2.99	
974	D445	21.16		0.55	
982	D445	21.15		0.46	
1011	D445	21.10		-0.03	
1066		----		----	
1161	ISO3104	21.218		1.12	
1201	D445	21.13		0.26	
1231	D445	21.02		-0.81	
1271	D445	21.095		-0.08	
1324	D445	21.060		-0.42	
1349	D445	21.1070		0.04	
1682		----		----	
1748	D445	21.18	C	0.75	First reported 20.8
1833	D445	21.09		-0.13	
1877	D445	21.09		-0.13	
4043		----		----	
6034	D445	21.13		0.26	
6048	D445	21.08		-0.23	
9090	D445	21.07		-0.32	

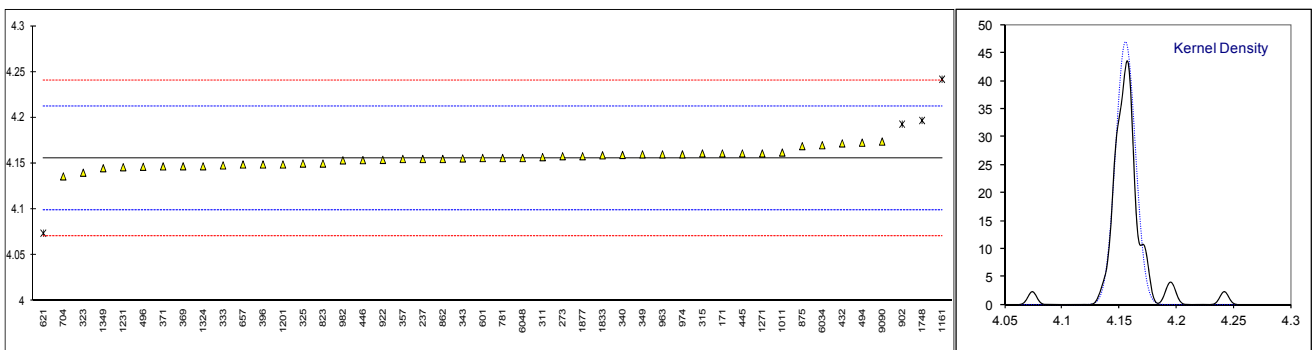
normality OK
n 42
outliers 3
mean (n) 21.103
st.dev. (n) 0.0535
R(calc.) 0.150
R(D445:15) 0.287



Determination of Kinematic Viscosity at 100°C on sample #16075; results in mm²/s

lab	method	value	mark	z(target)	remarks
171	D445	4.161		0.19	
237	D445	4.155		-0.02	
273	D445	4.158		0.09	
311	D445	4.157		0.05	
315	D445	4.161		0.19	
323	D445	4.140		-0.55	
325	D445	4.150		-0.20	
333	D445	4.148		-0.27	
340	D445	4.1594		0.14	
343	D445	4.1556		0.00	
349	D445	4.160		0.16	
357	D445	4.155		-0.02	
369	D445	4.147		-0.30	
371	D445	4.1469		-0.31	
396	D445	4.149		-0.23	
432	D445	4.172		0.58	
445	D445	4.161		0.19	
446	D445	4.1537		-0.07	
485		----		----	
494	D445	4.1728		0.61	
496	D445	4.1465		-0.32	
541		----		----	
601	D445	4.156		0.01	
621	D445	4.074	R(0.01)	-2.89	
657	D445	4.149		-0.23	
704	D445	4.1360		-0.69	
781	D445	4.156		0.01	
823	D445	4.150		-0.20	
862	D445	4.155		-0.02	
875	D445	4.169		0.48	
902	D445	4.193	R(0.01)	1.33	
922	D445	4.154		-0.06	
963	D445	4.160		0.16	
974	D445	4.160		0.16	
982	D445	4.1535		-0.07	
1011	D445	4.162		0.23	
1066		----		----	
1161	ISO3104	4.242	R(0.01)	3.06	
1201	D445	4.149		-0.23	
1231	D445	4.146		-0.34	
1271	D445	4.161		0.19	
1324	D445	4.1470		-0.30	
1349	D445	4.1449		-0.38	
1682		----		----	
1748	D445	4.197	R(0.01)	1.47	
1833	D445	4.159		0.12	
1877	D445	4.158		0.09	
4043		----		----	
6034	D445	4.17		0.51	
6048	D445	4.156		0.01	
9090	D445	4.174		0.65	

