Results of Proficiency Test
Engine Oil (Fresh)
June 2016

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1997, a proficiency test for fresh Engine Oil (Lubricating Oil) is organised every year by the Institute for Interlaboratory Studies. During the annual proficiency testing program 2015/2016, it was decided to continue the proficiency test for the analysis of Engine Oil (fresh) in accordance with the latest applicable version of ASTM D4485 and ACEA European Oil Sequences. In this interlaboratory study, 70 laboratories in 43 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2016 Engine Oil (fresh) proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test. Sample analyses for fit-for-use and homogeneity were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send to each laboratory two identical bottles (1 * 1 litre bottle and 1 * 0.5 litre bottle) of Engine Oil (Fresh), both labelled #16105.
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. From this 200 litre batch, after homogenization, 100 brown glass bottles of 1 litre and 100 brown glass bottles of 0.5 litre were filled (both labelled #16105). The homogeneity of the subsamples #16105 was checked by determination of Density at 15°C in accordance with ASTM D4052 and Kinematic Viscosity at 40ºC 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 #16105-1	0.88214	106.0
Sample #16105-2	0.88213	105.9
Sample #16105-3	0.88213	105.8
Sample #16105-4	0.88213	105.9
Sample #16105-5	0.88213	105.7
Sample #16105-6	0.88213	105.6
Sample #16105-7	0.88213	105.7
Sample #16105-8	0.88214	105.8

Table 1: homogeneity test results of subsamples #16105

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

	Density at 15 °C in kg/L	Kinematic Viscosity at 40°C in mm^2/s
r (observed)	0.00001	0.37
reference test method	ASTM D4052:15	ASTM D445:15
0.3 x R (ref. test method)	0.00015	0.39

Table 2: evaluation of the repeatabilities of the subsamples #16105

The calculated repeatabilities were less than 0.3 times the corresponding reproducibilities of the target methods. Therefore, homogeneity of the subsamples #16105 was assumed.

To each of the participating laboratories 1 * 1 litre bottle and 1 * 0.5 litre (both labelled, #16105) were sent on May 25, 2016.

2.5 ANALYSES

The participants were requested to determine on sample #16105: Acid Number, Base Number, Color ASTM, Conradson Carbon Residue, Ramsbottom Carbon Residue, Carbon Residue (Micro method), Density at 15°C, Evaporation loss by Noack, Flash Point COC, Flash Point PMcc, Foaming Tendency, Foam Stability, Kinematic Viscosity at 40°C and at 100°C, Viscosity Index, Viscosity Stabinger at 40°C and at 100ºC, Viscosity Apparent (CSS) at -20°C, Viscosity High Temperature High Shear, Nitrogen, Pour Point (manual and automated), Sulphated Ash, Sulphur, Water, Calcium, Phosphorus and Zinc.

To get comparable 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 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. Additional or corrected test results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organisation of this proficiency test was the one as described in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ (iis-protocol, version 3.3) of April 2014.

For 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 results should be used with due care.

According to ISO 5725 the original test results per determination were submitted to Dixon’s and/or 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 these with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a “x”. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph.

3.3 Z-SCORES

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

This target standard deviation was calculated from the literature reproducibility by division with 2.8.

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

The z-scores were calculated according to:

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

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

Absolute values for z<2 are very common and absolute values for z>3 are very rare.

Therefore, the usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this interlaboratory study no problems with sample despatch were encountered. Two participants reported after the final reporting date and only one participant did not report any test results at all. Not all laboratories were able to report all analyses requested. In total 69 participants reported 1007 numerical test results. Observed were 25 outlying results, which is 2.5%. 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 per test. The specified test methods and requirements were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the reported data. The abbreviations, used in these tables, are listed in appendix 3.

In the iis PT reports, ASTM methods are referred to with a number (e.g. 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 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 : This determination was very problematic. One statistical outlier was observed. The test results of three laboratories, that reported to have used ASTM D974 or ISO6618, were excluded because this test method is not equivalent to ASTM D664. The calculated reproducibility after rejection of the suspect data is not at all agreement with the requirements of ASTM D664:11a. In Table 1 of ASTM D664:11a the recommended size of the test portion is given. Results using smaller sample size may not be equivalent to results obtained with the recommended sample size (See note 13 of ASTM D664:11a).

Base Number : This determination was problematic. Four statistical outliers were observed. The test results of two laboratories, that reported to have used ASTM D4739, were excluded because these test methods are not equivalent to ASTM D2896. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D2896:15.
When the reported data of ASTM D2896 were evaluated separately for

procedure A and B, the calculated reproducibility for procedure B is in good agreement with the requirements of the standard. The calculated reproducibility for procedure A is not in agreement.

Color ASTM: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D1500:12.

iis also calculated a value for all results that were reported as 'less than' for example L2.5 or <2.5. This test method uses color standards with values that are 0.5 points apart, ranging from 0.5 – 8.0. Since this color test is determined by comparing the color of the sample to these standards, it is assumed when for example L2.5 is reported, the actual colour lies between 2.0 and 2.5. iis calculated this value as 2.25 (2.5 minus 0.25).

Conradson CR: 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 D189:06(2016).

Ramsbottom CR: Only five participants reported a test result, varying from 0.74 to 1.1437% M/M. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of ASTM D524:15. The low number of results may (partly) explain the large spread.

Carbon Residue: (micro method) 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 D4530:15.

Density at 15°C: This determination was problematic for a number of laboratories. Six statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4052:15.

Evaporation loss: by Noack This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5800:15a procedure A or procedure B. When the test results measured with ASTM D5800 procedure B are evaluated separately, the calculated reproducibility improves, but is still not in agreement with the requirements of ASTM D5800:15a procedure B.

Flash Point COC: 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 D92:16.

Flash Point PMcc: This determination was not problematic. One statistical outlier was observed and six results were excluded from statistical calculations as the laboratories reported to have used ASTM D93 procedure B, while procedure A is the only

procedure applicable to fresh oils. However, the calculated reproducibility after rejection of the suspect data is in agreement with ASTM D93-A:16.

Foaming Tendency: This determination may be (somewhat) problematic. One statistical outlier was observed. The calculated reproducibility for the Sequences I and III are in agreement with the requirements of ASTM D892:13. However, the calculated reproducibility of Sequence II is not in agreement.

The participants were requested to send pictures of the foam which was found right after the 5 min. blowing period of Sequence II. Twelve participants did send pictures to iis. Some from an angle that only shows the foam build-up, others also photographed the coverage with foam of the surface area of the oil.
ASTM D892 states in paragraph 12.2 that the amount of foam in ml should be reported, but that for the purpose of reporting results, when the bubble layer fails to completely cover the oil surface and/or a patch or eye of clear fluid is visible, the value shall be reported as nil foam. So based on the pictures, some laboratories reported 0 ml foam, based on a patch or eye of clear fluid visible, while others only reported the amount of foam. When asked about the coverage of foam of the surface, some laboratories answered that there can only be a clear patch when no bubbles are present. The bubble free patch was not present, so the amount of foam was reported.

Two example pictures:

reported: 0 ml foam


reported: 10 ml foam

Clearly the interpretation of the coverage of the surface area can vary, which will result in variation on the reported result (either reporting of actual amount of foam or nil foam).
Furthermore, the participants were requested to report whether a stone diffuser or a metal diffuser was used for the test. A difference in the consensus value was found depending on the metal diffuser used. When evaporated separately for the different diffuser used, the mean of the group using a stone diffuser was 8.8 ml foam and that of the group using a metal diffuser was 15.4 ml foam. Still

both groups did not meet the requirements of method ASTM D893:13

Foam Stability: None of the reporting laboratories reported a positive result for the settling period after 10 min. Therefore all reporting participants agreed on a result of 0 (Nil).

Kin.Visco. at 40°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 D445:15.

Kin.Visco.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 D445:15.

Viscosity Index: This determination was problematic. Two statistical outliers were observed. One test result was excluded, for the calculation was based on ASTM D7279 results, which is not mentioned in ASTM D2270. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D2270:10 (2016).
Three calculation errors were observed, taking into account that the method describes that rounding should be done to the nearest whole number and when the number is exactly halfway between the nearest two whole numbers, it is rounded to the nearest even number.
The calculated VI results for method D445 were evaluated separately, as well as the calculated VI result for method D7042 (from page 46 and 48). Remarkably the mean of the results performed by D445 (VI: 139.8) was lower than performed by D7042 (VI: 141.2). The reproducibilities improved, but are still not in agreement with the requirements of ASTM D2270:10 (2016).

Visco. Stab. at 40°C: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D7042:14.

Visco. Stab. at 100°C: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements ASTM D7042:14.

Visco. App. at -20°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D5293:15.

Visco. HTHS: This determination may not be problematic. Only three test results were reported. The calculated reproducibility is in agreement with the requirements of ASTM D4683:13.

Nitrogen: This determination was problematic. No statistical outliers were observed. One test result was excluded before the statistical evaluation as the used test method ASTM D4629 is not applicable for high viscosity liquids, nor for liquids containing more than 100 mg/kg nitrogen. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D5762:12 and ASTM D3228:08(2014).

Pour Point (man): 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 D97:16.

Pour Point (auto): This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5950:14.

Sulphated Ash: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D874:13a.

Sulphur: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D4294:16e1.
A matrix mismatch between sample and standards (e.g. different C/H ratio and/or the presence of interfering molecules) may (partly) explain the large spread. When evaluating ASTM D4294 data separately, the calculated reproducibility is not in agreement with the requirements of this test method.

Water: This determination was problematic for a number of laboratories. The preferred method to use for a product containing interfering components is ASTM D6304:16 method C. This method is applicable for oils with difficult matrix interferences only. Twenty-two laboratories reported results determined according ASTM D6304 method C. One statistical outlier was observed. After excluding all results from other test methods, the calculated reproducibility after rejection of the outlier is in agreement with the requirements of ASTM D6304:16.

Calcium: This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of ASTM D5185:13e1.

Phosphorus: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of ASTM D5185:13e1.

Zinc: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of ASTM D5185:13e.

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, ISO and IP standards), are compared in the next table.

Parameter	unit	n	Average	2.8 * sd	R(lit)
Acid Number	mg KOH/g	41	2.88	1.21	0.55
Base Number	mg KOH/g	46	9.41	0.79	0.66
Color ASTM		25	2.5	0.7	1.0
Conradson Carbon Residue	%M/M	14	1.15	0.16	0.26
Ramsbottom Carbon Residue	%M/M	5	1.00	0.53	0.14
Carbon Residue (micro method)	%M/M	21	1.20	0.15	0.20
Density at 15°C	kg/L	54	0.8822	0.0004	0.0005
Evaporation loss by Noack	%M/M	16	11.84	3.15	2.17
Flash Point COC	°C	46	227.3	16.8	18.0
Flash Point PMcc	°C	40	204.4	11.0	14.5
Foaming Tendency, Sequence I	ml	30	0.8	7.4	14.3
Foaming Tendency, Sequence II	ml	28	11.6	21.2	19.0
Foaming Tendency, Sequence III	ml	30	0.8	7.4	14.3
Foam Stability, Sequence I	ml	30	0	n.a.	n.a.
Foam Stability, Sequence II	ml	30	0	n.a.	n.a.
Foam Stability, Sequence III	ml	30	0	n.a.	n.a.
Kinematic Viscosity at 40°C	mm^2/s	53	105.61	1.32	1.29
Kinematic Viscosity at 100°C	mm^2/s	51	14.42	0.16	0.20
Viscosity Index		51	140.0	3.0	2.0
Stabinger Viscosity at 40°C	mm^2/s	19	105.11	1.84	1.26
Stabinger Viscosity at 100°C	mm^2/s	20	14.46	0.19	0.14
Viscosity, Apparent at -20°C	mPa·s	13	6620	444	483
Viscosity, HTHS	mPa·s	3	3.97	0.11	0.17
Nitrogen	mg/kg	10	899	286	239
Pour Point, manual	°C	37	-26.6	8.1	9.0
Pour Point, automated	°C	19	-27.4	7.5	4.5
Sulphated Ash	%M/M	31	1.04	0.17	0.15
Sulphur	%M/M	26	0.56	0.08	0.05
Water	mg/kg	21	166	277	363
Calcium	mg/kg	40	1029	268	124
Phosphorus	mg/kg	38	1241	384	152
Zinc	mg/kg	41	1420	478	244

Table 3: reproducibilities of tests on sample #16105

Without further statistical calculations it can be concluded that for a number of tests there is a not a good compliance of the group of participants with the relevant standards. The problematic tests have been discussed in paragraph 4.1.

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

	June 2016	June 2015	June 2014	May 2013	May 2012
Number of reporting labs	69	72	87	78	78
Number of results reported	1007	961	996	879	804
Statistical outliers	25	40	20	29	33
Percentage outliers	2.5%	4.2%	2.0%	3.3%	4.1%

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 against the requirements of the respective standards. The conclusions are given the following table:

Determination	June 2016	June 2015	June 2014	May 2013	May 2012
Acid Number	--	--	--	--	+/-
Base Number	-	--	+	-	--
Color ASTM	+	+	++	++	++
Conradson Carbon Residue	+	++	+	++	-
Ramsbottom Carbon Residue	--	--	--	--	-
Carbon Residue (micro method)	+	++	-	+	
Density at 15°C	+	--	--	--	-
Evaporation loss by Noack	-	+/-	n.e.	n.e.	n.e.
Flash Point COC	+	++	+/-	+	+/-
Flash Point PMcc	+	++	+	++	++
Foaming Tendency	+/-	+/-	n.e.	n.e.	n.e.
Kinematic Viscosity at 40°C	+/-	+/-	-	-	-
Kinematic Viscosity at 100°C	+	++	--	--	--
Viscosity Index	-	--	--	--	n.e.
Stabinger Viscosity at 40°C	-	+/-	-	--	--
Stabinger Viscosity at 100°C	-	+/-	+/-	--	--
Viscosity, Apparent (CSS) at -20°C	+	+/-	+	+	n.e.
Viscosity, HTHS	+	+	n.e.	n.e.	n.e.
Nitrogen	-	--	--	-	--
Pour Point, manual	+	++	+	-	+/-
Pour Point, automated	-	--	+/-	+	-
Sulphated Ash	-	--	+	-	--
Sulphur	-	--	--	--	--
Water	+	++	+	+	++
Calcium	--	--	+	-	--
Phosphorus	--	--	-	-	--
Zinc	--	--	-	-	-

Table 5: comparison determinations of sample #16105 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:

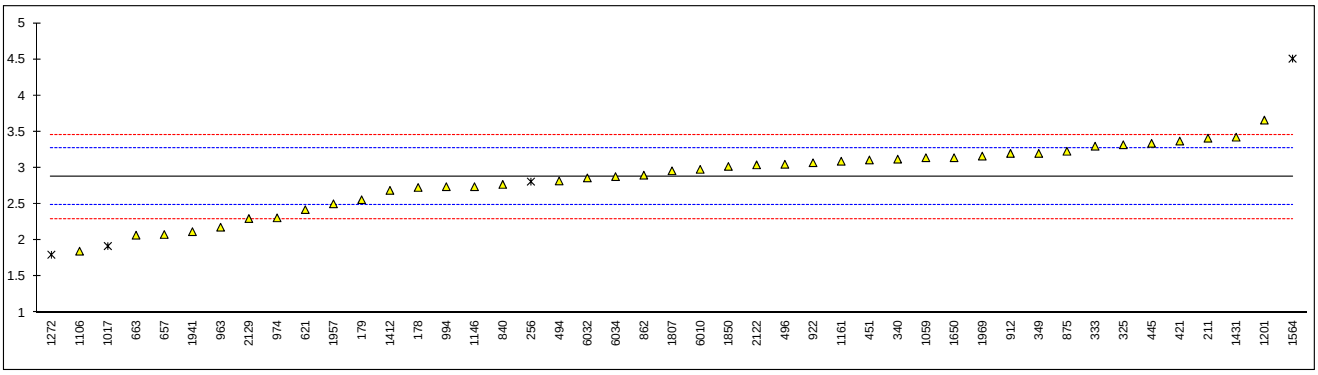
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- - : group performed worse than the standard
- -- : group performed much worse than the standard
- n.e.: not evaluated

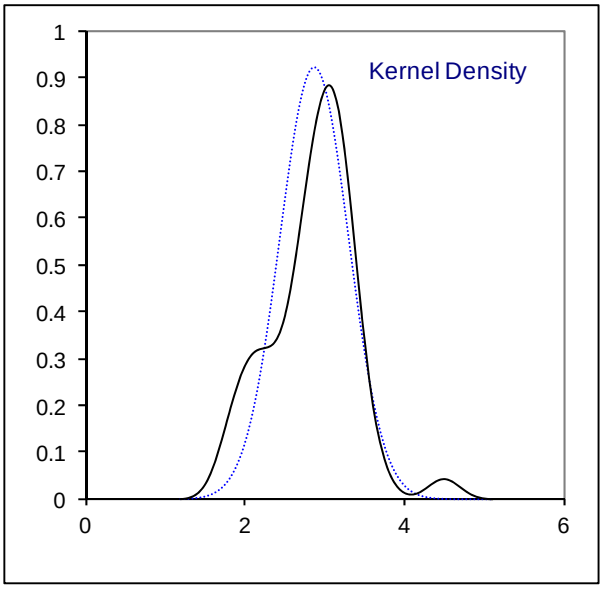
APPENDIX 1

Determination of Acid Number on Sample #16105; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178	INH-1118	2.73		-0.74	
179	D664	2.56		-1.61	
211	D664	3.41		2.74	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256	D974	2.81	ex	-0.33	result excluded see §4.1
315		-----		-----	
325	D664	3.32		2.28	
333	D664	3.3		2.18	
340	D664	3.12		1.26	
349	D664	3.2		1.67	
360		-----		-----	
421	ISO6619	3.37		2.54	
432		-----		-----	
445	D664	3.339		2.38	
450		-----		-----	
451	D664	3.11		1.20	
473		-----		-----	
494	D664	2.82		-0.28	
496	D664	3.05		0.90	
541		-----		-----	
621	D664	2.423		-2.32	
657	D664	2.08		-4.07	
663	D664	2.070		-4.12	
840	D664	2.772		-0.53	
862	D664	2.90		0.13	
875	D664	3.23		1.82	
902		-----		-----	
912	D664	3.2		1.67	
922	D664	3.071		1.01	
963	D664	2.18		-3.56	
974	D664	2.31		-2.89	
994	D664	2.74		-0.69	
1017	D974	1.92	ex	-4.89	result excluded see §4.1
1023		-----		-----	
1059	ISO6619	3.14		1.36	
1106	D664	1.8497		-5.25	
1146	D664	2.74		-0.69	
1161	D664	3.092		1.11	
1173		-----		-----	
1174		-----		-----	
1201	D664	3.66		4.02	
1235		-----		-----	
1272	ISO6618	1.8	ex	-5.51	result excluded see §4.1
1316		-----		-----	
1412	D664	2.69		-0.95	
1431	D664	3.4245		2.82	
1433		-----		-----	
1461		-----		-----	
1564	D664	4.51	C,R(0.05)	8.38	first reported: 4.21
1650	D664	3.14		1.36	
1748		-----		-----	
1799		-----		-----	
1807	D664	2.96		0.44	
1850	ISO6619	3.02		0.74	
1877		-----		-----	
1883		-----		-----	
1941	ISO6619	2.119		-3.87	
1957	D664	2.504		-1.90	
1969	D664	3.163		1.48	
2122	IP177	3.042		0.86	
2129	D664	2.30		-2.95	
6010	D664	2.98		0.54	
6016		-----		-----	
6032	D664	2.861		-0.07	
6034	D664	2.88		0.03	
9090		-----		-----	

normality	OK
n	41
outliers	1 (+3ex)
mean (n)	2.875
st.dev. (n)	0.4326
R(calc.)	1.211
R(D664:11a)	0.546

