

# **Results of Proficiency Test**

## **Mono Ethylene Glycol (MEG)**

### **October 2011**

Organised by: Institute for Interlaboratory Studies (iis)  
Spijkenisse, the Netherlands

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## 1 INTRODUCTION

Since 1994, the Institute for Interlaboratory Studies organised a proficiency test for the analysis of Mono Ethylene Glycol every year. As part of the annual proficiency test program of 2011/2012, the Institute decided to continue this proficiency test on Mono Ethylene Glycol. In this interlaboratory study 67 laboratories in 21 different countries have participated. See appendix 2 for the number of participants per country. In this report the results of the 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. Sample analyses for fit-for-use and homogeneity testing were subcontracted. To get maximum information from this study it was decided to send 4 different samples:

	Bottle type	Tests requested
Sample #11090	0.5 L amber glass bottle	for Acidity, Aldehyde, Chloride, Colour and DEG
Sample #11091	0.1 L amber glass bottle	for UV transmittance and Water
Sample #11092	0.25 L PE bottle	for Iron
Sample #11093	0.5 L amber glass bottle	for Ash, Density, Distillation and purity

table 1: type of samples

The 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 guide 43 and ILAC-G13:2007, (R007), 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% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

### 2.2 PROTOCOL

The protocol followed in the organisation 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 present 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 200 litre bulk material of MEG polyester grade was obtained from a local production plant. The bulk material was divided in four batches.

The first batch of approx. 85 litre was transferred to a precleaned 200 litre drum and spiked with DEG to a level of approx. 400 mg/kg and also with approx. 0.15 mg/kg Chloride. After homogenisation, the batch was transferred to 80 amber glass bottles of 0.5L and labelled #11090. The homogeneity of the subsamples was checked by determination of Diethylene Glycol in accordance with ASTM E2409:08 and Chloride in accordance with ASTM E2469:08 on 10 stratified randomly selected samples.

	DEG in %M/M	Chloride in mg/kg
Sample #11090-1	0.044	0.22
Sample #11090-2	0.048	0.23
Sample #11090-3	0.046	0.22
Sample #11090-4	0.045	0.22
Sample #11090-5	0.046	0.22
Sample #11090-6	0.046	0.22
Sample #11090-7	0.045	0.24
Sample #11090-8	0.048	0.22
Sample #11090-9	0.045	0.22
Sample #11090-10	0.045	0.22

table 2: homogeneity test results of subsamples #11090

The second batch of approx. 20 litre was transferred to a precleaned 25 litre can and purged with nitrogen. After homogenisation, the batch was transferred to 80 amber glass bottles of 100 mL. The bottles were closed with special screw caps with Teflon inner layer, and labelled #11091. The homogeneity of the subsamples #11091 was checked by determination of UV-Transmittance without nitrogen sparging at 220, 250, 275 and 350 nm in accordance with ASTM E2193:08 and Water in accordance with ASTM E1064:08 on 10 stratified randomly selected samples.

	UV(220nm) in T%	UV(250nm) in T%	UV(275nm) in T%	UV(350nm) in T%	Water in mg/kg
Sample #11091-1	66.4	86.0	90.3	94.6	280
Sample #11091-2	66.8	86.1	90.4	94.8	310
Sample #11091-3	66.2	85.9	90.2	94.7	310
Sample #11091-4	66.7	86.1	90.3	94.7	310
Sample #11091-5	67.2	86.0	90.2	94.7	270
Sample #11091-6	67.1	86.1	90.3	94.7	270
Sample #11091-7	66.9	86.1	90.2	94.6	270
Sample #11091-8	67.2	86.2	90.3	94.7	280
Sample #11091-9	67.3	86.2	90.2	94.7	280
Sample #11091-10	66.9	86.2	90.3	94.7	300

table 3: homogeneity test results of subsamples #11091

The third batch of approx. 50 litre, free of Iron, was obtained from a second local producer. After spiking with 4.0 mg Iron (100 mg/kg Iron standard, CPI standard P/N 4400-100ppm 262-100) and homogenisation, the batch was transferred to 80 HDPE bottles of 250 mL and labelled #11092. The homogeneity of the subsamples was checked by determination of Iron in accordance with ASTM E394:09 on 10 stratified randomly selected samples.

	Iron in mg/kg
Sample #11092-1	0.074
Sample #11092-2	0.076
Sample #11092-3	0.075
Sample #11092-4	0.074
Sample #11092-5	0.073
Sample #11092-6	0.077
Sample #11092-7	0.074
Sample #11092-8	0.079
Sample #11092-9	0.076
Sample #11092-10	0.078

table 4: homogeneity test results of subsamples #11092

The last batch of approx. 60 litre was transferred to a precleaned 60 litre drum. After homogenisation, the batch was transferred to 70 amber glass bottles of 0.5 L and labelled #11093. The homogeneity of the subsamples was checked by determination of Density in accordance with ASTM D4052:09 on 8 stratified randomly selected samples.

	Density @20°C in kg/L
Sample #11093-1	1.11337
Sample #11093-2	1.11337
Sample #11093-3	1.11339
Sample #11093-4	1.11339
Sample #11093-5	1.11338
Sample #11093-6	1.11339
Sample #11093-7	1.11339
Sample #11093-8	1.11338

table 5: homogeneity test results of subsamples #11093

From the above test results (table 2 – 5), the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the reference test methods in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	DEG	Cl	UV 220nm	UV 250nm	UV 275nm	UV 350nm	Water	Iron	Density
r (observed)	0.004	0.019	1.01	0.28	0.19	0.16	49.0	0.005	0.00002
0.3xR <sub>(ASTM E202)</sub>	--	0.028	--	--	--	--	--	--	--
0.3xR <sub>(ASTM E202)</sub>	0.004	--	--	--	--	--	--	--	--
0.3xR <sub>(ASTM E2193)</sub>	--	--	2.90	0.62	0.33	0.28	--	--	--
0.3xR <sub>(ASTM E202)</sub>	--	--	--	--	--	--	71.3	--	--
0.3xR <sub>(ASTM E1615)</sub>	--	--	--	--	--	--	--	0.021	--
0.3xR <sub>(ASTM D4052)</sub>	--	--	--	--	--	--	--	--	0.00015

table 6: homogeneity evaluation of subsamples #11090, #11091, #11092 and #11093

Each calculated repeatability was equal or less than 0.3 times the corresponding reproducibility of the reference method. Therefore, homogeneity of the samples was assumed.

To each of the participating laboratories 4 bottles (1\*0.5L bottle labelled as #11090, 1\*100 mL bottle, labelled as #11091, 1\*250 mL bottle, labelled as #11092 and 1\*0.5L bottle, labelled as #11093), were sent on October 6, 2011.

## 2.5 STABILITY OF THE SAMPLES

The stability of the Mono Ethylene Glycol, packed in amber glass and HDPE bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

## 2.6 ANALYSES

The participants were requested to determine Acidity as Acetic Acid, Aldehydes as Acetaldehyde, Appearance, Chloride as Cl, Colour (D5386), Colour Pt/Co (D1209) and Diethylene Glycol on sample #11090.

On sample #11091 was requested to determine UV Transmittance (at 350, 275, 250 and 220 nm) and Water. On sample #11092 was requested to determine only Iron. On sample #11093 was requested to determine Ash, Purity, Density @ 20°C, Specific Gravity @ 20/20°C and Distillation (Initial Boiling Point, 50%recovered and Dry Point). To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards, was sent together with each set of samples. In addition, a letter of instructions and a SDS were added to the 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 had not yet reported.

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 the) reported results.

Additional or corrected results have been 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 'iis 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. Not all data sets proved to have a normal distribution, in which cases the conclusions of 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 visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for each 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 cross. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 3; nr.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 according to:

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

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

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.

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

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

## 4 EVALUATION

In this interlaboratory study several problems were encountered with customs clearance or with the courier during dispatch of the samples to participants in Brazil, India and Mexico. Four participants did not report any results and another twenty-one participants reported the results after the final reporting date. Finally, 63 laboratories did report 927 numerical results. Observed were 42 outlying results, which is 4.5%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Several participants reported after receipt of the samples a small amount of leakage, coming from sample #11092. After investigation it turned out that the cap of the plastic bottle indeed may not be as tight as expected. For future proficiency tests a different type of bottle will be used.