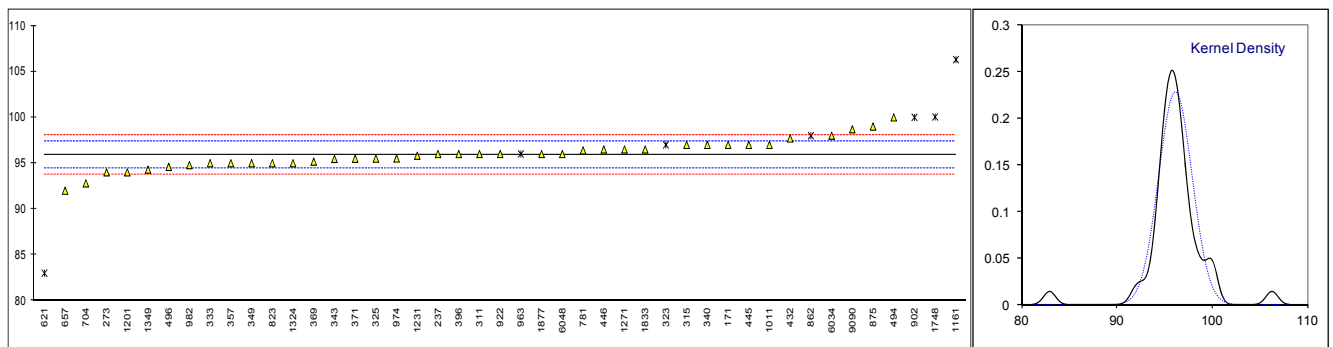
normality OK
n 42
outliers 4
mean (n) 4.1556
st.dev. (n) 0.00848
R(calc.) 0.0237
R(D445:15) 0.0790



Determination of Viscosity index on sample #16075

lab	method	value	mark	z(targ)	Calc.iis	remarks
171	D2270	97		1.52	96.97	
237	D2270	96.0		0.12	96.80	
273	D2270	94		-2.68	94.87	
311	D2270	96		0.12	96.60	
315	D2270	97		1.52	96.97	
323	D2270	97	ex	1.52	97.17	Outlier in viscosity at 40°C
325	D2270	95.5		-0.58	95.91	
333	D2270	95		-1.28	95.72	
340	D2270	97		1.52	97.57	
343	D2270	95.47		-0.62	95.89	
349	D2270	95		-1.28	95.81	
357	D2270	95		-1.28	95.87	
369	D2270	95.17		-1.04	95.59	
371	D2270	95.49		-0.59	95.84	
396	D2270	96		0.12	96.64	
432	D2270	97.7		2.50	98.09	
445	D2270	97		1.52	97.28	
446	D2270	96.5		0.82	96.87	
485		----		----	----	
494	D2270	100		5.72	100.22	
496	D2270	94.6		-1.84	94.98	
541		----		----	----	
601		----		----	----	
621	D2270	83	ex	-18.08	83.75	Outlier in viscosity at 100°C
657	D2270	92	C	-5.48	93.20	First reported 91.5
704	D2270	92.8		-4.36	93.22	
781	D2270	96.4		0.68	96.78	
823	D2270	95		-1.28	95.05	
862	D2270	98	C,ex	2.92	91.67	First reported 91, outlier in viscosity at 40°C
875	D2270	99		4.32	98.47	
902	D2270	100	ex	5.72	100.43	Outlier in viscosity at 100°C
922	D2270	96		0.12	96.36	
963	D2270	96	ex	0.12	92.03	Outlier in viscosity at 40°C
974	D2270	95.51		-0.57	95.91	
982	D2270	94.793		-1.57	95.20	
1011	D2270	97		1.52	97.10	
1066		----		----	----	
1161	D2270	106.3	C,ex	14.54	103.79	First reported 103.6, outlier in viscosity at 100°C
1201	D2270	94		-2.68	94.92	
1231	D2270	95.82		-0.13	96.24	
1271	D2270	96.5		0.82	97.05	
1324	D2270	95.0		-1.28	95.75	
1349	D2270	94.3		-2.26	94.73	
1682		----		----	----	
1748	D445	100.05	C,ex	5.79	100.25	First reported 104, outlier in viscosity at 100°C
1833	D2270	96.5		0.82	96.86	
1877	D2270	96		0.12	96.73	
4043		----		----	----	
6034		98		2.92	97.67	
6048	ISO2909	96		0.12	96.62	
9090	D2270	98.7		3.90	99.11	

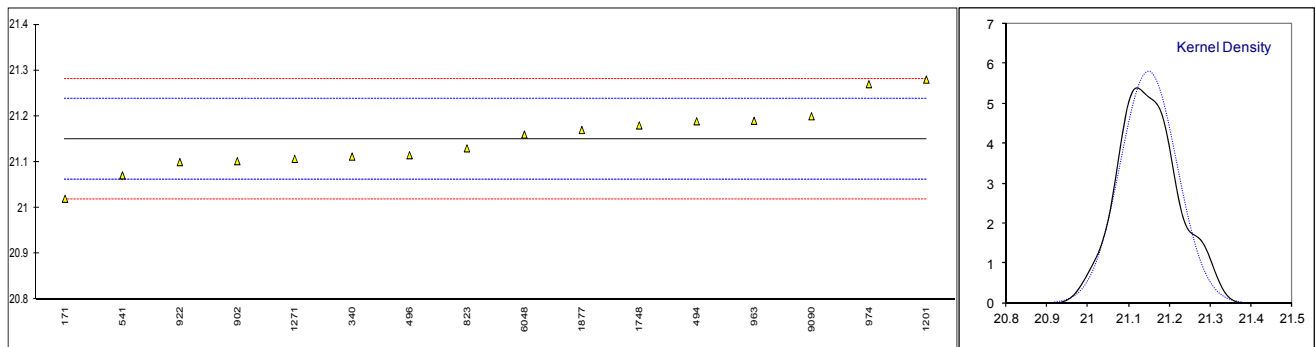
normality	suspect	suspect
n	38	38
outliers	0 (+7 excl)	0 (+7excl)
mean (n)	95.91	96.35
st.dev. (n)	1.578	1.390
R(calc.)	4.42	3.89
R(D2270:10)	2.00	2.00