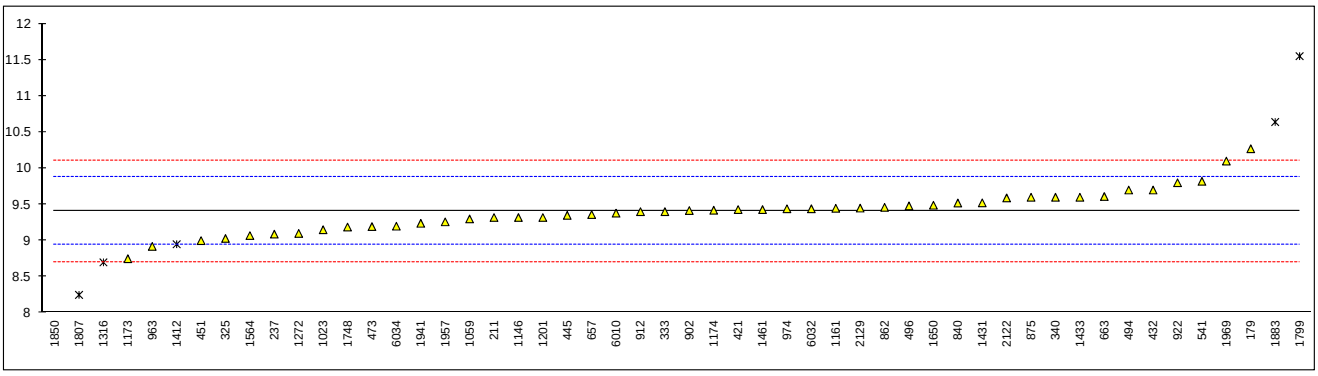


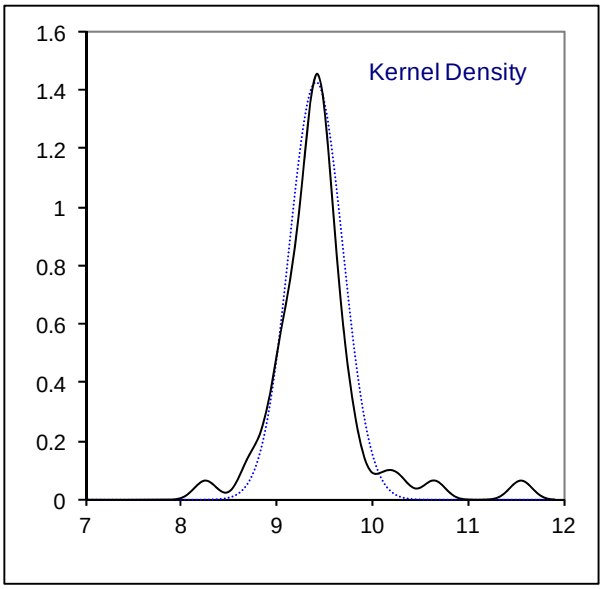


Determination of Base Number on Sample #16105; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179	D2896	10.27		3.67	
211	D2896 - B	9.32		-0.37	
237	D2896 - A	9.09	C	-1.34	first reported: 10.53
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D2896 - B	9.03		-1.60	
333	D2896 - A	9.4		-0.03	
340	D2896 - B	9.6		0.82	
349		-----		-----	
360		-----		-----	
421	ISO3771	9.43		0.10	
432	D2896 - B	9.70		1.25	
445	D2896 - B	9.35		-0.24	
450		-----		-----	
451	D2896 - B	9.0		-1.73	
473	D2896 - B	9.1940		-0.90	
494	D2896 - A	9.70		1.25	
496	D2896 - B	9.48		0.31	
541	D2896 - B	9.82		1.76	
621		-----		-----	
657	D2896 - B	9.36		-0.20	
663	D2896 - B	9.61		0.87	
840	D2896 - B	9.52		0.48	
862	D2896 - B	9.46		0.23	
875	D2896 - A	9.6		0.82	
902	D2896 - B	9.416		0.04	
912	D2896 - B	9.4		-0.03	
922	D2896 - B	9.80		1.68	
963	D2896 - A	8.92		-2.07	
974	D2896 - A	9.44		0.14	
994		-----		-----	
1017		-----		-----	
1023	D2896 - B	9.15		-1.09	
1059	ISO3771	9.3		-0.45	
1106		-----		-----	
1146	D2896 - A	9.32		-0.37	
1161	D2896 - B	9.447	C	0.17	first reported: 10.430
1173	In house	8.75		-2.79	
1174	INH-13727	9.42		0.06	
1201	D2896 - B	9.32		-0.37	
1235		-----		-----	
1272	ISO3771	9.1		-1.30	
1316	D4739	8.7	ex	-3.00	result excluded see §4.1
1412	D4739	8.95	ex	-1.94	result excluded see §4.1
1431	D2896 - B	9.5219		0.49	
1433	D2896 - B	9.6		0.82	
1461	INH-13727	9.43		0.10	
1564	D2896 - B	9.07		-1.43	
1650	D2896 - A	9.49		0.36	
1748	D2896 - A	9.1875		-0.93	
1799	D2896 - B	11.55	R(0.01)	9.12	
1807	D2896 - A	8.25	R(0.01)	-4.92	
1850	ISO3771	1.14	R(0.01)	-35.15	
1877		-----		-----	
1883	D2896 - B	10.64	C,R(0.01)	5.25	first reported: 11.23
1941	ISO3771	9.24		-0.71	
1957	D2896 - A	9.26		-0.62	
1969	D2896 - A	10.10		2.95	
2122		9.59		0.78	
2129	D2896 - A	9.45		0.19	
6010	D2896 - B	9.38		-0.11	
6016		-----		-----	
6032	D2896 - B	9.44		0.14	
6034	D2896 - A	9.2		-0.88	
9090		-----		-----	

		Only D2892-A	Only D2892-B
normality	suspect	suspect	OK
n	46	13	24
outliers	4 (+2ex)	1	2
mean (n)	9.406	9.397	9.416
st.dev. (n)	0.2802	0.2986	0.2202
R(calc.)	0.785	0.836	0.617
R(D2896:15)	0.658	0.658	0.659



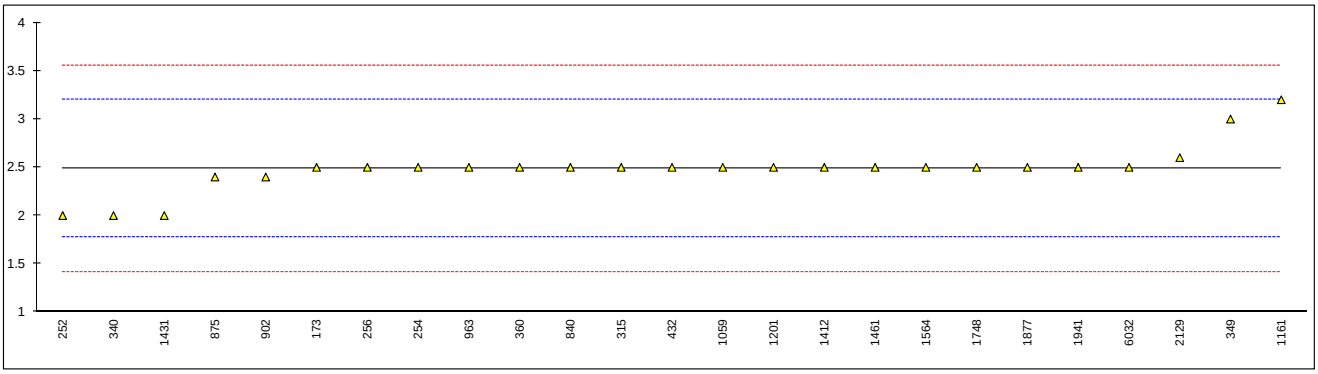


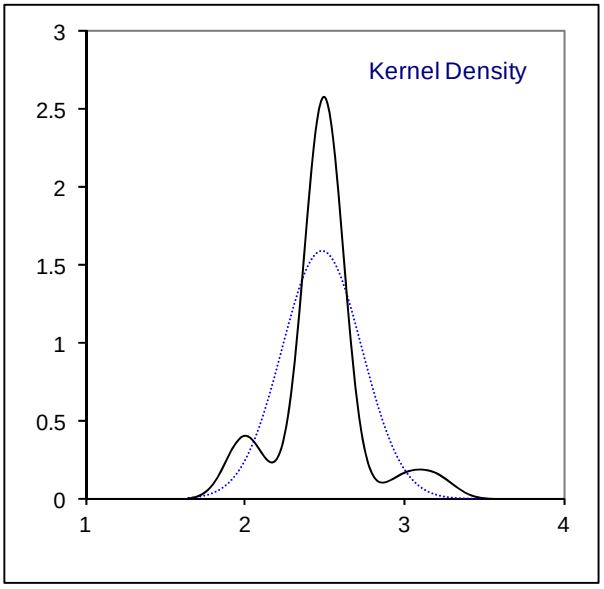
Determination of Color ASTM on Sample #16105

lab	method	value	mark	z(targ)	value calc. *	remarks
173	D1500	2.5		0.04	2.5	
178		-----		-----	-----	
179	D1500	L3.0		-----	2.75	
211	D1500	L 2.5		-----	2.25	
237	D1500	L3.0		-----	2.75	
252	D1500	2.0		-1.36	2.0	
254	D1500	2.5		0.04	2.5	
255		-----		-----	-----	
256	D1500	2.5		0.04	2.5	
315	D1500	2.5		0.04	2.5	
325	D6045	L2.5		-----	2.25	
333		-----		-----	-----	
340	D1500	2.0		-1.36	2.0	
349	D6045	3		1.44	3	
360	D1500	2.5		0.04	2.5	
421		-----		-----	-----	
432	D1500	2.5		0.04	2.5	
445	D1500	<2.5		-----	2.25	
450		-----		-----	-----	
451		-----		-----	-----	
473		-----		-----	-----	
494	D1500	L2,5		-----	2.25	
496	D1500	L2.5		-----	2.25	
541		-----		-----	-----	
621	D1500	L 2.5		-----	2.25	
657	D1500	L3.0		-----	2.75	
663	D1500	L2.5		-----	2.25	
840	D1500	2.5		0.04	2.5	
862	D1500	L3.0		-----	2.75	
875	D6045	2.4		-0.24	2.4	
902	D1500	2.4		-0.24	2.4	
912	D1500	<2.5		-----	2.25	
922	D1500	L2.5		-----	2.25	
963	D1500	2.5		0.04	2.5	
974	D1500	L2.5		-----	2.25	
994	D1500	L.2.5		-----	2.25	
1017		-----		-----	-----	
1023		-----		-----	-----	
1059	D1500	2.5		0.04	2.5	
1106		-----		-----	-----	
1146		-----		-----	-----	
1161	ISO2049	3.2		2.00	3.2	
1173		-----		-----	-----	
1174	ISO2049	L 2,5		-----	2.25	
1201	D1500	2.5		0.04	2.5	
1235	ISO2049	L2.5		-----	2.25	
1272	ISO2049	L 2,5		-----	2.25	
1316		-----		-----	-----	
1412	D1500	2.5		0.04	2.5	
1431	D1500	2.0		-1.36	2.0	
1433		-----		-----	-----	
1461	ISO2049	2.5		0.04	2.5	
1564	D1500	2.5		0.04	2.5	
1650		-----		-----	-----	
1748	D1500	2.5		0.04	2.5	
1799		-----		-----	-----	
1807	D1500	Naranja		-----	Naranja	
1850	D1500	L 2.5		-----	2.25	
1877	D6045	2.5		0.04	2.5	
1883	D1500	L2.5		-----	2.253	
1941	ISO2049	2.5		0.04	2.5	
1957	D1500	<3.0		-----	2.75	
1969		-----		-----	-----	
2122		-----		-----	-----	
2129	D6045	2.6		0.32	2.6	
6010		-----		-----	-----	
6016		-----		-----	-----	
6032	D1500	2.5		0.04	2.5	
6034	D1500	L2.5		-----	2.25	
9090		-----		-----	-----	

normality	not OK	suspect
n	25	47
outliers	0	0
mean (n)	2.48	2.43
st.dev. (n)	0.251	0.240
R(calc.)	0.70	0.67
R(D1500:12)	1.00	1.00

*) In the calculation of the mean, standard deviation and the reproducibility of this column, a reported value of 'L y' is changed into y-0.25 (for example L1.0 into 0.75)

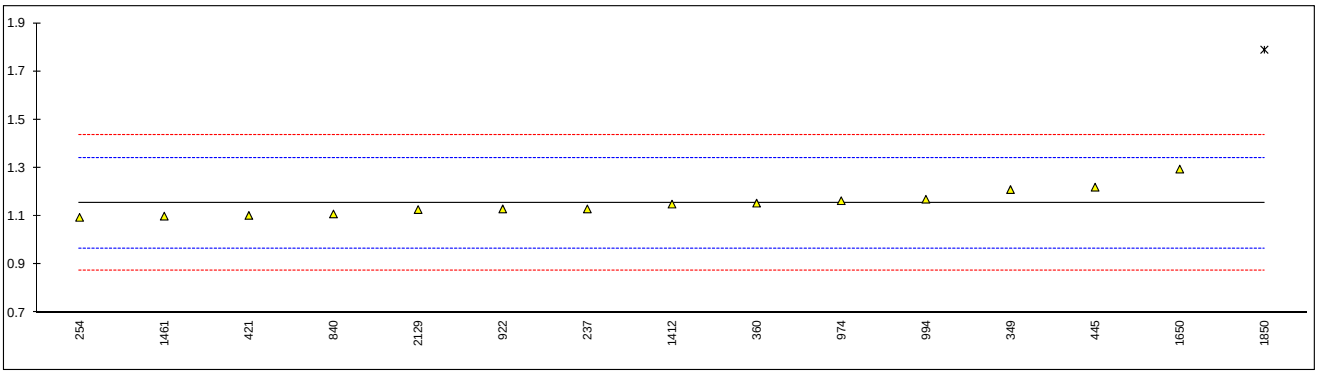


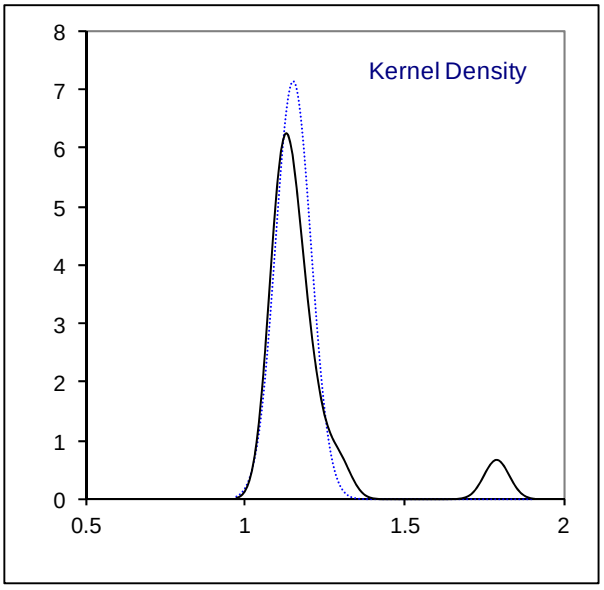


Determination of Conradson Carbon Residue on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237	D189	1.13		-0.26	
252		-----		-----	
254	D189	1.095		-0.63	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340		-----		-----	
349	D189	1.21		0.60	
360	D189	1.154		0.00	
421	ISO6615	1.103		-0.55	
432		-----		-----	
445	D189	1.22		0.70	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494		-----		-----	
496		-----		-----	
541		-----		-----	
621		-----		-----	
657		-----		-----	
663		-----		-----	
840	D189	1.109		-0.48	
862		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922	D189	1.13		-0.26	
963		-----		-----	
974	D189	1.164		0.11	
994	D189	1.17		0.17	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412	D189	1.15		-0.04	
1431		-----		-----	
1433		-----		-----	
1461	ISO6615	1.10		-0.58	
1564		-----		-----	
1650	D189	1.295		1.50	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850	D189	1.79	G(0.01)	6.79	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D189	1.127		-0.29	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	not OK
n	14
outliers	1
mean (n)	1.154
st.dev. (n)	0.0560
R(calc.)	0.157
R(D189:06)	0.262

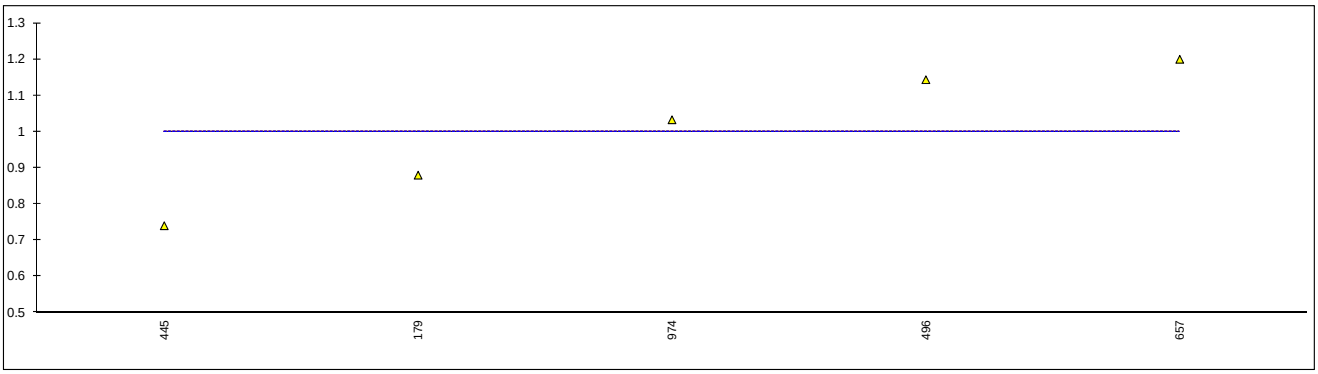




Determination of Ramsbottom Carbon Residue on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179	D524	0.88		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340		-----		-----	
349		-----		-----	
360		-----		-----	
421		-----		-----	
432		-----		-----	
445	D524	0.74		-----	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494		-----		-----	
496	D524	1.1437		-----	
541		-----		-----	
621		-----		-----	
657	D524	1.2		-----	
663		-----		-----	
840		-----		-----	
862		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974	D524	1.0329		-----	
994		-----		-----	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129		-----		-----	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

