Results of Proficiency Test
Crude Oil
November 2012

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Authors: ing. R.J. Starink
Correctors: dr. R.G. Visser & ing. L. Sweere

Report: iis12R01

December 2012

CONTENTS

Appendices-

1 INTRODUCTION

Since 1998, the Institute for Interlaboratory Studies organizes a proficiency test for Crude Oil every year. During the annual proficiency testing program 2012/2013, it was decided to continue the round robin for the analysis of Crude Oil. In this interlaboratory study 158 laboratories from 51 different countries have participated. See appendix 2 for the number of participants per country.
In this report, the results of the 2012 Crude Oil proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. It was decided to send one sample of approx. 1 litre of Crude Oil in a one liter wide-necked bottle to enable use of a large size Ultra Turrax for homogenisation. Analyses for fit-for-use and homogeneity testing were subcontracted. Participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies - Protocol for the Organisation, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2).

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 refinery. The approx. 200 litre of Crude Oil was homogenised in a metal drum. After homogenisation, the material was

transferred to 190 subsamples of 1 L wide-neck transparent colourless glass bottles and labelled #12135.
The homogeneity of the subsamples, before the addition of water, was checked by determination of Density in accordance ASTM D5002:10 and Water in accordance with ASTM D4377:11 on 8 stratified randomly selected samples.

	Density @ 15 °C in kg/L	Water in %M/M
Sample #12135-1	0.87456	0.071
Sample #12135-2	0.87451	0.069
Sample #12135-3	0.87452	0.070
Sample #12135-4	0.87454	0.070
Sample #12135-5	0.87457	0.070
Sample #12135-6	0.87453	0.068
Sample #12135-7	0.87450	0.068
Sample #12135-8	0.87451	0.071

Table 1: Homogeneity test results of subsamples #12135

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

	Density @ 15 °C in kg/L	Water in %M/M
observed repeatability	0.00007	0.0033
reference method	ASTM D5002:10	ASTM D4377:11
0.3*R (reference method)	0.00108	0.0117

Table 2: Repeatabilities on subsamples #12135

The calculated repeatabilities were less than 0.3 times the respective reproducibilities of the reference methods. Therefore, homogeneity of the subsamples #12135 was assumed.

The water content of the original Crude Oil was low (0.070 %M/M) and therefore for BSW probably only ‘less than’ results would be reported by the participating laboratories. Therefore each one litre subsample was enriched with 1.6 mL water per bottle (= 0.18 %M/M) by means of a calibrated FINN pipette.

To each of the participating laboratories one bottle of 1 L (labelled #12135) was sent on October 17, 2012. Because of the fact that it was not possible to get brown coloured wide-neck glass bottles, the (clear glass) bottles were packed in red plastics bags. In the letter of instructions, all participants were asked to shield the samples from light before analysis.

2.5 STABILITY OF THE SAMPLES

The stability of Crude Oil packed in the clear glass bottles with red plastic bag was checked. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine Total Acid Number, BSW, Density @ 15°C, API Gravity, Light ends (C1-C6), Pour Point (Upper and Lower), Salt as NaCl, Sediment (ASTM D4807 and D473), Total Sulphur, Total Mercury, Kinematic Viscosity @ 40°C and Water.

To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards and a letter of instructions were prepared and made available for download on the iis website.
A SDS and a form to confirm receipt of the samples were added to the sample package.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were received. The original reported results are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after deadline, a reminder fax was sent to those laboratories that did not report results at that moment.
Shortly after the deadline, the available results were screened for suspect data. A 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 raw data of these tests (no reanalysis). Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report 'i.i.s. Interlaboratory Studies- Protocol for the Organisation, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. 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. After removal of outliers, this check was repeated. In case a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

In accordance with ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

In order to 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 under 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 (see appendix 3; nos.13 and 14)

3.3 Z-SCORES

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

The z-scores were calculated in accordance with:

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

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 the fit-for-useness of the reported test result.

The $z_{(target)}$ scores are listed in the result tables in appendix 1.
Absolute values for $z<2$ are very common and absolute values for $z>3$ are very rare.

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

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

4 EVALUATION

In this proficiency test, some serious sample dispatch problems were encountered during the execution. The samples to the participants in Azerbaijan, Brazil, Côte D'Ivoire, Ecuador, Egypt, Gabon, Georgia, Greece, Israel, Jordan, Kazakhstan, Malaysia, Mexico, Nigeria, P.R. of China, Russia, Saudi Arabia, Serbia, Spain, Sudan, Sultanate of Oman, Turkmenistan, U.S.A., Ukraine and United Kingdom arrived near or after the deadline or did never reach the laboratories at all due to customs clearance and/or transportation problems.
In total 121 laboratories submitted 860 numerical results. Observed were 42 statistically outlying results, which is 4.9% of the reported results. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

Not all original data sets proved to have a normal distribution. For Acid Number, BSW, Density, API Gravity, C2 light ends, Pour Point, Sediment ASTM D 4807 and ASTM D473 and Total Sulphur and Kinematic Viscosity non-Gaussian distributions were found and therefore the statistical evaluation for these determinations should be used with care. In this section, the results are discussed per test.

Acid Number (Total): This determination was problematic for a number of laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D664:11a.

BSW: This determination was not problematic. Only one statistical outlier was observed and the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D4007:11.

Density: This determination was problematic for a number of laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5002:10. Several participants used ASTM D4052 / IP365. It must be noted that in the scope of these methods is mentioned that ASTM D5002 is to be used for crude oils (see e.g. §1.3 of ASTM D4052:11).

API Gravity: This determination was not problematic. Only one statistical outlier was observed and the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D287:12b.

Light Ends: This determination was very problematic. In total seven statistical outliers were observed. None of the calculated reproducibilities, after rejection of the statistical outliers, was in agreement with the requirements of IP344:04.

Pour Point, (Max.): This determination was not problematic. Eighteen test results were excluded from the calculations as the reported test method is in principle not suitable for Crude Oils (see the scope of this test method). After exclusion of the test results, only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier and the excluded test results is in full agreement with the requirements of ASTM D5853A:11.

Salt as NaCl: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ASTM D3230:10.

Sediment: ASTM D4807 The determination of sediment in accordance with ASTM D4807:10 was very problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers does not at all meet the requirements of ASTM D4807:10. The large spread may be explained by differences in execution of the method: e.g. use of an unheated funnel, a wrong filter or not well rinsing of the filter after filtration. Also homogenisation of the sample prior to sub sampling, is a critical step in this determination.

Sediment: ASTM D473: The determination of sediment in accordance with ASTM D473:07 was problematic for a number of laboratories. Six statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ASTM D473:07.

Sulphur: This determination was problematic for a number of laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D4294:10.

Mercury: This determination may be problematic at the low mercury concentration (< 4 µg/kg). Only one statistical outlier was observed, but the results vary over a wide range (0.1 – 14 µg/kg). The precision requirements of UOP938 (table B3) are extremely strict and as they are 10 times more strict than the Horwitz estimate, these requirements will not be met easily. Also, the reproducibility of UOP938 is only available for concentrations in µg/**L** and conversion to µg/**kg** will lead to extra uncertainty. Therefore, it was decided to use the Horwitz estimates for evaluation of the test results in this report. The calculated reproducibility is not at all in agreement with the strict estimated reproducibility, calculated using the Horwitz equation. Because another 9 laboratories reported ‘less than’ test results, it was decided to evaluated also the full data using x/2 for each <x test result. The evaluation of all 18 test results does not differ significantly from the evaluation of the 9 numerical test results.

Kin.Visc.@40°C: This determination was problematic. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D445:12.

Water: Serious analytical problems have been observed. Water was added to the samples. Therefore the minimum water concentration to be found was known (added amount = 0.18%M/M = 0.16%V/V). The laboratories should be able to find at least 0.11%V/V [$0.16\%V/V_{(\text{added amount})} - 0.05\%V/V_{(\text{R D4377})}$]. However, 10 of the 91 laboratories reported lower concentration than 0.11%V/V and therefore these test results were rejected prior to data analysis. The reason for the reported low water concentrations may possibly be insufficient homogenisation of the sample by the respective laboratory prior to sub sampling for analysis.
Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is still not at all in agreement with the requirements of ASTM D4377:11.

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. The average results per sample, calculated reproducibilities and reproducibilities, derived from literature standards (in casu ASTM standards) are compared in the next table.

Parameter	unit	n	average	2.8 *sd_R	R (lit)
Total Acid Number	mg KOH/g	57	0.435	0.161	0.202
BSW	%V/V	47	0.15	0.20	0.25
Density @ 15°C	kg/m^3	107	875.0	1.6	3.6
API Gravity		70	30.11	0.34	0.50
C1 Light Ends	%M/M	10	0.0014	0.0031	n.a.
C2 Light Ends	%M/M	16	0.019	0.016	0.008
C3 Light Ends	%M/M	16	0.16	0.06	0.03
C4 Light Ends	%M/M	15	0.64	0.14	0.08
C5 Light Ends	%M/M	14	1.10	0.27	0.11
C6 Light Ends	%M/M	11	2.11	0.90	0.45
Total C1-C6 Light Ends	%M/M	11	4.03	1.03	0.47
Pour Point, Max.	°C	31	-25.3	18.2	18.0
Salt as NaCl	mg/kg	62	6.73	10.31	11.62
Sediment (D4807)	%M/M	31	0.011	0.025	0.012
Sediment (D473)	%V/V51	51	0.006	0.017	0.035
Total Sulphur	%M/M	88	0.170	0.025	0.023
Total Mercury	µg/kg	8	2.7	7.5	2.9
Kinematic Viscosity @ 40°C	mm^2/s	66	5.201	0.444	0.385
Water	%V/V	77	0.227	0.115	0.058

Table 3: Reproducibilities of the tests methods for sample #12135

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2012 WITH PREVIOUS PTS

	November 2012	*November 2011*	*November 2010*	*November 2009*
Number of reporting labs	121	132	121	103
Number of results reported	860	845	879	695
Statistical outliers	42	43	43	48
Percentage outliers	4.9%	5.1%	4.9%	6.9%

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	*November 2012*	*November 2011*	*November 2010*	*November 2009*
Total Acid Number	++	++	++	++
BSW	++	-	--	--
Density @15°C	++	++	++	++
API Gravity	++	++	++	++
Light Ends (C1-C6)	--	+/-	--	++
Pour Point, max	+/-	--	++	n.e.
Salt as NaCl	+	--	++	++
Sediment (D4807)	--	-	--	--
Sediment (D473)	++	++	++	++
Sulphur	+/-	-	--	--
Mercury	(--)	(--)	(--)	(--)
Kinematic Viscosity @40ºC	--	++	--	--
Water	--	--	--	--

Table 5: Comparison determinations against the standard (bBetween brackets is a comparison against Horwitz)

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

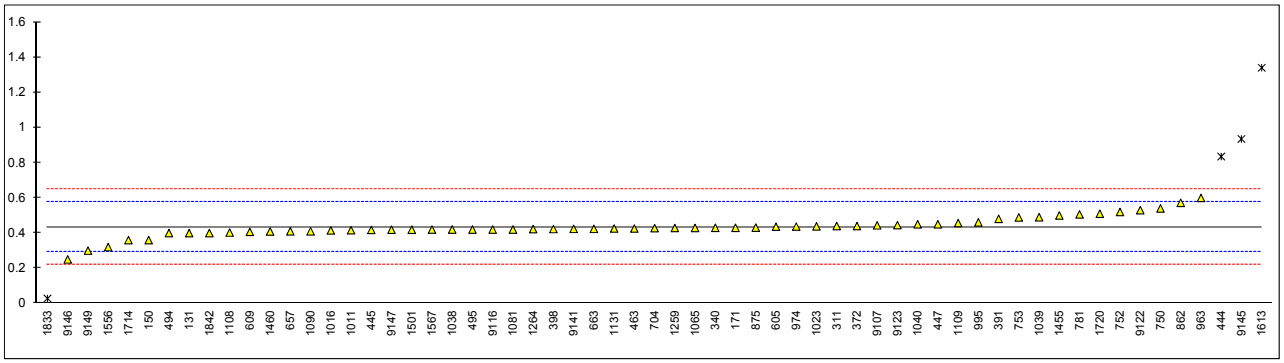
APPENDIX 1

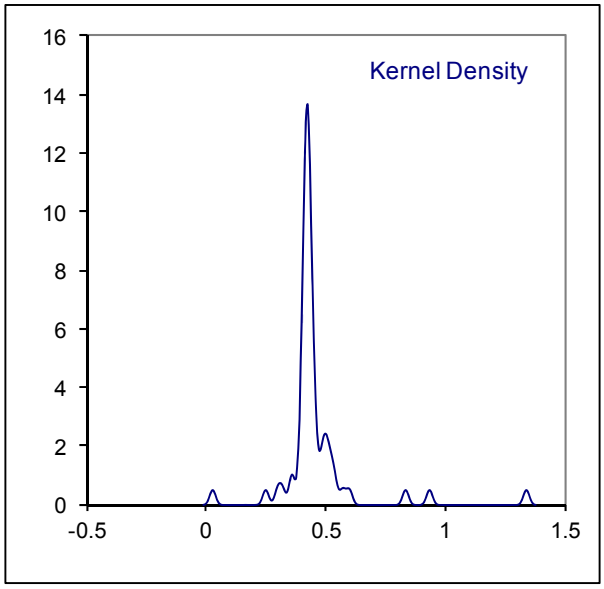
Determination of Acid Number (total) on sample #12135; results in mg KOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040	D3242	0.45		0.21
90		-----		-----	1056		-----		-----
92		-----		-----	1065	D664	0.429		-0.08
131	D664	0.400		-0.48	1081	D664	0.42		-0.20
150	D664	0.36		-1.03	1090	D664	0.41		-0.34
154		-----		-----	1108	D664	0.403		-0.44
158		-----		-----	1109	UOP565	0.457		0.31
171	D664	0.43		-0.06	1131	D664	0.426		-0.12
193		-----		-----	1160		-----		-----
195		-----		-----	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259	D664	0.4287		-0.08
238		-----		-----	1264	D664	0.4226		-0.17
273		-----		-----	1272		-----		-----
311	D664	0.44		0.07	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455	D664	0.50		0.90
335		-----		-----	1460	D664	0.409		-0.35
340	D664	0.430		-0.06	1501	D664	0.419		-0.22
372	D664	0.44		0.07	1539		-----		-----
375		-----		-----	1554		-----		-----
391	D664	0.481		0.64	1556	ISO6619	0.32		-1.59
398	D664	0.423		-0.16	1562		-----		-----
399		-----		-----	1564		-----		-----
402		-----		-----	1567	D664	0.420		-0.20
441		-----		-----	1603		-----		-----
442		-----		-----	1613	D664	1.34	G(0.01)	12.53
444	D664	0.835	G(0.01)	5.54	1635		-----		-----
445	D664	0.418		-0.23	1654		-----		-----
446		-----		-----	1658		-----		-----
447	D664	0.45		0.21	1714	in house	0.36		-1.03
463	D664	0.426		-0.12	1720	D664	0.51		1.04
485		-----		-----	1728		-----		-----
494	D664	0.40		-0.48	1800		-----		-----
495	D664	0.42		-0.20	1810		-----		-----
527		-----		-----	1811		-----		-----
529		-----		-----	1815		-----		-----
541	D664	<0.1		-----	1833	D664	0.028	G(0.01)	-5.63
551		-----		-----	1842	in house	0.40		-0.48
593		-----		-----	1930		-----		-----
602		-----		-----	9050		-----		-----
605	D664	0.436		0.02	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D664	0.4069		-0.38	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D664	0.41		-0.34	9060		-----		-----
663	D664	0.424		-0.15	9061		-----		-----
704	D664	0.428		-0.09	9099		-----		-----
732		-----		-----	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D664	0.54		1.46	9106		-----		-----
751		-----		-----	9107	D664	0.4438		0.13
752	D664	0.52		1.18	9108		-----		-----
753	D664	0.489		0.75	9116	D664	0.42		-0.20
781	D664	0.506		0.99	9117		-----		-----
862	D664	0.572		1.90	9119		-----		-----
873		-----		-----	9120		-----		-----
874		-----		-----	9121		-----		-----
875	D664	0.431		-0.05	9122	D664	0.53		1.32
904		-----		-----	9123	D664	0.445		0.14
962		-----		-----	9126		-----		-----
963	D664	0.60		2.29	9132		-----		-----
974	D664	0.437		0.03	9133		-----		-----
982		-----		-----	9134		-----		-----
994		-----		-----	9135		-----		-----
995	D664	0.4609		0.36	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D664	0.416		-0.26	9138		-----		-----
1016	D664	0.415		-0.27	9139		-----		-----
1023	D664	0.4382		0.05	9141	D664	0.4239		-0.15
1038	D664	0.42		-0.20	9142		-----		-----
1039	D664	0.49		0.77	9143		-----		-----
9144		-----		-----					