Determination of Viscosity Stabinger at 40 °C on sample #16075; results in mm²/s

lab	method	value	mark	z(targ)	remarks
171	D7042	21.02		-2.94	
237		----		----	
273		----		----	
311		----		----	
315		----		----	
323		----		----	
325		----		----	
333		----		----	
340	D7042	21.112		-0.86	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432		----		----	
445		----		----	
446		----		----	
485		----		----	
494	D7042	21.189		0.89	
496	D7042	21.115		-0.79	
541	D7042	21.071		-1.79	
601		----		----	
621		----		----	
657		----		----	
704		----		----	
781		----		----	
823	D7042	21.13		-0.45	
862		----		----	
875		----		----	
902	D7042	21.102		-1.08	
922	D7042	21.10		-1.13	
963	D7042	21.19		0.91	
974	D7042	21.27	C	2.73	First reported 18.09
982		----		----	
1011		----		----	
1066		----		----	
1161		----		----	
1201	D7042	21.28		2.95	
1231		----		----	
1271	D7042	21.107		-0.97	
1324		----		----	
1349		----		----	
1682		----		----	
1748	D7042	21.18	C	0.69	First reported 20.708
1833		----		----	
1877	D7042	21.17		0.46	
4043		----		----	
6034		----		----	
6048	D7042	21.16		0.23	
9090	D7042	21.20		1.14	

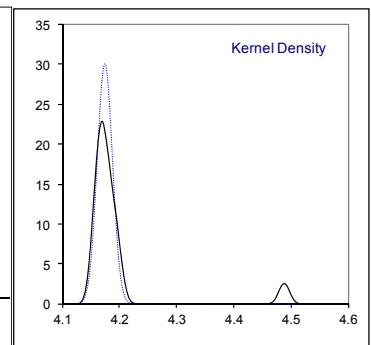
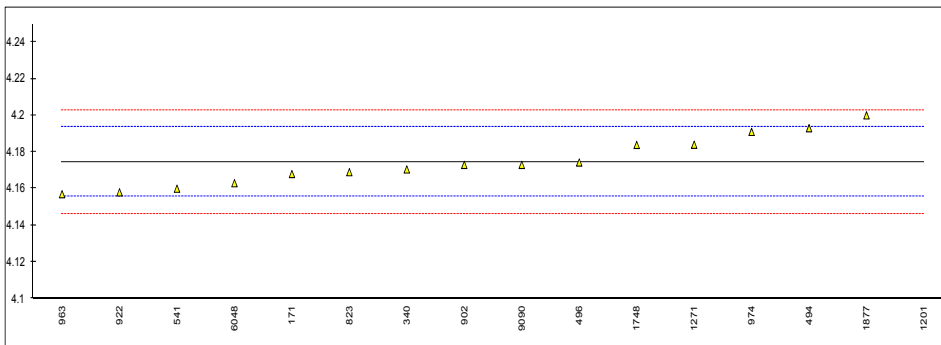
normality OK
n 16
outliers 0
mean (n) 21.150
st.dev. (n) 0.0689
R(calc.) 0.193
R(D7042:14) 0.124



Determination of Viscosity Stabinger at 100 °C on sample #16075; results in mm²/s

lab	method	value	mark	z(targ)	remarks
171	D7042	4.168		-0.69	
237		----		----	
273		----		----	
311		----		----	
315		----		----	
323		----		----	
325		----		----	
333		----		----	
340	D7042	4.1705		-0.42	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432		----		----	
445		----		----	
446		----		----	
485		----		----	
494	D7042	4.1930		1.95	
496	D7042	4.1743		-0.02	
541	D7042	4.1600		-1.53	
601		----		----	
621		----		----	
657		----		----	
704		----		----	
781		----		----	
823	D7042	4.169		-0.58	
862		----		----	
875		----		----	
902	D7042	4.173		-0.16	
922	D7042	4.158		-1.74	
963	D7042	4.157		-1.85	
974	D7042	4.191	C	1.74	First reported 3.403
982		----		----	
1011		----		----	
1066		----		----	
1161		----		----	
1201	D7042	4.488	G(0.01)	33.12	
1231		----		----	
1271	D7042	4.184		1.00	
1324		----		----	
1349		----		----	
1682		----		----	
1748	D7042	4.1839		0.99	
1833		----		----	
1877	D7042	4.200		2.69	
4043		----		----	
6034		----		----	
6048	D7042	4.163		-1.22	
9090	D7042	4.173		-0.16	