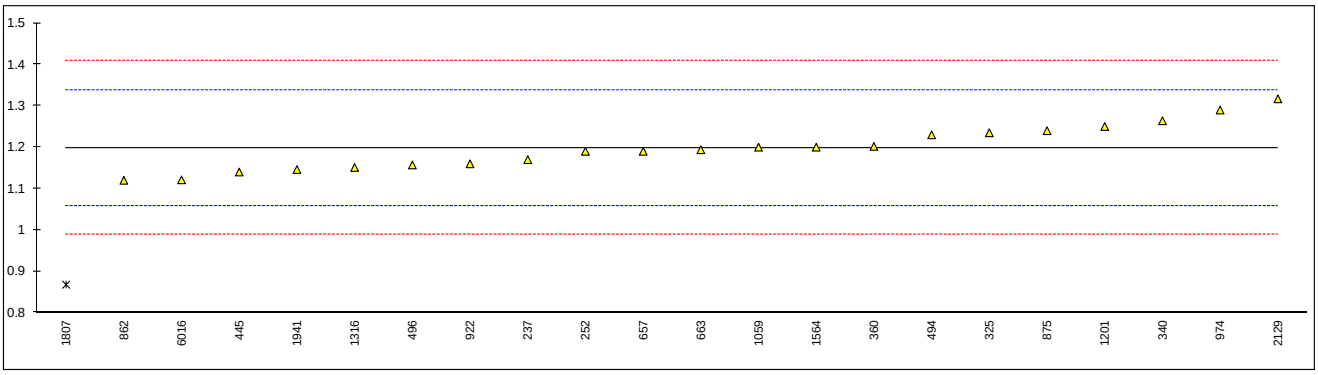
normality	unknown
n	5
outliers	0
mean (n)	0.999
st.dev. (n)	0.1896
R(calc.)	0.531
R(D524:15)	0.140

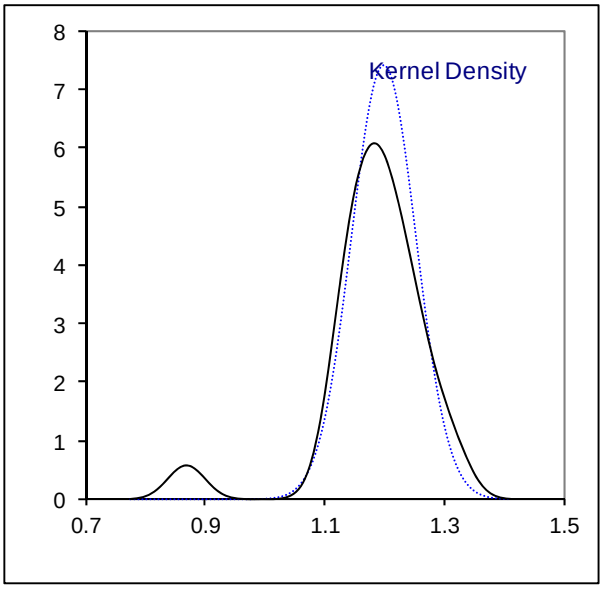


Determination of Carbon Residue (micro method) on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237	D4530	1.17		-0.41	
252	D4530	1.19		-0.12	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D4530	1.235		0.52	
333		-----		-----	
340	D4530	1.264		0.93	
349		-----		-----	
360	D4530	1.202		0.05	
421		-----		-----	
432		-----		-----	
445	D4530	1.14		-0.83	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D4530	1.23		0.45	
496	D4530	1.1572		-0.59	
541		-----		-----	
621		-----		-----	
657	D4530	1.19		-0.12	
663	D4530	1.194		-0.06	
840		-----		-----	
862	D4530	1.12		-1.12	
875	D4530	1.24		0.59	
902		-----		-----	
912		-----		-----	
922	D4530	1.16		-0.55	
963		-----		-----	
974	D4530	1.290		1.30	
994		-----		-----	
1017		-----		-----	
1023		-----		-----	
1059	ISO10370	1.20		0.02	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201	D4530	1.25		0.73	
1235		-----		-----	
1272		-----		-----	
1316	ISO10370	1.151		-0.68	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564	D4530	1.2		0.02	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807	D4530	0.8678	R(0.01)	-4.71	
1850		-----		-----	
1877		-----		-----	
1883		-----		-----	
1941	ISO10370	1.146		-0.75	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	ISO10370	1.317		1.69	
6010		-----		-----	
6016	D4530	1.121		-1.10	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	OK
n	21
outliers	1
mean (n)	1.198
st.dev. (n)	0.0539
R(calc.)	0.151
R(D4530:15)	0.197

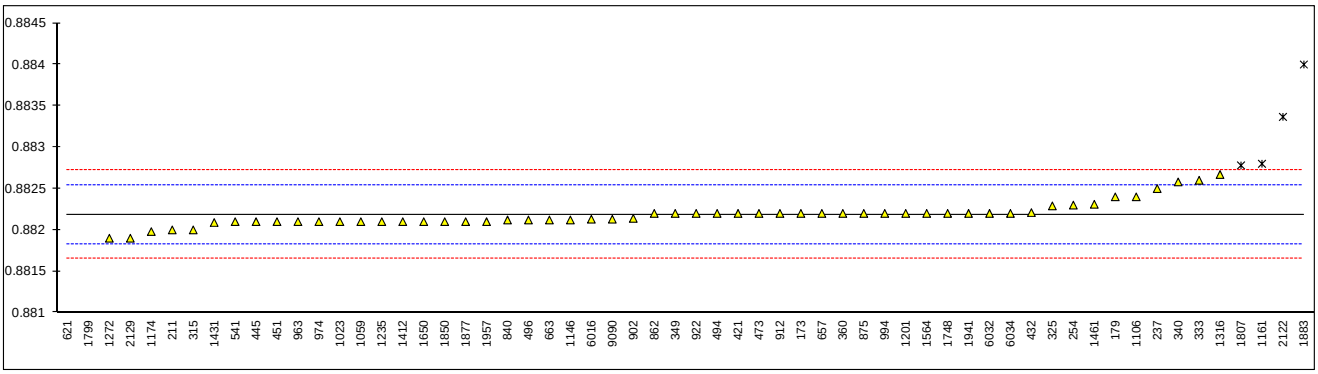


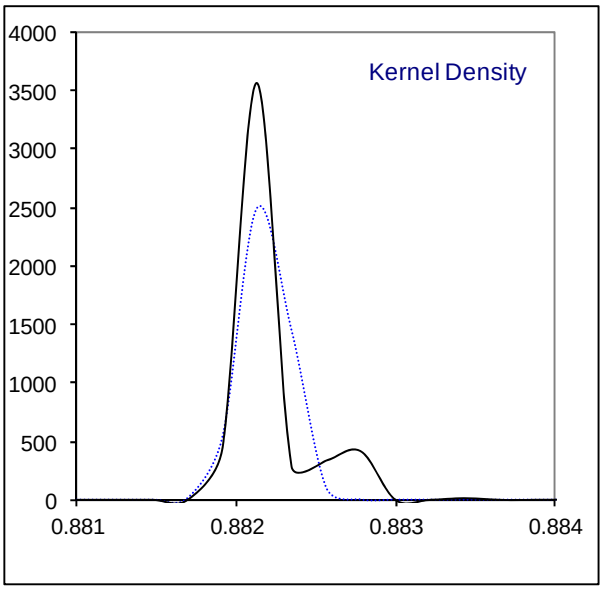


Determination of Density at 15°C on Sample #16105; results in kg/L

lab	method	value	mark	z(targ)	remarks
173	D4052	0.8822		0.09	
178		-----		-----	
179	D4052	0.8824	C	1.21	reported: 882.4 kg/L (probably a unit error)
211	D1298	0.8820		-1.03	
237	D4052	0.8825		1.77	
252		-----		-----	
254	D4052	0.88230		0.65	
255		-----		-----	
256		-----		-----	
315	D4052	0.8820		-1.03	
325	D4052	0.88229		0.60	
333	D4052	0.8826		2.33	
340	D4052	0.88258		2.22	
349	D4052	0.8822		0.09	
360	D4052	0.8822		0.09	
421	ISO12185	0.8822	C	0.09	first reported: 880.8 kg/m^3
432	D4052	0.88221		0.15	
445	D4052	0.8821		-0.47	
450		-----		-----	
451	D4052	0.8821		-0.47	
473	D4052	0.8822		0.09	
494	D4052	0.8822		0.09	
496	D4052	0.88212		-0.35	
541	D4052	0.8821		-0.47	
621	D4052	0.8287	R(0.01)	-299.51	
657	D4052	0.8822		0.09	
663	D4052	0.88212		-0.35	
840	D4052	0.88212		-0.35	
862	D4052	0.8822		0.09	
875	D4052	0.8822		0.09	
902	D4052	0.88214		-0.24	
912	D4052	0.8822		0.09	
922	D4052	0.8822		0.09	
963	D4052	0.8821		-0.47	
974	D4052	0.8821		-0.47	
994	D4052	0.8822		0.09	
1017		-----		-----	
1023	D4052	0.8821		-0.47	
1059	D4052	0.8821		-0.47	
1106	D5002	0.8824	C	1.21	first reported: 895.8 kg/m^3
1146	ISO12185	0.88212		-0.35	
1161	ISO3675	0.8828	C,R(0.05)	3.45	first reported: 0.8812
1173		-----		-----	
1174	ISO3675	0.88198		-1.14	
1201	D4052	0.8822		0.09	
1235	ISO12185	0.8821		-0.47	
1272	ISO12185	0.8819		-1.59	
1316	D4052	0.88267		2.73	
1412	D4052	0.8821		-0.47	
1431	D4052	0.88209		-0.52	
1433		-----		-----	
1461	ISO3675	0.88231		0.71	
1564	D4052	0.8822		0.09	
1650	D4052	0.8821		-0.47	
1748	D4052	0.8822		0.09	
1799	D7042 (D4052)	0.8790	R(0.01)	-17.83	
1807	D4052	0.88278	R(0.05)	3.34	
1850	D4052	0.8821		-0.47	
1877	D4052	0.8821		-0.47	
1883	D1298	0.8840	C,R(0.01)	10.17	first reported: 0.8837
1941	D4052	0.8822		0.09	
1957	D4052	0.8821		-0.47	
1969		-----		-----	
2122	D4052	0.8833666	R(0.01)	6.63	
2129	D4052	0.8819		-1.59	
6010		-----		-----	
6016	D4052	0.88213		-0.30	
6032	D4052	0.8822		0.09	
6034	D4052	0.8822		0.09	
9090	D4052	0.88213		-0.30	

normality	not OK
n	54
outliers	6
mean (n)	0.88218
st.dev. (n)	0.000150
R(calc.)	0.00042
R(D4052:15)	0.00050

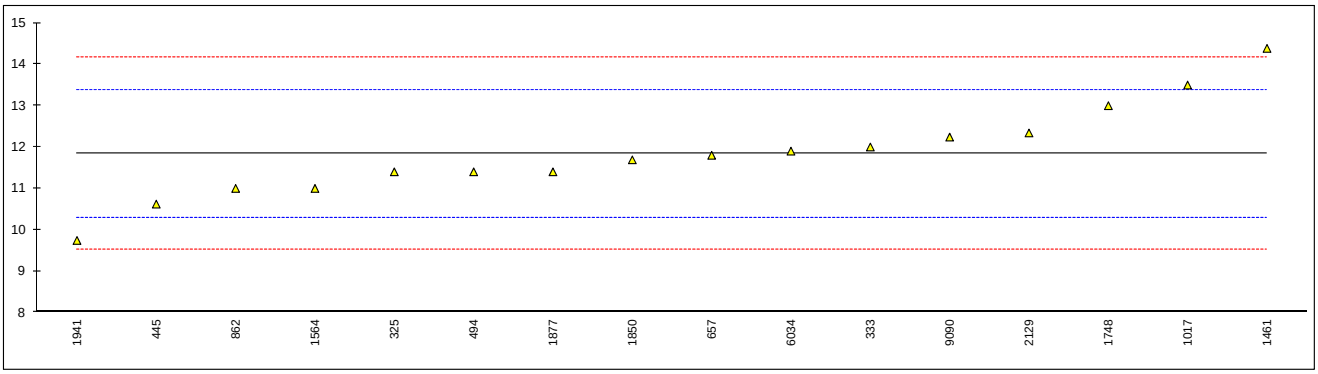


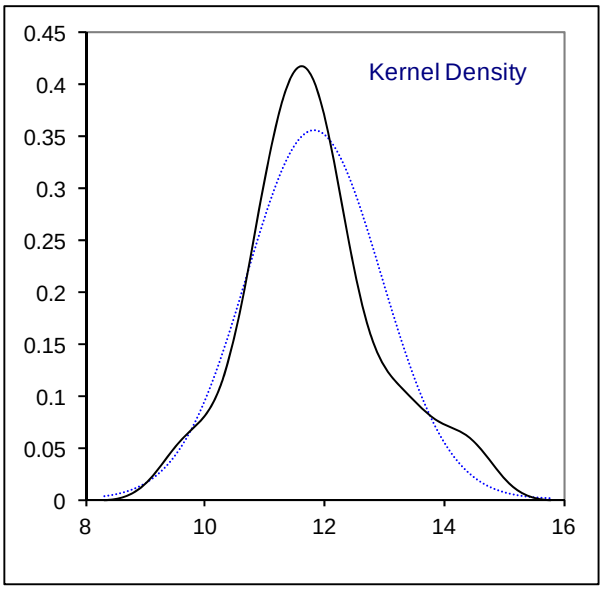


Determination of Evaporation loss by Noack on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	CEC L-40-93	11.4		-0.57	
333	CEC L-40-93	12.0		0.21	
340		-----		-----	
349		-----		-----	
360		-----		-----	
421		-----		-----	
432		-----		-----	
445	D5800 - B	10.62		-1.57	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D5800 - B	11.4		-0.57	
496		-----		-----	
541		-----		-----	
621		-----		-----	
657	D5800 - B	11.8		-0.05	
663		-----		-----	
840		-----		-----	
862	D5800 - B	11.0		-1.08	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017	CEC L-40-93	13.5		2.15	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461	INH-8688	14.385		3.29	
1564	DIN 51581	11.0		-1.08	
1650		-----		-----	
1748	D5800 - B	13		1.50	
1799		-----		-----	
1807		-----		-----	
1850	DIN 51581	11.69		-0.19	
1877	D5800 - B	11.4		-0.57	
1883		-----		-----	
1941	D5800 - A	9.74		-2.71	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D5800 - A	12.34		0.65	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034	D5800 - A	11.9		0.08	
9090	D5800 - B	12.24		0.52	

			Only D5800B:15a
	normality	OK	OK
	n	16	7
	outliers	0	0
	mean (n)	11.838	11.637
	st.dev. (n)	1.1234	0.7959
	R(calc.)	3.146	2.228
	R(D5800A:15a)	2.166	--
Comp	R(D5800B:15a)	1.517	1.498

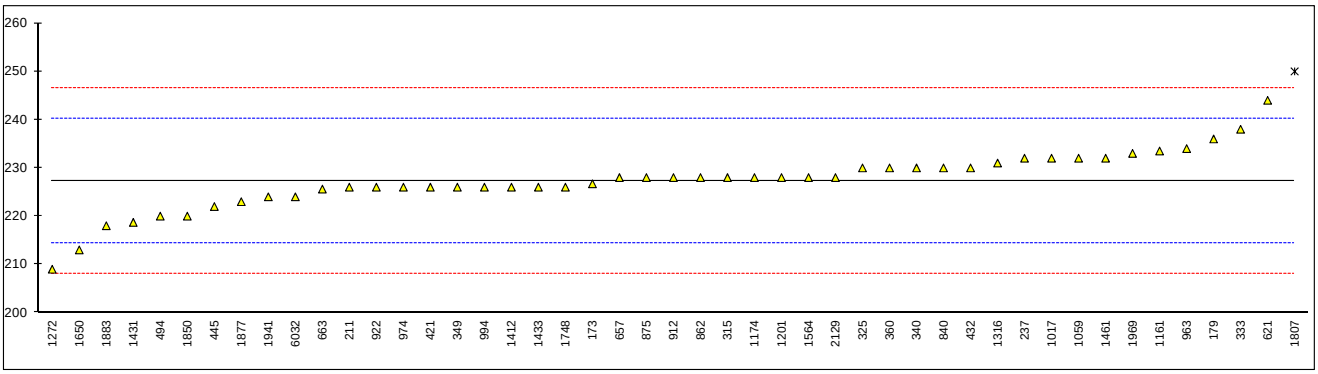


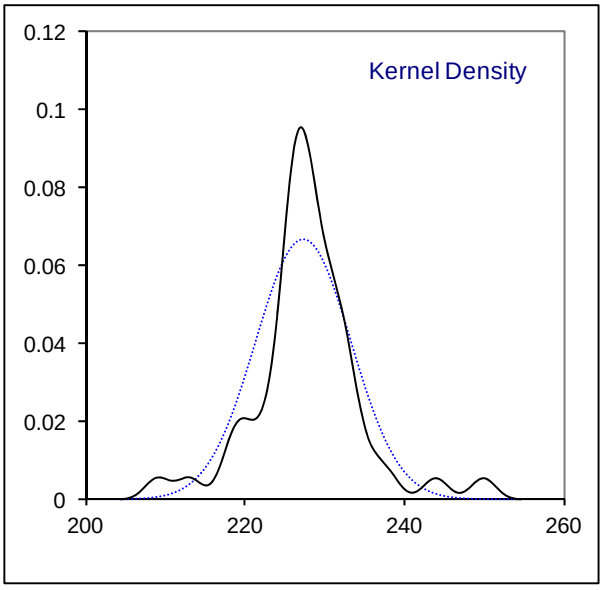


Determination of Flash Point COC. on Sample #16105; results in °C

lab	method	value	mark	z(targ)	remarks
173	D92	226.7		-0.10	
178		-----		-----	
179	D92	236		1.35	
211	D92	226		-0.21	
237	D92	232.0		0.73	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315	D92	228		0.10	
325	D92	230		0.41	
333	D92	238		1.66	
340	D92	230		0.41	
349	D92	226		-0.21	
360	D92	230		0.41	
421	ISO2592	226		-0.21	
432	D92	230		0.41	
445	D92	222		-0.83	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D92	220		-1.14	
496		-----		-----	
541		-----		-----	
621	D92	244.0		2.59	
657	D92	228		0.10	
663	D92	225.6		-0.27	
840	D92	230		0.41	
862	D92	228		0.10	
875	D92	228		0.10	
902		-----		-----	
912	D92	228		0.10	
922	D92	226		-0.21	
963	D92	234		1.04	
974	D92	226		-0.21	
994	D92	226.0		-0.21	
1017	D92	232		0.73	
1023		-----		-----	
1059	ISO2592	232		0.73	
1106		-----		-----	
1146		-----		-----	
1161	ISO2592	233.5		0.96	
1173		-----		-----	
1174	ISO2592	228		0.10	
1201	D92	228.0		0.10	
1235		-----		-----	
1272	ISO2592	209		-2.85	
1316	D92	231		0.57	
1412	D92	226.0		-0.21	
1431	D92	218.7		-1.34	
1433	D92	226		-0.21	
1461	ISO2592	232		0.73	
1564	D92	228		0.10	
1650	D92	213		-2.23	
1748	D92	226		-0.21	
1799		-----		-----	
1807	D92	250.0	R(0.05)	3.53	
1850	ISO2592	220		-1.14	
1877	D92	223		-0.67	
1883	D92	218		-1.45	
1941	ISO2592	224		-0.52	
1957		-----		-----	
1969	ISO2592	233		0.88	
2122		-----		-----	
2129	D92	228.0		0.10	
6010		-----		-----	
6016		-----		-----	
6032	D92	224		-0.52	
6034		-----		-----	
9090		-----		-----	

normality	not OK
n	46
outliers	1
mean (n)	227.34
st.dev. (n)	6.002
R(calc.)	16.81
R(D92:16)	18.00