### 4.1 EVALUATION PER TEST

In this section, the results are discussed per sample and per test.

Not all data sets proved to have a normal distribution. Not normal distributions were found with the following determinations: Aldehydes, Colour Pt/Co, Colour, Density @15°C, Distillation (50% recovered and DP), Purity, Specific Gravity and UV Transmittance (350,

250 and 220nm). For these determinations the statistical evaluation should be used with due care.

Since 2010 a new version of ASTM E202 was published. Regretfully, the new version is not always clear about the precision data in certain test methods, in those cases the precision data of ASTM E202: 2005 was used.

Some of the used reference test methods provide precision data related to a specific concentration. For these tests, the target reproducibility is estimated.

Acidity: This determination was not problematic, when evaluated against ASTM D1613. The calculated reproducibility, after rejection of the statistical outlier, is in good agreement with the requirements of ASTM D1613:06. However, when compared with ASTM E2679:09, which was especially developed for Ethylene glycols, the calculated reproducibility is not at all in agreement with requirements of the test method. The main difference between both methods is that ASTM E2679 is a potentiometric titration method, while in ASTM D1613 an indicator is used.

Aldehydes: 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 E2313:08.

Appearance: No analytical problems were observed. Almost all participants agreed about the appearance of sample #11090, which was bright, clear and free of suspended matter. Four participants reported “fail”.

Ash: No statistical outliers were observed. Regretfully, the consensus value is below the application range (0.001 – 0.180 %M/M) of ASTM D482:07. Therefore no significant conclusions were drawn.

Chloride: This determination was problematic for a number of laboratories. Four statistical outliers and two false negatives were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in full agreement with the requirements of ASTM E2469:08. The average recovery of Chloride (theoretical increment of 0.15 mg Cl/kg) may be good: “less than 147%” (the actual blank Chloride content is unknown).

Colour Pt/Co: The determination was problematic. Three statistical outliers were observed and the calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D1209:11.

Colour D5386: The determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5386:10. The large spread and the bimodally divided data may be explained by differences in the setting of the cell path length.

- Density: The determination was problematic for a number of laboratories. Three statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ASTM D4052:09.
- DEG: The determination was not problematic. Only two statistical outliers were observed and the calculated reproducibility, after rejection of the statistical outliers, is in full agreement the requirements of ASTM E2409:08. The average recovery of DEG (theoretical increment of 200.7 mg DEG/kg) may be good: "less then 167%" (the actual blank DEG content is unknown).
- Distillation: This determination was problematic for a number of laboratories. Seven statistical outliers were observed. However, all calculated reproducibilities after rejection of the statistical outliers are in good agreement with the requirements of ASTM E202:05. When the results of 13 (!) laboratories were manually corrected for barometric pressure (theoretical boiling point 197.6°C, see table 3 in ASTM D1078:05), the calculated reproducibilities of IBP, 50% recovered and DP are all smaller. One result was excluded for statistical evaluation, as the reported value for Mid-Boiling Point was smaller then Initial Boiling Point.
- Iron: This determination was not problematic. Six statistical outliers and two false negatives were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM E1615:08. The average recovery of Iron (theoretical increment of 0.068 mg Iron/kg) may be good: "less then 121%" (the actual blank Iron content is unknown).
- Purity: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM E202:10. However, the spread of this PT robin is large in comparison with last years PT (0.059 vs. 0.038)
- Specific Gravity: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM E202:10.
- UV: This determination was somewhat problematic. In total nine statistical outliers were observed. The calculated reproducibilities for 275 and 220 nm are, after rejection of the statistical outliers, in good agreement with the requirements of ASTM E2193:08 (unsparged). However, the calculated reproducibilities for UV at 350 and 250 nm are not in agreement with the requirements of ASTM E2193:08 (unsparged).

It should be noticed that the reproducibility requirements of ASTM E2193:08 for 250 and 275 nm, unsparged are strange in comparison with the repeatability, intermediate and the reproducibility requirements (sparged).  $R_{(275\text{nm}, \text{unsparged})}$  is very large and  $R_{(250\text{nm}, \text{unsparged})}$  is very strict. Only two of the participants reported to have used nitrogen to purge the sample prior to the measurement of UV.

Water: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM E202:10.

#### 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	$2.8 * s_{dR}$	R (lit.)
Acidity as Acetic Acid	mg/kg	53	4.9	7.1	2.5
Aldehydes as Acetaldehyde	mg/kg	46	5.8	3.9	5.0
Appearance		46	pass	--	--
Ash	%M/M	27	0.0004	0.0005	(0.0050)
Chloride as Cl	mg/kg	33	0.22	0.18	0.18
Colour Pt/Co	---	40	9.4	7.8	7.0
Colour ASTM D5386	---	30	10.0	8.1	6.2
Density at 20°C	kg/L	43	1.1133	0.0003	0.0005
Diethylene Glycol	mg/kg	54	335.4	84.8	85.3
Initial Boiling Point	°C	40	196.99	0.79	1.20
50% recovered	°C	34	198.57	0.46	0.80
Dry Point	°C	37	197.97	0.56	1.30
Iron as Fe	mg/kg	47	0.083	0.023	0.089
Purity	%M/M	45	99.9599	0.0588	0.2900
Specific Gravity 20/20°C	---	41	1.1153	0.0002	0.0005
UV Transmittance at 350 nm	%T	52	95.10	1.38	1.15
UV Transmittance at 275 nm	%T	54	90.94	1.84	2.11
UV Transmittance at 250 nm	%T	52	86.78	2.08	1.10
UV Transmittance at 220 nm	%T	52	67.65	3.53	4.05
Water	mg/kg	56	321.8	104.7	265.7

table 7: reproducibilities of samples #11090, #11091, #11092 and #11093

Results between brackets were below the application range of the method, therefore results should be evaluated with care

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

#### 4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2011 WITH PREVIOUS PTS

	October 2011	October 2010	October 2009	October 2008
Number of reporting labs	63	62	56	59
Number of results reported	927	907	763	777
Statistical outliers	42	36	36	36
Percentage outliers	4.5%	4.0%	4.7%	4.6%

table 8: comparison of statistical summary parameters 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 in the following table:

	October 2011	October 2010	October 2009	October 2008
Acidity as Acetic Acid	--	++	++	++
Aldehydes as Acetaldehyde	++	++	++	++
Ash	(++)	(++)	(++)	(++)
Chloride as Cl	+/-	--	++	--
Colour Pt/Co	-	++	++	++
Colour ASTM D5368	--	++	++	n.e.
Density at 20°C	++	++	++	++
Diethylene Glycol	+/-	--	--	--
Initial Boiling Point	++	++	++	++
50% recovered	++	++	++	n.e.
Dry Point	++	++	++	++
Iron as Fe	++	++	++	++
Purity	++	++	++	++
Specific Gravity 20/20°C	++	++	++	++
UV Transmittance at 350 nm	--	++	++	++
UV Transmittance at 275 nm	++	++	++	++
UV Transmittance at 250 nm	--	--	--	--
UV Transmittance at 220 nm	++	+	+/-	-
Water	++	++	+	--

table 9: comparison determinations against the standard

Results between brackets were below the application range of the method, therefore results should be evaluated with care