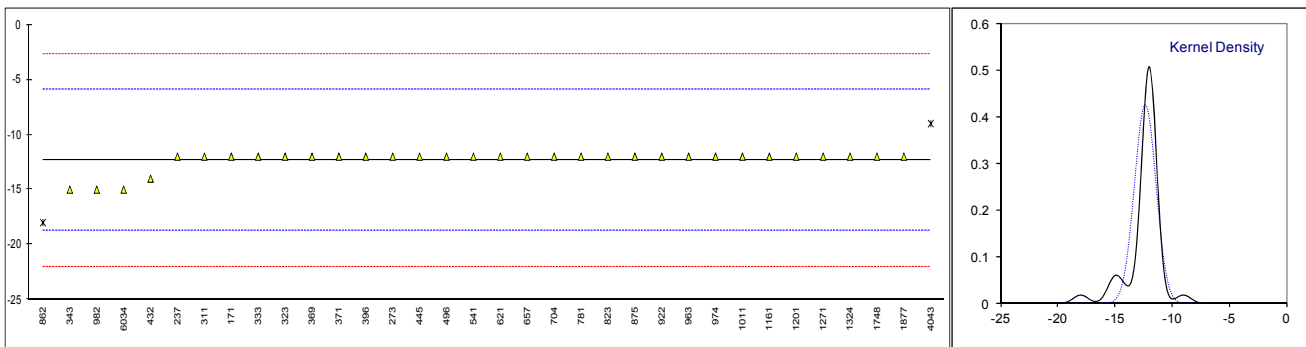
normality OK
n 15
outliers 1
mean (n) 4.1745
st.dev. (n) 0.01325
R(calc.) 0.0371
R(D7042:14) 0.0265



Determination of Pour Point manual on sample #16075; results in °C

lab	method	value	mark	z(targ)	remarks
171	D97	-12		0.11	
237	D97	-12		0.11	
273	D97	-12		0.11	
311	D97	-12		0.11	
315		----		----	
323	D97	-12		0.11	
325		----		----	
333	D97	-12		0.11	
340		----		----	
343	D97	-15		-0.83	
349		----		----	
357		----		----	
369	D97	-12		0.11	
371	D97	-12		0.11	
396	D97	-12		0.11	
432	D97	-14		-0.52	
445	D97	-12		0.11	
446		----		----	
485		----		----	
494		----		----	
496	D97	-12		0.11	
541	D97	-12		0.11	
601		----		----	
621	D97	-12		0.11	
657	D97	-12		0.11	
704	D97	-12		0.11	
781	D97	-12		0.11	
823	D97	-12		0.11	
862	D97	-18	R(0.01)	-1.76	
875	D97	-12		0.11	
902		----		----	
922	D97	-12		0.11	
963	D97	-12		0.11	
974	D97	-12		0.11	
982	D97	-15		-0.83	
1011	D97	-12		0.11	
1066		----		----	
1161	ISO3016	-12		0.11	
1201	D97	-12		0.11	
1231		----		----	
1271	ISO3016	-12		0.11	
1324	D97	-12		0.11	
1349		----		----	
1682		----		----	
1748	D97	-12		0.11	
1833		----		----	
1877	D97	-12		0.11	
4043	D5950	-9	R(0.05)	1.04	
6034	D97	-15		-0.83	
6048		----		----	
9090		----		----	

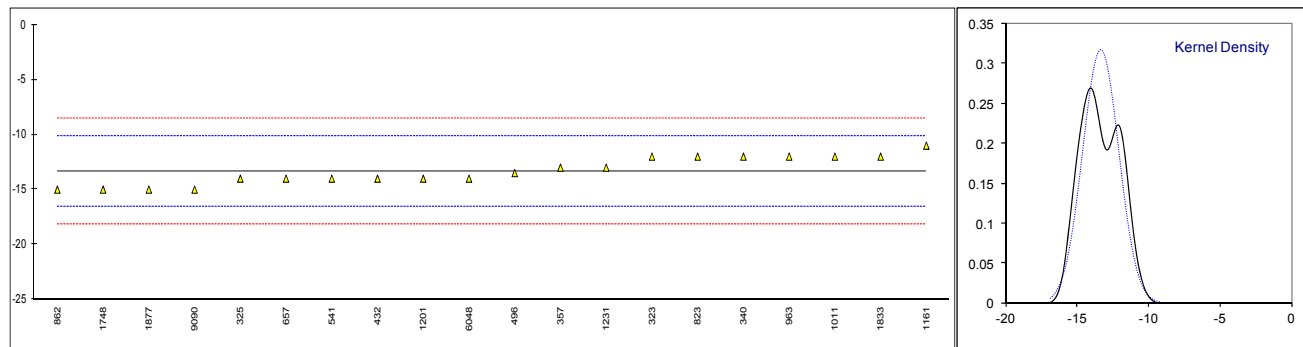
normality not OK
n 32
outliers 2
mean (n) -12.34
st.dev. (n) 0.937
R(calc.) 2.62
R(D97:16) 9.00