9145	D664	0.9350	G(0.01)	6.93
9146	D664Mod.	0.25		-2.56
9147	D664	0.419		-0.22
9148		-----		-----
9149	D664	0.30		-1.86
9151		-----		-----
9152		-----		-----

normality	not OK
n	57
outliers	4
mean (n)	0.4346
st.dev. (n)	0.05763
R(calc.)	0.1614
R(D664:11a)	0.2023





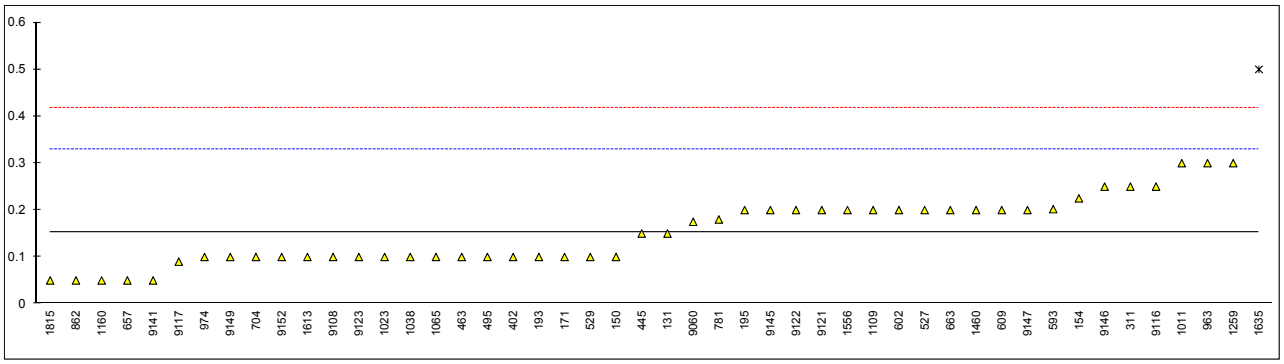
Determination of BSW on sample #12135; results in %V/V

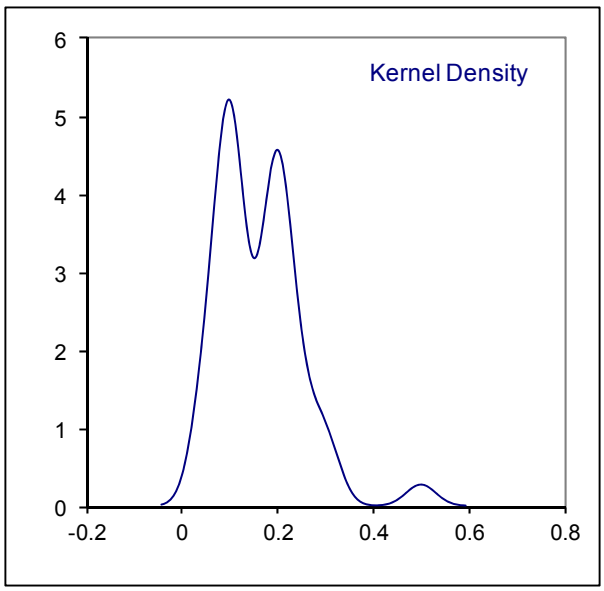
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040		-----		-----
90		-----		-----	1056		-----		-----
92		-----		-----	1065	D4007	0.1		-0.59
131	D4007	0.150		-0.03	1081		-----		-----
150	D4007	0.10		-0.59	1090		-----		-----
154	D4007	0.225		0.82	1108		-----		-----
158		-----		-----	1109	D4007	0.2		0.53
171	D4007	0.100		-0.59	1131		-----		-----
193	D4007	0.10		-0.59	1160	D4007	0.05		-1.16
195	D4007	0.20		0.53	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259	D4007	0.30		1.66
238		-----		-----	1264	D4007	<0.05		-----
273		-----		-----	1272		-----		-----
311	D4007	0.25		1.10	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455		-----		-----
335		-----		-----	1460	D4007	0.20		0.53
340		-----		-----	1501		-----		-----
372		-----		-----	1539		-----		-----
375		-----		-----	1554		-----		-----
391		-----		-----	1556	ISO3734	0.20		0.53
398		-----		-----	1562		-----		-----
399		-----		-----	1564		-----		-----
402	D4007	0.1		-0.59	1567		-----		-----
441		-----		-----	1603		-----		-----
442		-----		-----	1613	D4007	0.1		-0.59
444		-----		-----	1635	D4007	0.5	G(0.01)	3.91
445	D4007	0.15		-0.03	1654		-----		-----
446		-----		-----	1658		-----		-----
447		-----		-----	1714		-----		-----
463	D4007	0.1		-0.59	1720		-----		-----
485		-----		-----	1728		-----		-----
494		-----		-----	1800		-----		-----
495	D4007	0.10		-0.59	1810		-----		-----
527	D4007	0.20		0.53	1811		-----		-----
529	D4007	0.1		-0.59	1815	D4007	0.05		-1.16
541		-----		-----	1833		-----		-----
551		-----		-----	1842		-----		-----
593	calc	0.202		0.56	1930		-----		-----
602	D4007	0.20	C	0.53	9050		-----		-----
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D4007	0.20		0.53	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D4007	0.050		-1.16	9060	D4007	0.175		0.25
663	D4007	0.20		0.53	9061		-----		-----
704	D4007	0.10		-0.59	9099		-----		-----
732		-----		-----	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751		-----		-----	9107		-----		-----
752		-----		-----	9108	D4007	0.10		-0.59
753		-----		-----	9116	D4007	0.250		1.10
781	D4007	0.18		0.31	9117	D4007	0.090		-0.71
862	D4007	0.05		-1.16	9119		-----		-----
873		-----		-----	9120		-----		-----
874		-----		-----	9121	D4007	0.20		0.53
875		-----		-----	9122	D4007	0.20		0.53
904		-----		-----	9123	D4007	0.10		-0.59
962		-----		-----	9126		-----		-----
963	D4007	0.30		1.66	9132		-----		-----
974	D4007	0.10		-0.59	9133		-----		-----
982		-----		-----	9134		-----		-----
994		-----		-----	9135		-----		-----
995		-----		-----	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D4007	0.30		1.66	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023	D4007	0.1		-0.59	9141	D4007	0.05		-1.16
1038	D4007	0.10		-0.59	9142		-----		-----
1039		-----		-----	9143		-----		-----
9144		-----		-----					

9145	D4007	0.2	0.53
9146	D4007Mod.	0.25	1.10
9147	INH-341	0.200	0.53
9148		-----	-----
9149	D4007	0.1	-0.59
9151		-----	-----
9152	D4007	0.1	-0.59

normality	not OK
n	47
outliers	1
mean (n)	0.153
st.dev. (n)	0.0712
R(calc.)	0.199
R(D4007:11)	0.249

Lab 602: first reported 0.40





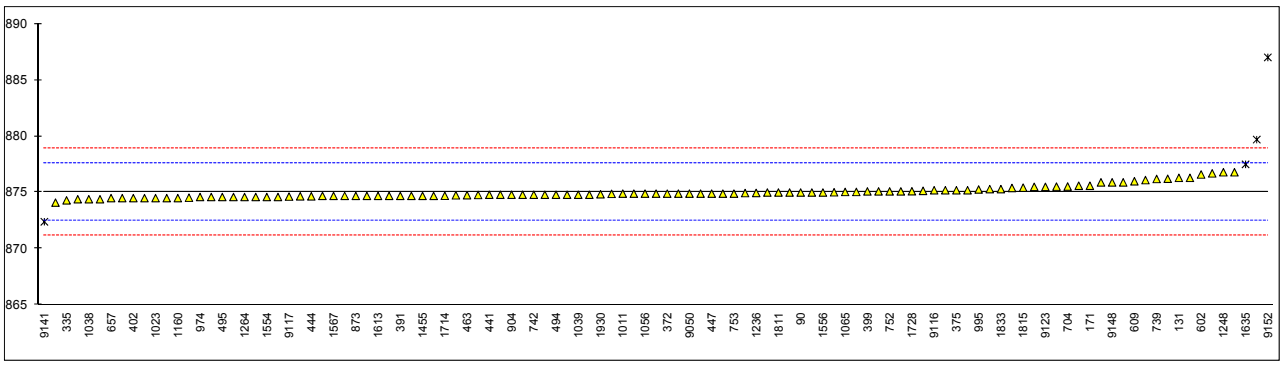
Determination of Density @ 15°C on sample #12135; results in kg/m^3

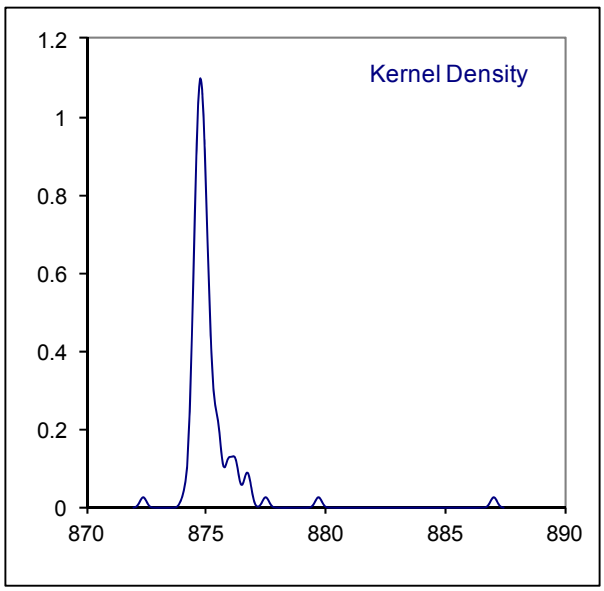
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D5002	874.95		-0.07	1040	ISO12185	874.8		-0.18
90	D5002	875.0		-0.03	1056	D5002	874.9		-0.11
92		-----		-----	1065	D5002	875.05	C	0.01
131	D5002	876.3		0.98	1081	D5002	875.0		-0.03
150	D5002	875.6		0.44	1090	ISO12185	874.40		-0.49
154		-----		-----	1108	D5002	874.9		-0.11
158		-----		-----	1109	D1298	875.4		0.28
171	D5002	875.6		0.44	1131	D5002	875.146		0.09
193	D4052	874.8		-0.18	1160	D5002	874.5		-0.42
195		-----		-----	1236	D5002	874.96	C	-0.06
203		-----		-----	1248	D5002Mod.	876.8		1.37
225		-----		-----	1259	ISO3675	874.7		-0.26
238		-----		-----	1264	D5002	874.6		-0.34
273	D5002	876.3	C	0.98	1272		-----		-----
311	D5002	874.8		-0.18	1287		-----		-----
314	D5002	874.5		-0.42	1403		-----		-----
333	D5002	874.7		-0.26	1412		-----		-----
334	D5002	874.6		-0.34	1455	D5002	874.7		-0.26
335	D5002	874.3		-0.57	1460	D7042	876.8	C	1.37
340		-----		-----	1501	D5002	875.0		-0.03
372	D5002	874.9		-0.11	1539	D5002	876.7		1.29
375	D1298	875.2		0.13	1554	ISO3675	874.6	C	-0.34
391	D5002	874.7		-0.26	1556	ISO12185	875.0		-0.03
398	D5002	874.7		-0.26	1562		-----		-----
399	D1298	875.1		0.05	1564		-----		-----
402	D5002	874.5		-0.42	1567	D5002	874.7		-0.26
441	D4052	874.8		-0.18	1603	in house	874.9		-0.11
442	IP365	874.75		-0.22	1613	D5002	874.7		-0.26
444	D4052	874.66		-0.29	1635	D1298	877.5	G(0.05)	1.91
445	D5002	875.9		0.67	1654	D4052	874.538	C	-0.39
446	D5002	874.4		-0.49	1658		-----		-----
447	D4052	874.90		-0.11	1714	D5002	874.71	C	-0.25
463	D5002	874.76		-0.21	1720	D5002	874.5		-0.42
485	D5002	874.7		-0.26	1728	D5002	875.11		0.06
494	D5002	874.8		-0.18	1800	inhouse	875.1		0.05
495	D5002	874.6		-0.34	1810	D5002	874.6	C	-0.34
527		-----		-----	1811	D5002	875.0		-0.03
529	D5002	874.5		-0.42	1815	ISO12185	875.43		0.31
541	D5002	874.6		-0.34	1833	D4052	875.3		0.20
551		-----		-----	1842	IP365	874.9		-0.11
593	D1298	875.2		0.13	1930	ISO12185	874.84		-0.15
602	D1298	876.6		1.21	9050	INH-21	874.9		-0.11
605	D5002	876.22		0.92	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D5002	876.0		0.75	9053		-----		-----
613	D4052	875.52		0.38	9057	D5002	874.9		-0.11
657	D5002	874.5		-0.42	9060	D5002	874.88		-0.12
663	D5002	875.02		-0.01	9061		-----		-----
704	D5002	875.53		0.38	9099		-----		-----
732	D5002	875.05		0.01	9100		-----		-----
739	INH-51069	876.2		0.90	9101		-----		-----
742	D5002	874.8		-0.18	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D5002	875.3		0.20	9106		-----		-----
751	D1298	874.9		-0.11	9107	D5002	874.6	C	-0.34
752	D5002	875.1		0.05	9108	D5002	875.5	C	0.36
753	D5002	874.9		-0.11	9116	D5002	875.2		0.13
781	D5002	874.7		-0.26	9117	D5002	874.64		-0.31
862	D5002	874.66		-0.29	9119		-----		-----
873	D5002	874.7	C	-0.26	9120		-----		-----
874	D5002	874.7		-0.26	9121	D5002	875.2		0.13
875	D5002	875.0		-0.03	9122	D5002	874.78		-0.20
904	D5002	874.8		-0.18	9123	D5002	875.5		0.36
962		-----		-----	9126		-----		-----
963	D5002	874.8		-0.18	9132		-----		-----
974	D5002	874.6		-0.34	9133		-----		-----
982	D1298	879.7	G(0.01)	3.62	9134		-----		-----
994	D5002	874.8	C	-0.18	9135		-----		-----
995	D5002	875.27		0.18	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D5002	874.9		-0.11	9138		-----		-----
1016	ISO12185	875.1	C	0.05	9139		-----		-----
1023	D5002	874.5		-0.42	9141	D5002	872.4	G(0.01)	-2.05
1038	D5002	874.4		-0.49	9142		-----		-----
1039	D5002	874.8		-0.18	9143		-----		-----
9144		-----		-----					

9145	D5002	876.1		0.83
9146		-----		-----
9147	INH-344	874.100		-0.73
9148	INH-506	875.9		0.67
9149	D5002	875.9		0.67
9151		-----		-----
9152	D5002	887.0	G(0.01)	9.29

normality	not OK
n	107
outliers	4
mean (n)	875.04
st.dev. (n)	0.559
R(calc.)	1.57
R(D5002:10)	3.61

Lab 273: first reported 883.4
Lab 1810: first reported 847.6
Lab 872: reported 0.8747 (unit error)
Lab 994: reported 0.8748 (unit error)
Lab 1016: reported 0.8751 (unit error)
Lab 1065: reported 0.87505 (unit error)
Lab 1236: reported 0.87496 (unit error)
Lab 1460: reported 0.8768 (unit error)
Lab 1554: reported 0.8746 (unit error)
Lab 1654: reported 0.874538 (unit error)
Lab 1714: reported 0.87471 (unit error)
Lab 9107: reported 0.8746 (unit error)
Lab 9108: reported 0.8755 (unit error)