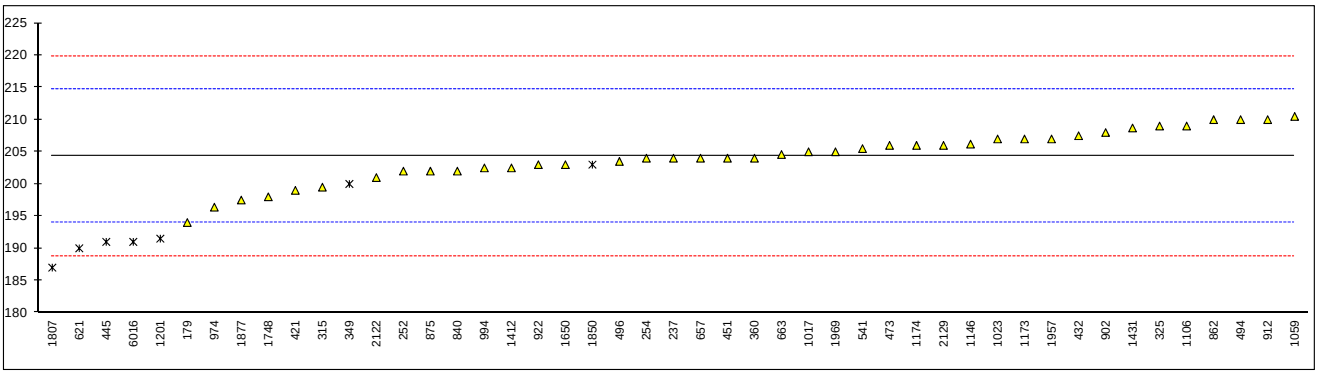


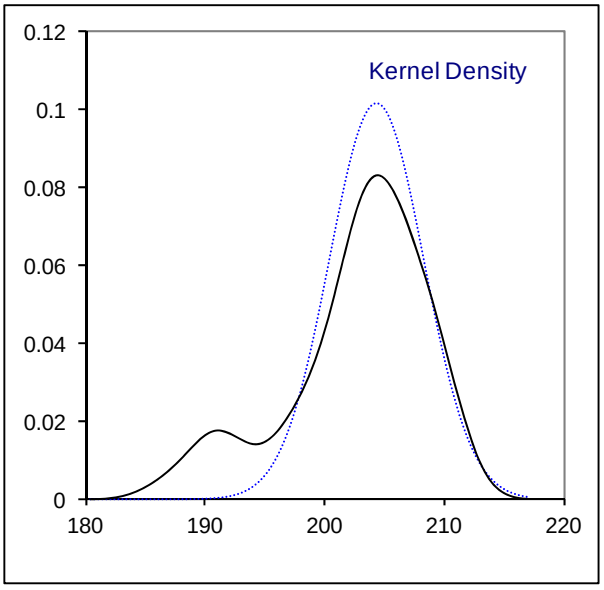


Determination of Flash Point PMcc on Sample #16105; results in °C

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179	D93	194		-2.00	
211		-----		-----	
237	D93-A	204		-0.07	
252	D93-A	202.0		-0.45	
254	D93-A	204.0		-0.07	
255		-----		-----	
256		-----		-----	
315	D93-A	199.5		-0.94	
325	D93-A	209		0.90	
333		-----		-----	
340		-----		-----	
349	D93-B	200	ex	-0.84	result excluded see §4.1
360	D93-A	204.0		-0.07	
421	ISO2719-A	199		-1.03	
432	D93-A	207.5		0.61	
445	D93-B	191.0	ex	-2.58	result excluded see §4.1
450		-----		-----	
451	D93-A	204		-0.07	
473	D93-A	206.0		0.32	
494	D93-A	210		1.09	
496	D93-A	203.5		-0.16	
541	D93-A	205.5		0.22	
621	D93-B	190.0	ex	-2.77	result excluded see §4.1
657	D93-A	204		-0.07	
663	D93-A	204.58		0.04	
840	D93-A	202		-0.45	
862	D93-A	210		1.09	
875	D93-A	202.0		-0.45	
902	D93-A	208.0		0.70	
912	D93-A	210		1.09	
922	D93-A	203		-0.26	
963		-----		-----	
974	D93-A	196.4		-1.53	
994	D93-A	202.5		-0.36	
1017	D93-A	205.0		0.13	
1023	D93-A	207		0.51	
1059	ISO2719-A	210.5		1.19	
1106	D93-A	209.0		0.90	
1146	D93-A	206.2		0.36	
1161		-----		-----	
1173	IP34-A	207.0		0.51	
1174	ISO2719-A	206		0.32	
1201	D93-B	191.5	ex	-2.48	result excluded see §4.1
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412	D93-A	202.5		-0.36	
1431	D93-A	208.7		0.84	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650	D93-A	203		-0.26	
1748	D93-A	198		-1.22	
1799		-----		-----	
1807	D93-A	187.0	R(0.01)	-3.35	
1850	ISO2719-B	203	ex	-0.26	result excluded see §4.1
1877	D93-A	197.5		-1.32	
1883		-----		-----	
1941		-----		-----	
1957	D93-A	207		0.51	
1969	ISO2719-A	205		0.13	
2122	IP34-A	201		-0.65	
2129	D93-A	206.0		0.32	
6010		-----		-----	
6016	D93-B	191	ex	-2.58	result excluded see §4.1
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	OK
n	40
outliers	1 (+6ex)
mean (n)	204.35
st.dev. (n)	3.933
R(calc.)	11.01
R(D93-A:16)	14.51





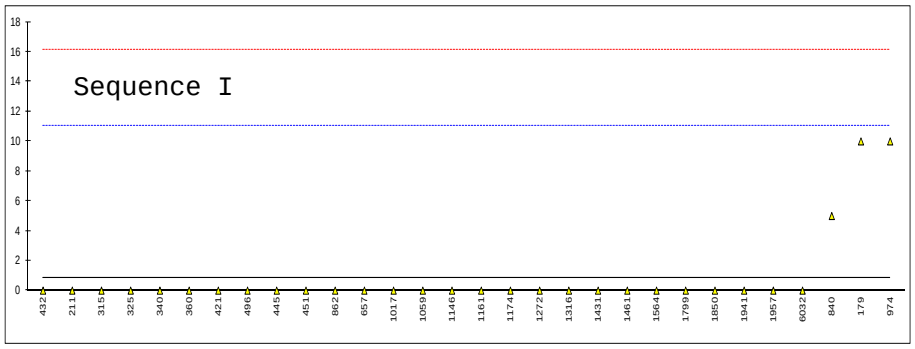
Determination of Foaming Tendency, 5 min blowing period on Sample #16105; results in ml

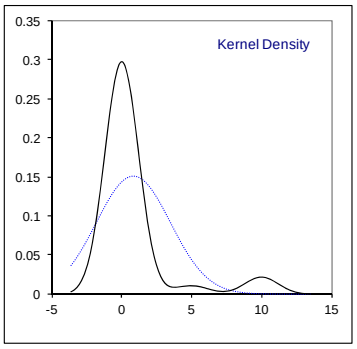
lab	method	diffuser	Seq. I	mark	z(targ)	Seq. II	mark	z(targ)	Seq. III	mark	z(targ)
173			-----		-----	-----		-----	-----		-----
178			-----		-----	-----		-----	-----		-----
179	D892	Metal (stainless steel)	10		1.80	10		-0.24	10		1.80
211	D892	Stone (non-metallic)	0		-0.16	10		-0.24	0		-0.16
237			-----		-----	-----		-----	-----		-----
252			-----		-----	-----		-----	-----		-----
254			-----		-----	-----		-----	-----		-----
255			-----		-----	-----		-----	-----		-----
256			-----		-----	-----		-----	-----		-----
315	D892Mod	Metal (stainless steel)	0		-0.16	30	R(0.05)	2.71	0		-0.16
325	D892	Metal (stainless steel)	0		-0.16	20		1.24	0		-0.16
333			-----		-----	-----		-----	-----		-----
340	D892	Metal (stainless steel)	0		-0.16	0		-1.71	0		-0.16
349			-----		-----	-----		-----	-----		-----
360	D892	Stone (non-metallic)	0		-0.16	10		-0.24	0		-0.16
421	ISO6247	Stone (non-metallic)	0		-0.16	10		-0.24	0		-0.16
432	D892	Stone (non-metallic)	0		-0.16	0		-1.71	0		-0.16
445	D892	Metal (stainless steel)	0		-0.16	20		1.24	0		-0.16
450			-----		-----	-----		-----	-----		-----
451	IP146	Stone (non-metallic)	0		-0.16	Trace		-----	0		-0.16
473			-----		-----	-----		-----	-----		-----
494			-----		-----	-----		-----	-----		-----
496	D892	Metal (stainless steel)	0		-0.16	0		-1.71	0		-0.16
541			-----		-----	-----		-----	-----		-----
621			-----		-----	-----		-----	-----		-----
657	D892	Stone (non-metallic)	0		-0.16	20		1.24	0		-0.16
663			-----		-----	-----		-----	-----		-----
840	D892	Stone (non-metallic)	5		0.82	15		0.50	5		0.82
862	D892	Metal (stainless steel)	0		-0.16	10		-0.24	0		-0.16
875			-----		-----	-----		-----	-----		-----
902			-----		-----	-----		-----	-----		-----
912			-----		-----	-----		-----	-----		-----
922			-----		-----	-----		-----	-----		-----
963			-----		-----	-----		-----	-----		-----
974	D892	Metal (stainless steel)	10		1.80	20		1.24	0		-0.16
994			-----		-----	-----		-----	-----		-----
1017	D892	Stone (non-metallic)	0		-0.16	0		-1.71	0		-0.16
1023			-----		-----	-----		-----	-----		-----
1059	D892	Stone (non-metallic)	0		-0.16	0		-1.71	0		-0.16
1106			-----		-----	-----		-----	-----		-----
1146	ISO6247	Metal (stainless steel)	0		-0.16	20		1.24	10		1.80
1161	ISO6247		0		-0.16	20		1.24	0		-0.16
1173			-----		-----	-----		-----	-----		-----
1174	ISO6247	Stone (non-metallic)	0		-0.16	10		-0.24	0		-0.16
1201			-----		-----	-----		-----	-----		-----
1235			-----		-----	-----		-----	-----		-----
1272	ISO6247		0		-0.16	10		-0.24	0		-0.16
1316	D892	Metal (stainless steel)	0		-0.16	20		1.24	0		-0.16
1412			-----		-----	-----		-----	-----		-----
1431	D892	Stone (non-metallic)	0		-0.16	20		1.24	0		-0.16
1433			-----		-----	-----		-----	-----		-----
1461	ISO6247		0		-0.16	10		-0.24	0		-0.16
1564	D892	Stone (non-metallic)	0		-0.16	10		-0.24	0		-0.16
1650			-----		-----	-----		-----	-----		-----
1748			-----		-----	-----		-----	-----		-----
1799	D892		0		-0.16	10		-0.24	0		-0.16
1807			-----		-----	-----		-----	-----		-----
1850	D892	Stone (non-metallic)	0		-0.16	0		-1.71	0		-0.16
1877			-----		-----	-----		-----	-----		-----
1883			-----		-----	-----		-----	-----		-----
1941	ISO6247	Metal (stainless steel)	0		-0.16	20		1.24	0		-0.16
1957	D892	Metal (stainless steel)	0		-0.16	20		1.24	0		-0.16
1969			-----		-----	-----		-----	-----		-----
2122			-----		-----	-----		-----	-----		-----
2129			-----		-----	-----		-----	-----		-----
6010			-----		-----	-----		-----	-----		-----
6016			-----		-----	-----		-----	-----		-----
6032	D892	Metal (stainless steel)	0		-0.16	10		-0.24	0		-0.16
6034			-----		-----	-----		-----	-----		-----
9090			-----		-----	-----		-----	-----		-----

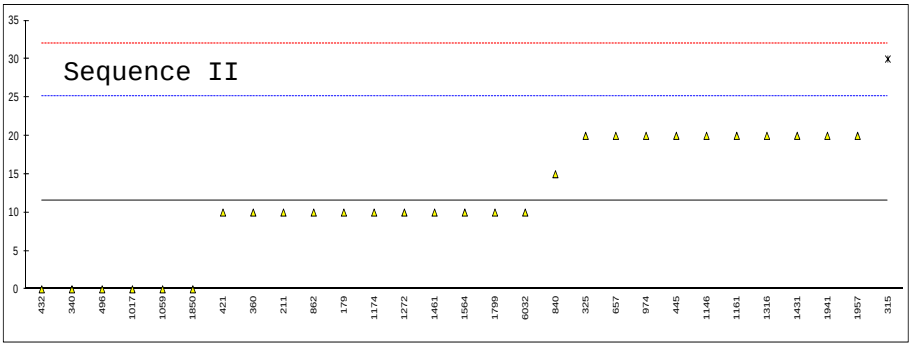
normality	not OK	OK	not OK
n	30	28	30
outliers	0	1	0
mean (n)	0.83	11.61	0.83
st.dev. (n)	2.653	7.583	2.653
R(calc.)	7.43	21.23	7.43
R(D892:13)	14.27	19.01	14.27

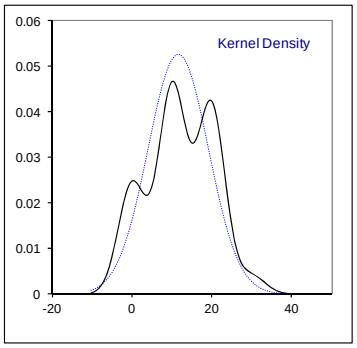
Sequence II – stone or metal diffuser:

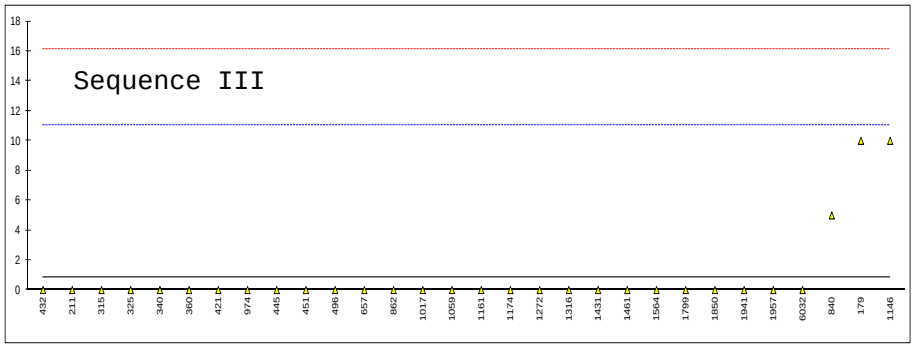
	Only stone diffuser	Only metal diffuser
normality	OK	OK
n	12	13
outliers	0	0
mean (n)	8.75	15.38
st.dev. (n)	7.424	8.771
R(calc.)	20.79	24.56
R(D892:13)	17.75	20.67

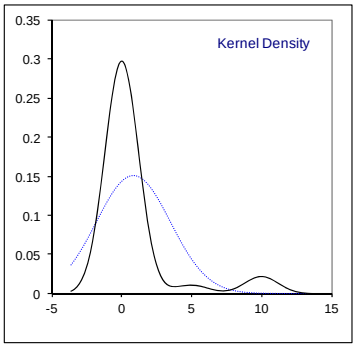












Determination of Foam Stability, 10 min settling point on Sample #16105; results in ml

lab	method	Seq. I	mark	z(targ)	Seq. II	mark	z(targ)	Seq. III	mark	z(targ)
173		-----		-----	-----		-----	-----		-----
178		-----		-----	-----		-----	-----		-----
179	D892	0		-----	0		-----	0		-----
211	D892	0		-----	0		-----	0		-----
237		-----		-----	-----		-----	-----		-----
252		-----		-----	-----		-----	-----		-----
254		-----		-----	-----		-----	-----		-----
255		-----		-----	-----		-----	-----		-----
256		-----		-----	-----		-----	-----		-----
315	D892	0		-----	0		-----	0		-----
325	D892	0		-----	0		-----	0		-----
333		-----		-----	-----		-----	-----		-----
340	D892	0		-----	0		-----	0		-----
349		-----		-----	-----		-----	-----		-----
360	D892	0		-----	0		-----	0		-----
421	ISO6247	0		-----	0		-----	0		-----
432	D892	0		-----	0		-----	0		-----
445	D892	0		-----	0		-----	0		-----
450		-----		-----	-----		-----	-----		-----
451	IP146	0		-----	0		-----	0		-----
473		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
496	D892	0		-----	0		-----	0		-----
541		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
657	D892	0		-----	0		-----	0		-----
663		-----		-----	-----		-----	-----		-----
840	D892	0		-----	0		-----	0		-----
862	D892	0		-----	0		-----	0		-----
875		-----		-----	-----		-----	-----		-----
902		-----		-----	-----		-----	-----		-----
912		-----		-----	-----		-----	-----		-----
922		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
974	D892	0		-----	0		-----	0		-----
994		-----		-----	-----		-----	-----		-----
1017	D892	0		-----	0		-----	0		-----
1023		-----		-----	-----		-----	-----		-----
1059	D892	0		-----	0		-----	0		-----
1106		-----		-----	-----		-----	-----		-----
1146	ISO6247	0		-----	0		-----	0		-----
1161	ISO6247	0		-----	0	C	-----	0	C	-----
1173		-----		-----	-----		-----	-----		-----
1174	ISO6247	0		-----	0		-----	0		-----
1201		-----		-----	-----		-----	-----		-----
1235		-----		-----	-----		-----	-----		-----
1272	ISO6247	0		-----	0		-----	0		-----
1316	D892	0		-----	0		-----	0		-----
1412		-----		-----	-----		-----	-----		-----
1431	D892	0		-----	0		-----	0		-----
1433		-----		-----	-----		-----	-----		-----
1461	ISO6247	0		-----	0		-----	0		-----
1564	D892	0		-----	0		-----	0		-----
1650		-----		-----	-----		-----	-----		-----
1748		-----		-----	-----		-----	-----		-----
1799	D892	0		-----	0		-----	0		-----
1807		-----		-----	-----		-----	-----		-----
1850	D892	0/0		-----	0/0		-----	0/0		-----
1877		-----		-----	-----		-----	-----		-----
1883		-----		-----	-----		-----	-----		-----
1941	ISO6247	0		-----	0		-----	0		-----
1957	D892	0		-----	0		-----	0		-----
1969		-----		-----	-----		-----	-----		-----
2122		-----		-----	-----		-----	-----		-----
2129		-----		-----	-----		-----	-----		-----
6010		-----		-----	-----		-----	-----		-----
6016		-----		-----	-----		-----	-----		-----
6032	D892	0		-----	0		-----	0		-----
6034		-----		-----	-----		-----	-----		-----
9090		-----		-----	-----		-----	-----		-----

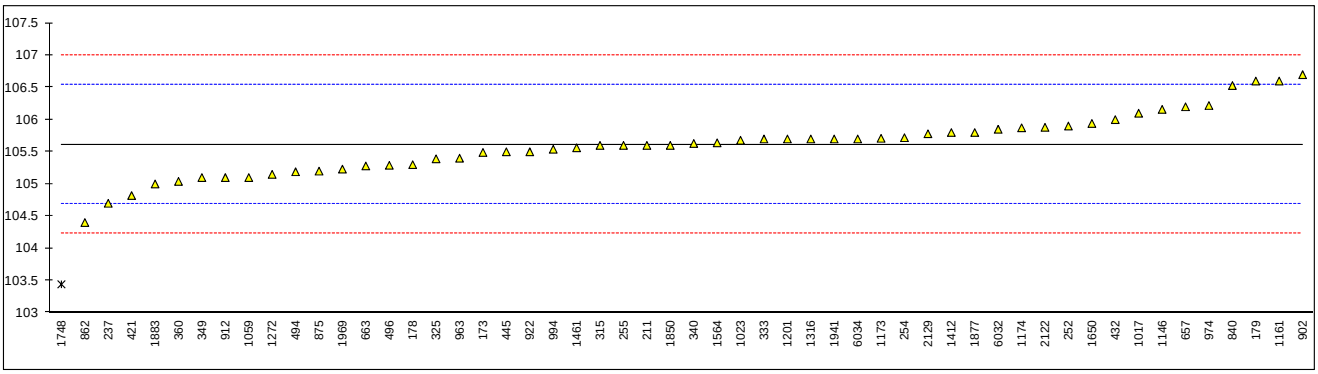
normality	n.a.	n.a.	n.a.
n	30	30	30
outliers	n.a.	n.a.	n.a.
mean (n)	0	0	0
st.dev. (n)	n.a.	n.a.	n.a.
R(calc.)	n.a.	n.a.	n.a.
R(D892:13)	n.a.	n.a.	n.a.