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

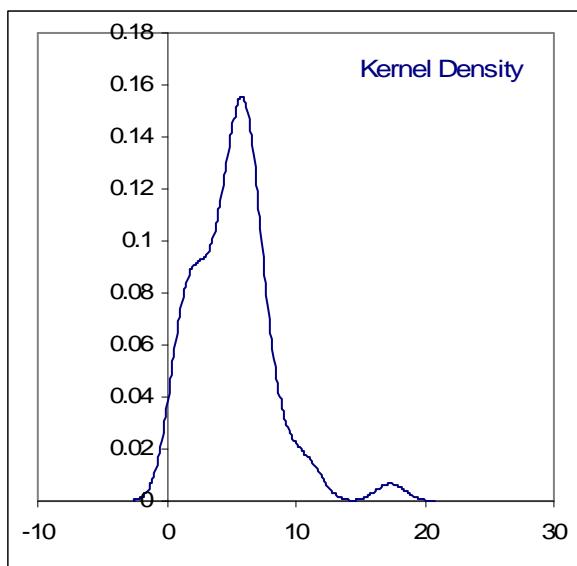
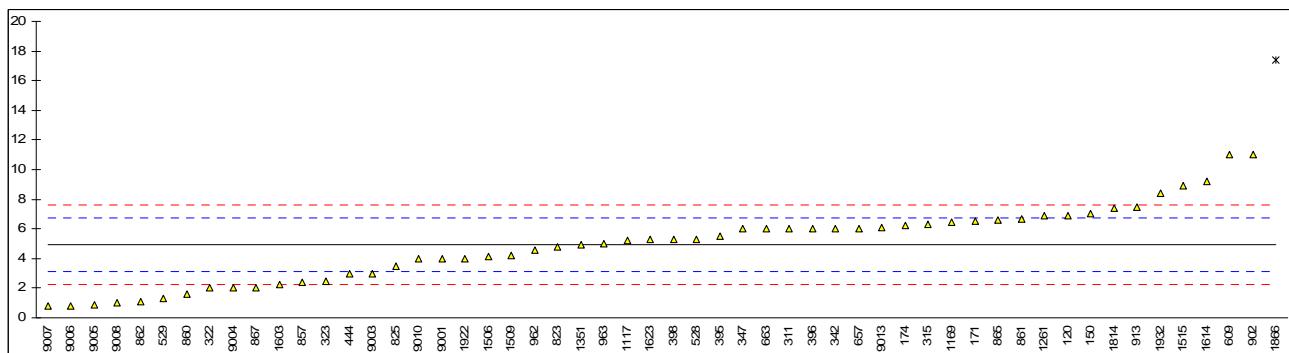
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- : group performed worse than the standard
- : group performed much worse than the standard

**APPENDIX 1**

Determination of Acidity as Acetic Acid on sample #11090; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	INH-0210	6.9		2.21	
150	D1613	7		2.32	
169		----		----	
171	D1613	6.5		1.76	
174	D1613	6.2		1.42	
311	D1613	6		1.20	
315	E2679	6.3		1.53	
322	E2679	2.0		-3.29	
323	E2679	2.5		-2.73	
342	D1613	6.0		1.20	
343		----		----	
347	D1613	6.0		1.20	
395	E2679	5.5		0.64	
396	D1613	6		1.20	
398	E2679	5.3		0.41	
444	E2679	2.94		-2.24	
528	E2679	5.3		0.41	
529	E2679	1.279		-4.10	
551		----		----	
557		----		----	
558		----		----	
609	D1613	10.99		6.80	
657	E2679	6.02		1.22	
663	D1613	6		1.20	
823	E2679	4.8		-0.15	
825	D1613	3.5		-1.61	
857	E2679	2.4		-2.84	
860	E2679	1.62		-3.72	
861	D1613	6.7		1.98	
862	E2679	1.07		-4.33	
865	D1613	6.6		1.87	
867	E2679	2.05		-3.23	
902	E2679	11.0		6.81	
912		----		----	
913	D1613	7.5		2.88	
962	E2679	4.6		-0.37	
963	D1613	5		0.08	
1059		----		----	
1117	D1613	5.2		0.30	
1151		----		----	
1169	E2679	6.46		1.71	
1217	E2679	<0.01		<-5.52	False negative ?
1261	D1613	6.9		2.21	
1351	D1613	4.93		0.00	
1467		----		----	
1506	D1613	4.136		-0.89	
1509	D1613	4.2		-0.82	
1515	D1613	8.9		4.45	
1603	in house	2.25		-3.01	
1614	D1613	9.2		4.79	
1623	D1613	5.30		0.41	
1814	E2679	7.36		2.72	
1866	E2679	17.36	G(0.01)	13.94	
1922	D1613	4	C	-1.05	First reported 16
1932	E2679	8.4		3.89	
3166	INH-4130	<0.5		<-4.97	False negative?
9000		----		----	
9001	E2679	4		-1.05	
9003	E2679	3.0		-2.17	
9004	E2679	2.05		-3.23	
9005	E2679	0.9		-4.52	
9006	INH-03	0.80		-4.64	
9007	D1613	0.775		-4.66	
9008	E2679	1		-4.41	
9010	E2679	4		-1.05	
9011		----		----	
9013	E2679	6.095		1.30	

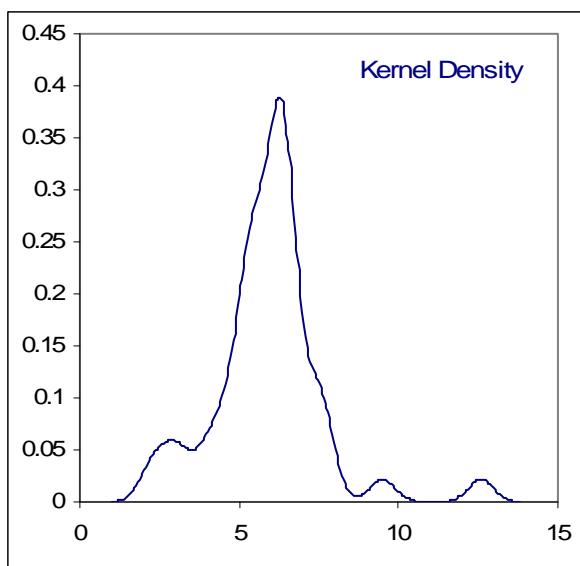
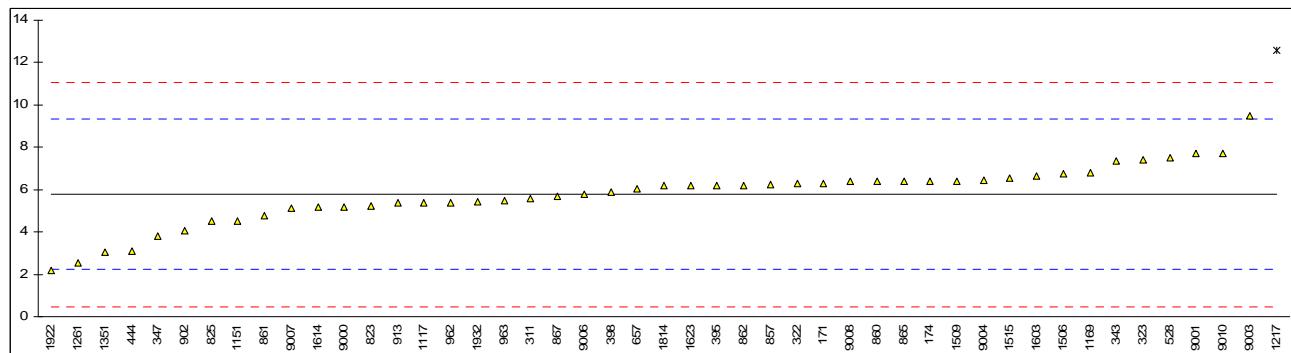
	OK	Only ASTM D1613	Only ASTM E2679
normality		OK	OK
n	53	24	26
outliers	1	0	1
mean (n)	4.93	5.98	4.15
st.dev. (n)	2.523	2.046	2.564
R(calc.)	7.06	5.73	7.18
R(E2679:09)	2.50	14.00	2.10