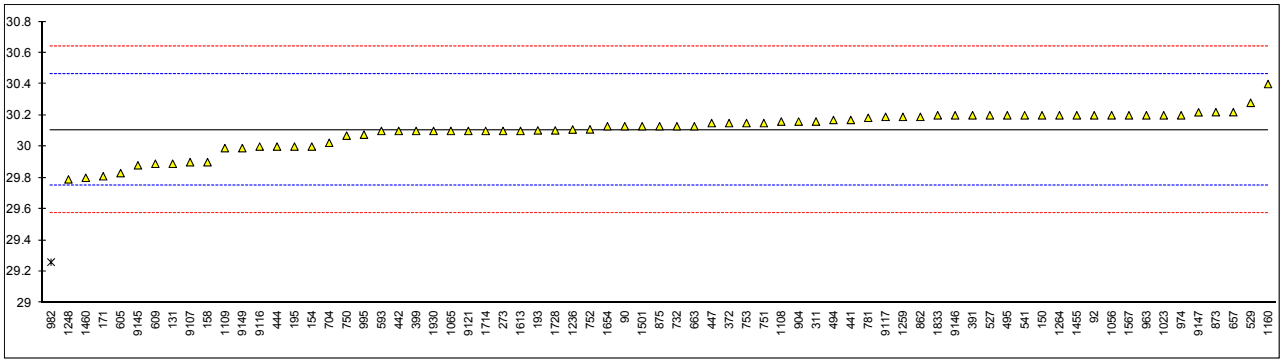
Determination of API Gravity on sample #12135;

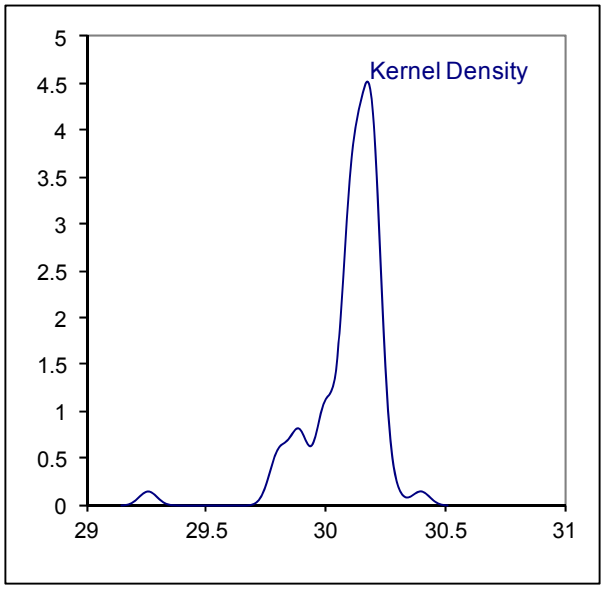
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040		-----		-----
90	D287	30.13		0.13	1056	Calculated	30.2		0.52
92	D1298	30.2		0.52	1065	Calculated	30.1		-0.04
131	D5002	29.89		-1.21	1081		-----		-----
150	D287	30.2		0.52	1090		-----		-----
154	D287	30.0		-0.60	1108	Calculated	30.16		0.30
158	D287	29.9		-1.16	1109	D287	29.99		-0.65
171	D287	29.81		-1.66	1131		-----		-----
193	D4052	30.1035		-0.02	1160	D287	30.4		1.64
195	D287	30.0		-0.60	1236	D287	30.109		0.01
203		-----		-----	1248	in house	29.79		-1.77
225		-----		-----	1259	D287	30.19		0.47
238		-----		-----	1264	D287	30.2		0.52
273	D287	30.1		-0.04	1272		-----		-----
311	D4052	30.16		0.30	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455	D287	30.2		0.52
335		-----		-----	1460	Converted	29.80		-1.72
340		-----		-----	1501	D4052	30.13		0.13
372	Converted	30.15		0.24	1539		-----		-----
375		-----		-----	1554		-----		-----
391	D287	30.2		0.52	1556		-----		-----
398		-----		-----	1562		-----		-----
399	D287	30.1		-0.04	1564		-----		-----
402		-----		-----	1567	Calculated	30.2		0.52
441	D1298	30.17		0.36	1603		-----		-----
442	D287	30.1		-0.04	1613	D287	30.1		-0.04
444	D4052	30.0		-0.60	1635		-----		-----
445		-----		-----	1654	D4052	30.13		0.13
446		-----		-----	1658		-----		-----
447	D1250	30.15		0.24	1714	D5002	30.10		-0.04
463		-----		-----	1720		-----		-----
485		-----		-----	1728	D287	30.1035		-0.02
494	D5002	30.17		0.36	1800		-----		-----
495	Calculated	30.20		0.52	1810		-----		-----
527	D287	30.2		0.52	1811		-----		-----
529	D287	30.28		0.97	1815		-----		-----
541	D5002	30.2		0.52	1833	D1298	30.2		0.52
551		-----		-----	1842		-----		-----
593	D1298	30.1		-0.04	1930	D287	30.10		-0.04
602		-----		-----	9050		-----		-----
605	D4052	29.83		-1.55	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D4052	29.89		-1.21	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D5002	30.22		0.64	9060		-----	ex	-----
663	D287	30.13		0.13	9061		-----		-----
704	D1250	30.024		-0.46	9099		-----		-----
732	D1250	30.13		0.13	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D1250	30.07		-0.20	9106		-----		-----
751	Calculated	30.15		0.24	9107	D287	29.9		-1.16
752	D1250	30.11		0.02	9108		-----		-----
753	D1250calc	30.15		0.24	9116	D287	30.0		-0.60
781	D1250	30.184		0.43	9117	Calculated	30.19		0.47
862	D287	30.19		0.47	9119		-----		-----
873	Calculated	30.22		0.64	9120		-----		-----
874		-----		-----	9121	D5002	30.1		-0.04
875	D1250	30.13		0.13	9122		-----		-----
904	D287	30.16		0.30	9123		-----		-----
962		-----		-----	9126		-----		-----
963	D287	30.2		0.52	9132		-----		-----
974	D1250	30.20		0.52	9133		-----		-----
982	D1298	29.26	G(0.01)	-4.74	9134		-----		-----
994		-----		-----	9135		-----		-----
995	D1250	30.076		-0.17	9136		-----		-----
996		-----		-----	9137		-----		-----
1011		-----		-----	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023	D1250	30.2		0.52	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039		-----		-----	9143		-----		-----
9144		-----		-----					

9145	D287	29.88	-1.27
9146	in house	30.2	0.52
9147	INH-344	30.219	0.63
9148		-----	-----
9149	D287	29.99	-0.65
9151		-----	-----
9152		-----	-----

normality	not OK
n	70
outliers	1
mean (n)	30.107
st.dev. (n)	0.1211
R(calc.)	0.339
R(D287:12b)	0.500

Lab 9060: reported 0.8758, result excluded





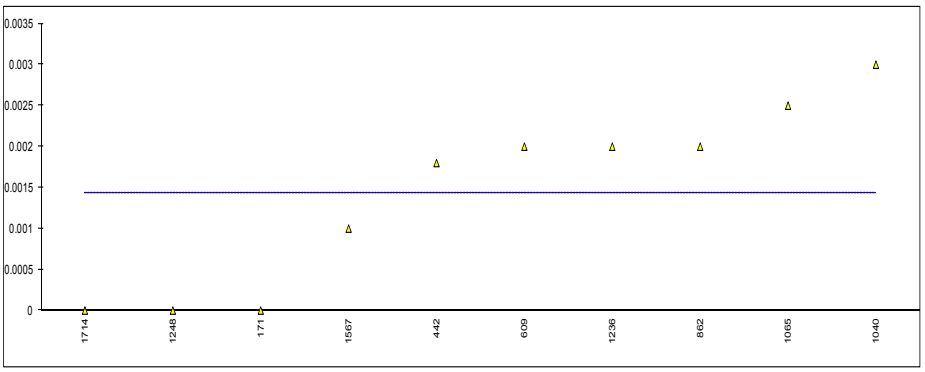
Determination of individual Light ends [C1-C3] on sample #12135; results in%M/M

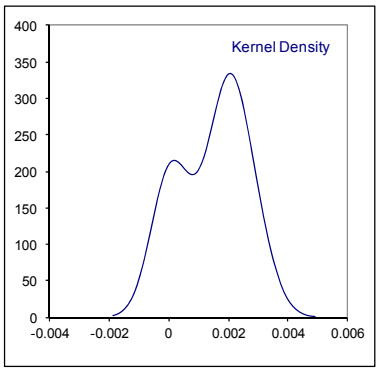
lab	method	C1	mark	z(targ)	C2	mark	z(targ)	C3	mark	z(targ)
62		-----		-----	-----		-----	-----		-----
90		-----		-----	-----		-----	-----		-----
92		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
150	IP344	<0.01		-----	0.02		0.29	0.17		1.08
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
171	IP344	0.0		-----	0.012		-2.70	0.139		-1.56
193		-----		-----	-----		-----	-----		-----
195		-----		-----	-----		-----	-----		-----
203		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	IP344	<0.01		-----	0.01		-3.44	0.13		-2.32
314		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
340		-----		-----	-----		-----	-----		-----
372		-----		-----	-----		-----	-----		-----
375		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
398		-----		-----	-----		-----	-----		-----
399		-----		-----	-----		-----	-----		-----
402		-----		-----	-----		-----	-----		-----
441		-----		-----	-----		-----	-----		-----
442	IP344	0.0018		-----	0.0225		1.23	0.1676		0.88
444		-----		-----	-----		-----	-----		-----
445	IP344Mod.	<0.01		-----	0.016		-1.20	0.145		-1.05
446		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
463		-----		-----	-----		-----	-----		-----
485		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
495	IP344	<0.01		-----	0.02		0.29	0.18		1.94
527		-----		-----	-----		-----	-----		-----
529		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
593		-----		-----	-----		-----	-----		-----
602		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
608		-----		-----	-----		-----	-----		-----
609	IP344	0.0020		-----	0.0217		0.93	0.1616		0.37
613		-----		-----	-----		-----	-----		-----
657		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
739		-----		-----	-----		-----	-----		-----
742		-----		-----	-----		-----	-----		-----
749		-----		-----	-----		-----	-----		-----
750		-----		-----	-----		-----	-----		-----
751		-----		-----	-----		-----	-----		-----
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
862	IP344	0.002		-----	0.024		1.79	0.168		0.91
873		-----		-----	-----		-----	-----		-----
874		-----		-----	-----		-----	-----		-----
875		-----		-----	-----		-----	-----		-----
904		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
982		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	-----		-----
996		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1023	D5134Mod	<0.01		-----	0.01		-3.44	0.14		-1.47
1038		-----		-----	-----		-----	-----		-----
1039		-----		-----	0.0199		0.25	0.1683		0.94
1040	in house	0.003		-----	0.021		0.67	0.132		-2.15

1056		-----	-----	-----		-----	-----	-----
1065	IP344	0.0025	-----	0.033		5.15	0.207	4.24
1081		-----	-----	-----		-----	-----	-----
1090		-----	-----	-----		-----	-----	-----
1108		-----	-----	-----		-----	-----	-----
1109		-----	-----	-----		-----	-----	-----
1131		-----	-----	-----		-----	-----	-----
1160		-----	-----	-----		-----	-----	-----
1236	IP344	0.002	-----	0.020		0.29	0.156	-0.11
1248	in house	0.000	-----	0.020		0.29	0.162	0.40
1259		-----	-----	-----		-----	-----	-----
1264		-----	-----	-----		-----	-----	-----
1272		-----	-----	-----		-----	-----	-----
1287		-----	-----	-----		-----	-----	-----
1403		-----	-----	-----		-----	-----	-----
1412		-----	-----	-----		-----	-----	-----
1455		-----	-----	-----		-----	-----	-----
1460		-----	-----	-----		-----	-----	-----
1501		-----	-----	-----		-----	-----	-----
1539		-----	-----	-----		-----	-----	-----
1554		-----	-----	-----		-----	-----	-----
1556		-----	-----	-----		-----	-----	-----
1562		-----	-----	-----		-----	-----	-----
1564		-----	-----	-----		-----	-----	-----
1567	IP601	0.001	-----	0.0174	C	-0.68	0.128	-2.49
1603		-----	-----	-----		-----	-----	-----
1613		-----	-----	-----		-----	-----	-----
1635		-----	-----	-----		-----	-----	-----
1654		-----	-----	-----		-----	-----	-----
1658		-----	-----	-----		-----	-----	-----
1714	in house	0.000	-----	0.020		0.29	0.162	0.40
1720		-----	-----	-----		-----	-----	-----
1728		-----	-----	-----		-----	-----	-----
1800		-----	-----	-----		-----	-----	-----
1810		-----	-----	-----		-----	-----	-----
1811		-----	-----	-----		-----	-----	-----
1815		-----	-----	-----		-----	-----	-----
1833		-----	-----	-----		-----	-----	-----
1842		-----	-----	-----		-----	-----	-----
1930		-----	-----	-----		-----	-----	-----
9050		-----	-----	-----		-----	-----	-----
9051		-----	-----	-----		-----	-----	-----
9052		-----	-----	-----		-----	-----	-----
9053		-----	-----	-----		-----	-----	-----
9057		-----	-----	-----		-----	-----	-----
9060		-----	-----	-----		-----	-----	-----
9061		-----	-----	-----		-----	-----	-----
9099		-----	-----	-----		-----	-----	-----
9100		-----	-----	-----		-----	-----	-----
9101		-----	-----	-----		-----	-----	-----
9102		-----	-----	-----		-----	-----	-----
9104		-----	-----	-----		-----	-----	-----
9106		-----	-----	-----		-----	-----	-----
9107		-----	-----	-----		-----	-----	-----
9108		-----	-----	-----		-----	-----	-----
9116		-----	-----	-----		-----	-----	-----
9117		-----	-----	-----		-----	-----	-----
9119		-----	-----	-----		-----	-----	-----
9120		-----	-----	-----		-----	-----	-----
9121		-----	-----	-----		-----	-----	-----
9122		-----	-----	-----		-----	-----	-----
9123		-----	-----	-----		-----	-----	-----
9126		-----	-----	-----		-----	-----	-----
9132		-----	-----	-----		-----	-----	-----
9133		-----	-----	-----		-----	-----	-----
9134		-----	-----	-----		-----	-----	-----
9135		-----	-----	-----		-----	-----	-----
9136		-----	-----	-----		-----	-----	-----
9137		-----	-----	-----		-----	-----	-----
9138		-----	-----	-----		-----	-----	-----
9139		-----	-----	-----		-----	-----	-----
9141		-----	-----	-----		-----	-----	-----
9142		-----	-----	-----		-----	-----	-----
9143		-----	-----	-----		-----	-----	-----
9144		-----	-----	-----		-----	-----	-----
9145		-----	-----	-----		-----	-----	-----
9146		-----	-----	-----		-----	-----	-----
9147		-----	-----	-----		-----	-----	-----
9148		-----	-----	-----		-----	-----	-----
9149		-----	-----	-----		-----	-----	-----

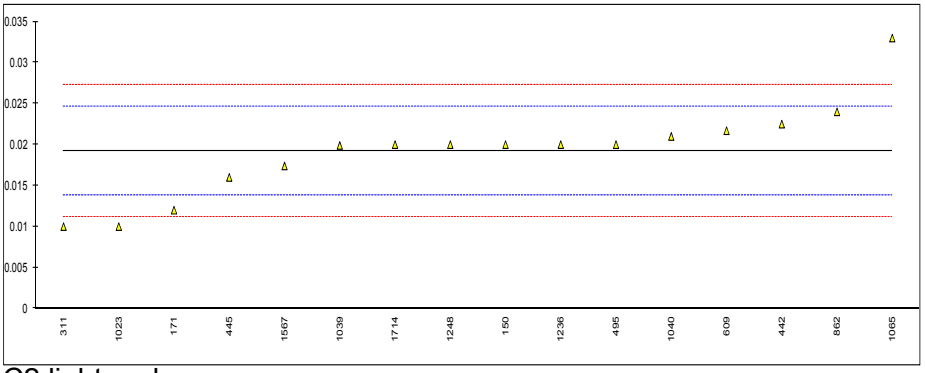
9151		-----	-----	-----	-----	-----	-----	
9152		-----	-----	-----	-----	-----	-----	
	normality	OK		not OK		OK		
	n	10		16		16		
	outliers	0		0		0		
	mean (n)	0.0014		0.0192		0.1573		
	st.dev. (n)	0.00111		0.00561		0.02095		
	R(calc.)	0.0031		0.0157		0.0587		
	R(IP344:04)	n.a.		0.0075		0.0329		