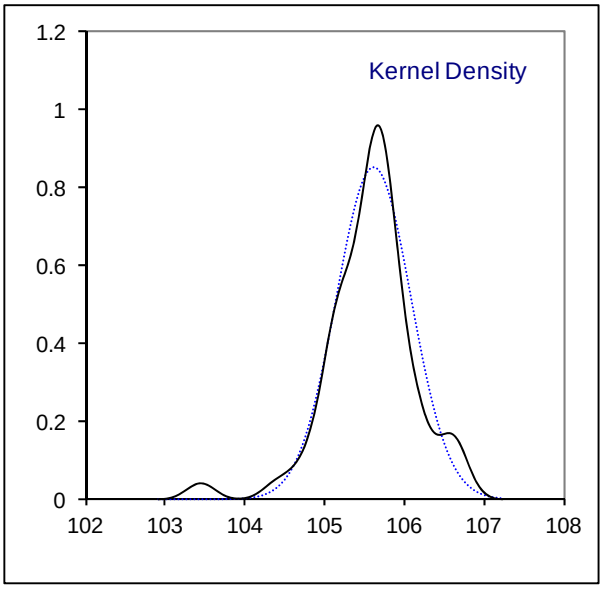
Lab 1161 first reported for Sequence II: 10 and for Sequence III: 10.

Determination of Kinematic Viscosity at 40°C on Sample #16105; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
173	D445	105.49		-0.27	
178	D445	105.3		-0.68	
179	D445	106.6		2.14	
211	D445	105.6		-0.03	
237	D445	104.7		-1.98	
252	D445	105.9		0.62	
254	D445	105.72		0.23	
255	D7279	105.6		-0.03	
256		-----		-----	
315	D445	105.6		-0.03	
325	D445	105.39		-0.48	
333	D445	105.7		0.19	
340	D445	105.63		0.04	
349	D445	105.1		-1.12	
360	D445	105.04		-1.25	
421	ISO3104	104.82		-1.72	
432	D445	106.0		0.84	
445	D445	105.5		-0.25	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D445	105.19		-0.92	
496	D445	105.29		-0.70	
541		-----		-----	
621		-----		-----	
657	D445	106.2		1.28	
663	D445	105.28		-0.72	
840	D445	106.53		1.99	
862	D445	104.4		-2.64	
875	D445	105.2		-0.90	
902	D445	106.7	C	2.36	first reported: 103.0
912	D445	105.1		-1.12	
922	D445	105.5		-0.25	
963	D445	105.4		-0.46	
974	D445	106.22		1.32	
994	D445	105.54		-0.16	
1017	D445	106.1		1.06	
1023	D445	105.68		0.15	
1059	ISO3104	105.1		-1.12	
1106		-----		-----	
1146	D445	106.16		1.19	
1161	ISO3104	106.6		2.14	
1173	IP71	105.71		0.21	
1174	ISO3104	105.8725		0.56	
1201	D445	105.7		0.19	
1235		-----		-----	
1272	ISO3104	105.15		-1.01	
1316	ISO3104	105.7		0.19	
1412	D445	105.8		0.41	
1431		-----		-----	
1433		-----		-----	
1461	ISO3104	105.5630		-0.11	
1564	D445	105.64		0.06	
1650	D445	105.94		0.71	
1748	D445	103.44	C,R(0.01)	-4.72	first reported 102.3
1799		-----		-----	
1807		-----		-----	
1850	ISO3104	105.6		-0.03	
1877	D445	105.8		0.41	
1883	D445	105.00		-1.33	
1941	ISO3104	105.7		0.19	
1957		-----		-----	
1969	ISO3104	105.2305		-0.83	
2122		105.88		0.58	
2129	D445	105.780		0.36	
6010		-----		-----	
6016		-----		-----	
6032	D7279	105.85		0.51	
6034	D445	105.7		0.19	
9090		-----		-----	

normality	OK
n	53
outliers	1
mean (n)	105.613
st.dev. (n)	0.4705
R(calc.)	1.317
R(D445:15)	1.288

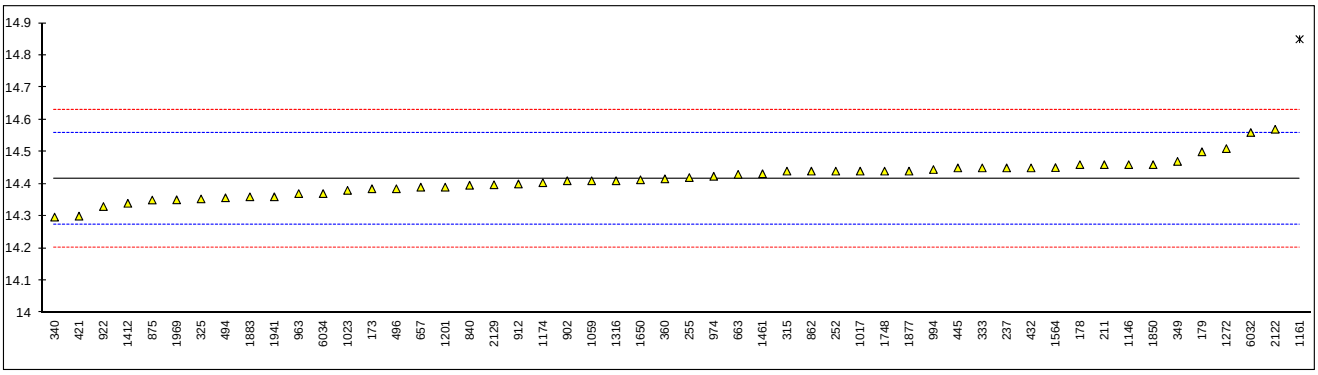


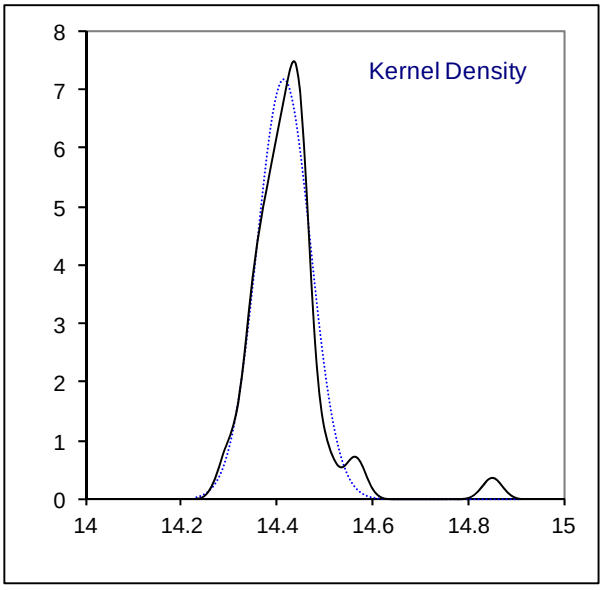


Determination of Kinematic Viscosity at 100°C on Sample #16105; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
173	D445	14.385		-0.44	
178	D445	14.46		0.62	
179	D445	14.50		1.18	
211	D445	14.46		0.62	
237	D445	14.45		0.48	
252	D445	14.44		0.34	
254		-----		-----	
255	D7279	14.42		0.06	
256		-----		-----	
315	D445	14.44		0.34	
325	D445	14.3535		-0.88	
333	D445	14.45		0.48	
340	D445	14.297		-1.68	
349	D445	14.47		0.76	
360	D445	14.416		0.00	
421	ISO3104	14.300		-1.63	
432	D445	14.45		0.48	
445	D445	14.45		0.48	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D445	14.357		-0.83	
496	D445	14.385		-0.44	
541		-----		-----	
621		-----		-----	
657	D445	14.39		-0.37	
663	D445	14.430		0.20	
840	D445	14.396		-0.28	
862	D445	14.44		0.34	
875	D445	14.35		-0.93	
902	D445	14.41		-0.08	
912	D445	14.40		-0.23	
922	D445	14.33		-1.21	
963	D445	14.37		-0.65	
974	D445	14.424		0.11	
994	D445	14.445		0.41	
1017	D445	14.44		0.34	
1023	D445	14.38		-0.51	
1059	ISO3104	14.41		-0.08	
1106		-----		-----	
1146	D445	14.460		0.62	
1161	ISO3104	14.85	C,R(0.01)	6.11	first reported: 14.78
1173		-----		-----	
1174	ISO3104	14.4040		-0.17	
1201	D445	14.39		-0.37	
1235		-----		-----	
1272	ISO3104	14.51		1.32	
1316	ISO3104	14.41		-0.08	
1412	D445	14.34		-1.07	
1431		-----		-----	
1433		-----		-----	
1461	ISO3104	14.4317		0.22	
1564	D445	14.451		0.49	
1650	D445	14.413		-0.04	
1748	D445	14.44		0.34	
1799		-----		-----	
1807		-----		-----	
1850	ISO3104	14.46		0.62	
1877	D445	14.44		0.34	
1883	D445	14.36		-0.79	
1941	ISO3104	14.36		-0.79	
1957		-----		-----	
1969	ISO3104	14.3509		-0.92	
2122		14.57		2.17	
2129	D445	14.3975		-0.26	
6010		-----		-----	
6016		-----		-----	
6032	D7279	14.56		2.03	
6034	D445	14.37		-0.65	
9090		-----		-----	

normality	OK
n	51
outliers	1
mean (n)	14.416
st.dev. (n)	0.0556
R(calc.)	0.156
R(D445:15)	0.199



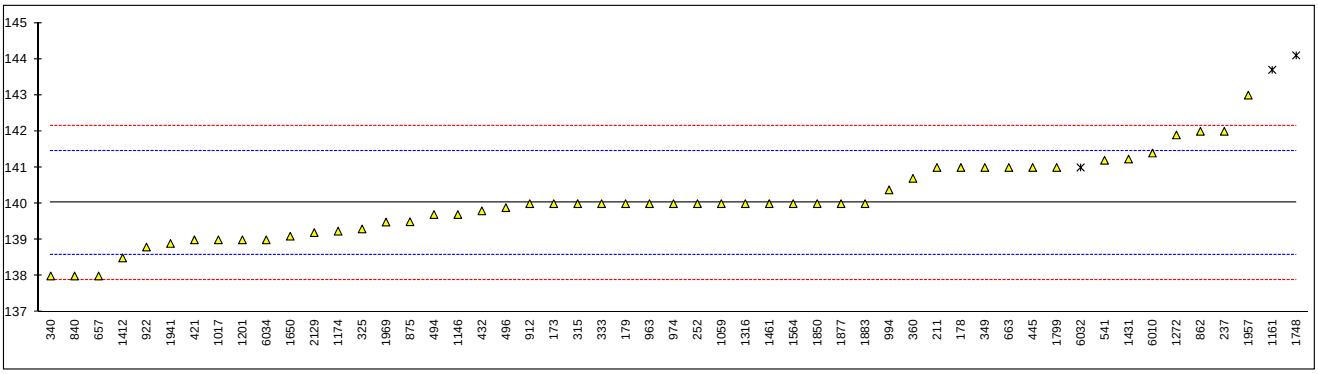


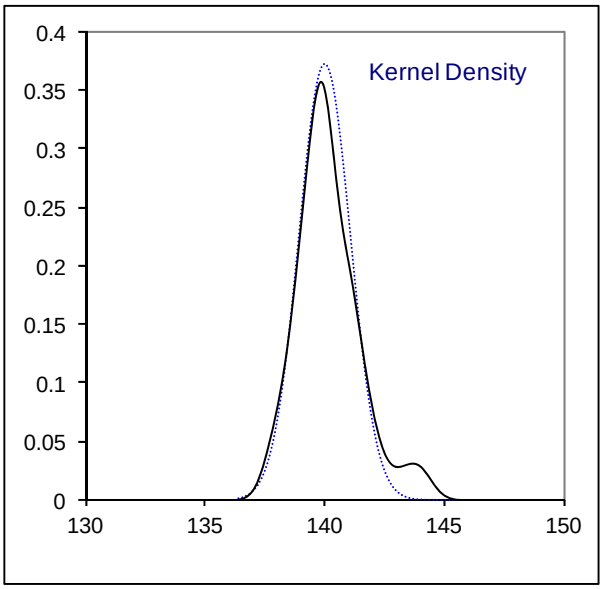
Determination of Viscosity Index on Sample #16105

lab	method	value	mark	z(targ)	calc. iis	mark	remarks
173	D2270	140		-0.03	139.61		
178	D2270	141		1.37	140.99		
179	D2270	140		-0.03	139.66		
211	D2270	141		1.37	140.54		
237	D2270	142		2.77	141.73		
252	D2270	140		-0.03	139.81		
254		-----		-----	-----		
255		-----		-----	139.96	ex	test result excluded, based on D7279
256		-----		-----	-----		
315	D2270	140		-0.03	140.25		
325	D2270	139.3		-1.01	139.30		
333	D2270	140		-0.03	140.25		
340	D2270	138		-2.83	138.12		
349	D2270	141		1.37	141.43		
360	D2270	140.7		0.95	140.73		
421	ISO2909	139		-1.43	139.35		
432	D2270	139.8		-0.31	139.81		
445	D2270	141		1.37	140.55		
450		-----		-----	-----		
451		-----		-----	-----		
473		-----		-----	-----		
494	D2270	139.7		-0.45	139.64		
496	D2270	139.89		-0.18	139.91		
541	D2270	141.2		1.65	141.16		calculated from Stabinger test results
621		-----		-----	-----		
657	D2270	138		-2.83	138.65		
663	D2270	141.0		1.37	140.58		
840	D2270	138		-2.83	138.26		
862	D2270	142		2.77	142.04		
875	D2270	139.5		-0.73	139.53		
902		-----		-----	138.22		
912	D2270	140		-0.03	140.41		
922	D2270	138.8		-1.71	138.79		
963	D2270	140		-0.03	139.53		
974	D2270	140	E	-0.03	139.11		
994	D2270	140.38		0.51	140.41		
1017	D2270	139		-1.43	139.52		
1023		-----		-----	139.26		
1059	ISO2909	140		-0.03	140.55		
1106		-----		-----	-----		
1146	D2270	139.7		-0.45	139.72		
1161	D2270	143.7	DG(0.05),E	5.15	144.63	ex	outlier in viscosity at 100°C
1173		-----		-----	-----		
1174	ISO2909	139.24		-1.09	139.33		
1201	D2270	139		-1.43	139.38		
1235		-----		-----	-----		
1272	ISO2909	141.9		2.63	141.94		
1316	D2270	140		-0.03	139.67		
1412	D2270	138.5		-2.13	138.50		
1431	D2270	141.233		1.70	141.29		calculated from Stabinger test results
1433		-----		-----	-----		
1461	ISO2909	140		-0.03	140.19		
1564	D2270	140		-0.03	140.35		
1650	D2270	139.1		-1.29	139.36		
1748	D2270	144.1	C,DG(0.05),E	5.71	143.49	ex	outlier in viscosity at 40°C, first reported: 145.2
1799	D2270	141.0		1.37	141.07		calculated from Stabinger test results
1807		-----		-----	-----		
1850	ISO2909	140		-0.03	140.54		
1877	D2270	140		-0.03	139.96		
1883		140		-0.03	139.97		
1941	ISO2909	138.9		-1.57	138.94		
1957	D2270	143		4.17	142.80		calculated from Stabinger test results
1969	ISO2909	139.49		-0.74	139.50		
2122		-----		-----	141.72		
2129	D2270	139.2		-1.15	139.37		
6010	D2270	141.4		1.93	141.48		calculated from Stabinger test results
6016		-----		-----	-----		
6032	D2270	141	ex	1.37	141.62	ex	test result excluded, based on D7279
6034		139		-1.43	139.09		
9090		-----		-----	-----		

		calc. iis	calc. D445 only	calc. D7042 only*
normality	OK	OK	OK	not OK
n	50	53	45	17
outliers	2 (+1ex)	0 (+4ex)	2	1
mean (n)	140.019	140.035	139.847	141.212
st.dev. (n)	1.0720	1.0411	0.9576	0.9049
R(calc.)	3.002	2.915	2.681	2.534
R(D2270:10)	2.000	2.000	2.000	2.000

* calculating using all D7042 results from page 46 and 48

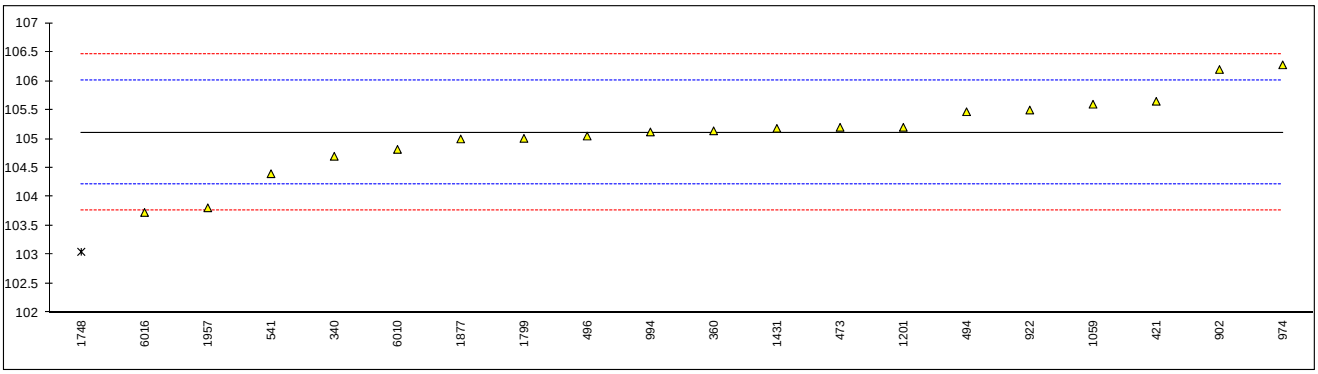


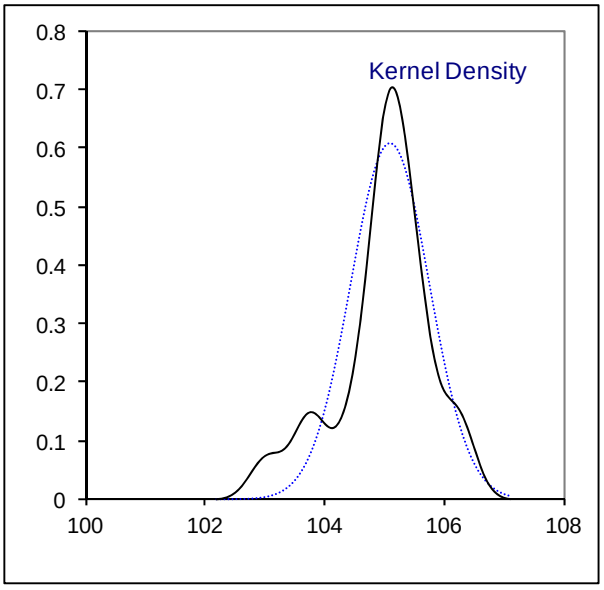


Determination of Viscosity Stabinger at 40°C on Sample #16105; results in mm^2/s

lab	method	value	mark	z(targ)	
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340	D7042	104.7		-0.91	
349		-----		-----	
360	D7042	105.14		0.07	
421	D7042	105.65		1.21	
432		-----		-----	
445		-----		-----	
450		-----		-----	
451		-----		-----	
473	D7042	105.20		0.20	
494	D7042	105.47		0.80	
496	D7042	105.05		-0.13	
541	D7042	104.4		-1.58	
621		-----		-----	
657		-----		-----	
663		-----		-----	
840		-----		-----	
862		-----		-----	
875		-----		-----	
902	D7042	106.2	C	2.43	first reported: 107.2
912		-----		-----	
922	D7042	105.5		0.87	
963		-----		-----	
974	D7042	106.28		2.61	
994	D7042	105.12		0.03	
1017		-----		-----	
1023		-----		-----	
1059	D7042	105.6		1.09	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201	D7042	105.2	C	0.20	first reported: 101.0
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431	D7042	105.183		0.17	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650		-----		-----	
1748	D7042	103.05	C,R(0.05)	-4.58	first reported: 102.96
1799	D7042	105.01		-0.22	
1807		-----		-----	
1850		-----		-----	
1877	D7042	105.0		-0.24	
1883		-----		-----	
1941		-----		-----	
1957	D7042	103.81		-2.89	
1969		-----		-----	
2122		-----		-----	
2129		-----		-----	
6010	D7042	104.82		-0.64	
6016	D7042	103.73		-3.07	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	OK
n	19
outliers	1
mean (n)	105.109
st.dev. (n)	0.6570
R(calc.)	1.840
R(D7042:14)	1.258