## Determination of Aldehydes as Acetaldehyde on sample #11090; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		----		----	
150		----		----	
169		----		----	
171	E2313	6.3	C	0.30	First reported 9.77
174	E2313	6.4		0.36	
311	E2313	5.6		-0.09	
315		----		----	
322	E2313	6.3		0.30	
323	E2313	7.4		0.92	
342		----		----	
343	E2313	7.34		0.89	
347	E2313	3.8		-1.11	
395	E2313	6.2		0.24	
396		----		----	
398	E2313	5.9		0.08	
444	INH-CM	3.08		-1.52	
528	E2313	7.494		0.98	
529		----		----	
551		----		----	
557		----		----	
558		----		----	
609		----		----	
657	E2313	6.056		0.16	
663		----		----	
823	E2313	5.2		-0.32	
825	E2313	4.5		-0.71	
857	E2313	6.24		0.27	
860	E2313	6.4		0.36	
861	E2313	4.76		-0.57	
862	E2313	6.2		0.24	
865	E2313	6.40		0.36	
867	E2313	5.68		-0.05	
902	E2313	4.07		-0.96	
912		----		----	
913	E2313	5.4		-0.21	
962	E2313	5.4		-0.21	
963	E2313	5.5		-0.15	
1059		----		----	
1117	E2313	5.4		-0.21	
1151	E2313	4.51		-0.71	
1169	E2313	6.80		0.58	
1217	E2313	12.6	G(0.01)	3.86	
1261	INH-63	2.5115		-1.84	
1351	E2313	3.04		-1.54	
1467		----		----	
1506	E2313	6.74		0.55	
1509	E2313	6.41		0.36	
1515	E2313	6.53		0.43	
1603	in house	6.67		0.51	
1614	E2313	5.15		-0.35	
1623	INH-012	6.19		0.24	
1814	E2313	6.178		0.23	
1866		----		----	
1922	E2313	2.2		-2.01	
1932	E2313	5.42		-0.20	
3166		----		----	
9000	E2313	5.18		-0.33	
9001	E2313	7.7		1.09	
9003	E2313	9.5		2.11	
9004	E2313	6.45		0.39	
9005		----		----	
9006	E2313	5.8		0.02	
9007	E2313	5.147		-0.35	
9008	E2313	6.399		0.36	
9010	E2313	7.7		1.09	
9011		----		----	
9013		----		----	

normality	not OK
n	46
outliers	1
mean (n)	5.77
st.dev. (n)	1.399
R(calc.)	3.92
R(E2313:08)	4.96



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## Determination of Appearance on sample #11090;

lab	method	value	mark	z(targ)	remarks
120	E2680	fail	-----		
150		-----	-----		
169	E2680	pass	-----		
171	E2680	C&F	-----		
174	E2680	pass	-----		
311	E2680	pass	-----		
315	INH-402	B&C	-----		
322	E2680	pass	-----		
323	E2680	pass	-----		
342	E2680	fail	-----		
343		-----	-----		
347	E2680	fail	-----		
395	E2680	pass	-----		
396	E2680	pass	-----		
398	E2680	clear	-----		
444	E2680	pass	-----		
528	E2680	CFFSM	-----		
529	E2680	pass	-----		
551		-----	-----		
557		-----	-----		
558		-----	-----		
609	E2680	pass	-----		
657	E2680	pass	-----		
663	E2680	pass	-----		
823	E2680	pass	-----		
825	E2680	pass	-----		
857	E2680	pass	-----		
860	E2680	pass	-----		
861	E2680	pass	-----		
862	E2680	pass	-----		
865	E2680	pass	-----		
867	E2680	pass	-----		
902	E2680	pass	-----		
912	E2680	B&C	-----		
913	E2680	CFFSM	-----		
962	E2680	pass	-----		
963	E2680	pass	-----		
1059		-----	-----		
1117	E2680	CFFSM	-----		
1151		-----	-----		
1169	E2680	Fail	-----		
1217	E2680	pass	-----		
1261	E2680	clear	-----		
1351		-----	-----		
1467		-----	-----		
1506	D4176	CFFSM	-----		
1509	D4176	CFFSM	-----		
1515	E2680	pass	-----		
1603	in house	pass	-----		
1614	E2680	clear	-----		
1623	D2090	pass	-----		
1814		-----	-----		
1866		-----	-----		
1922	E2680	pass	-----		
1932	E2680	clear	-----		
3166	E2680	clear	-----		
9000	E2680	pass	-----		
9001	E2680	pass	-----		
9003	E2680	pass	-----		
9004		-----	-----		
9005	E2680	pass	-----		
9006	E2680	SF	-----		
9007	E2680	pass	-----		
9008	E2680	pass	-----		
9010	E2680	pass	-----		
9011	E2680	pass	-----		
9013	E2680	pass	-----		