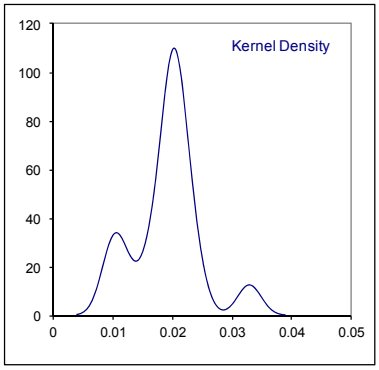
Lab 1567: first reported 0.015



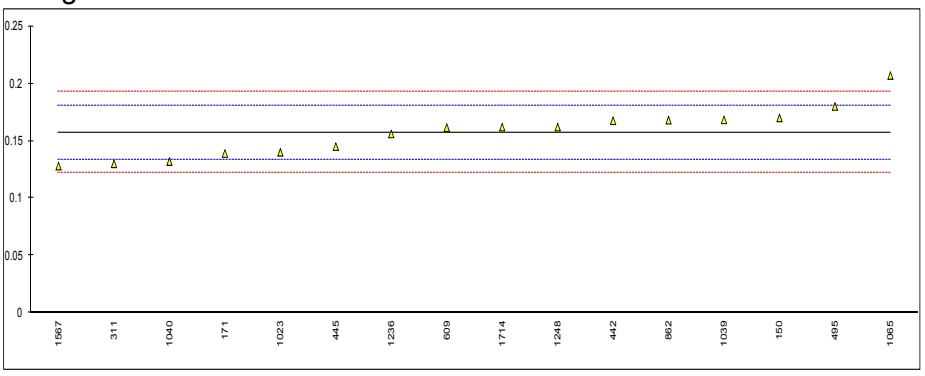


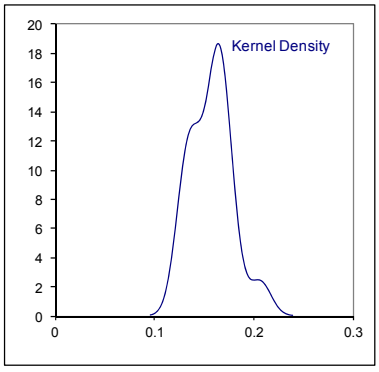
C1 light ends





C2 light ends





C3 light ends

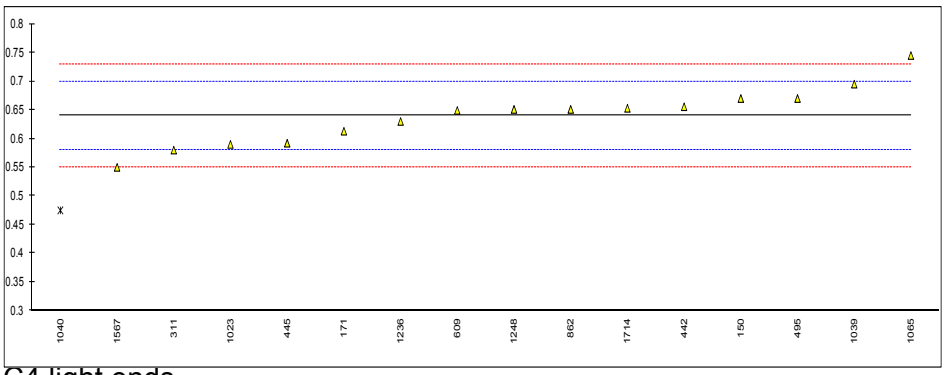
Determination of individual Light ends [C4-C6] on sample #12135; results in%M/M

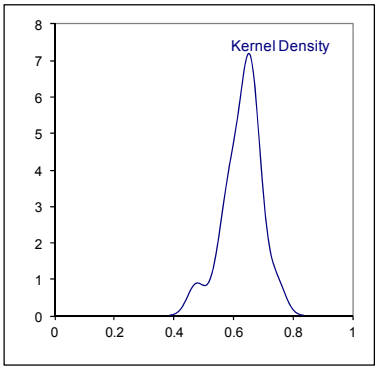
lab	method	C4	mark	z(targ)	C5	mark	z(targ)	C6	mark	z(targ)
62		-----		-----	-----		-----	-----		-----
90		-----		-----	-----		-----	-----		-----
92		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
150	IP344	0.67		1.01	1.32		5.58	1.82		-1.80
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
171	IP344	0.613		-0.88	1.049		-1.15	1.913		-1.22
193		-----		-----	-----		-----	-----		-----
195		-----		-----	-----		-----	-----		-----
203		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	IP344	0.58		-1.98	1.11		0.37	2.45		2.12
314		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
340		-----		-----	-----		-----	-----		-----
372		-----		-----	-----		-----	-----		-----
375		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
398		-----		-----	-----		-----	-----		-----
399		-----		-----	-----		-----	-----		-----
402		-----		-----	-----		-----	-----		-----
441		-----		-----	-----		-----	-----		-----
442	IP344	0.6557		0.53	1.1684		1.81	1.8300		-1.74
444		-----		-----	-----		-----	-----		-----
445	IP344	0.592		-1.58	1.052		-1.07	1.051	G(0.05)	-6.58
446		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
463		-----		-----	-----		-----	-----		-----
485		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
495	IP344	0.67	C	1.01	1.14	C	1.11	2.27	C	1.00
527		-----		-----	-----		-----	-----		-----
529		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
593		-----		-----	-----		-----	-----		-----
602		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
608		-----		-----	-----		-----	-----		-----
609	IP344	0.6493	C	0.32	1.0541	C	-1.02	-----		-----
613		-----		-----	-----		-----	-----		-----
657		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
739		-----		-----	-----		-----	-----		-----
742		-----		-----	-----		-----	-----		-----
749		-----		-----	-----		-----	-----		-----
750		-----		-----	-----		-----	-----		-----
751		-----		-----	-----		-----	-----		-----
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
862	IP344	0.651		0.38	1.151		1.38	2.342		1.45
873		-----		-----	-----		-----	-----		-----
874		-----		-----	-----		-----	-----		-----
875		-----		-----	-----		-----	-----		-----
904		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
982		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	-----		-----
996		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1023	D5134/D4626	0.59		-1.65	1.03		-1.62	1.27	G(0.05)	-5.22
1038		-----		-----	-----		-----	-----		-----
1039	IP601	0.695		1.83	1.0635		-0.79	2.5841		2.96
1040	in house	0.475	G(0.05)	-5.46	0.819	D(0.05)	-6.86	-----		-----

1056		-----	-----	-----		-----	-----	-----
1065	IP344	0.745	3.49	1.591	G(0.05)	12.30	-----	-----
1081		-----	-----	-----		-----	-----	-----
1090		-----	-----	-----		-----	-----	-----
1108		-----	-----	-----		-----	-----	-----
1109		-----	-----	-----		-----	-----	-----
1131		-----	-----	-----		-----	-----	-----
1160		-----	-----	-----		-----	-----	-----
1236	IP344	0.630	-0.32	1.048		-1.17	2.468	2.23
1248	In house	0.651	0.38	1.069		-0.65	1.798	-1.94
1259		-----	-----	-----		-----	-----	-----
1264		-----	-----	-----		-----	-----	-----
1272		-----	-----	-----		-----	-----	-----
1287		-----	-----	-----		-----	-----	-----
1403		-----	-----	-----		-----	-----	-----
1412		-----	-----	-----		-----	-----	-----
1455		-----	-----	-----		-----	-----	-----
1460		-----	-----	-----		-----	-----	-----
1501		-----	-----	-----		-----	-----	-----
1539		-----	-----	-----		-----	-----	-----
1554		-----	-----	-----		-----	-----	-----
1556		-----	-----	-----		-----	-----	-----
1562		-----	-----	-----		-----	-----	-----
1564		-----	-----	-----		-----	-----	-----
1567	IP601	0.550	-2.97	0.900		-4.85	1.696	-2.57
1603		-----	-----	-----		-----	-----	-----
1613		-----	-----	-----		-----	-----	-----
1635		-----	-----	-----		-----	-----	-----
1654		-----	-----	-----		-----	-----	-----
1658		-----	-----	-----		-----	-----	-----
1714	in house	0.653	0.44	1.179		2.08	2.029	-0.50
1720		-----	-----	-----		-----	-----	-----
1728		-----	-----	-----		-----	-----	-----
1800		-----	-----	-----		-----	-----	-----
1810		-----	-----	-----		-----	-----	-----
1811		-----	-----	-----		-----	-----	-----
1815		-----	-----	-----		-----	-----	-----
1833		-----	-----	-----		-----	-----	-----
1842		-----	-----	-----		-----	-----	-----
1930		-----	-----	-----		-----	-----	-----
9050		-----	-----	-----		-----	-----	-----
9051		-----	-----	-----		-----	-----	-----
9052		-----	-----	-----		-----	-----	-----
9053		-----	-----	-----		-----	-----	-----
9057		-----	-----	-----		-----	-----	-----
9060		-----	-----	-----		-----	-----	-----
9061		-----	-----	-----		-----	-----	-----
9099		-----	-----	-----		-----	-----	-----
9100		-----	-----	-----		-----	-----	-----
9101		-----	-----	-----		-----	-----	-----
9102		-----	-----	-----		-----	-----	-----
9104		-----	-----	-----		-----	-----	-----
9106		-----	-----	-----		-----	-----	-----
9107		-----	-----	-----		-----	-----	-----
9108		-----	-----	-----		-----	-----	-----
9116		-----	-----	-----		-----	-----	-----
9117		-----	-----	-----		-----	-----	-----
9119		-----	-----	-----		-----	-----	-----
9120		-----	-----	-----		-----	-----	-----
9121		-----	-----	-----		-----	-----	-----
9122		-----	-----	-----		-----	-----	-----
9123		-----	-----	-----		-----	-----	-----
9126		-----	-----	-----		-----	-----	-----
9132		-----	-----	-----		-----	-----	-----
9133		-----	-----	-----		-----	-----	-----
9134		-----	-----	-----		-----	-----	-----
9135		-----	-----	-----		-----	-----	-----
9136		-----	-----	-----		-----	-----	-----
9137		-----	-----	-----		-----	-----	-----
9138		-----	-----	-----		-----	-----	-----
9139		-----	-----	-----		-----	-----	-----
9141		-----	-----	-----		-----	-----	-----
9142		-----	-----	-----		-----	-----	-----
9143		-----	-----	-----		-----	-----	-----
9144		-----	-----	-----		-----	-----	-----
9145		-----	-----	-----		-----	-----	-----
9146		-----	-----	-----		-----	-----	-----
9147		-----	-----	-----		-----	-----	-----
9148		-----	-----	-----		-----	-----	-----
9149		-----	-----	-----		-----	-----	-----

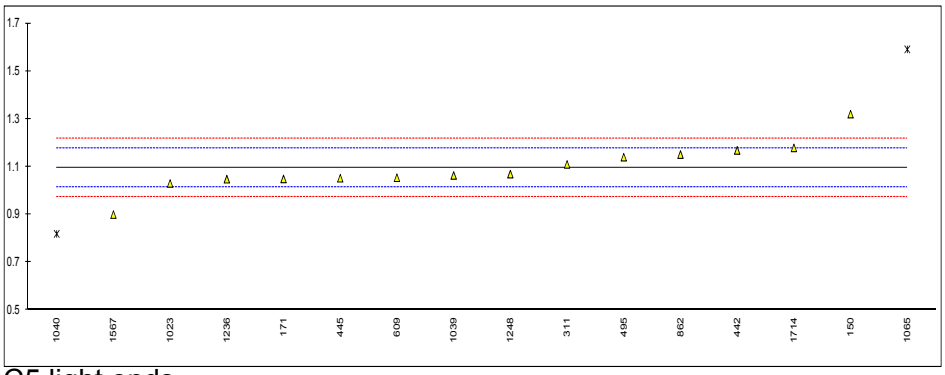
9151		-----	-----	-----	-----	-----	-----	
9152		-----	-----	-----	-----	-----	-----	
	normality	OK		OK		OK		
	n	15		14		11		
	outliers	1		2		2		
	mean (n)	0.6397		1.095		2.109		
	st.dev. (n)	0.04923		0.0962		0.3201		
	R(calc.)	0.1378		0.269		0.896		
	R(IP344:04)	0.0844		0.113		0.450		

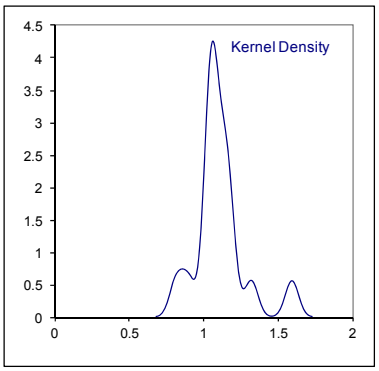
Lab 495: first reported 0.44; 0.52; 0.47
Lab 609: first reported 0.3915; 0.9900



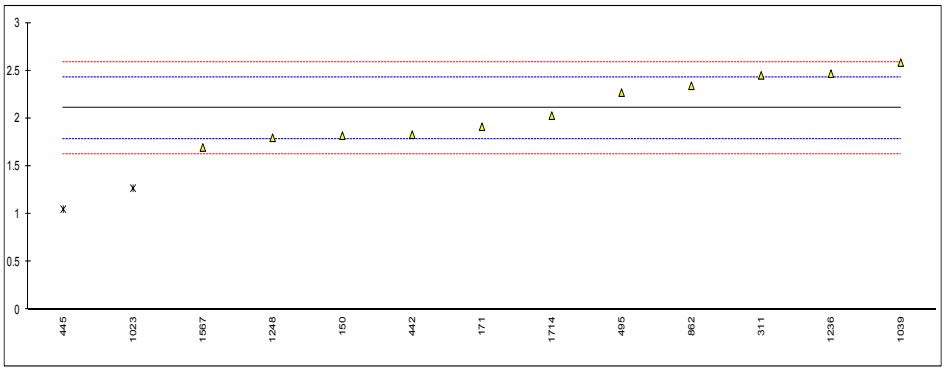


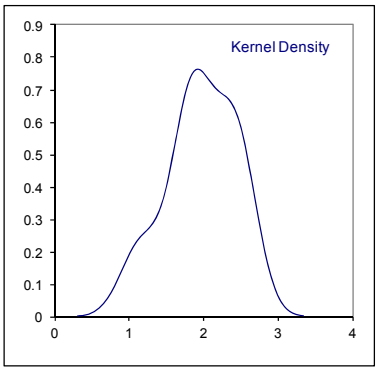
C4 light ends





C5 light ends





C6 light ends

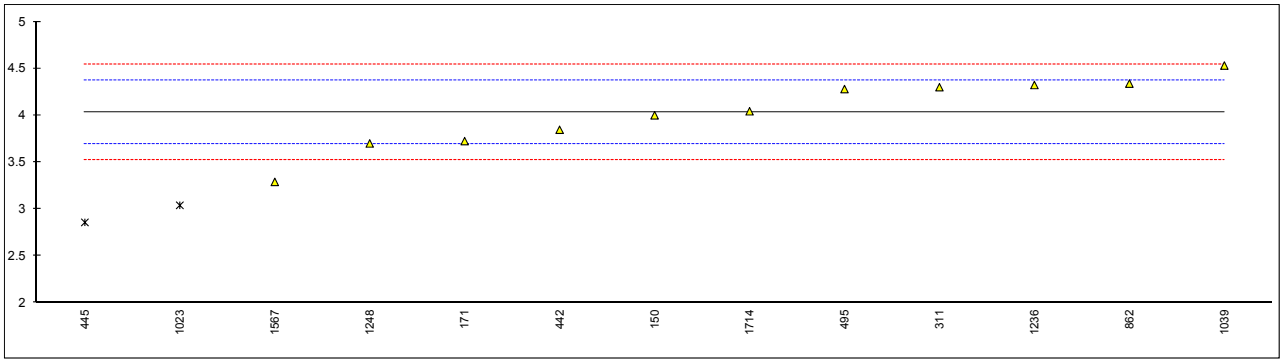
Determination of Total Light ends [C1-C6] on sample #12135; results in %M/M