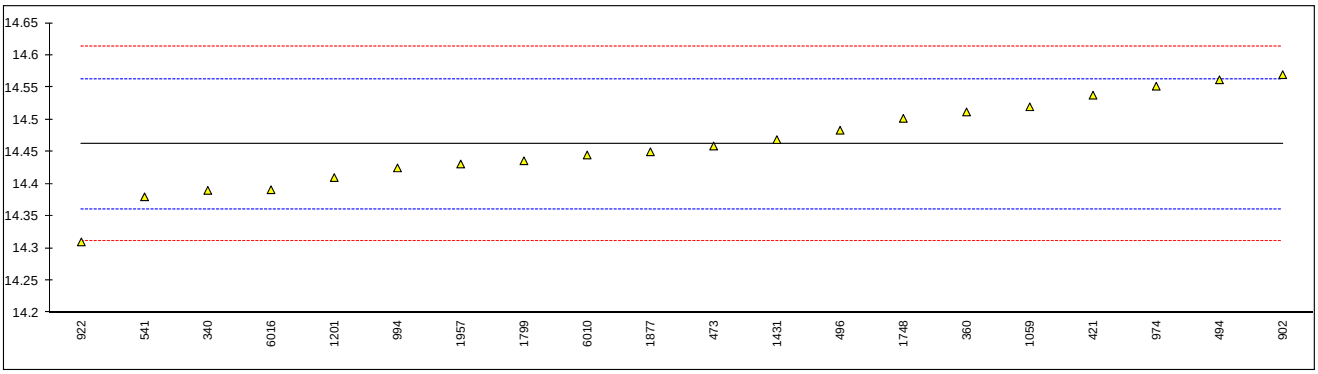


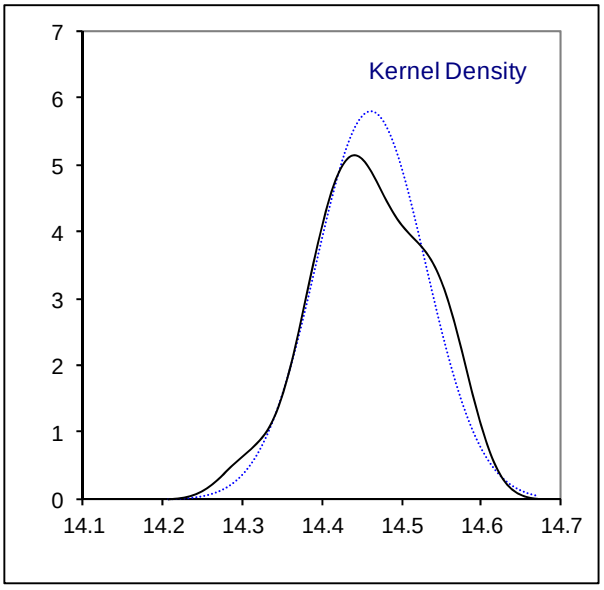


Determination of Viscosity Stabinger at 100°C on Sample #16105; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340	D7042	14.39		-1.42	
349		-----		-----	
360	D7042	14.512		1.00	
421	D7042	14.538		1.51	
432		-----		-----	
445		-----		-----	
450		-----		-----	
451		-----		-----	
473	D7042	14.459		-0.06	
494	D7042	14.562		1.99	
496	D7042	14.4835		0.43	
541	D7042	14.38		-1.62	
621		-----		-----	
657		-----		-----	
663		-----		-----	
840		-----		-----	
862		-----		-----	
875		-----		-----	
902	D7042	14.57		2.15	
912		-----		-----	
922	D7042	14.31		-3.01	
963		-----		-----	
974	D7042	14.552		1.79	
994	D7042	14.425		-0.73	
1017		-----		-----	
1023		-----		-----	
1059	D7042	14.52		1.16	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201	D7042	14.41	C	-1.03	first reported: 12.49
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431	D7042	14.469		0.14	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650		-----		-----	
1748	D7042	14.502		0.80	
1799	D7042	14.436		-0.51	
1807		-----		-----	
1850		-----		-----	
1877	D7042	14.45		-0.23	
1883		-----		-----	
1941		-----		-----	
1957	D7042	14.431		-0.61	
1969		-----		-----	
2122		-----		-----	
2129		-----		-----	
6010	D7042	14.445		-0.33	
6016	D7042	14.391		-1.40	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	OK
n	20
outliers	0
mean (n)	14.462
st.dev. (n)	0.0687
R(calc.)	0.192
R(D7042:14)	0.141



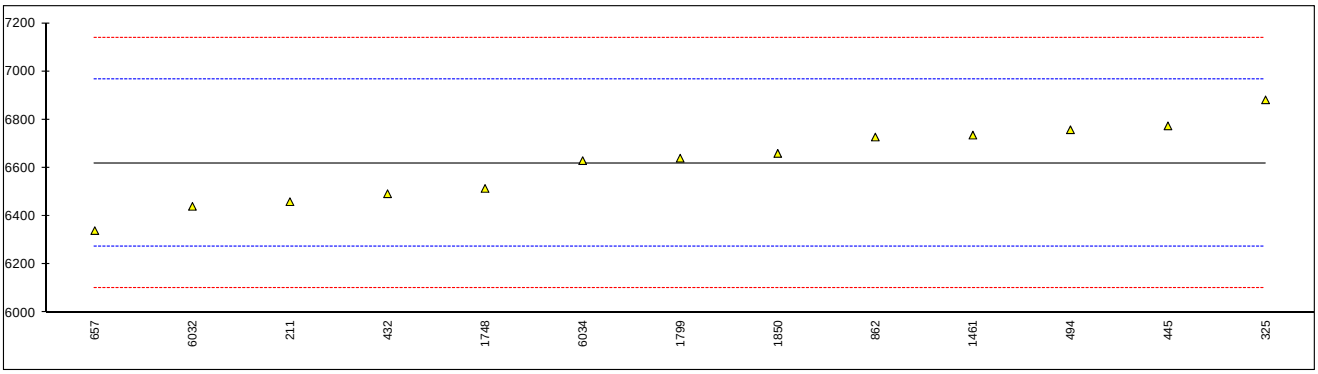


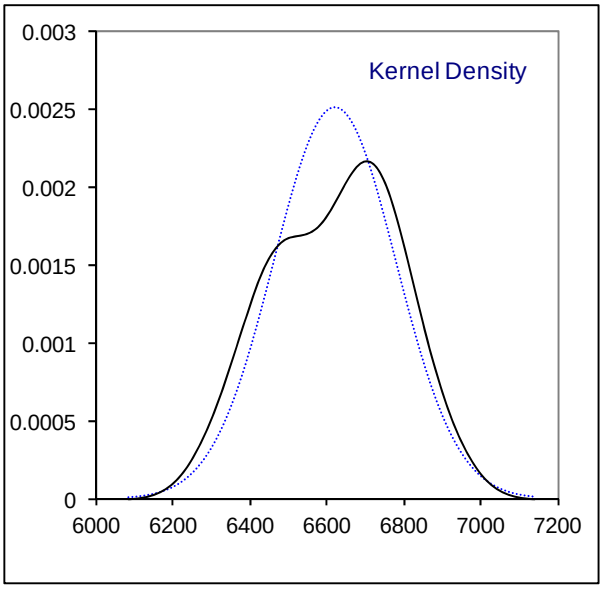
Determination of Viscosity, Apparent (CCS) at -20°C on Sample #16105; results in mPa·s

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211	D5293	6460	C	-0.93	first reported 7320
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D5293	6882		1.52	
333		-----		-----	
340		-----		-----	
349		-----		-----	
360		-----		-----	
421		-----		-----	
432	D5293	6493		-0.73	
445	D5293	6774		0.89	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D5293	6758		0.80	
496		-----		-----	
541		-----		-----	
621		-----		-----	
657	D5293	6340		-1.62	
663		-----		-----	
840		-----		-----	
862	D5293	6728		0.63	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461	D5293	6736		0.67	
1564		-----		-----	
1650		-----		-----	
1748	D5293	6515		-0.61	
1799	D5293	6640		0.12	
1807		-----		-----	
1850	D5293	6660		0.23	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129		-----		-----	
6010		-----		-----	
6016		-----		-----	
6032	D5293	6440.7		-1.04	
6034	D5293	6630		0.06	
9090		-----		-----	
				-----	

normality	OK
n	13
outliers	0
mean (n)	6619.75
st.dev. (n)	158.620
R(calc.)	444.14
R(D5293:15)	483.24

R(D5293:15) constant cooling instrument = 483.24
R(D5293:15) thermo-electrically cooled instrument = 397.18

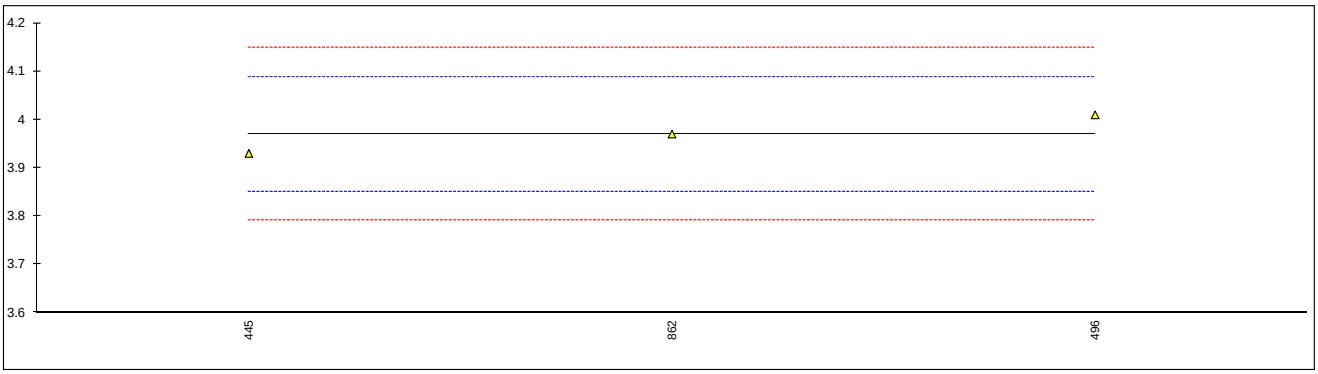




Determination of Viscosity HTHS by Tapered Bearing Simulator on Sample #16105; results in mPa·s

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340		-----		-----	
349		-----		-----	
360		-----		-----	
421		-----		-----	
432		-----		-----	
445	D4741	3.93		-0.67	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494		-----		-----	
496	CEC L-36-90	4.01		0.67	
541		-----		-----	
621		-----		-----	
657		-----		-----	
663		-----		-----	
840		-----		-----	
862	D4741	3.97		0.00	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129		-----		-----	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	unknown
n	3
outliers	n.a.
mean (n)	3.970
st.dev. (n)	0.0400
R(calc.)	0.112
R(D4683:13)	0.166

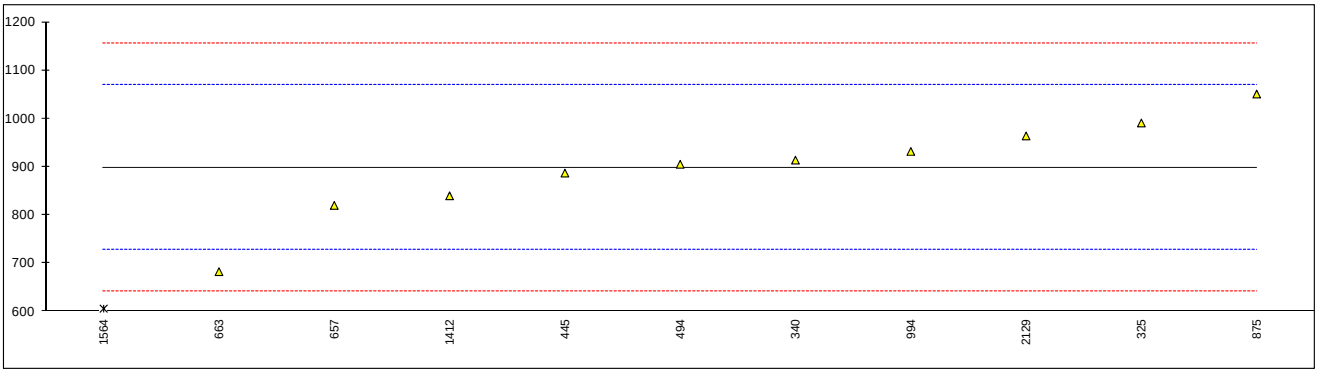


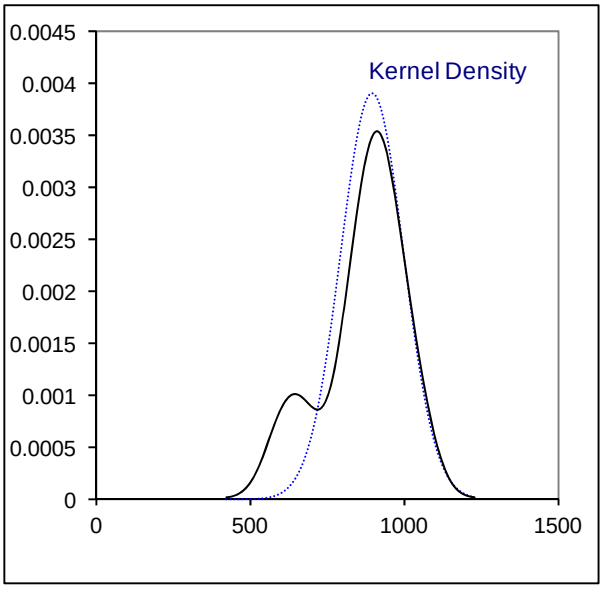
Determination of Nitrogen on Sample #16105; results in mg/kg

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D5762	991		1.08	
333		-----		-----	
340	D5762	914		0.18	
349		-----		-----	
360		-----		-----	
421		-----		-----	
432		-----		-----	
445	D5762	887		-0.14	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D5762	905.32		0.08	
496		-----		-----	
541		-----		-----	
621		-----		-----	
657	D5762	820		-0.92	
663	D5762	682.6		-2.53	
840		-----		-----	
862		-----		-----	
875	D5762	1051		1.78	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994	D5762	932		0.39	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235		-----		-----	
1272		-----		-----	
1316		-----		-----	
1412	D5762	840		-0.69	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564	D4629	606.0	ex	-3.43	result excluded, see §4.1
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D3228	964		0.76	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	suspect
n	10
outliers	0 (+1ex)
mean (n)	898.692
st.dev. (n)	102.1116
R(calc.)	285.912
R(D5762:16)	239.052

R(D3228:08) = 200.000

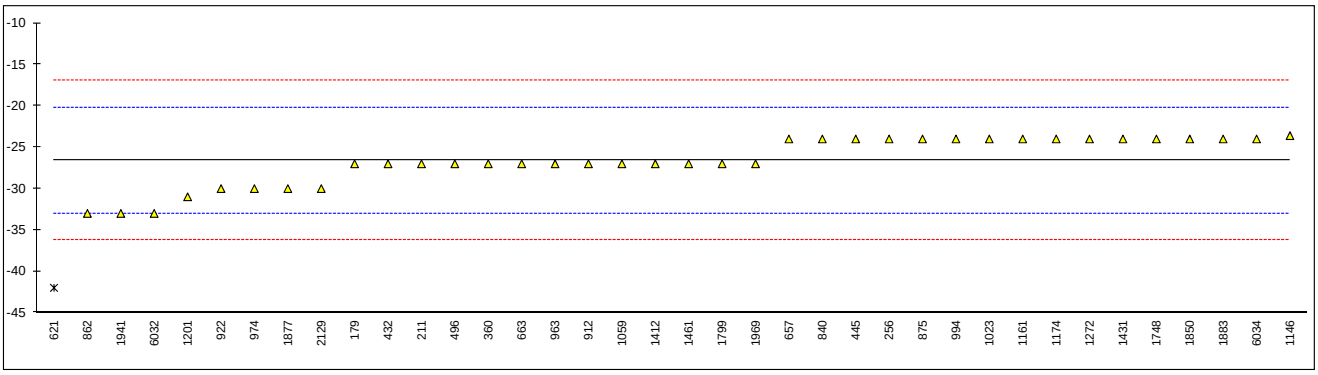


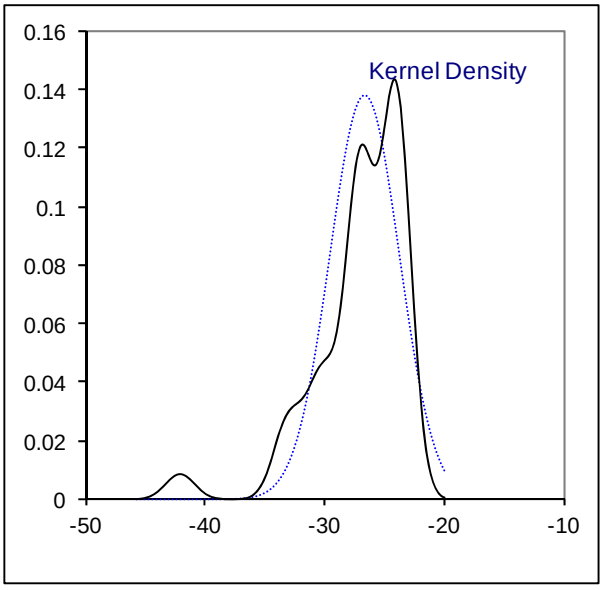


Determination of Pour Point, Manual on Sample #16105; results in °C

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179	D97	-27		-0.12	
211	D97	-27		-0.12	
237		-----		-----	
252		-----		-----	
254	D97	<-18.0		-----	
255		-----		-----	
256	D97	-24		0.81	
315		-----		-----	
325		-----		-----	
333		-----		-----	
340		-----		-----	
349		-----		-----	
360	D97	-27		-0.12	
421		-----		-----	
432	D97	-27		-0.12	
445	D97	-24		0.81	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494		-----		-----	
496	D97	-27		-0.12	
541		-----		-----	
621	D97	-42.0	R(0.01)	-4.79	
657	D97	-24		0.81	
663	D97	-27		-0.12	
840	D97	-24		0.81	
862	D97	-33		-1.99	
875	D97	-24		0.81	
902		-----		-----	
912	D97	-27		-0.12	
922	D97	-30		-1.05	
963	D97	-27		-0.12	
974	D97	-30		-1.05	
994	D97	-24		0.81	
1017		-----		-----	
1023	D97	-24		0.81	
1059	ISO3016	-27		-0.12	
1106		-----		-----	
1146	D97	-23.6		0.94	
1161	ISO3016	-24		0.81	
1173		-----		-----	
1174	ISO3016	-24		0.81	
1201	D97	-31		-1.37	
1235		-----		-----	
1272	ISO3016	-24		0.81	
1316		-----		-----	
1412	D97	-27		-0.12	
1431	D97	-24.0		0.81	
1433		-----		-----	
1461	ISO3016	-27		-0.12	
1564		-----		-----	
1650		-----		-----	
1748	D97	-24		0.81	
1799	D97	-27		-0.12	
1807		-----		-----	
1850	ISO3016	-24		0.81	
1877	D97	-30		-1.05	
1883	D97	-24		0.81	
1941	ISO3016	-33		-1.99	
1957		-----		-----	
1969	ISO3016	-27		-0.12	
2122		-----		-----	
2129	D97	-30		-1.05	
6010		-----		-----	
6016		-----		-----	
6032	D97	-33		-1.99	
6034	D97	-24		0.81	
9090		-----		-----	

normality	OK
n	37
outliers	1
mean (n)	-26.61
st.dev. (n)	2.891
R(calc.)	8.10
R(D97:16)	9.00