B&amp;C = Bright and clear

C&amp;F = Clear and Free

CFFSM = Clear and free from suspended matter

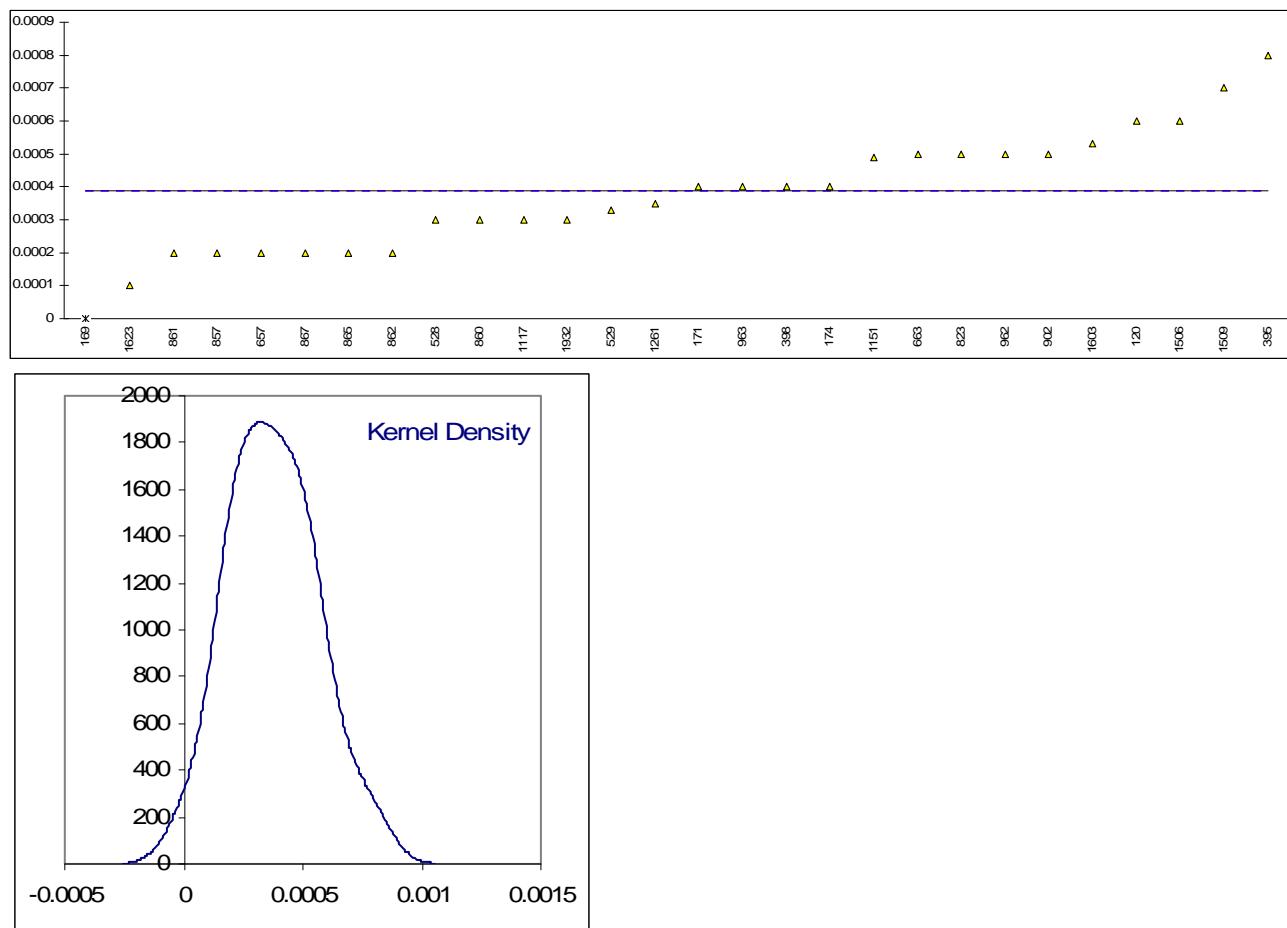
SF = Suspended Free

## Determination of Ash on sample #11093; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D482	0.0006		----	
150	D482	<0.001		----	
169	D482	0.000	ex	----	Result excluded as zero is not a real result
171	D482	0.0004		----	
174	D482	0.0004		----	
311	D482	<0.001		----	
315		----		----	
322		----		----	
323	D482	<0.001		----	
342		----		----	
343		----		----	
347		----		----	
395	D482	0.0008		----	
396		----		----	
398	D482	0.0004		----	
444	D482	<0.001	C	----	First reported 0.0076
528	D482	0.00030		----	
529	D482	0.00033		----	
551		----		----	
557		----		----	
558		----		----	
609		----		----	
657	D482	0.0002		----	
663	D482	0.0005		----	
823	D482	0.0005		----	
825		----		----	
857	D482	0.0002		----	
860	D482	0.0003		----	
861	D482	0.0002		----	
862	D482	0.0002		----	
865	D482	0.0002		----	
867	D482	0.0002		----	
902	D482	0.0005		----	
912	D482	<0.001		----	
913	D482	<0.001		----	
962	D482	0.0005		----	
963	D482	0.0004		----	
1059		----		----	
1117	D482	0.0003		----	
1151	D482	0.00049		----	
1169		----		----	
1217		----		----	
1261	D1119	0.00035		----	
1351		----		----	
1467		----		----	
1506	D482	0.0006		----	
1509	D482	0.0007		----	
1515		----		----	
1603	in house	0.00053		----	
1614		----		----	
1623	D482	0.0001		----	
1814		----		----	
1866		----		----	
1922	D482	<0.001		----	
1932	D482	0.0003		----	
3166	INH-51	<0.0002		----	
9000		----		----	
9001		----		----	
9003		----		----	
9004		----		----	
9005		----		----	
9006		----		----	
9007		----		----	
9008		----		----	
9010		----		----	
9011		----		----	
9013		----		----	

normality      OK  
 n                27  
 outliers        1  
 mean (n)      0.00039  
 st.dev. (n)    0.000172  
 R(calc.)      0.00048  
 R(D482:07)    (0.00500)

Application range = 0.001 – 0.180%M/M



## Determination of Chloride as Cl on sample #11090; results in mg/kg

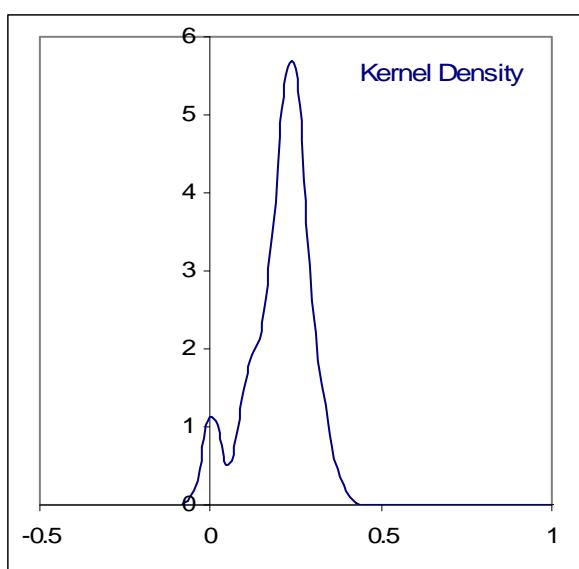
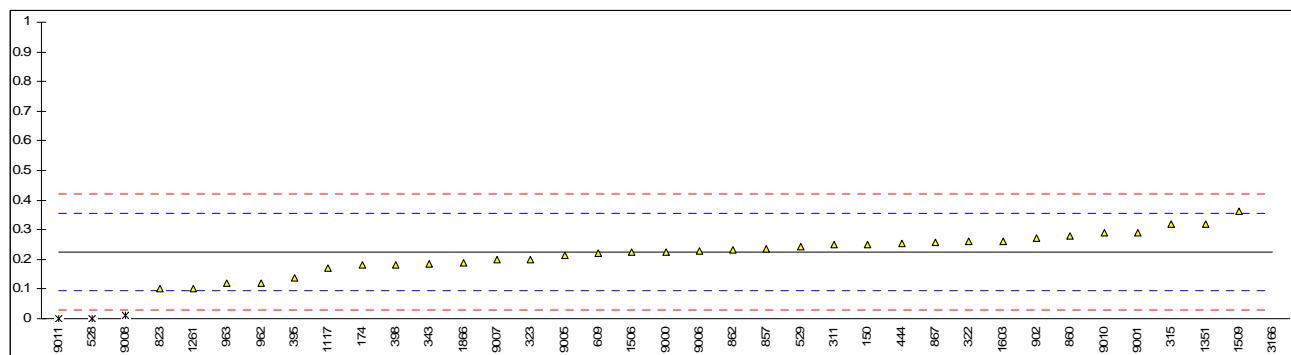
lab	method	value	mark	z(targ)	remarks
120	INH-0221	<0.5		<4.36	
150	INH-2367	0.25		0.41	
169		-----		-----	
171	E2469	<0.1		<-1.89	False negative?
174	E2469	0.18		-0.66	
311	E2469	0.25		0.41	
315	INH-158	0.32		1.49	
322	E2469	0.26		0.57	
323	E2469	0.20		-0.35	
342		-----		-----	
343	E2469	0.183		-0.61	
347		-----		-----	
395	E2469	0.136		-1.33	
396		-----		-----	
398	E2469	0.181		-0.64	
444	E2469	0.253		0.46	
528	E2469	0.0010	DG(0.05)	-3.41	
529	E2469	0.243		0.31	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E2469	0.22		-0.05	
657	INH-0055	<0.5		<4.36	
663		-----		-----	
823	E2469	0.1	C	-1.89	First reported 0.6
825		-----		-----	
857	E2469	0.234		0.17	
860	IMPCA002	0.28		0.87	
861	INH-001	<0.5		<4.36	
862	E2469	0.233		0.15	
865	INH-001	<0.5		<4.36	
867	E2469	0.256		0.51	
902	E2469	0.271		0.74	
912		-----		-----	
913		-----		-----	
962	E2469	0.12		-1.58	
963	E2469	0.12		-1.58	
1059		-----		-----	
1117	E2469	0.169		-0.83	
1151		-----		-----	
1169	E2469	<0.1		<-1.89	False negative?
1217		-----		-----	
1261	INH-635	0.10		-1.89	
1351	IMPCA008	0.32		1.49	
1467		-----		-----	
1506	E2469	0.224		0.01	
1509	E2469	0.361		2.12	
1515		-----		-----	
1603	in house	0.26		0.57	
1614		-----		-----	
1623		-----		-----	
1814		-----		-----	
1866	E2469	0.19		-0.51	
1922		-----		-----	
1932	E2469	nil		-----	
3166	INH-4020	4.0	G(0.01)	57.93	
9000	E2469	0.225		0.03	
9001	E2469	0.29		1.03	
9003		-----		-----	
9004		-----		-----	
9005	E2469	0.214		-0.14	
9006	E2469	0.227		0.06	
9007	E2469	0.1999		-0.35	
9008	E2469	0.011	G(0.05)	-3.25	
9010	E2469	0.29		1.03	
9011	E2469	0.0005	DG(0.05)	-3.41	
9013		-----		-----	

normality	OK
n	33
outliers	4
mean (n)	0.22
st.dev. (n)	0.063
R(calc.)	0.18
R(E202:10)	0.18

Spike:

0.15

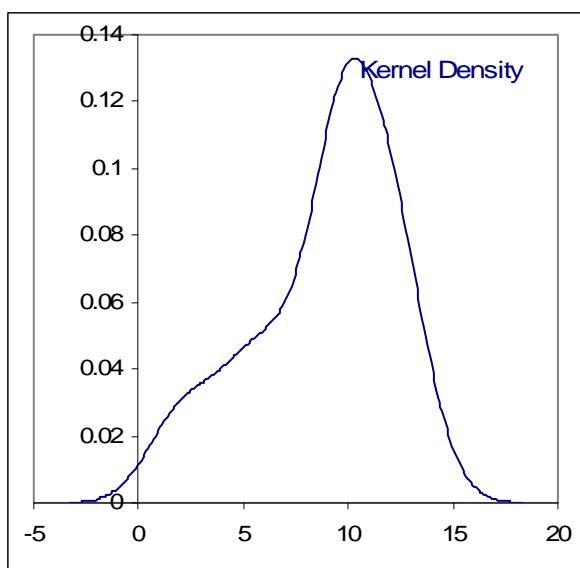
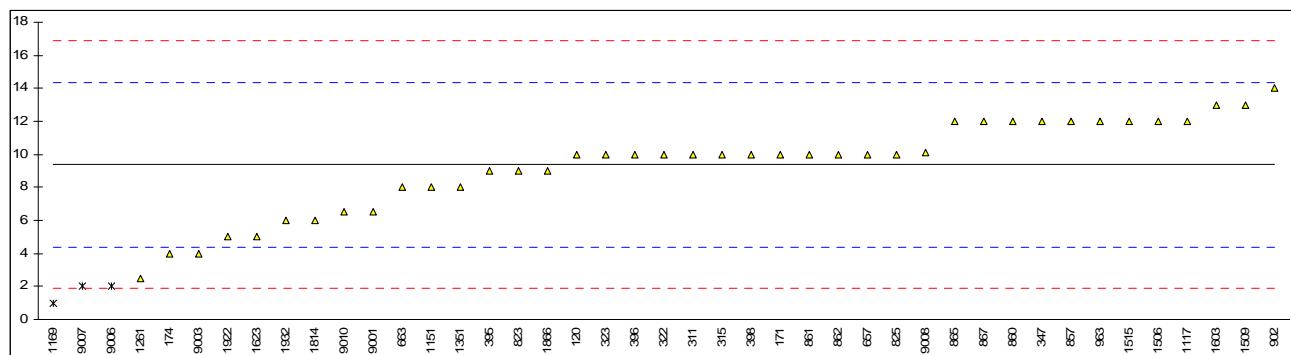
Recovery &lt; 147%



## Determination of Colour Pt/Co on sample #11090;

lab	method	value	mark	z(targ)	remarks
120	D1209	10		0.23	
150		----		----	
169		----		----	
171	D1209	10		0.23	
174	D1209	4		-2.17	
311	D1209	10		0.23	
315	D1209	10		0.23	
322	D1209	10		0.23	
323	D1209	10		0.23	
342		----		----	
343		----		----	
347	D1209	12		1.03	
395	D1209	9		-0.17	
396	D1209	10		0.23	
398	D1209	10		0.23	
444		----		1.03	
528		----		----	
529		----		----	
551		----		----	
557		----		----	
558		----		----	
609		----		----	
657	D1209	10		0.23	
663	D1209	8		-0.57	
823	D1209	9		-0.17	
825	D1209	10		0.23	
857	D1209	12		1.03	
860	D1209	12		1.03	
861	D1209	10		0.23	
862	D1209	10		0.23	
865	D1209	12		1.03	
867	D1209	12		1.03	
902	D1209	14		1.83	
912		----		----	
913		----		----	
962	D1209	<15		----	
963	D1209	12		1.03	
1059		----		----	
1117	D1209	12		1.03	
1151	D1209	8		-0.57	
1169	D1209	1	G(0.05)	-3.37	
1217		----		----	
1261	D1209	2.5		-2.77	
1351	D1209	8		-0.57	
1467		----		----	
1506	D1209	12		1.03	
1509	D1209	13		1.43	
1515	D1209	12		1.03	
1603	in house	13		1.43	
1614	D1209	<5		----	
1623	D1209	5		-1.77	
1814	D1209	6		-1.37	
1866	D1209	9		-0.17	
1922	D1209	5		-1.77	
1932	D1209	6		-1.37	
3166		----		----	
9000		----		----	
9001	D1209	6.5		-1.17	
9003	D1209	4		-2.17	
9004		----		----	
9005		----		----	
9006	D1209	2	DG(0.05)	-2.97	
9007	D1209	2.0	DG(0.05)	-2.97	
9008	D1209	10.13		0.28	
9010	D1209	6.5		-1.17	
9011		----		----	
9013		----		----	

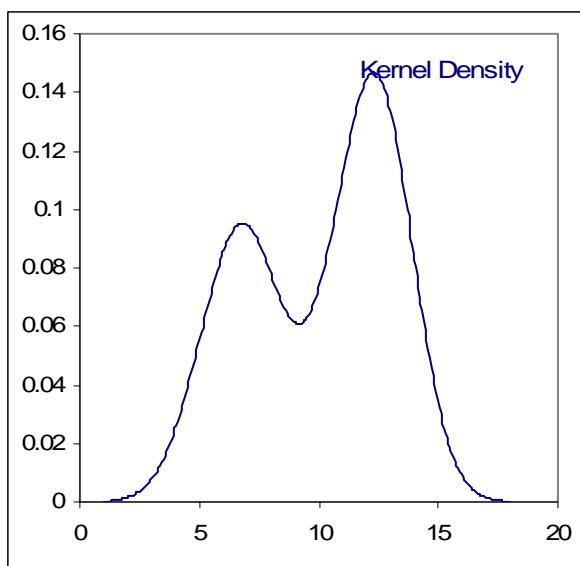
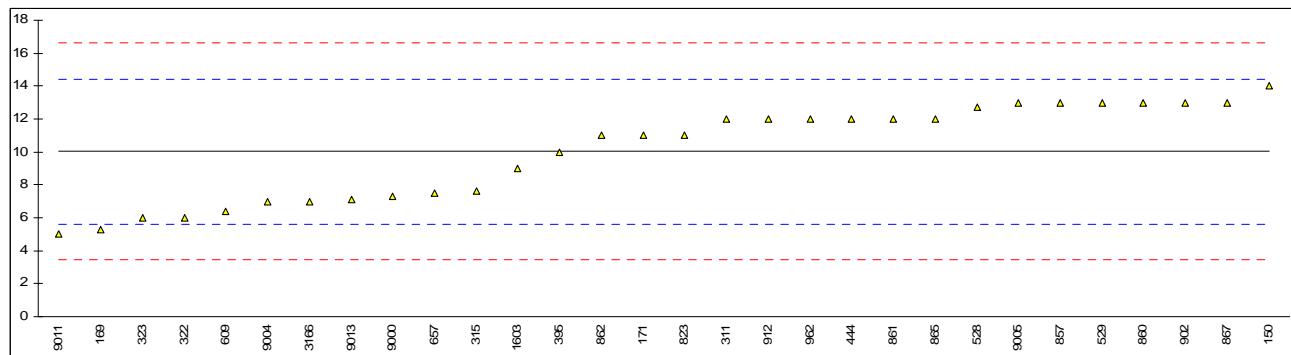
normality	not OK
n	40
outliers	3
mean (n)	9.4
st.dev. (n)	2.79
R(calc.)	7.8
R(D1209:11)	7.0



## Determination of Colour by Tristimulus Colorimetry on sample #11090;

lab	method	value	mark	z(targ)	remarks
120		----		----	
150	D5386	14		1.81	
169	D5386	5.3		-2.15	
171	D5386	11		0.44	
174		----		----	
311	D5386	12		0.90	
315	D5386	7.6		-1.11	
322	D5386	6		-1.83	
323	D5386	6		-1.83	
342		----		----	
343		----		----	
347		----		----	
395	D5386	10		-0.01	
396		----		----	
398		----		----	
444	D5386	12		0.90	
528	D5386	12.7		1.22	
529	D5386	13		1.35	
551		----		----	
557		----		----	
558		----		----	
609	D5386	6.4		-1.65	
657	D5386	7.51		-1.15	
663		----		----	
823	D5386	11		0.44	
825		----		----	
857	D5386	13		1.35	
860	D5386	13		1.35	
861	D5386	12		0.90	
862	D5386	11		0.44	
865	D5386	12		0.90	
867	D5386	13		1.35	
902	D5386	13		1.35	
912	D5386	12		0.90	
913		----		----	
962	D5386	12		0.90	
963		----		----	
1059		----		----	
1117		----		----	
1151		----		----	
1169		----		----	
1217	D5386	<5		----	
1261		----		----	
1351		----		----	
1467		----		----	
1506		----		----	
1509		----		----	
1515		----		----	
1603	in house	9		-0.47	
1614		----		----	
1623		----		----	
1814		----		----	
1866		----		----	
1922		----		----	
1932	D5386	<10		----	
3166	INH-10	7		-1.38	
9000	D5386	7.3		-1.24	
9001		----		----	
9003		----		----	
9004	D5386	7.0		-1.38	
9005	D5386	13		1.35	
9006		----		----	
9007		----		----	
9008		----		----	
9010		----		----	
9011	D5386	5		-2.29	
9013	D5386	7.1		-1.33	