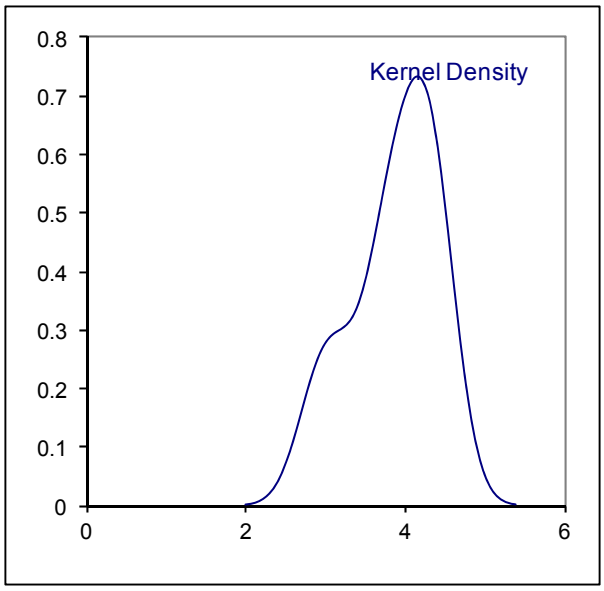
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040		-----		-----
90		-----		-----	1056		-----		-----
92		-----		-----	1065		-----		-----
131		-----		-----	1081		-----		-----
150	IP344	4.00		-0.20	1090		-----		-----
154		-----		-----	1108		-----		-----
158		-----		-----	1109		-----		-----
171	IP344	3.725		-1.83	1131		-----		-----
193		-----		-----	1160		-----		-----
195		-----		-----	1236	IP344	4.323		1.71
203		-----		-----	1248	in house	3.700		-1.98
225		-----		-----	1259		-----		-----
238		-----		-----	1264		-----		-----
273		-----		-----	1272		-----		-----
311	IP344	4.30		1.57	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455		-----		-----
335		-----		-----	1460		-----		-----
340		-----		-----	1501		-----		-----
372		-----		-----	1539		-----		-----
375		-----		-----	1554		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1562		-----		-----
399		-----		-----	1564		-----		-----
402		-----		-----	1567	IP601	3.290		-4.41
441		-----		-----	1603		-----		-----
442	IP344	3.8460		-1.11	1613		-----		-----
444		-----		-----	1635		-----		-----
445	IP344Mod.	2.858	G(0.05)	-6.97	1654		-----		-----
446		-----		-----	1658		-----		-----
447		-----		-----	1714	in house	4.043		0.05
463		-----		-----	1720		-----		-----
485		-----		-----	1728		-----		-----
494		-----		-----	1800		-----		-----
495	IP344	4.28	C	1.46	1810		-----		-----
527		-----		-----	1811		-----		-----
529		-----		-----	1815		-----		-----
541		-----		-----	1833		-----		-----
551		-----		-----	1842		-----		-----
593		-----		-----	1930		-----		-----
602		-----		-----	9050		-----		-----
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609		-----		-----	9053		-----		-----
613		-----		-----	9057		-----		-----
657		-----		-----	9060		-----		-----
663		-----		-----	9061		-----		-----
704		-----		-----	9099		-----		-----
732		-----		-----	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751		-----		-----	9107		-----		-----
752		-----		-----	9108		-----		-----
753		-----		-----	9116		-----		-----
781		-----		-----	9117		-----		-----
862	IP344	4.338		1.80	9119		-----		-----
873		-----		-----	9120		-----		-----
874		-----		-----	9121		-----		-----
875		-----		-----	9122		-----		-----
904		-----		-----	9123		-----		-----
962		-----		-----	9126		-----		-----
963		-----		-----	9132		-----		-----
974		-----		-----	9133		-----		-----
982		-----		-----	9134		-----		-----
994		-----		-----	9135		-----		-----
995		-----		-----	9136		-----		-----
996		-----		-----	9137		-----		-----
1011		-----		-----	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023	D5134Mod./D4626	3.04	G(0.05)	-5.89	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039	IP601	4.5308		2.94	9143		-----		-----
9144		-----		-----					

9145	-----	-----
9146	-----	-----
9147	-----	-----
9148	-----	-----
9149	-----	-----
9151	-----	-----
9152	-----	-----

normality	OK
n	11
outliers	2
mean (n)	4.034
st.dev. (n)	0.3676
R(calc.)	1.029
R(IP344:04)	0.473

Lab 495: First reported 1.63





Determination of Pour Point (Maximum) on sample #12135; results in °C

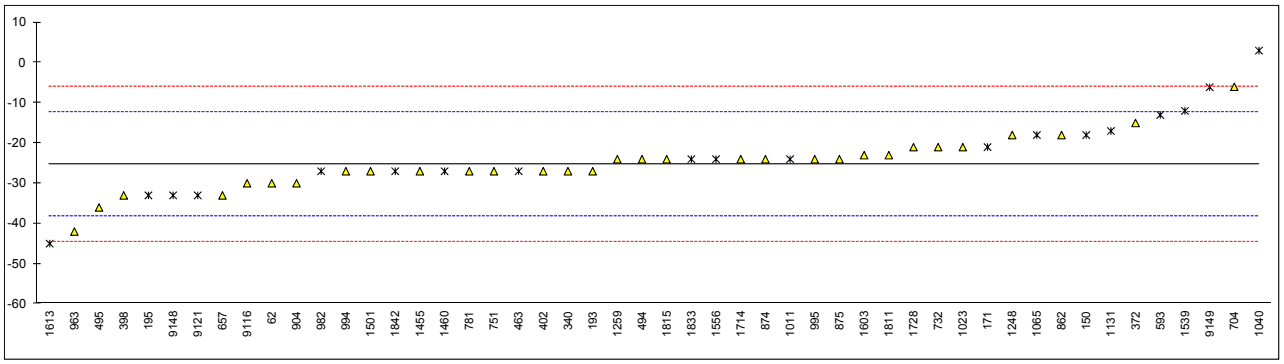
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D5853A	-30		-0.73	1040	ISO3016	3	ex	4.40
90		-----		-----	1056		-----		-----
92		-----		-----	1065	D5950	-18	ex	1.13
131		-----		-----	1081		-----		-----
150	D5950	-18	ex	1.13	1090		-----		-----
154		-----		-----	1108		-----		-----
158		-----		-----	1109		-----		-----
171	D97	-21.0	ex	0.67	1131	D6749	-17	ex	1.29
193	D5853A	-27		-0.27	1160		-----		-----
195	D97	-33	ex	-1.20	1236		-----		-----
203		-----		-----	1248	IP441Mod.	-18		1.13
225		-----		-----	1259	D5853A	-24		0.20
238		-----		-----	1264	D5853A	<-30		-----
273	D5853A	<-24		-----	1272		-----		-----
311		-----		-----	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455	D5853A	-27		-0.27
335		-----		-----	1460	D5949	-27.0	ex	-0.27
340	D5853A	-27		-0.27	1501	D5853A	-27		-0.27
372	D5853A	-15		1.60	1539	D97	-12	ex	2.07
375		-----		-----	1554		-----		-----
391		-----		-----	1556	ISO3016	-24	ex	0.20
398	D5853A	-33		-1.20	1562		-----		-----
399	D5853A	<-21		-----	1564		-----		-----
402	D5853A	-27.0		-0.27	1567		-----		-----
441		-----		-----	1603	in house	-23		0.36
442		-----		-----	1613	D5853A	-45	G(0.05)	-3.07
444		-----		-----	1635	D5853A	<-21		-----
445	D5853A	≤-36		-----	1654		-----		-----
446		-----		-----	1658		-----		-----
447	D97	<-36	ex	-----	1714	D5853A	-24		0.20
463	D6892A	-27	ex	-0.27	1720		-----		-----
485		-----		-----	1728	D5853A	-21	C	0.67
494	D5853A	-24		0.20	1800		-----		-----
495	D5853A	-36		-1.67	1810		-----		-----
527		-----		-----	1811	D5853A	-23		0.36
529		-----		-----	1815	D5853A	-24.0		0.20
541	D97	<-24	ex	-----	1833	D97	-24	ex	0.20
551		-----		-----	1842	D5950	-27	ex	-0.27
593	D97	-13	ex	1.91	1930		-----		-----
602		-----		-----	9050		-----		-----
605	D5853A	≤-36		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D5853A	≤-36		-----	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D5853A	-33	C	-1.20	9060		-----		-----
663		-----		-----	9061		-----		-----
704	D5853A	-6		3.00	9099		-----		-----
732	D5853A	-21		0.67	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751	D5853A	-27		-0.27	9107		-----		-----
752		-----		-----	9108		-----		-----
753		-----		-----	9116	D5853	-30		-0.73
781	D5853A	-27		-0.27	9117	D5853A	<-36		-----
862	D5853A	-18		1.13	9119		-----		-----
873		-----		-----	9120		-----		-----
874	D5853A	-24		0.20	9121	D97	-33	ex	-1.20
875	D5853A	-24		0.20	9122		-----		-----
904	D5853A	-30		-0.73	9123		-----		-----
962		-----		-----	9126		-----		-----
963	D5853A	-42		-2.60	9132		-----		-----
974	D5853A	<-42		-----	9133		-----		-----
982	D97	-27	ex	-0.27	9134		-----		-----
994	D5853A	-27		-0.27	9135		-----		-----
995	D5853A	-24		0.20	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D97	-24	ex	0.20	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023	D5853A	-21		0.67	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039		-----		-----	9143		-----		-----
9144		-----		-----					

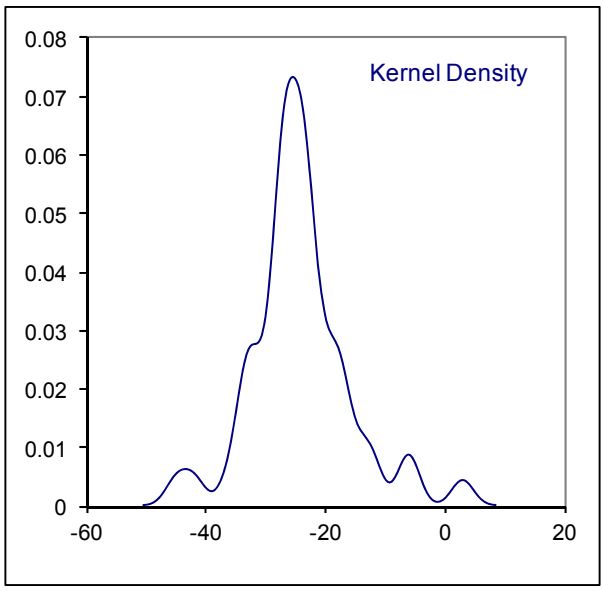
9145	D5853A	<-51		<-4.00
9146		-----		-----
9147		-----		-----
9148	D97	-33	ex	-1.20
9149	D97	-6.11111	ex	2.98
9151		-----		-----
9152		-----		-----

			All test results included:
normality	not OK		not OK
n	31		49
outliers	1	+18 excluded	1
mean (n)	-25.29		-24.76
st.dev. (n)	6.492		7.532
R(calc.)	18.18		21.09
R(D5853A:11)	18.00		18.00

Lab 657: First reported -42
Lab 1728: first reported 0
Lab 9145: False negative result

Ex = results excluded, method is not intended for Crude Oils





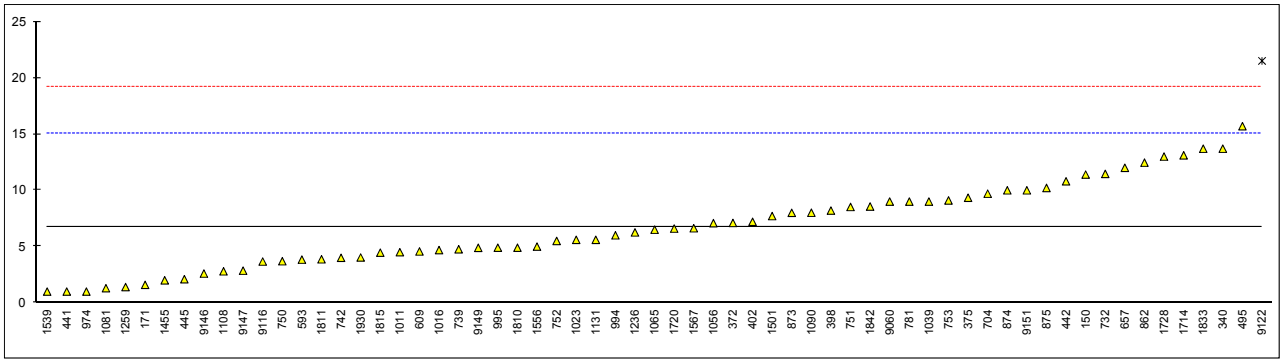
Determination of Salt as NaCl on sample #12135; results in mg/kg

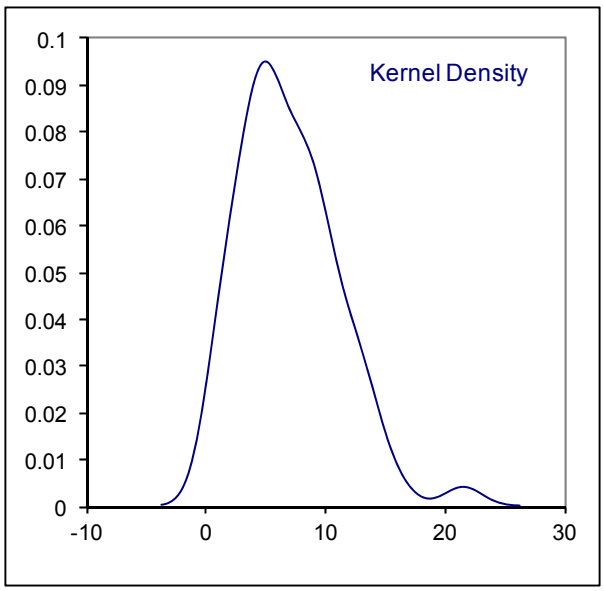
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040		-----		-----
90		-----		-----	1056	D3230	7.08		0.08
92		-----		-----	1065	D3230	6.5		-0.06
131		-----		-----	1081	D3230	1.3		-1.31
150	D3230	11.4		1.13	1090	D3230	8.01		0.31
154		-----		-----	1108	D3230	2.8		-0.95
158		-----		-----	1109		-----		-----
171	D3230	1.60		-1.24	1131	D3230	5.6		-0.27
193		-----		-----	1160		-----		-----
195		-----		-----	1236	D3230	6.26		-0.11
203		-----		-----	1248		-----		-----
225		-----		-----	1259	D3230	1.4		-1.28
238		-----		-----	1264	D3230	<1		-----
273		-----		-----	1272		-----		-----
311	D3230	<3		-----	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334		-----		-----	1455	D3230	2		-1.14
335		-----		-----	1460		-----		-----
340	D3230	13.7		1.68	1501	D3230	7.71		0.24
372	D3230	7.1		0.09	1539	D3230	1		-1.38
375	D3230	9.34		0.63	1554		-----		-----
391		-----		-----	1556	D3230	5		-0.42
398	D3230	8.2		0.35	1562		-----		-----
399		-----		-----	1564		-----		-----
402	D3230	7.20		0.11	1567	D6470Mod.	6.63		-0.02
441	IP265	1		-1.38	1603		-----		-----
442	IP265	10.8		0.98	1613		-----		-----
444		-----		-----	1635		-----		-----
445	IP265	2.1		-1.12	1654		-----		-----
446		-----		-----	1658		-----		-----
447		-----		-----	1714	D6470	13.11		1.54
463		-----		-----	1720	D6470	6.6		-0.03
485		-----		-----	1728	in house	13	C	1.51
494		-----		-----	1800		-----		-----
495	D3230	15.7		2.16	1810	D3230	4.9		-0.44
527		-----		-----	1811	D3230	3.87		-0.69
529		-----		-----	1815	D3230	4.46		-0.55
541		-----		-----	1833	D3230	13.7		1.68
551		-----		-----	1842	IP265	8.56		0.44
593	D3230	3.839		-0.70	1930	DIN51576	4.03		-0.65
602		-----		-----	9050		-----		-----
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D3230	4.5669		-0.52	9053		-----		-----
613		-----		-----	9057		-----		-----
657	IP265	12		1.27	9060	D3230	9		0.55
663		-----		-----	9061		-----		-----
704	D3230	9.7		0.72	9099		-----		-----
732	INH-21534	11.46		1.14	9100		-----		-----
739	INH-21534	4.76		-0.47	9101		-----		-----
742	INH-21534	4.0		-0.66	9102		-----		-----
749		-----		-----	9104		-----		-----
750	INH-21534	3.7		-0.73	9106		-----		-----
751	D3230	8.52		0.43	9107		-----		-----
752	D3230	5.5		-0.30	9108		-----		-----
753	D3230	9.1		0.57	9116	D3230	3.67		-0.74
781	D3230	9		0.55	9117		-----		-----
862	D3230	12.46		1.38	9119		-----		-----
873	D3230	8		0.31	9120		-----		-----
874	D3230	10		0.79	9121		-----		-----
875	D3230	10.21		0.84	9122	D3230	21.5	G(0.05)	3.56
904		-----		-----	9123		-----		-----
962		-----		-----	9126		-----		-----
963		-----		-----	9132		-----		-----
974	D3230	1		-1.38	9133		-----		-----
982		-----		-----	9134		-----		-----
994	D3230	6		-0.18	9135		-----		-----
995	D3230	4.8962		-0.44	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D3230	4.5		-0.54	9138		-----		-----
1016	D3230	4.69		-0.49	9139		-----		-----
1023	D3230	5.6		-0.27	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039	D3230	9		0.55	9143		-----		-----
9144		-----		-----					