Determination of Pour Point automated 1°C int. on sample #16075; results in °C

lab	method	value	mark	z(targ)	remarks
171		----		----	
237		----		----	
273		----		----	
311		----		----	
315		----		----	
323	D5950	-12		0.82	
325	D5950	-14		-0.42	
333		----		----	
340	D5950	-12		0.82	
343		----		----	
349		----		----	
357	D5950	-13		0.20	
369		----		----	
371		----		----	
396		----		----	
432	D5950	-14		-0.42	
445		----		----	
446		----		----	
485		----		----	
494		----		----	
496	D6892	-13.5		-0.11	
541	D5950	-14		-0.42	
601		----		----	
621		----		----	
657	D5950	-14		-0.42	
704		----		----	
781		----		----	
823	D5950	-12		0.82	
862	D5950	-15		-1.04	
875		----		----	
902		----		----	
922		----		----	
963	D5950	-12		0.82	
974		----		----	
982		----		----	
1011	D6892	-12		0.82	
1066		----		----	
1161	D6749	-11		1.45	
1201	D5950	-14		-0.42	
1231	D5950	-13		0.20	
1271		----		----	
1324		----		----	
1349		----		----	
1682		----		----	
1748	D5950	-15		-1.04	
1833	D5950	-12		0.82	
1877	D5950	-15		-1.04	
4043		----		----	
6034		----		----	
6048	D5950	-14		-0.42	
9090	D5950	-15		-1.04	

normality OK
n 20
outliers 0
mean (n) -13.32
st.dev. (n) 1.259
R(calc.) 3.53
R(D5950:14) 4.50



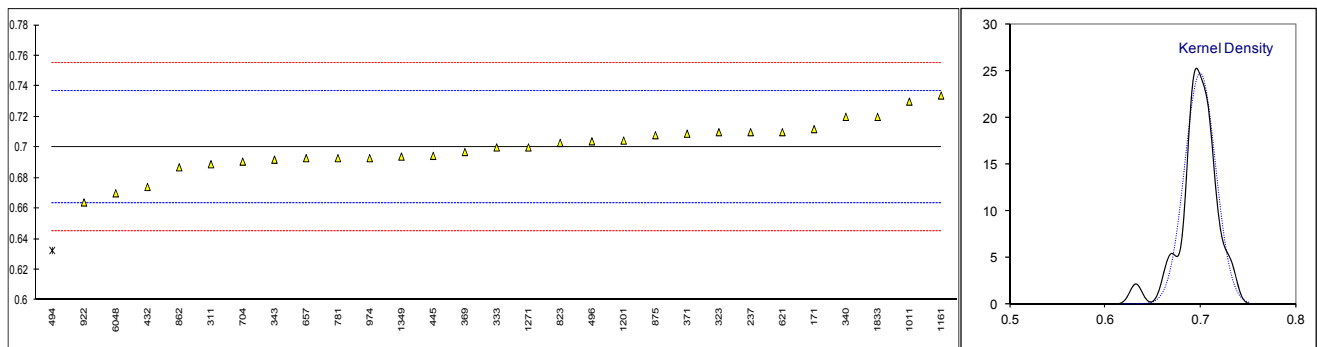
Determination of Rust prevention (proc.B) on sample #16075

lab	method	value	mark	z(targ)	remarks
171		----		----	
237		----		----	
273		----		----	
311		----		----	
315	D665	Fails		----	>5% of surface affected
323	D665	severe rusting		----	
325	D665	severe		----	
333		----		----	
340		----		----	
343		----		----	
349		----		----	
357		----		----	
369		----		----	
371		----		----	
396		----		----	
432		----		----	
445	D665	Fail		----	
446		----		----	
485		----		----	
494		----		----	
496	D665	fail		----	
541		----		----	
601		----		----	
621		----		----	
657		----		----	
704		----		----	
781		----		----	
823		----		----	
862	D665	Severe Rusting		----	
875		----		----	
902		----		----	
922		----		----	
963		----		----	
974		----		----	
982		----		----	
1011		----		----	
1066		----		----	
1161		----		----	
1201		----		----	
1231		----		----	
1271		----		----	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833		----		----	
1877		----		----	
4043		----		----	
6034		----		----	
6048		----		----	
9090		----		----	
	reported	6 fail			