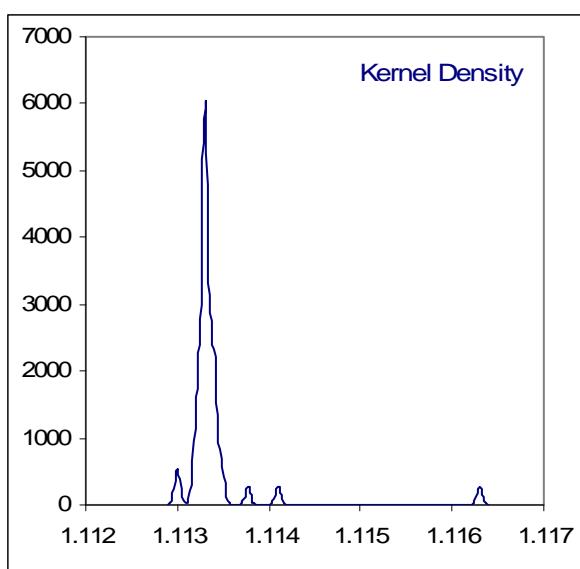
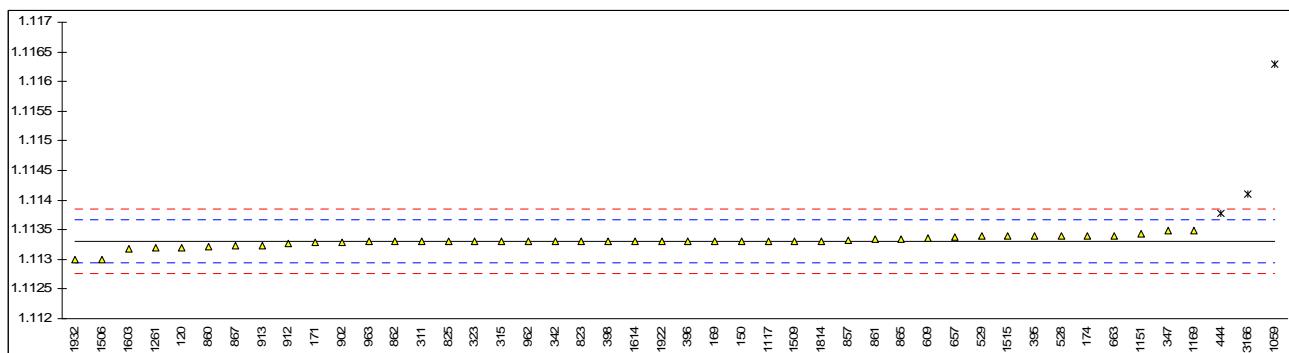
normality	not OK
n	30
outliers	0
mean (n)	10.0
st.dev. (n)	2.89
R(calc.)	8.1
R(D5386:10)	6.2



## Determination of Density at 20 °C on sample #11093; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	1.1132		-0.58	
150	D4052	1.1133		-0.02	
169	D4052	1.1133		-0.02	
171	D4052	1.11328		-0.13	
174	D4052	1.1134		0.54	
311	D4052	1.1133		-0.02	
315	D4052	1.1133		-0.02	
322		----		----	
323	D4052	1.1133		-0.02	
342	D4052	1.1133		-0.02	
343		----		----	
347	D4052	1.11348		0.99	
395	D4052	1.1134		0.54	
396	D4052	1.1133		-0.02	
398	D4052	1.1133		-0.02	
444	D4052	1.11377	C,G(0.01)	2.61	First reported 1.11701
528	INH-DD	1.11340		0.54	
529	D4052	1.1134		0.54	
551		----		----	
557		----		----	
558		----		----	
609	D4052	1.11336		0.32	
657	D4052	1.11337		0.37	
663	D4052	1.1134		0.54	
823	D4052	1.1133		-0.02	
825	D4052	1.1133		-0.02	
857	D4052	1.11333		0.15	
860	D4052	1.11322		-0.47	
861	D4052	1.11334		0.21	
862	D4052	1.1133		-0.02	
865	D4052	1.11334		0.21	
867	D4052	1.11323		-0.41	
902	D4052	1.11329		-0.07	
912	D4052	1.11326		-0.24	
913	D4052	1.11323		-0.41	
962	D4052	1.1133		-0.02	
963	D4052	1.1133		-0.02	
1059	D4052	1.1163	G(0.01)	16.78	
1117	D4052	1.1133		-0.02	
1151	D4052	1.11343		0.71	
1169	D4052	1.11348		0.99	
1217		----		----	
1261	D4052	1.1132		-0.58	
1351		----		----	
1467		----		----	
1506	D4052	1.1130		-1.70	
1509	D4052	1.1133		-0.02	
1515	D4052	1.1134		0.54	
1603	in house	1.11318		-0.69	
1614	D4052	1.1133		-0.02	
1623		----		----	
1814	D4052	1.11331		0.04	
1866		----		----	
1922	D4052	1.1133		-0.02	
1932	D4052	1.1130		-1.70	
3166	D1475	1.1141	C,G(0.01)	4.46	First reported 1.110
9000		----		----	
9001		----		----	
9003		----		----	
9004		----		----	
9005		----		----	
9006		----		----	
9007		----		----	
9008		----		----	
9010		----		----	
9011		----		----	
9013		----		----	

normality	not OK
n	43
outliers	3
mean (n)	1.11330
st.dev. (n)	0.000096
R(calc.)	0.00027
R(D4052:09)	0.00050

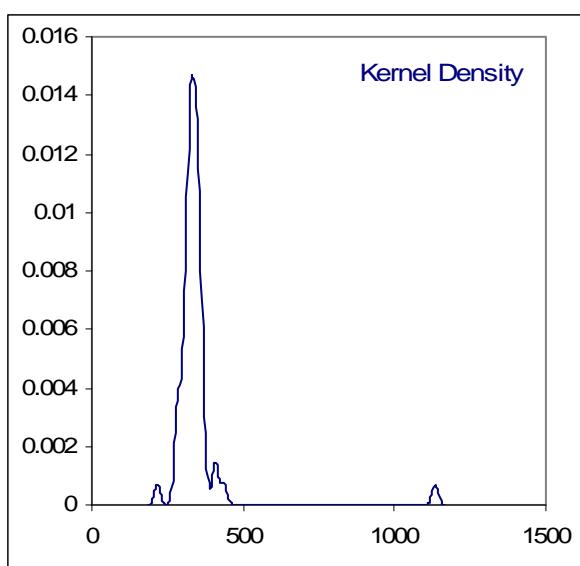
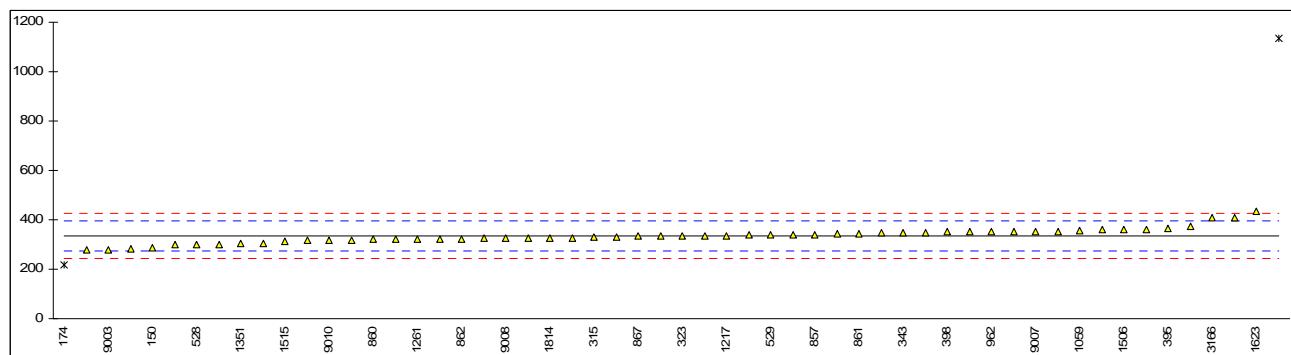