9145		-----	-----
9146	in house	2.6	-1.00
9147	INH-205	2.859	-0.93
9148		-----	-----
9149	D3230	4.89	-0.44
9151	D3230	10	0.79
9152	D3230	<10	-----

normality	OK
n	62
outliers	1
mean (n)	6.729
st.dev. (n)	3.6826
R(calc.)	10.311
R(D3230:10)	11.616

Lab 1728: first reported 35.2





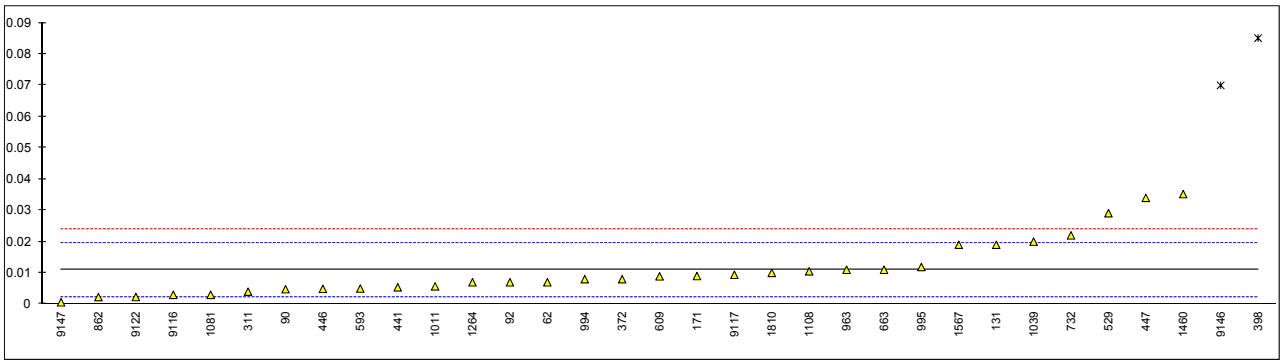
Determination of Sediment ASTM D4807 on sample #12135; results in %M/M

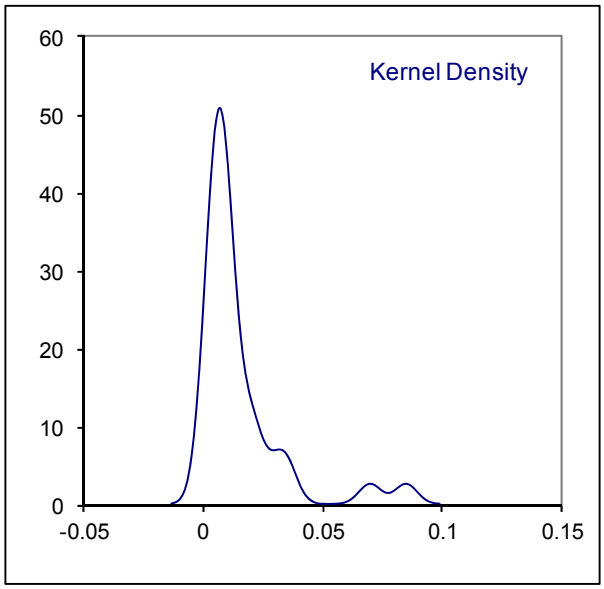
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D4807	0.007		-0.89	1040	D4807	<0.01		-----
90	D4807	0.0048		-1.39	1056		-----		-----
92	D4807	0.007		-0.89	1065		-----		-----
131	D4807	0.019		1.85	1081	in house	0.003		-1.80
150		-----		-----	1090	D4807	<0.01		-----
154		-----		-----	1108	D4807	0.0105		-0.09
158		-----		-----	1109		-----		-----
171	D4807	0.009		-0.43	1131		-----		-----
193		-----		-----	1160		-----		-----
195		-----		-----	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259		-----		-----
238		-----		-----	1264	D4807	0.007		-0.89
273		-----		-----	1272		-----		-----
311	D4807	0.004		-1.57	1287		-----		-----
314		-----		-----	1403		-----		-----
333		-----		-----	1412		-----		-----
334	D4807	<0.001		-----	1455	D4807	<0.001		-----
335		-----		-----	1460	D4807	0.0352		5.54
340		-----		-----	1501		-----		-----
372	D4807	0.008		-0.66	1539		-----		-----
375		-----		-----	1554		-----		-----
391		-----		-----	1556		-----		-----
398	D4807	0.0851	C,G(0.01)	16.92	1562		-----		-----
399		-----		-----	1564		-----		-----
402		-----		-----	1567	D4807	0.0190		1.85
441	D4807	0.0054		-1.25	1603		-----		-----
442		-----		-----	1613		-----		-----
444		-----		-----	1635		-----		-----
445		-----		-----	1654		-----		-----
446	D4807	0.0049		-1.37	1658		-----		-----
447	D4807	0.034	C	5.27	1714		-----		-----
463		-----		-----	1720		-----		-----
485		-----		-----	1728		-----		-----
494		-----		-----	1800		-----		-----
495	D4807	<0.01		-----	1810	D4807	0.01		-0.21
527		-----		-----	1811		-----		-----
529	D4807	0.0291		4.15	1815		-----		-----
541		-----		-----	1833		-----		-----
551		-----		-----	1842		-----		-----
593	D4807	0.005		-1.35	1930		-----		-----
602		-----		-----	9050		-----		-----
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D4807	0.0089		-0.46	9053		-----		-----
613		-----		-----	9057		-----		-----
657		-----		-----	9060		-----		-----
663	D4807	0.011		0.02	9061		-----		-----
704		-----		-----	9099		-----		-----
732	D4807	0.022		2.53	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751		-----		-----	9107		-----		-----
752		-----		-----	9108		-----		-----
753		-----		-----	9116	D4807	0.003		-1.80
781		-----		-----	9117	D4807	0.0094		-0.34
862	D4807	0.00226		-1.97	9119		-----		-----
873		-----		-----	9120		-----		-----
874		-----		-----	9121		-----		-----
875		-----		-----	9122	D4807	0.0023		-1.96
904		-----		-----	9123		-----		-----
962		-----		-----	9126		-----		-----
963	D4807	0.011		0.02	9132		-----		-----
974		-----		-----	9133		-----		-----
982		-----		-----	9134		-----		-----
994	D4807	0.008		-0.66	9135		-----		-----
995	D4807	0.01189		0.23	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D4807	0.0057	C	-1.19	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023		-----		-----	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039	D4807	0.02		2.07	9143		-----		-----
9144		-----		-----					

9145		-----		-----
9146	D4807Mod.	0.07	G(0.01)	13.48
9147	INH-337	0.0006		-2.35
9148		-----		-----
9149		-----		-----
9151		-----		-----
9152		-----		-----

normality	not OK
n	31
outliers	2
mean (n)	0.0109
st.dev. (n)	0.00905
R(calc.)	0.0254
R(D4807:10)	0.0123

Lab 398: first reported 0.0871
Lab 447: first reported 0.048
Lab 1011: first reported 0.0283





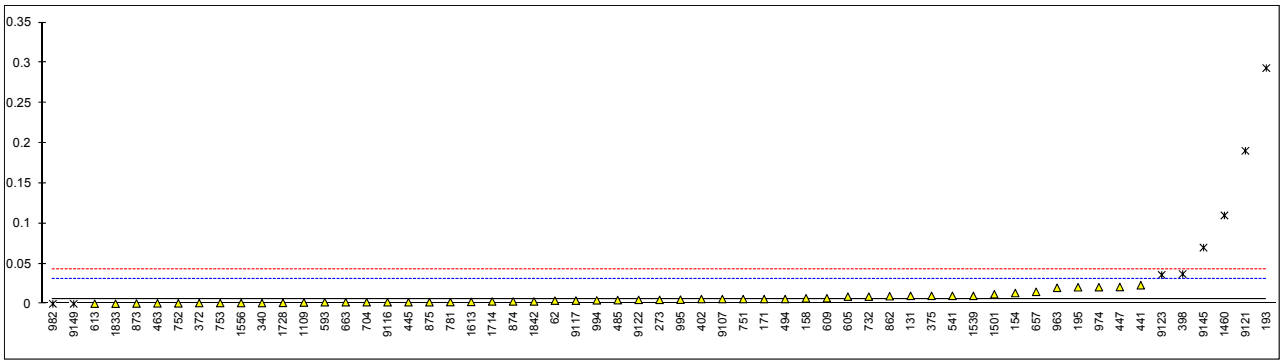
Determination of Sediment ASTM D473 on sample #12135; results in %V/V

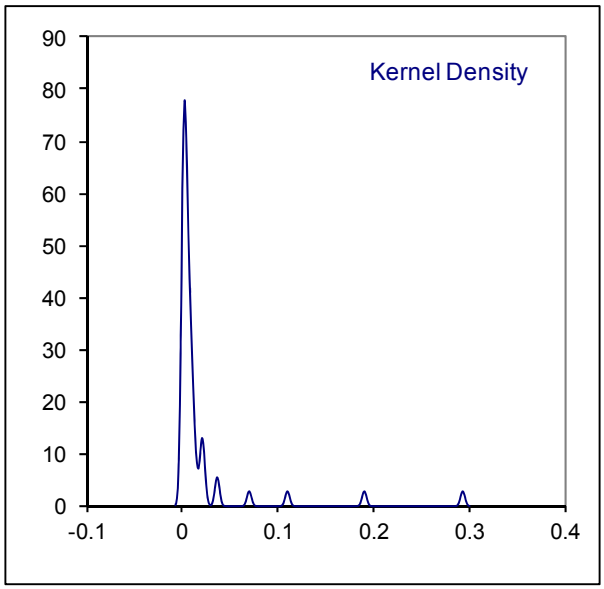
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D473	0.004		-0.19	1040		-----		-----
90		-----		-----	1056		-----		-----
92		-----		-----	1065		-----		-----
131	D473	0.01		0.29	1081		-----		-----
150	D473	<0.01		-----	1090		-----		-----
154	D473	0.0135		0.58	1108		-----		-----
158	D473	0.0069		0.04	1109	D473	0.0017		-0.38
171	D473	0.006		-0.03	1131		-----		-----
193	D473	0.293326	G(0.01)	23.20	1160		-----		-----
195	D473	0.02069		1.16	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259		-----		-----
238		-----		-----	1264	D473	<0.01		-----
273	D473	0.005		-0.11	1272		-----		-----
311	D473	<0.01		-----	1287		-----		-----
314		-----		-----	1403		-----		-----
333	D473	<0.01		-----	1412		-----		-----
334		-----		-----	1455	D473	<0.01		-----
335	D473	<0.01		-----	1460	D473	0.11	G(0.01)	8.38
340	D473	0.001		-0.43	1501	D473	0.012		0.45
372	D473	0.001		-0.43	1539	D473	0.01		0.29
375	D473	0.010		0.29	1554		-----		-----
391		-----		-----	1556	ISO3735	0.001		-0.43
398	D473	0.0371	G(0.01)	2.48	1562		-----		-----
399		-----		-----	1564		-----		-----
402	D473	0.006		-0.03	1567		-----		-----
441	D473	0.0232		1.36	1603		-----		-----
442		-----		-----	1613	D473	0.0025		-0.31
444		-----		-----	1635		-----		-----
445	D473	0.002		-0.35	1654		-----		-----
446		-----		-----	1658		-----		-----
447	D473	0.021		1.18	1714	D473	0.003		-0.27
463	D473	0.0007		-0.46	1720		-----		-----
485	D473	0.0047		-0.14	1728	D473	0.00131		-0.41
494	D473	0.006		-0.03	1800		-----		-----
495	D473	<0.01		-----	1810		-----		-----
527		-----		-----	1811		-----		-----
529		-----		-----	1815		-----		-----
541	D473	0.01		0.29	1833	D473	0.00026		-0.49
551		-----		-----	1842	D473	0.003		-0.27
593	D473	0.002		-0.35	1930		-----		-----
602		-----		-----	9050		-----		-----
605	D473	0.009		0.21	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D473	0.007		0.05	9053		-----		-----
613	D473	0.00023		-0.50	9057		-----		-----
657	D473	0.015		0.70	9060		-----		-----
663	D473	0.002		-0.35	9061		-----		-----
704	D473	0.002		-0.35	9099		-----		-----
732	D473	0.009		0.21	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751	D473	0.006		-0.03	9107	D473	0.006		-0.03
752	D473	0.0007		-0.46	9108		-----		-----
753	D473	0.001		-0.43	9116	D473	0.0020		-0.35
781	D473	0.0022		-0.34	9117	D473	0.0041		-0.18
862	D473	0.0095		0.25	9119		-----		-----
873	D473	0.0005		-0.48	9120		-----		-----
874	D473	0.0030		-0.27	9121	D473	0.1904	G(0.01)	14.88
875	D473	0.0021		-0.35	9122	D473	0.005		-0.11
904		-----		-----	9123	D473	0.036	G(0.01)	2.40
962		-----		-----	9126		-----		-----
963	D473	0.02		1.10	9132		-----		-----
974	D473	0.0207		1.16	9133		-----		-----
982	D473	0	ex	-0.52	9134		-----		-----
994	D473	0.0044		-0.16	9135		-----		-----
995	D473	0.00526		-0.09	9136		-----		-----
996		-----		-----	9137		-----		-----
1011		-----		-----	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023		-----		-----	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039		-----		-----	9143		-----		-----
9144		-----		-----					

9145	D473	0.07	G(0.01)	5.14
9146		-----		-----
9147		-----		-----
9148		-----		-----
9149	D473	0	ex	-0.52
9151		-----		-----
9152		-----		-----

	normality	not OK
	n	51
	outliers	6 + 2 excl.
	mean (n)	0.0064
	st.dev. (n)	0.00611
	R(calc.)	0.0171
	R(D473:07)	0.0346