Determination of Sulphur on sample #16075; results in %M/M

lab	method	value	mark	z(targ)	remarks
171	D2622	0.7120		0.64	
237	D4294	0.710		0.53	
273		----		----	
311	D2622	0.689		-0.61	
315		----		----	
323	D2622	0.710		0.53	
325		----		----	
333	D4294	0.700		-0.01	
340	D4294	0.720		1.07	
343	IP336	0.692		-0.45	
349		----		----	
357		----		----	
369	D2622	0.697		-0.17	
371	D4294	0.709		0.48	
396		----		----	
432	D4951	0.6741		-1.42	
445	D2622	0.6945		-0.31	
446		----		----	
485		----		----	
494	ISO20846	0.63253	R(0.01)	-3.67	
496	D2622	0.7040375		0.21	
541		----		----	
601		----		----	
621	D4294	0.710		0.53	
657	D4294	0.693		-0.39	
704	D4294	0.6907		-0.52	
781	D4294	0.693		-0.39	
823	D5453	0.7030		0.15	
862	D2622	0.687		-0.72	
875	D4294	0.708		0.42	
902		----		----	
922	D4294	0.664		-1.96	
963		----		----	
974	D4294	0.693		-0.39	
982		----		----	
1011	IP336	0.73		1.62	
1066		----		----	
1161	ISO8754	0.7340		1.83	
1201	D4294	0.7045		0.23	
1231		----		----	
1271	D4294	0.700		-0.01	
1324		----		----	
1349	IP336	0.6940		-0.34	
1682		----		----	
1748		----		----	
1833	IP336	0.72		1.07	
1877		----		----	
4043		----		----	
6034		----		----	
6048	ISO8754	0.67		-1.64	
9090		----		----	

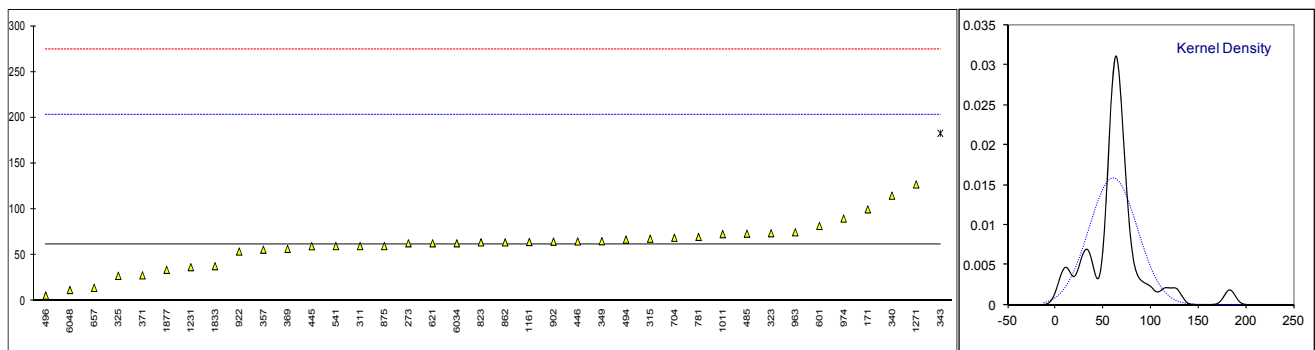
normality OK
n 28
outliers 1
mean (n) 0.7002
st.dev. (n) 0.01612
R(calc.) 0.0451
R(D2622:10) 0.0516