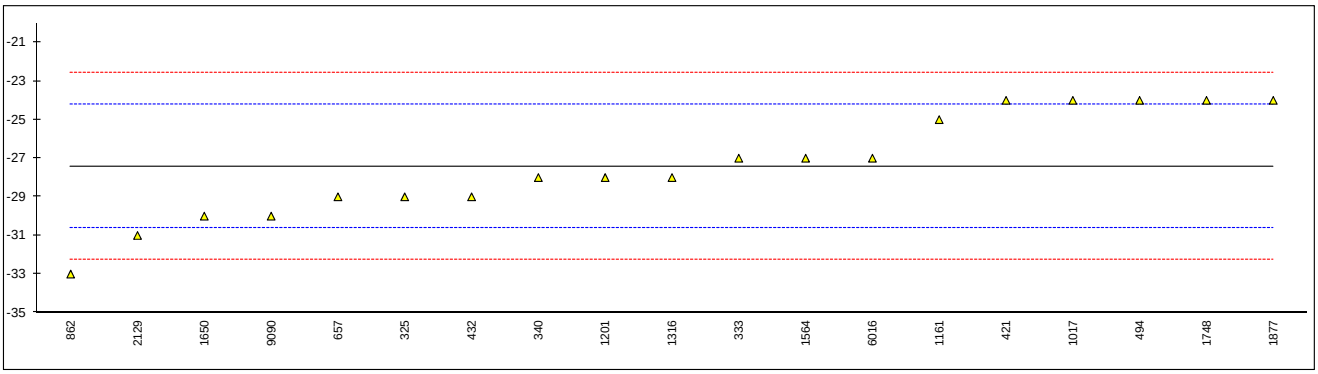


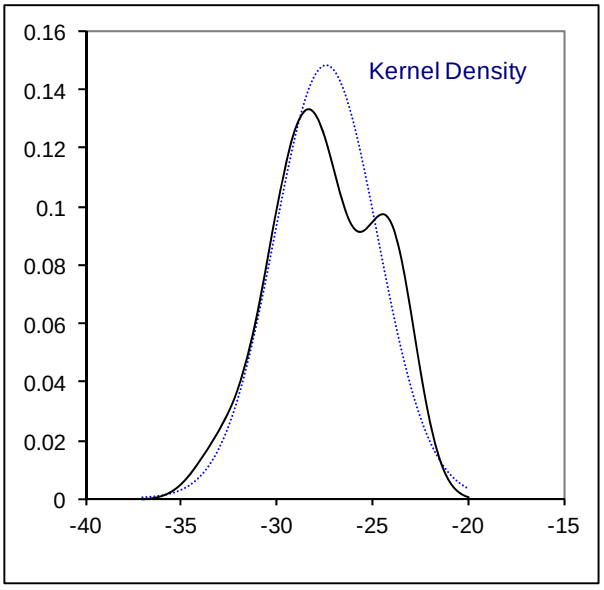


Determination of Pour Point, Automated, 1°C interval on Sample #16105; results in °C

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D5950	-29		-0.98	
333	D5950	-27		0.26	
340	D5950	-28		-0.36	
349		-----		-----	
360		-----		-----	
421	D6749	-24		2.13	
432	D5950	-29		-0.98	
445		-----		-----	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D5950	-24		2.13	
496		-----		-----	
541		-----		-----	
621		-----		-----	
657	D5950	-29		-0.98	
663		-----		-----	
840		-----		-----	
862	D5950	-33		-3.47	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974		-----		-----	
994		-----		-----	
1017	D5950	-24		2.13	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161	D6749	-25		1.51	
1173		-----		-----	
1174		-----		-----	
1201	D5950	-28		-0.36	
1235		-----		-----	
1272		-----		-----	
1316	D5950	-28		-0.36	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564	D5950	-27		0.26	
1650	D5950	-30		-1.60	
1748	D5950	-24		2.13	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1877	D5950	-24		2.13	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D5950	-31		-2.23	
6010		-----		-----	
6016	D5950	-27		0.26	
6032		-----		-----	
6034		-----		-----	
9090	D5950	-30		-1.60	

normality	OK
n	19
outliers	0
mean (n)	-27.42
st.dev. (n)	2.694
R(calc.)	7.54
R(D5950:14)	4.50

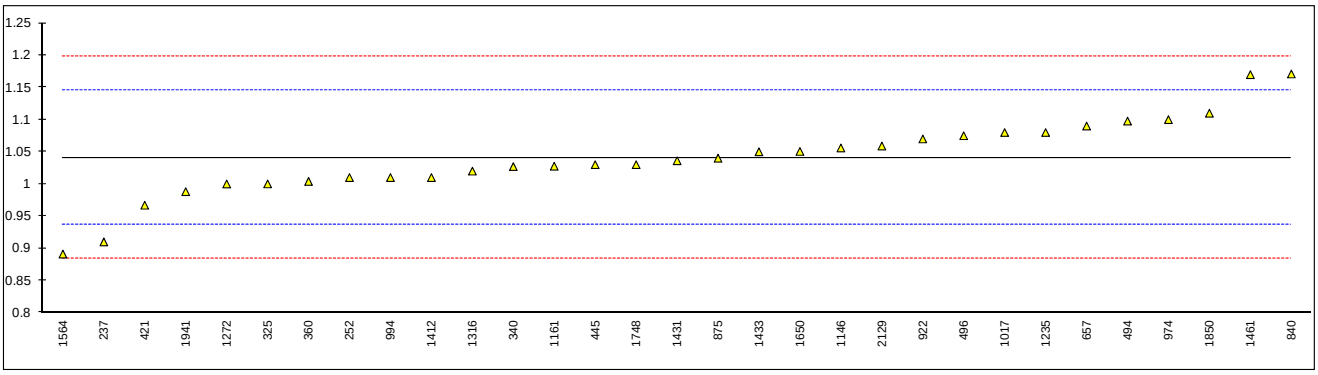


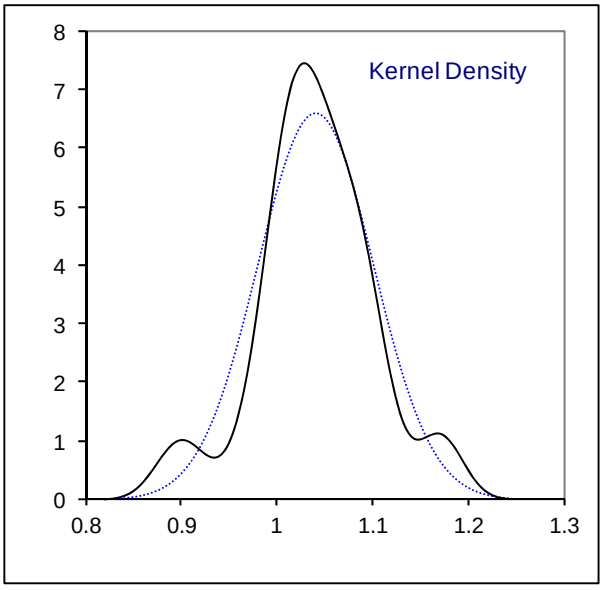


Determination of Sulphated Ash on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237	D874	0.910		-2.50	
252	D874	1.01		-0.59	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	D874	1.000108493		-0.78	
333		-----		-----	
340	D874	1.027		-0.26	
349		-----		-----	
360	D874	1.004		-0.70	
421	ISO3987	0.967		-1.41	
432		-----		-----	
445	D874	1.03		-0.20	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D874	1.0978		1.09	
496	D874	1.075		0.66	
541		-----		-----	
621		-----		-----	
657	D874	1.09		0.94	
663		-----		-----	
840	D874	1.171		2.49	
862		-----		-----	
875	D874	1.04		-0.01	
902		-----		-----	
912		-----		-----	
922	D874	1.07		0.56	
963		-----		-----	
974	D874	1.10		1.14	
994	D874	1.01		-0.59	
1017	D874	1.08		0.75	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146	D874	1.056		0.29	
1161	ISO3987	1.0276		-0.25	
1173		-----		-----	
1174		-----		-----	
1201		-----		-----	
1235	ISO3987	1.08		0.75	
1272	ISO3987	1.0		-0.78	
1316	D874	1.02		-0.40	
1412	D874	1.01		-0.59	
1431	D874	1.036		-0.09	
1433	ISO3987	1.05		0.18	
1461	ISO3987	1.17		2.48	
1564	D874	0.891		-2.86	
1650	D874	1.0506		0.19	
1748	D874	1.03		-0.20	
1799		-----		-----	
1807		-----		-----	
1850	ISO3987	1.11		1.33	
1877		-----		-----	
1883		-----		-----	
1941	ISO3987	0.988		-1.01	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D874	1.059		0.35	
6010		-----		-----	
6016		-----		-----	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

normality	suspect
n	31
outliers	0
mean (n)	1.041
st.dev. (n)	0.0605
R(calc.)	0.169
R(D874:13a)	0.146

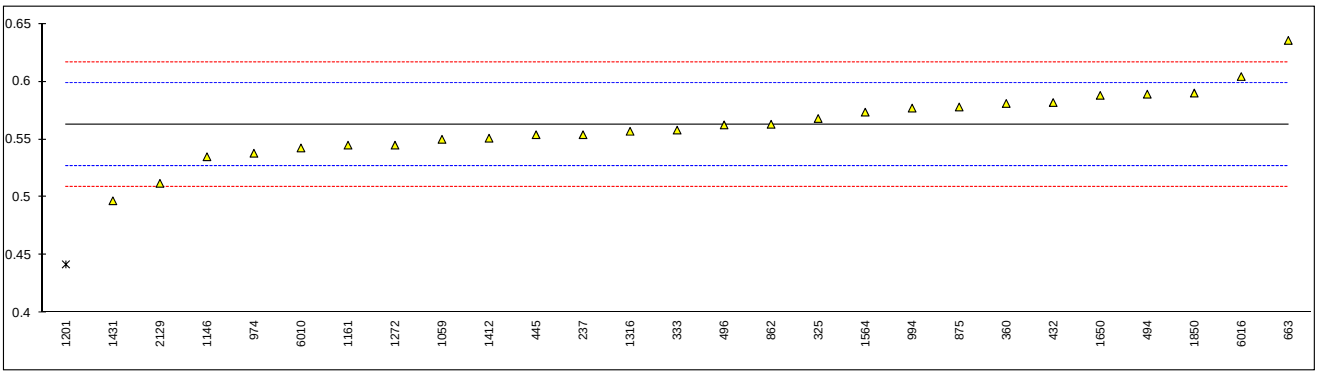


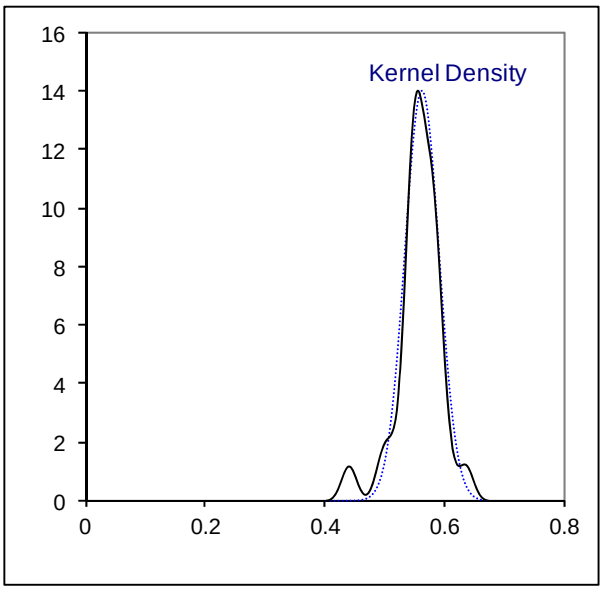


Determination of Sulphur on Sample #16105; results in %M/M

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178		-----		-----	
179		-----		-----	
211		-----		-----	
237	D4294	0.554		-0.49	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315		-----		-----	
325	INH-6443	0.568		0.30	
333	D4294	0.558		-0.26	
340		-----		-----	
349		-----		-----	
360	D4294	0.581		1.02	
421		-----		-----	
432	D4951	0.5818		1.07	
445	D2622	0.554		-0.49	
450		-----		-----	
451		-----		-----	
473		-----		-----	
494	D2622	0.589		1.47	
496	D2622	0.56245		-0.01	
541		-----		-----	
621		-----		-----	
657		-----		-----	
663	D4294	0.6355		4.06	
840		-----		-----	
862	D2622	0.5630		0.02	
875	D4294	0.578		0.85	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
974	D4294	0.538		-1.38	
994	D4294	0.577		0.80	
1017		-----		-----	
1023		-----		-----	
1059	ISO14596	0.55		-0.71	
1106		-----		-----	
1146	D4294	0.535		-1.55	
1161	In house	0.545		-0.99	
1173		-----		-----	
1174		-----		-----	
1201	D5453	0.4420	R(0.01)	-6.74	Also reported ASTM D4294: 0.484
1235		-----		-----	
1272	ISO8754	0.545		-0.99	
1316	D7751	0.557		-0.32	
1412	D4294	0.551		-0.65	
1431	D4294	0.4969		-3.67	
1433		-----		-----	
1461		-----		-----	
1564	D5453	0.5735		0.60	
1650	D4294	0.588		1.41	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		0.59		1.52	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----		-----	
1969		-----		-----	
2122		-----		-----	
2129	D4294	0.512		-2.83	
6010	DIN51399-1	0.5426		-1.12	
6016	D4294	0.6043		2.32	
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

		Only D4294:
normality	suspect	OK
n	26	13
outliers	1	0
mean (n)	0.563	0.562
st.dev. (n)	0.0284	0.0376
R(calc.)	0.080	0.105
R(D4294:16e1)	0.050	0.050

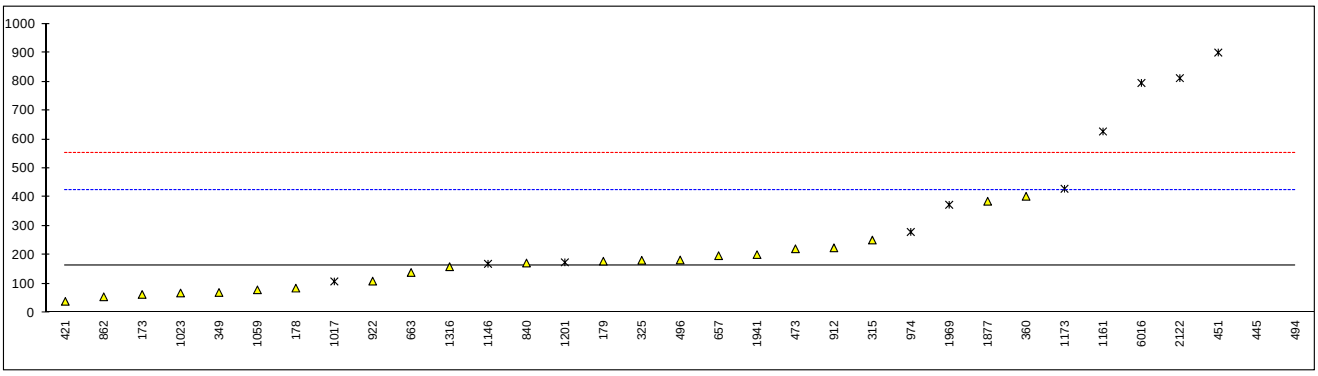


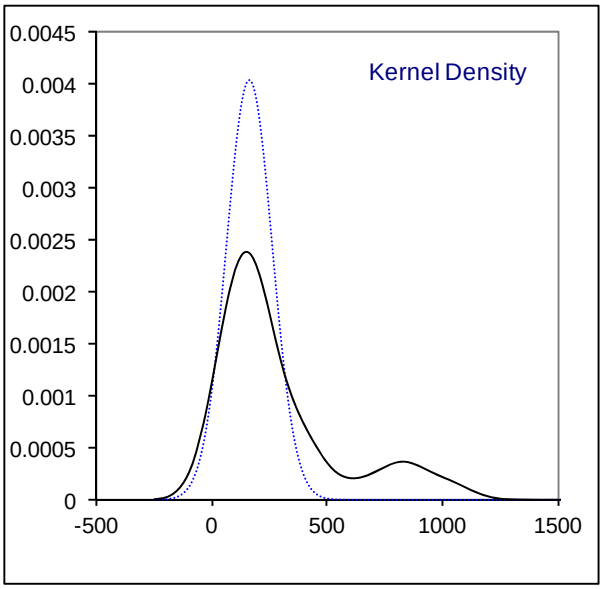


Determination of Water content by KF on Sample #16105; results in mg/kg

lab	method	value	mark	z(targ)	remarks
173	D6304-C	64		-0.79	
178	D6304-C	86		-0.62	
179	D6304-C	179		0.10	
211		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
256		-----		-----	
315	D6304-C	252.0		0.67	
325	D6304-C	182		0.13	
333		-----		-----	
340		-----		-----	
349	D6304-C	71		-0.73	
360	D6304-C	403.3		1.83	
421	D6304-C	40.2		-0.97	
432		-----		-----	
445	IP438	1040	ex	6.75	result excluded, see §4.1
450		-----		-----	
451	D6304-C	900	R(0.01)	5.67	
473	D6304-C	222		0.43	
494	D6304-A	2675	ex	19.38	result excluded, see §4.1
496	D6304-C	183		0.13	
541		-----		-----	
621		-----		-----	
657	D6304-C	198.0		0.25	
663	D6304-C	140		-0.20	
840	D6304-C	172.5		0.05	
862	D6304-C	56		-0.85	
875		-----		-----	
902		-----		-----	
912	D6304-C	225		0.46	
922	D6304-C	110		-0.43	
963		-----		-----	
974	D6304-A	280	ex,C	0.88	result excluded, see §4.1, first reported: 0.184% M/M
994		-----		-----	
1017	D6304-A	109	ex	-0.44	result excluded, see §4.1
1023	D6304-C	69		-0.75	
1059	D6304-Cmod.	80		-0.66	
1106		-----		-----	
1146	D6304-A	170	ex	0.03	result excluded, see §4.1
1161	D6304-A	627.213	ex,C	3.56	result excluded, see §4.1, first reported: 2417.049
1173	IP438	429.2	ex	2.03	
1174		-----		-----	
1201	D6304-A	175	ex	0.07	result excluded, see §4.1
1235		-----		-----	
1272		-----		-----	
1316	D6304-C	160		-0.04	
1412		-----		-----	
1431		-----		-----	
1433		-----		-----	
1461		-----		-----	
1564		-----		-----	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1877	D6304-C	386		1.70	
1883		-----		-----	
1941	D6304-C	201.7		0.28	
1957		-----		-----	
1969	ISO12937	374	ex	1.61	result excluded, see §4.1
2122		811.666	ex	4.99	result excluded, see §4.1
2129		-----		-----	
6010		-----		-----	
6016	D6304-A	795	ex	4.86	result excluded, see §4.1
6032		-----		-----	
6034		-----		-----	
9090		-----		-----	