Ex = result excluded, zero is not a real result





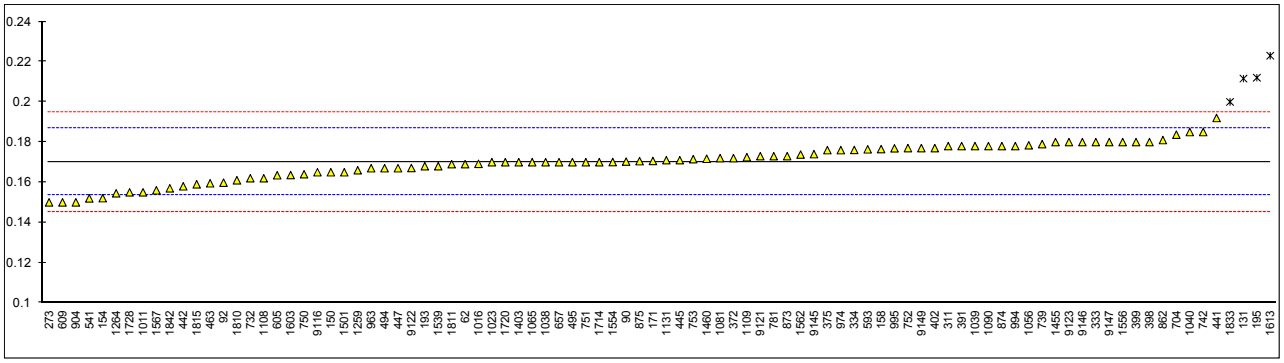
Determination of Total Sulphur on sample #12135; results in %M/M

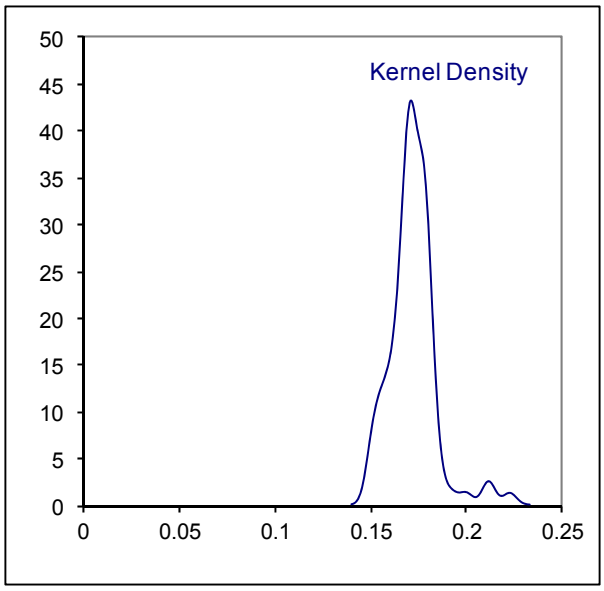
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D4294	0.169		-0.14	1040	ISO8754	0.185		1.79
90	D4294	0.1703		0.01	1056	D7343	0.1784		0.99
92	D4294	0.1598		-1.25	1065	IP336	0.17		-0.02
131	D4294	0.2116	G(0.01)	5.00	1081	D4294	0.172		0.22
150	D4294	0.165		-0.63	1090	D4294	0.178		0.94
154	D4294	0.1521		-2.18	1108	D4294	0.162		-0.99
158	D4294	0.1765		0.76	1109	D4294	0.1725		0.28
171	D4294	0.1706		0.05	1131	D4294	0.171		0.10
193	D4294	0.168		-0.27	1160		-----		-----
195	D4294	0.21205	G(0.05)	5.05	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259	ISO3675	0.166		-0.51
238		-----		-----	1264	D4294	0.1545		-1.89
273	D4294	0.15		-2.44	1272		-----		-----
311	D4294	0.178		0.94	1287		-----		-----
314		-----		-----	1403	ISO10304	0.17		-0.02
333	D2622	0.180		1.18	1412		-----		-----
334	D4294	0.1761		0.71	1455	D2622	0.180		1.18
335		-----		-----	1460	D4294	0.1717		0.18
340		-----		-----	1501	D4294	0.1650		-0.63
372	D4294	0.172		0.22	1539	D4294	0.168		-0.27
375	D4294	0.176		0.70	1554	ISO8754	0.17008		-0.01
391	D4294	0.178		0.94	1556	ISO8754	0.18		1.18
398	D4294	0.180		1.18	1562	INH-519	0.1738		0.43
399	D4294	0.180		1.18	1564		-----		-----
402	D4294	0.177		0.82	1567	D4294	0.156		-1.71
441	IP336	0.192		2.63	1603	in house	0.1636		-0.80
442	IP336	0.158		-1.47	1613	D4294	0.223	G(0.01)	6.37
444		-----		-----	1635		-----		-----
445	D4294	0.171		0.10	1654		-----		-----
446		-----		-----	1658		-----		-----
447	IP336	0.167		-0.39	1714	D2622	0.170		-0.02
463	D4294	0.1595		-1.29	1720	D4294	0.170		-0.02
485		-----		-----	1728	D4294	0.155		-1.83
494	D4294	0.167		-0.39	1800		-----		-----
495	D4294	0.17		-0.02	1810	D4294	0.161		-1.11
527		-----		-----	1811	D4294	0.169		-0.14
529		-----		-----	1815	D7039Mod.	0.159		-1.35
541	D4294	0.152		-2.20	1833	D4294	0.20	G(0.01)	3.60
551		-----		-----	1842	in house	0.157		-1.59
593	D4294	0.1764		0.75	1930		-----		-----
602		-----		-----	9050		-----		-----
605	D4294	0.1635		-0.81	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D4294	0.150	C	-2.44	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D4294	0.170		-0.02	9060		-----		-----
663		-----		-----	9061		-----		-----
704	D4294	0.1837		1.63	9099		-----		-----
732	D4294	0.162		-0.99	9100		-----		-----
739	D4294	0.179		1.06	9101		-----		-----
742	D4294	0.185		1.79	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D4294	0.164		-0.75	9106		-----		-----
751	D4294	0.170		-0.02	9107		-----		-----
752	D4294	0.177		0.82	9108		-----		-----
753	D4294	0.1715		0.16	9116	D4294	0.165		-0.63
781	D4294	0.173		0.34	9117		-----		-----
862	D4294	0.181		1.30	9119		-----		-----
873	D4294	0.173		0.34	9120		-----		-----
874	D4294	0.178		0.94	9121	D4294	0.173		0.34
875	D4294	0.1705		0.04	9122	D4294	0.1671		-0.37
904	D4294	0.15		-2.44	9123	D4294	0.180		1.18
962		-----		-----	9126		-----		-----
963	D4294	0.167		-0.39	9132		-----		-----
974	D4294	0.176		0.70	9133		-----		-----
982		-----		-----	9134		-----		-----
994	D4294	0.178		0.94	9135		-----		-----
995	D4294	0.1769		0.81	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D4294	0.155		-1.83	9138		-----		-----
1016	D2622	0.1692		-0.12	9139		-----		-----
1023	IP336	0.170		-0.02	9141		-----		-----
1038	D4294	0.170		-0.02	9142		-----		-----
1039	D2622	0.178		0.94	9143		-----		-----
9144		-----		-----					

9145	D4294	0.174	0.46
9146	D2622Mod.	0.18	1.18
9147	D2622	0.180	1.18
9148		-----	-----
9149	D4294	0.177	0.82
9151		-----	-----
9152		-----	-----

normality	not OK
n	88
outliers	4
mean (n)	0.1702
st.dev. (n)	0.00890
R(calc.)	0.0249
R(D4294:10)	0.0232

Lab 609: first reported 0.137



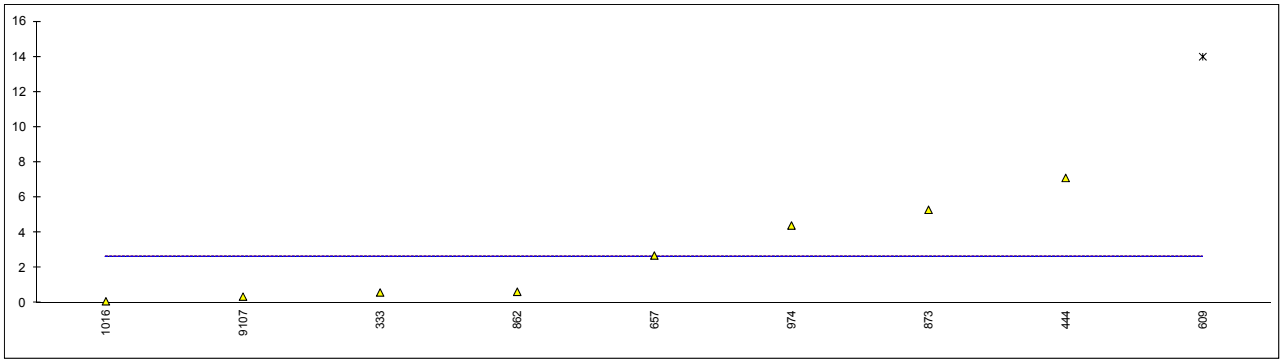


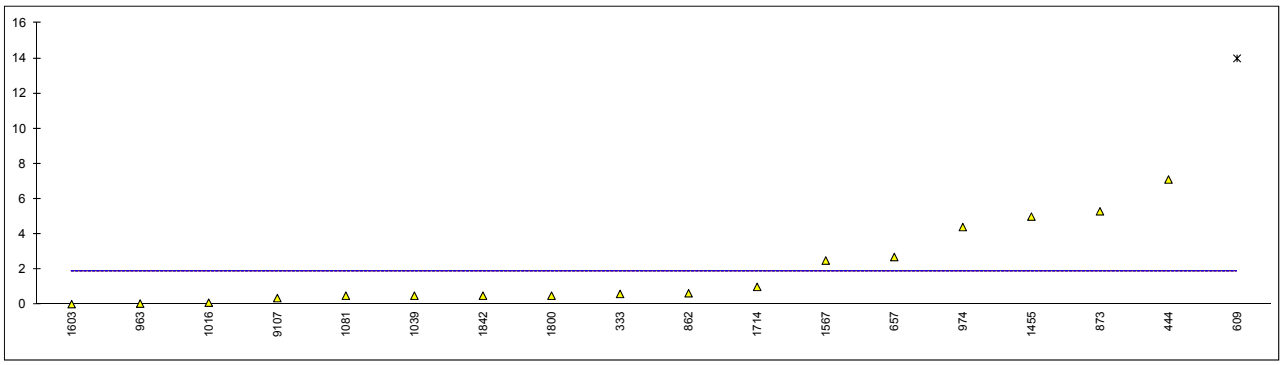
Determination of Total Mercury on sample #12135; results in µg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62		-----		-----	1040		-----		-----
90		-----		-----	1056		-----		-----
92		-----		-----	1065		-----		-----
131		-----		-----	1081	in house	<1		-----
150		-----		-----	1090		-----		-----
154		-----		-----	1108		-----		-----
158		-----		-----	1109		-----		-----
171		-----		-----	1131		-----		-----
193		-----		-----	1160		-----		-----
195		-----		-----	1236		-----		-----
203		-----		-----	1248		-----		-----
225		-----		-----	1259		-----		-----
238		-----		-----	1264		-----		-----
273		-----		-----	1272		-----		-----
311		-----		-----	1287		-----		-----
314		-----		-----	1403		-----		-----
333	UOP938	0.6		-1.98	1412		-----		-----
334		-----		-----	1455	INH-80	<10		-----
335		-----		-----	1460		-----		-----
340		-----		-----	1501		-----		-----
372		-----		-----	1539		-----		-----
375		-----		-----	1554		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1562		-----		-----
399		-----		-----	1564		-----		-----
402		-----		-----	1567	D7622	<5		-----
441		-----		-----	1603	in house	<0.04		-----
442		-----		-----	1613		-----		-----
444	UOP938	7.11		4.30	1635		-----		-----
445		-----		-----	1654		-----		-----
446		-----		-----	1658		-----		-----
447		-----		-----	1714	UOP938	<2		-----
463		-----		-----	1720		-----		-----
485		-----		-----	1728		-----		-----
494		-----		-----	1800	in house	<1		-----
495		-----		-----	1810		-----		-----
527		-----		-----	1811		-----		-----
529		-----		-----	1815		-----		-----
541		-----		-----	1833		-----		-----
551		-----		-----	1842	UOP938	<1		-----
593		-----		-----	1930		-----		-----
602		-----		-----	9050		-----		-----
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	UOP938	14	G(0.05)	10.95	9053		-----		-----
613		-----		-----	9057		-----		-----
657	UOP938	2.7		0.05	9060		-----		-----
663		-----		-----	9061		-----		-----
704		-----		-----	9099		-----		-----
732		-----		-----	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750		-----		-----	9106		-----		-----
751		-----		-----	9107	UOP938	0.363		-2.21
752		-----		-----	9108		-----		-----
753		-----		-----	9116		-----		-----
781		-----		-----	9117		-----		-----
862	UOP938	0.64		-1.94	9119		-----		-----
873	UOP938	5.3		2.55	9120		-----		-----
874		-----		-----	9121		-----		-----
875		-----		-----	9122		-----		-----
904		-----		-----	9123		-----		-----
962		-----		-----	9126		-----		-----
963	UOP938	<0.1		-----	9132		-----		-----
974	UOP938	4.405		1.69	9133		-----		-----
982		-----		-----	9134		-----		-----
994		-----		-----	9135		-----		-----
995		-----		-----	9136		-----		-----
996		-----		-----	9137		-----		-----
1011		-----		-----	9138		-----		-----
1016	UOP938	0.1		-2.46	9139		-----		-----
1023		-----		-----	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039	UOP938	<1		-----	9143		-----		-----
9144		-----		-----					

9145	-----	-----
9146	-----	-----
9147	-----	-----
9148	-----	-----
9149	-----	-----
9151	-----	-----
9152	-----	-----

		using all reported test results ***):
normality	OK	not OK
n	8	17
outliers	1	1
mean (n)	2.65	1.87
st.dev. (n)	2.672	2.237
R(calc.)	7.48	6.26
R(Horwitz)	2.90	2.15
R(UOP938:10)	0.64	0.45





***) In the calculation of the mean, standard deviation, the reproducibility and in above graph, using x/2 for each reported value <x

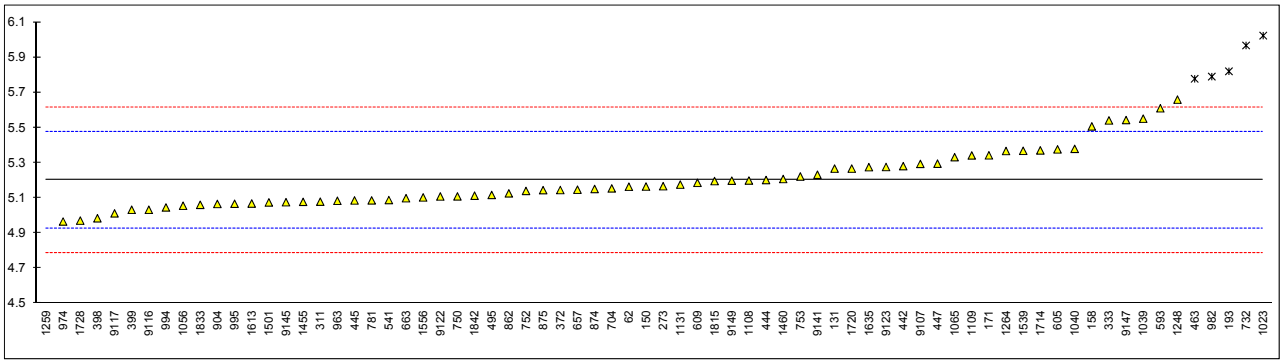
Determination of Kinematic Viscosity @ 40 ºC on sample #12135; results in mm^2/s