Determination of Water content by KF on sample #16075; results in mg/kg

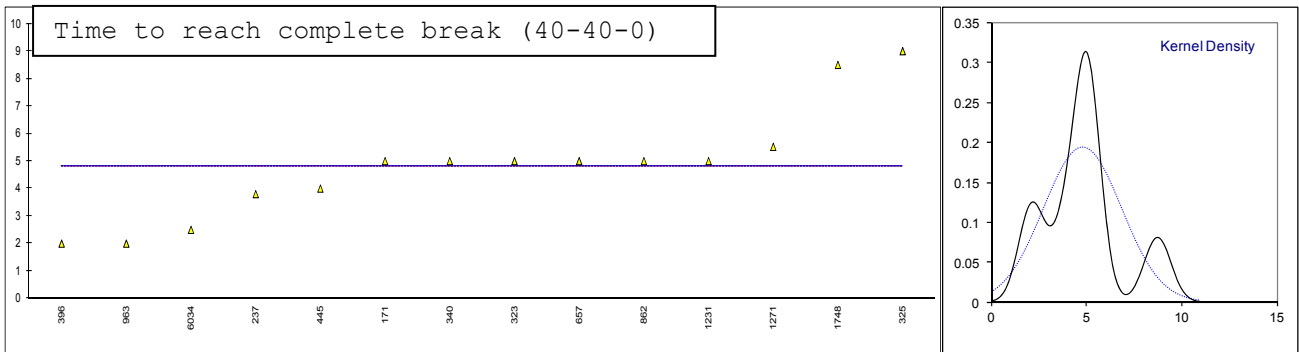
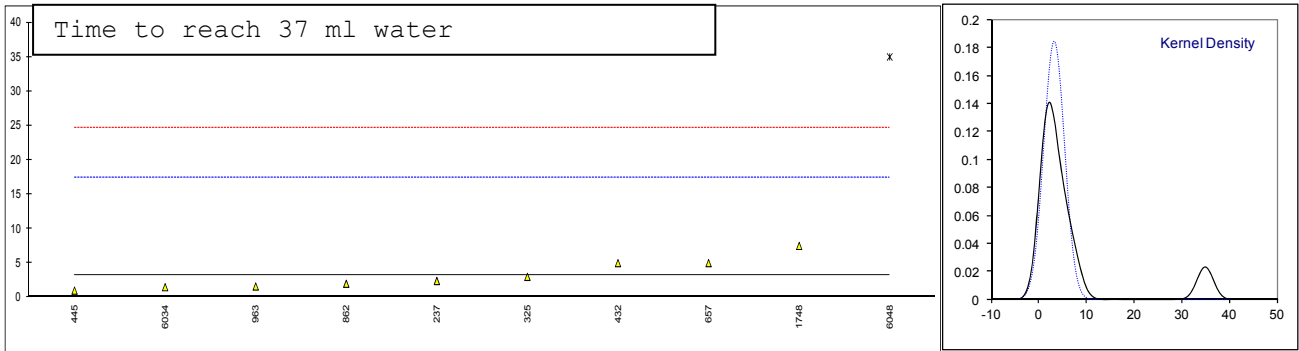
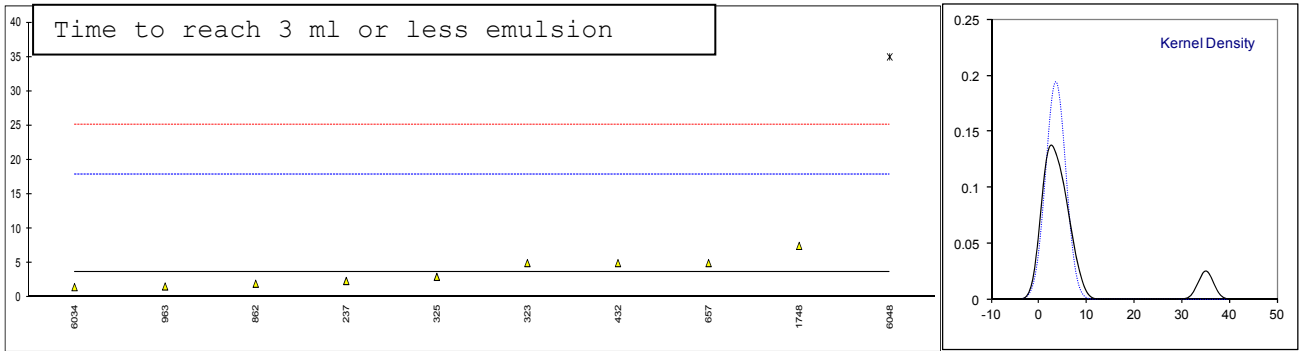
lab	method	value	mark	z(targ)	remarks
171	D6304-A	100		0.55	
237		----		----	
273	D6304-A	63		0.03	
311	D6304-A	60		-0.02	
315	D6304-A	68		0.10	
323	D6304-A	74		0.18	
325	D6304-C	27.5		-0.47	
333		----		----	
340	D6304-A	115		0.76	
343	E203	183	R(0.01)	1.71	
349	D6304-A	65.3		0.06	
357	D6304-A	56		-0.07	
369	ISO12937	56.9		-0.06	
371	ISO12937	28		-0.47	
396		----		----	
432		----		----	
445	D6304-A	59.8		-0.02	
446	D6304-A	65		0.05	
485	D6304-A	73.5		0.17	
494	D6304-B	67		0.08	
496	D6304-C	6		-0.78	
541	D6304-A	60		-0.02	
601	D6304-A	82.0		0.29	
621	D6304-B	63		0.03	
657	D6304-C	14.4		-0.66	
704	ISO12937	69		0.11	
781	D6304-A	70		0.12	
823	D6304-A	64		0.04	
862	D6304-A	64		0.04	
875	D6304-A	60		-0.02	
902	D6304-A	64.8		0.05	
922	D6304-A	54		-0.10	
963	D6304-A	75		0.19	
974	D6304-A	90		0.40	
982		----		----	
1011	D6304-A	73		0.17	
1066		----		----	
1161	D6304-C	64.454		0.05	
1201	D6304-C	<1000		----	
1231	D6304-A	37		-0.34	
1271	ISO12937	127.2		0.93	
1324		----		----	
1349		----		----	
1682		----		----	
1748		----		----	
1833	D6304-A	38		-0.33	
1877	D6304-C	34		-0.38	
4043		----		----	
6034	D6304-A	63		0.03	
6048	ISO12937	12		-0.69	
9090		----		----	

normality suspect
n 37
outliers 1
mean (n) 61.19
st.dev. (n) 25.180
R(calc.) 70.50
R(D6304:16) 199.37