		All reported test results:
normality	suspect	not OK
n	21	32
outliers	1 (+11ex)	1
mean (n)	165.748	287.243
st.dev. (n)	99.0417	265.3388
R(calc.)	277.317	742.949
R(D6304:16)	362.528	504.223

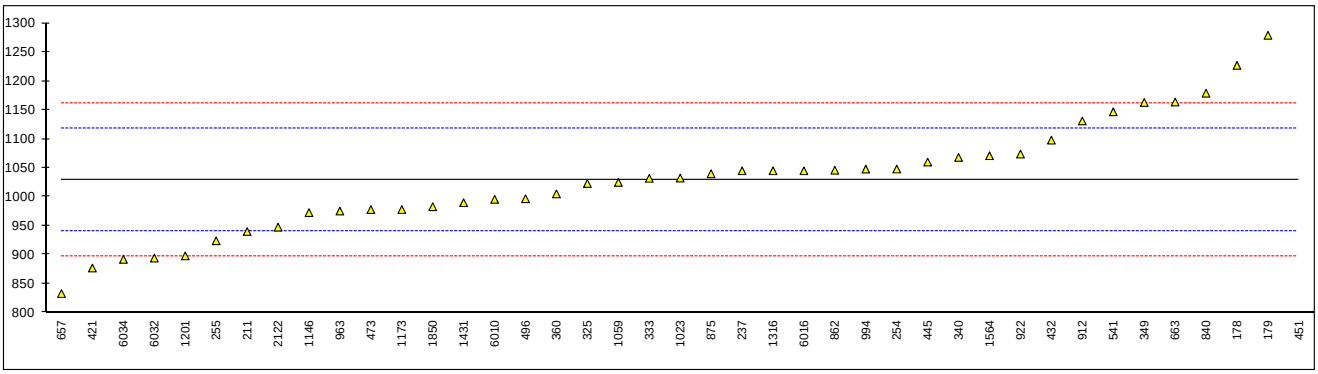


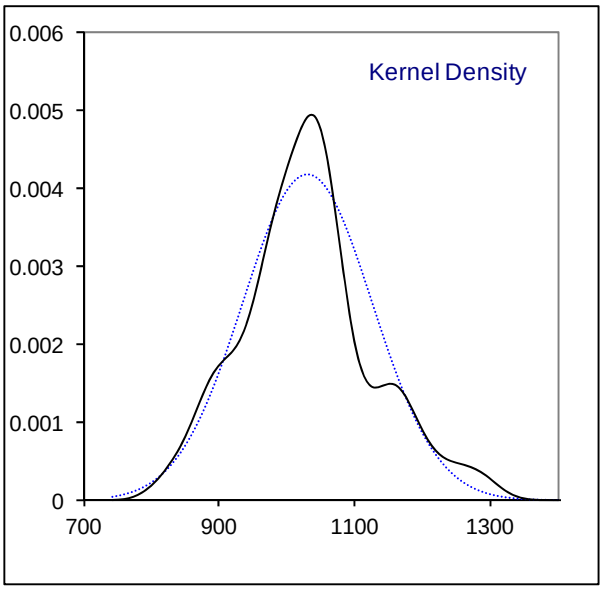


Determination of Calcium as Ca on Sample #16105; results in mg/kg

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178	D5185	1227		4.48	
179	D5185	1279		5.65	
211	D6595	940		-2.02	
237	D5185	1045	C	0.36	first reported: 1302
252		-----		-----	
254	IP308	1048.04		0.42	
255	INH-01Ca	924	C	-2.38	first reported: 763
256		-----		-----	
315		-----		-----	
325	D5185	1023		-0.14	
333	D5185	1032		0.06	
340	D5185	1068		0.88	
349	D5185	1163		3.03	
360	D5185	1005		-0.55	
421	D5185	877		-3.45	
432	D4951	1098		1.56	
445	D5185	1060		0.70	
450		-----		-----	
451	D5185	3034	R(0.01)	45.38	
473	D5185	978.0		-1.16	
494		-----		-----	
496	D5185	996.7		-0.74	
541	D5185	1146.8		2.66	
621		-----		-----	
657	D5185	833		-4.44	
663	D5185	1163.7		3.04	
840	D5185	1179		3.39	
862	D5185	1046		0.38	
875	D5185	1040		0.24	
902		-----		-----	
912	D5185	1131		2.30	
922	D5185	1074		1.01	
963	D5185	975.4		-1.22	
974		-----		-----	
994	D5185	1048		0.42	
1017		-----		-----	
1023	D5185	1032.5		0.07	
1059	In house	1025		-0.10	
1106		-----		-----	
1146	In house	972.8		-1.28	
1161		-----		-----	
1173	In house	978.1		-1.16	
1174		-----		-----	
1201	D5185	898		-2.97	
1235		-----		-----	
1272		-----		-----	
1316	D5185	1045		0.36	
1412		-----		-----	
1431	In house	990		-0.89	
1433		-----		-----	
1461		-----		-----	
1564	D4951	1071		0.94	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		983		-1.05	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----	W	-----	result withdrawn, first reported: 773
1969		-----		-----	
2122	D5185	947.62		-1.85	
2129		-----		-----	
6010	DIN51399-1	995.7		-0.76	
6016	D5185	1045		0.36	
6032	D6595	894.2		-3.06	
6034	D5185	892.1		-3.10	
9090		-----		-----	

normality	OK
n	40
outliers	1
mean (n)	1029.27
st.dev. (n)	95.587
R(calc.)	267.64
R(D5185:13e1)	123.70

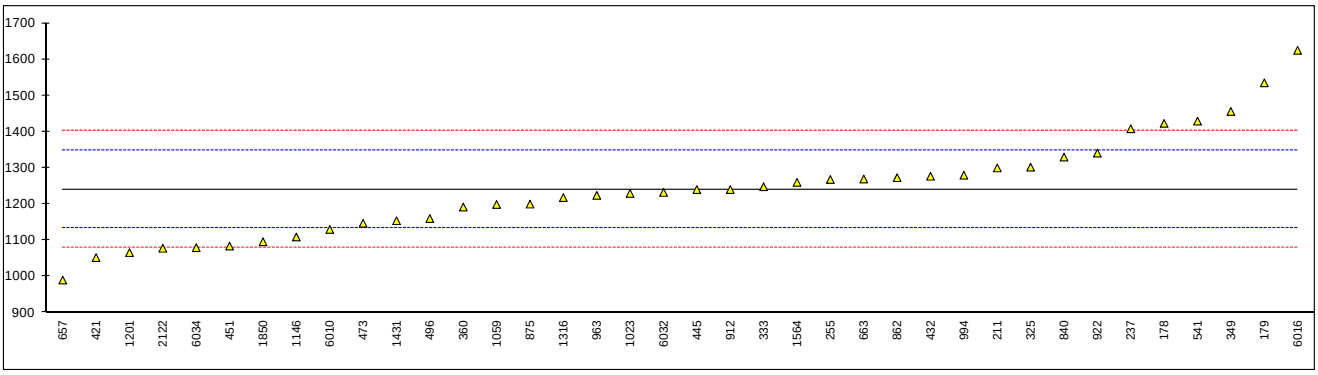


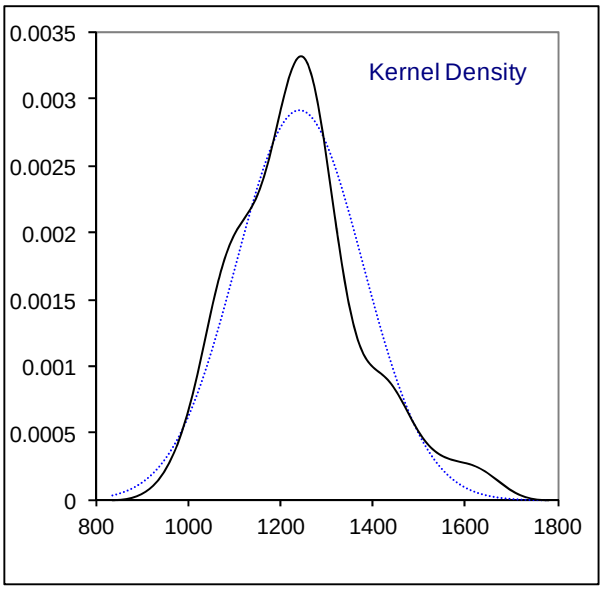


Determination of Phosphorus as P on Sample #16105; results in mg/kg

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178	D5185	1423		3.37	
179	D5185	1535		5.44	
211	D6595	1300		1.10	
237	D5185	1408		3.09	
252		-----		-----	
254		-----		-----	
255	INH-01P	1268		0.51	
256		-----		-----	
315		-----		-----	
325	D5185	1302		1.13	
333	D5185	1248		0.14	
340	D5185	>1000		-----	
349	D5185	1456		3.98	
360	D5185	1192		-0.90	
421	D5185	1052		-3.49	
432	D4951	1277		0.67	
445	D5185	1240		-0.01	
450		-----		-----	
451	D5185	1084		-2.90	
473	D5185	1147.0		-1.73	
494		-----		-----	
496	D5185	1160		-1.49	
541	D5185	1429.2		3.49	
621		-----		-----	
657	D5185	990		-4.63	
663	D5185	1269.4		0.53	
840	D5185	1330		1.65	
862	D5185	1273		0.60	
875	D5185	1200		-0.75	
902		-----		-----	
912	D5185	1240		-0.01	
922	D5185	1341		1.85	
963	D5185	1224		-0.31	
974		-----		-----	
994	D5185	1280		0.73	
1017		-----		-----	
1023	D5185	1229.6		-0.20	
1059	In house	1199		-0.77	
1106		-----		-----	
1146	In house	1109		-2.43	
1161		-----		-----	
1173		-----		-----	
1174		-----		-----	
1201	D5185	1066		-3.23	
1235		-----		-----	
1272		-----		-----	
1316	D5185	1218		-0.42	
1412		-----		-----	
1431	In house	1154		-1.60	
1433		-----		-----	
1461		-----		-----	
1564	D4951	1260		0.36	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		1096		-2.67	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----	W	-----	result withdrawn, first reported: 888
1969		-----		-----	
2122	D5185	1077.97		-3.01	
2129		-----		-----	
6010	DIN51399-1	1130		-2.05	
6016	D5185	1625		7.11	
6032	D6595	1232.3		-0.15	
6034	D5185	1079.6		-2.98	
9090		-----		-----	

normality	OK
n	38
outliers	0
mean (n)	1240.66
st.dev. (n)	137.023
R(calc.)	383.66
R(D5185:13e1)	151.46



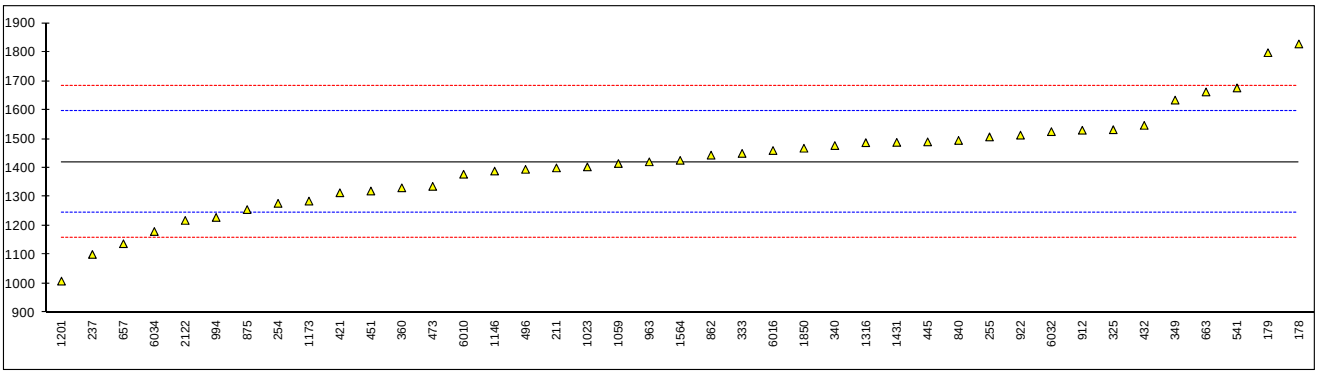


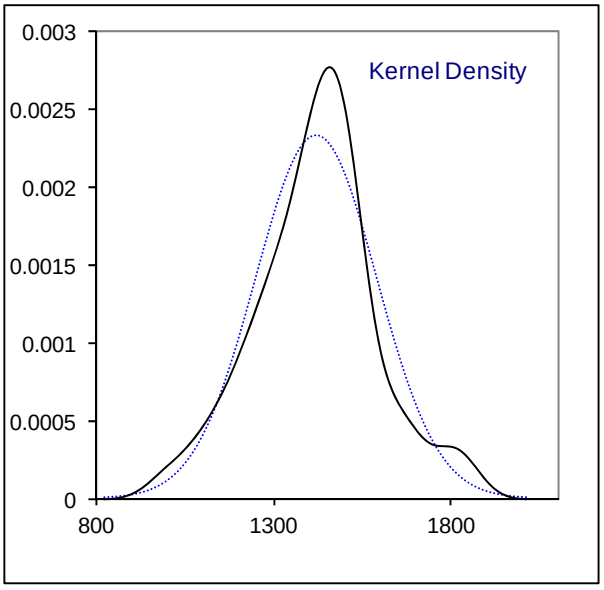
Determination of Zinc as Zn on Sample #16105; results in mg/kg

lab	method	value	mark	z(targ)	remarks
173		-----		-----	
178	D5185	1828		4.68	
179	D5185	1798		4.34	
211	D6595	1400		-0.23	
237	D5185	1101		-3.67	
252		-----		-----	
254	IP308	1277.68		-1.64	
255	INH-01Zn	1507		1.00	
256		-----		-----	
315		-----		-----	
325	D5185	1532		1.28	
333	D5185	1450		0.34	
340	D5185	1477		0.65	
349	D5185	1634		2.46	
360	D5185	1331		-1.03	
421	D5185	1314		-1.22	
432	D4951	1547		1.46	
445	D5185	1490		0.80	
450		-----		-----	
451	D5185	1320		-1.15	
473	D5185	1336.0		-0.97	
494		-----		-----	
496	D5185	1395		-0.29	
541	D5185	1676.2		2.94	
621		-----		-----	
657	D5185	1138		-3.25	
663	D5185	1662.3		2.78	
840	D5185	1495		0.86	
862	D5185	1444		0.27	
875	D5185	1256		-1.89	
902		-----		-----	
912	D5185	1530		1.26	
922	D5185	1513		1.06	
963	D5185	1421		0.01	
974		-----		-----	
994	D5185	1229		-2.20	
1017		-----		-----	
1023	D5185	1403.4		-0.20	
1059	In house	1415		-0.06	
1106		-----		-----	
1146	In house	1389		-0.36	
1161		-----		-----	
1173	In house	1285.4		-1.55	
1174		-----		-----	
1201	D5185	1009		-4.73	
1235		-----		-----	
1272		-----		-----	
1316	D5185	1487		0.77	
1412		-----		-----	
1431	In house	1488		0.78	
1433		-----		-----	
1461		-----		-----	
1564	D4951	1426		0.06	
1650		-----		-----	
1748		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		1468		0.55	
1877		-----		-----	
1883		-----		-----	
1941		-----		-----	
1957		-----	W	-----	result withdrawn, first reported: 1001
1969		-----		-----	
2122	D5185	1218.59		-2.32	
2129		-----		-----	
6010	DIN51399-1	1378		-0.49	
6016	D5185	1460		0.46	
6032	D6595	1525.3		1.21	
6034	D5185	1180.3		-2.76	
9090		-----		-----	

normality	OK
n	41
outliers	0
mean (n)	1420.37
st.dev. (n)	170.742
R(calc.)	478.08
R(D5185:13e1)	243.62

application range: 10 – 1000 mg/kg





APPENDIX 2

Number of participants per country

1 lab in ARGENTINA
1 lab in AUSTRIA
2 labs in AZERBAIJAN
3 labs in BELGIUM
1 lab in BRUNEI
3 labs in BULGARIA
1 lab in CHINA, People's Republic
1 lab in CROATIA
1 lab in CZECH REPUBLIC
2 labs in FRANCE
4 labs in GERMANY
1 lab in GREECE
1 lab in INDIA
1 lab in INDONESIA
1 lab in JORDAN
1 lab in KAZAKHSTAN
2 labs in KENYA
1 lab in LEBANON
1 lab in MACEDONIA
1 lab in MALAYSIA
2 labs in MOROCCO
3 labs in NETHERLANDS
1 lab in NIGERIA
2 labs in NORWAY
1 lab in PAKISTAN
1 lab in PERU
1 lab in POLAND
1 lab in QATAR
1 lab in ROMANIA
1 lab in RUSSIAN FEDERATION
1 lab in SAUDI ARABIA
2 labs in SERBIA
1 lab in SINGAPORE
1 lab in SLOVENIA
3 labs in SPAIN
1 lab in SWEDEN
2 labs in TANZANIA
1 lab in THAILAND
3 labs in TURKEY
1 lab in UNITED ARAB EMIRATES
6 labs in UNITED KINGDOM
3 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

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 outlier test
R(0.05)	= straggler in Rosner outlier test
E	= probably an error in calculations
ex	= test result excluded from calculations
U	= reported in different unit
W	= test result withdrawn on request of the participant
fr.	= first reported
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Safety Data Sheet

Literature:

1 iis Interlaboratory Studies, Protocol for the Organization, Statistics and Evaluation, April 2014

2 ASTM E178-89

3 ASTM E1301-89

4 ISO 5725-86

5 ISO 5725, parts 1-6, 1994

6 ISO13528-05

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

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

9 IP 367/84

10 DIN 38402 T41/42

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