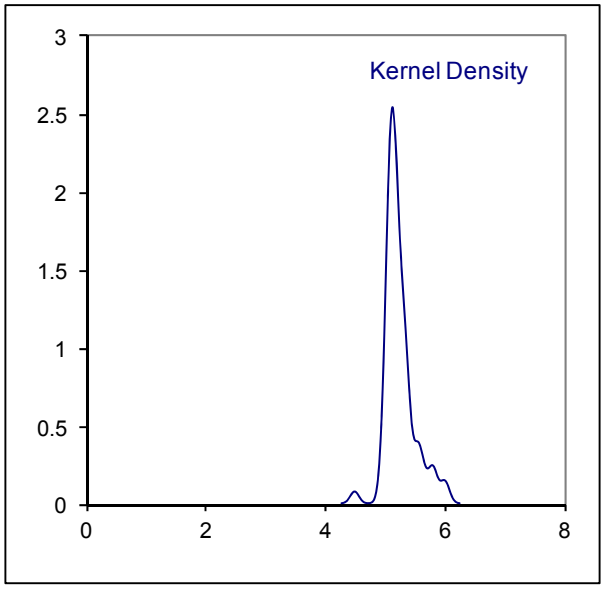
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D445	5.164		-0.27	1040	ISO3104	5.3791		1.30
90		-----		-----	1056	D445	5.0559		-1.05
92		-----		-----	1065	D445	5.332		0.96
131	D445	5.267		0.48	1081		-----		-----
150	D445	5.165		-0.26	1090		-----		-----
154		-----		-----	1108	D445	5.199		-0.01
158	D445	5.50693		2.23	1109	D445	5.342		1.03
171	D445	5.3425		1.03	1131	D445	5.176		-0.18
193	D445	5.82	DG(0.05)	4.51	1160		-----		-----
195		-----		-----	1236		-----		-----
203		-----		-----	1248	IP71Mod.	5.6591		3.34
225		-----		-----	1259	ISO3104	4.4854	G(0.05)	-5.20
238		-----		-----	1264	D445	5.367		1.21
273	D445	5.167		-0.24	1272		-----		-----
311	D445	5.079		-0.88	1287		-----		-----
314		-----		-----	1403		-----		-----
333	D445	5.541		2.48	1412		-----		-----
334		-----		-----	1455	D445	5.078		-0.89
335		-----		-----	1460	D445	5.2077		0.05
340		-----		-----	1501	D7042	5.0747		-0.92
372	D445	5.145		-0.40	1539	D445	5.368		1.22
375		-----		-----	1554		-----		-----
391		-----		-----	1556	ISO3104	5.103		-0.71
398	D445	4.9846		-1.57	1562		-----		-----
399	D445	5.033		-1.22	1564		-----		-----
402		-----		-----	1567		-----		-----
441		-----		-----	1603		-----		-----
442	IP71	5.2808		0.58	1613	D445	5.0684		-0.96
444	D445	5.2020		0.01	1635	D445	5.275	C	0.54
445	D445	5.086		-0.83	1654		-----		-----
446		-----		-----	1658		-----		-----
447	D445	5.295		0.69	1714	D445	5.3704		1.24
463	D445	5.7774	G(0.05)	4.20	1720	D7042	5.267		0.48
485		-----		-----	1728	D445	4.9712		-1.67
494		-----		-----	1800		-----		-----
495	D445	5.117		-0.61	1810		-----		-----
527		-----		-----	1811		-----		-----
529		-----		-----	1815	ISO3104	5.1960		-0.03
541	D7042	5.088		-0.82	1833	D445	5.061		-1.01
551		-----		-----	1842	IP71	5.113		-0.64
593	D445	5.61	C	2.98	1930		-----		-----
602		-----		-----	9050		-----		-----
605	D445	5.3763		1.28	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D445	5.186		-0.11	9053		-----		-----
613		-----		-----	9057		-----		-----
657	D445	5.147		-0.39	9060		-----		-----
663	D445	5.0985		-0.74	9061		-----		-----
704	D445	5.1543		-0.34	9099		-----		-----
732	D445	5.967	DG(0.05)	5.58	9100		-----		-----
739		-----		-----	9101		-----		-----
742		-----		-----	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D445	5.109		-0.67	9106		-----		-----
751		-----		-----	9107	D445	5.2937		0.68
752	D445	5.140		-0.44	9108		-----		-----
753	D445	5.2222		0.16	9116	D445	5.033		-1.22
781	D445	5.0862		-0.83	9117	D7042	5.0125		-1.37
862	D445	5.1263		-0.54	9119		-----		-----
873		-----		-----	9120		-----		-----
874	D445	5.151		-0.36	9121		-----		-----
875	D445	5.1443		-0.41	9122	D445	5.1085		-0.67
904	D445	5.066		-0.98	9123	D445	5.276		0.55
962		-----		-----	9126		-----		-----
963	D445	5.084		-0.85	9132		-----		-----
974	D445	4.966		-1.71	9133		-----		-----
982	D445	5.79	DG(0.05)	4.29	9134		-----		-----
994	D445	5.046		-1.12	9135		-----		-----
995	D445	5.067		-0.97	9136		-----		-----
996		-----		-----	9137		-----		-----
1011		-----		-----	9138		-----		-----
1016		-----		-----	9139		-----		-----
1023	D445	6.023	DG(0.05)	5.98	9141	D445	5.232		0.23
1038		-----		-----	9142		-----		-----
1039	IP71	5.551		2.55	9143		-----		-----
9144		-----		-----					

9145	D445	5.076	-0.91
9146		-----	-----
9147	INH-344	5.543	2.49
9148		-----	-----
9149	D7042	5.1983	-0.02
9151		-----	-----
9152		-----	-----

normality	not OK
n	66
outliers	6
mean (n)	5.2005
st.dev. (n)	0.15856
R(calc.)	0.4440
R(D445:12)	0.3848

Lab 593: first reported 6.97
Lab 1635: first reported 5.755





Determination of Water on sample #12135; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
62	D4377	0.2149		-0.60	1040	DIN51777	0.14	C	-4.22
90	D4928	0.209		-0.89	1056	D4928	0.270		2.06
92	D4377	0.266		1.86	1065	D95	0.1	ex	-6.15
131	D4928	0.21523		-0.59	1081	ISO12937	0.212		-0.74
150	D4377	0.183		-2.14	1090	D4928	0.22		-0.36
154		-----		-----	1108	D4377	0.10	ex	-6.15
158	D4377	0.2963		3.33	1109	D6304	0.132		-4.61
171	D4377	0.1504		-3.72	1131		-----		-----
193		-----		-----	1160		-----		-----
195	D4928	0.10	ex	-6.15	1236	D4377	0.283		2.68
203		-----		-----	1248	D4377	0.217		-0.50
225		-----		-----	1259	D4006	0.100	ex	-6.15
238		-----		-----	1264	D4377	0.3858	G(0.05)	7.65
273		-----		-----	1272		-----		-----
311	D4928	0.27		2.06	1287		-----		-----
314	D4928	0.214		-0.65	1403		-----		-----
333	D4928	0.23		0.12	1412		-----		-----
334	D4377	0.239		0.56	1455	D4377	0.279		2.49
335	D4377	0.2863		2.84	1460		-----		-----
340	D4377	0.200		-1.32	1501	D4928	0.267		1.91
372	D4377	0.23		0.12	1539	D4377	0.256		1.38
375		-----		-----	1554		-----		-----
391		-----		-----	1556	D6304	0.24		0.61
398	D4377	0.218		-0.45	1562		-----		-----
399		-----		-----	1564		-----		-----
402		-----		-----	1567	D4928	0.242		0.70
441	D4928	0.20		-1.32	1603	in house	0.2745		2.27
442	IP386	0.2277		0.01	1613		-----		-----
444	D95	0.15		-3.74	1635		-----		-----
445	D4377	0.301		3.55	1654		-----		-----
446	IP386	0.2418		0.69	1658		-----		-----
447	IP386	0.235		0.37	1714	D4006	0.169		-2.82
463	D4928	0.184		-2.10	1720		-----		-----
485	D4377	0.1946		-1.58	1728	D4377	0.24797		0.99
494	D4928	0.2764		2.36	1800	in house	0.211		-0.79
495	D4377	0.28		2.54	1810	D4377	0.29		3.02
527		-----		-----	1811	D4377	0.218		-0.45
529	D4377	0.2307		0.16	1815	ISO10337	0.2119		-0.75
541	D4006	0.2		-1.32	1833	D95	0	ex	-10.98
551		-----		-----	1842	D95	0.05	ex	-8.57
593	D4006	0.200		-1.32	1930	DIN51777	0.227		-0.02
602		-----		-----	9050	INH-256	0.190		-1.81
605		-----		-----	9051		-----		-----
608		-----		-----	9052		-----		-----
609	D4377	0.232		0.22	9053		-----		-----
613	D4928	0.274	U,ex	2.25	9057		-----		-----
657	D4377	0.17		-2.77	9060	D4928	0.19		-1.81
663	D4928	0.272		2.15	9061		-----		-----
704	D4377	0.243		0.75	9099		-----		-----
732	INH-2477	0.36	G(0.05)	6.40	9100		-----		-----
739	INH-2477	0.18		-2.29	9101		-----		-----
742	D4377	0.235		0.37	9102		-----		-----
749		-----		-----	9104		-----		-----
750	D4377	0.21		-0.84	9106		-----		-----
751		-----		-----	9107	D6304	0.3000		3.50
752	D4006	0.225		-0.12	9108		-----		-----
753	D4006	0.250		1.09	9116		-----		-----
781		-----		-----	9117	E203	0.230		0.12
862	D4377	0.072	ex	-7.50	9119		-----		-----
873	D4006	0.200		-1.32	9120		-----		-----
874	D4006	0.200		-1.32	9121	D4006	0.2185		-0.43
875		-----		-----	9122	D4377	0.188		-1.90
904	D4928	0.40	G(0.05)	8.33	9123	D4928	0.145		-3.98
962		-----		-----	9126		-----		-----
963	D4377	0.277		2.39	9132		-----		-----
974	D4928	0.01605	ex	-10.21	9133		-----		-----
982	D95	0.1	ex	-6.15	9134		-----		-----
994	D4928	0.208		-0.94	9135		-----		-----
995	D6304	0.2297		0.11	9136		-----		-----
996		-----		-----	9137		-----		-----
1011	D4928	0.262	C	1.67	9138		-----		-----
1016	D4377	0.2600	C	1.57	9139		-----		-----
1023	D4928	0.2565		1.40	9141		-----		-----
1038		-----		-----	9142		-----		-----
1039	D4928	0.24		0.61	9143		-----		-----
9144		-----		-----					

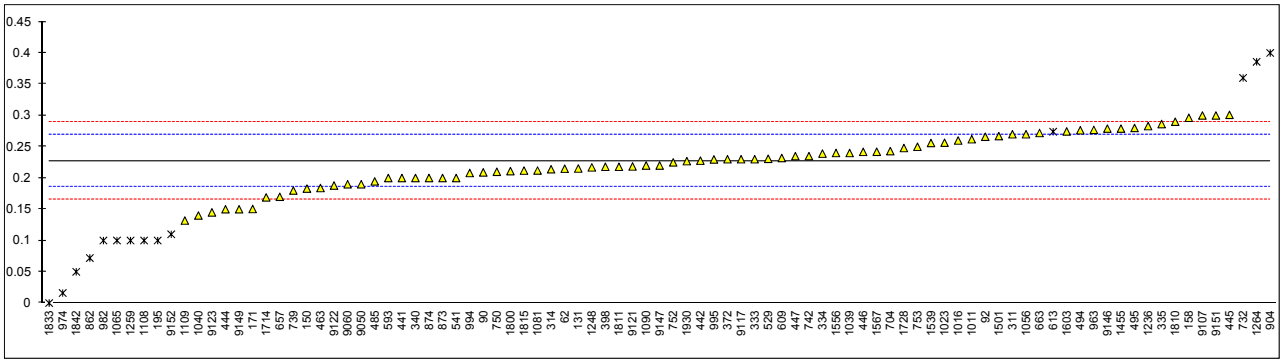
9145		-----		-----
9146	D4377Mod.	0.279		2.49
9147	D4928	0.220		-0.36
9148		-----		-----
9149	D4377	0.15		-3.74
9151	D4377	0.3		3.50
9152	D4377	0.11	ex	-5.67

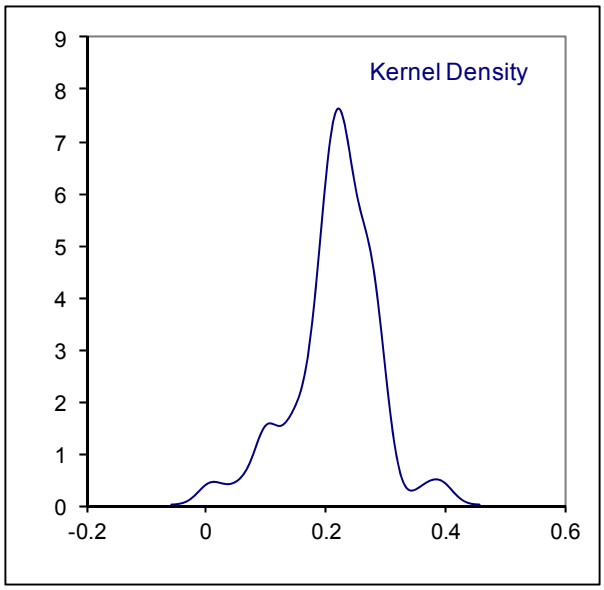
			Only D4377	Only D4928
	normality	OK	OK	OK
	n	77	31	23
	outliers	3	1	1
	mean (n)	0.2274	0.2377	0.2302
	st.dev. (n)	0.04105	0.04394	0.03307
	R(calc.)	0.1149	0.1230	0.0926
	R(D4377:11)	0.0580	0.0589	0.0419

Spike 0.1618 %V/V

Lab 1011: first reported 0.361
Lab 1040: first reported 0.16
Lab 613: result excluded as reported result is in %M/M
Lab 1016: reported 2600 (unit error)

Ex = result excluded, see $4.1





APPENDIX 2
Number of participants per country

1 lab in ARGENTINA
3 labs in AUSTRALIA
2 labs in AZERBAIJAN
1 lab in BAHAMAS
1 lab in BELARUS REPUBLIC
1 lab in BRAZIL
1 lab in BULGARIA
6 labs in CANADA
1 lab in CÔTE D'IVOIRE
2 labs in CROATIA
2 labs in CZECH REPUBLIC
1 lab in ECUADOR
1 lab in EGYPT
1 lab in ESTONIA
4 labs in FRANCE
1 lab in GABON
1 lab in GEORGIA
5 labs in GERMANY
1 lab in GREECE
1 lab in IRAN
1 lab in ISRAEL
4 labs in ITALY
1 lab in JORDAN
1 lab in KAZAKHSTAN
2 labs in LITHUANIA
6 labs in MALAYSIA
2 labs in MEXICO
1 labs in NEGARA BRUNEI DARUSSALAM
9 labs in NIGERIA
5 labs in NORWAY
8 labs in OMAN
2 labs in P.R. of CHINA
3 labs in POLAND
1 lab in PORTUGAL
2 labs in ROMANIA
14 labs in RUSSIA
4 labs in SAUDI ARABIA
1 lab in SERBIA
1 lab in SINGAPORE
1 lab in SOUTH AFRICA
1 lab in SPAIN
1 lab in SUDAN
3 labs in SWEDEN
1 lab in THAILAND
9 labs in THE NETHERLANDS
3 labs in TURKEY
1 lab in TURKMENISTAN
1 lab in U.A.E.
14 labs in U.S.A.
1 lab in UKRAINE
15 labs in UNITED KINGDOM

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
E	= error in calculations
U	= reported in different unit
W	= withdrawn on request participant
ex	= excluded from calculations
fr.	= first reported
n.a.	= not applicable
n.d.	= not determined
SDS	= Safety data Sheet

Literature

1	iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, January 2010
2	ASTM E178-02
3	ASTM E1301-03
4	ISO 13528-05
5	ISO 5725-86
6	ISO 5725, parts 1-6, 1994
7	M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8	W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9	IP 367/84
10	DIN 38402 T41/42
11	P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12	J.N. Miller, Analyst, 118, 455, (1993)
13	Analytical Methods Committee Technical brief, No4 February 2001.
14	The Royal Society of Chemistry 2002, Analyst 2002, 127 page 1359-1364, P.J. Lowthian and M. Thompson (see http-//www.rsc.org/suppdata/an/b2/b205600n/).