Determination of Water Separability at 54°C on sample #16075; results in minutes

lab	method	time to reach 3 ml or less emulsion	mark	z(targ)	time to reach 37 ml of water	mark	z(targ)	time to reach complete break (40-40-0)	mark	time test aborted
171		----		----	----		----	5		----
237	D1401	2.4		-0.18	2.4		-0.12	3.8		NO
273		----		----	----		----	----		----
311		----		----	----		----	----		----
315		----		----	----		----	----		----
323	D1401	5		0.19	<5		----	5		----
325	D1401	3		-0.09	3		-0.03	9		----
333		----		----	----		----	----		----
340		----		----	----		----	5		----
343		----		----	----		----	----		----
349		----		----	----		----	----		----
357		----		----	----		----	----		----
369		----		----	----		----	----		----
371		----		----	----		----	----		----
396		----		----	----		----	2		----
432	D1401	5		0.19	5		0.25	>30	false +	----
445	D1401	<1		----	1		-0.31	4		----
446		----		----	----		----	----		----
485		----		----	----		----	----		----
494	D1401	<5		----	<5		----	>45	false +	----
496		----		----	----		----	----		----
541		----		----	----		----	----		----
601		----		----	----		----	----		----
621		----		----	----		----	----		----
657	D1401	5		0.19	5		0.25	5		----
704		----		----	----		----	----		----
781		----		----	----		----	----		----
823		----		----	----		----	----		----
862	D1401	2		-0.23	2		-0.17	5		----
875		----		----	----		----	----		----
902		----		----	----		----	----		----
922		----		----	----		----	----		----
963	D1401	1.6		-0.29	1.6		-0.23	2.0		----
974		----		----	----		----	----		----
982		----		----	----		----	----		----
1011		----		----	----		----	----		----
1066		----		----	----		----	----		----
1161		----		----	----		----	----		----
1201		----		----	----		----	----		----
1231		----		----	----		----	5		----
1271		----		----	----		----	5.52		----
1324		----		----	----		----	----		----
1349		----		----	----		----	----		----
1682		----		----	----		----	----		----
1748	D1401	7.5		0.54	7.5		0.60	8.5		----
1833		----		----	----		----	----		----
1877		----		----	----		----	----		----
4043		----		----	----		----	----		----
6034	D1401	1.5		----	1.5		----	2.5		----
6048	ISO6614	35	G(0.01)	4.39	35	G(0.01)	4.45	----		----
9090	D1401	<5		----	----		----	----		----
	normality	OK			suspect					
	n	9			9					
	outliers	1			1					
	mean (n)	3.67			3.22					
	st.dev. (n)	2.056			2.161					
	R(calc.)	5.76			6.05					
	R(D1401:12e1)	20.00			20.00					



Determination of Water Separability at 54°C sample #16075; results in ml

lab	method	volume oil phase	volume water phase	volume emulsion phase	reported
171	D1401	40	40	0	----
237	D1401	40	40	0	----
273		----	----	----	----
311		----	----	----	----
315		----	----	----	----
323	D1401	40	40	0	----
325		----	----	----	40-38-2[3]
333		----	----	----	----
340	D1401	40	40	0	----
343		----	----	----	----
349		----	----	----	----
357		----	----	----	----
369		----	----	----	----
371		----	----	----	----
396	D1401	40	40	0	----
432	D1401	41	39	0	----
445	D1401	40	40	0	----
446		----	----	----	----
485		----	----	----	----
494	D1401	40	40	80	false positive? ----
496		----	----	----	----
541		----	----	----	----
601		----	----	----	----
621		----	----	----	----
657	D1401	40	40	0	----
704		----	----	----	----
781		----	----	----	----
823		----	----	----	----
862	D1401	40	40	0	40-40-0[5min]
875		----	----	----	----
902		----	----	----	----
922		----	----	----	----
963		----	----	----	----
974		----	----	----	----
982		----	----	----	----
1011		----	----	----	----
1066		----	----	----	----
1161		----	----	----	----
1201		----	----	----	----
1231		----	----	----	----
1271		----	----	----	----
1324		----	----	----	----
1349		----	----	----	----
1682		----	----	----	----
1748	D1401	40	40	0	----
1833		----	----	----	----
1877		----	----	----	----
4043		----	----	----	----
6034		----	----	----	40/40/0 [5]
6048	ISO6614	40	39	1	----
9090	D1401	40	40	0	----

APPENDIX 2

Number of participants per country

1 lab in ALGERIA
1 lab in ARGENTINA
1 lab in AUSTRIA
3 labs in BELGIUM
1 lab in BOSNIA and HERZEGOVINA
2 labs in CHINA, People's Republic
1 lab in FINLAND
3 labs in FRANCE
3 labs in GERMANY
1 lab in INDONESIA
1 lab in IRAN, Islamic Republic of
1 lab in ITALY
1 lab in JORDAN
2 labs in LATVIA
1 lab in MALAYSIA
4 labs in NETHERLANDS
1 lab in NIGERIA
1 lab in PAKISTAN
1 lab in POLAND
1 lab in PORTUGAL
1 lab in QATAR
2 labs in RUSSIAN FEDERATION
1 lab in SAUDI ARABIA
1 lab in SINGAPORE
1 lab in SOUTH AFRICA
1 lab in SOUTH KOREA
2 labs in SPAIN
1 lab in THAILAND
4 labs in TURKEY
1 lab in UKRAINE
1 lab in UNITED ARAB EMIRATES
3 labs in UNITED KINGDOM
1 lab in UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations:

C	= final result after checking of first reported suspect result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
ex	= excluded from calculations
U	= reported in different unit
W	= result withdrawn on request of the participants
fr.	= first reported
S	= scope of the reported method is not applicable
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Material Safety Data Sheet

Literature:

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