## Determination of Diethylene Glycol on sample #11090; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		----		----	
150	E2409	285		-1.65	
169	INH-540	1135	G(0.01)	26.24	
171	E2409	282.3		-1.74	
174	E2409	217	G(0.05)	-3.88	
311	E2409	410		2.45	
315	in house	330.5		-0.16	
322	E2409	343		0.25	
323	E2409	335		-0.01	
342		----		----	
343	E2409	347.3		0.39	
347	E2409	350		0.48	
395	E2409	365		0.97	
396		----		----	
398	E2469	351		0.51	
444	E2409	362		0.87	
528	E2409	298.8		-1.20	
529	E2409	339.9		0.15	
551		----		----	
557		----		----	
558		----		----	
609	E2409	360	C	0.81	First reported 455.8
657	E2409	325		-0.34	
663	E202	354.12		0.62	
823	E2409	324		-0.37	
825	E2409	305		-1.00	
857	E2409	341		0.19	
860	E2409	320		-0.50	
861	E2409	344		0.28	
862	E2409	323		-0.41	
865	E2409	352		0.55	
867	E2409	333		-0.08	
902	E2409	298.25		-1.22	
912		----		----	
913		----		----	
962	E2409	352.2		0.55	
963	E2409	300	C	-1.16	First reported 0.03 (unit error?)
1059	in house	355		0.64	
1117	E2409	323		-0.41	
1151	E2409	333.4		-0.06	
1169	E2409	279.7		-1.83	
1217	E2409	336.0	C	0.02	First reported 0.03360 (unit error?)
1261	INH-594	322		-0.44	
1351	E2409	305.0		-1.00	
1467		----		----	
1506	E2409	361.5		0.86	
1509	E2409	316.4		-0.62	
1515	E2409	311		-0.80	
1603	in house	353		0.58	
1614	E2409	328		-0.24	
1623	E2409	436.22		3.31	
1814	E2409	325.1		-0.34	
1866	E2409	340.9		0.18	
1922		----		----	
1932	E2409	320		-0.50	
3166	in house	407.5		2.37	
9000	E2409	331.9		-0.11	
9001	E2409	319		-0.54	
9003	E2409	280		-1.82	
9004	E2409	339.8		0.15	
9005	E2409	335.4		0.00	
9006	INH-11	345.96		0.35	
9007	E2409	353.3		0.59	
9008	E2409	325		-0.34	
9010	E2409	319		-0.54	
9011		----		----	
9013	E2409	375.0	C	1.30	First reported 235

normality	OK
n	54
outliers	2
mean (n)	335.36
st.dev. (n)	30.280
R(calc.)	84.78
R(E202:10)	85.32

Spike: 200.7      Recovery <167%



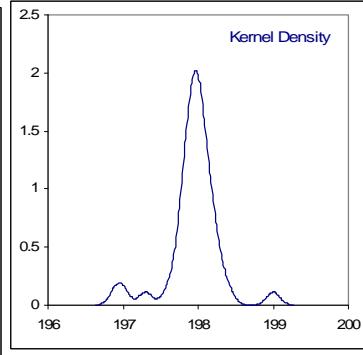
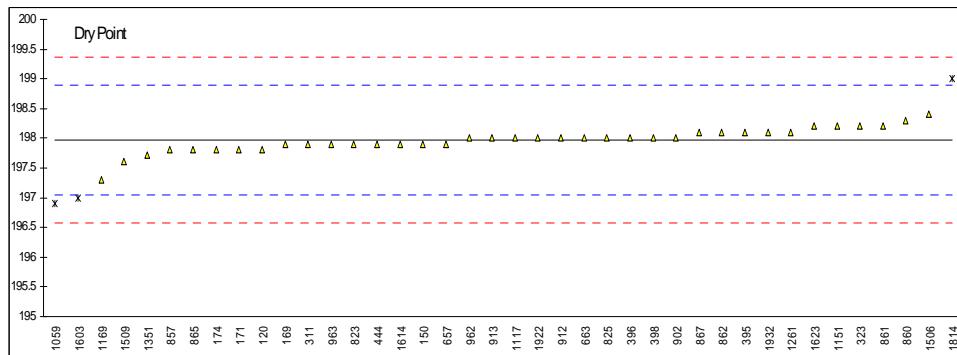
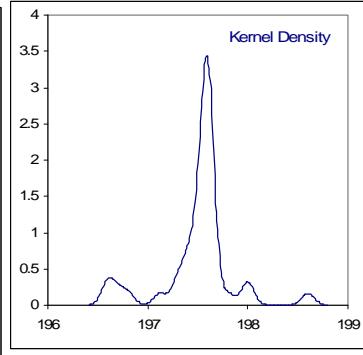
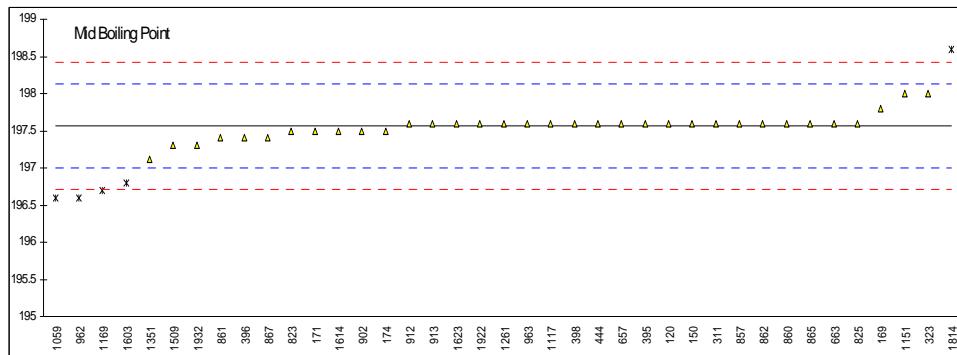
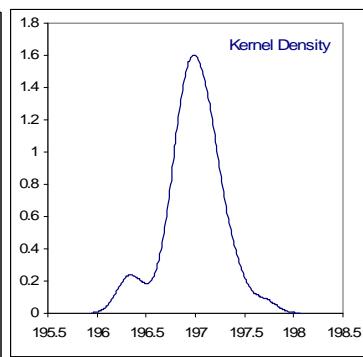
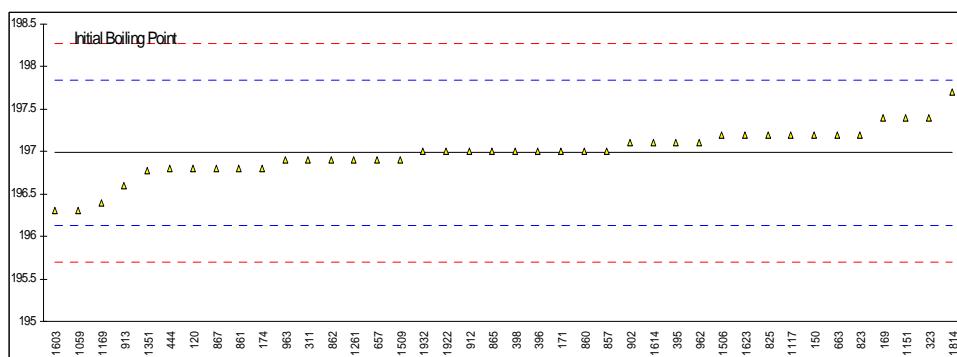
## Determination of Distillation: IBP, 50% recovered, Dry Point on sample #11093; results in °C

lab	method	IBP	mark	z(targ)	50%	mark	z(targ)	DP	mark	z(targ)	remarks
120	D1078	196.8		-0.44	197.6		0.12	197.8		-0.36	
150	D1078	197.2		0.50	197.6		0.12	197.9		-0.15	
169	D1078	197.4		0.96	197.8		0.82	197.9		-0.15	
171	D1078	197.0		0.03	197.5		-0.23	197.8		-0.36	
174	D1078	196.8		-0.44	197.5		-0.23	197.8		-0.36	
311	D1078	196.9		-0.20	197.6		0.12	197.9		-0.15	
315		----		----			----	----		----	
322		----		----			----	----		----	
323	D1078	197.4		0.96	198.0		1.52	198.2		0.50	
342		----		----			----	----		----	
343		----		----			----	----		----	
347		----		----			----	----		----	
395	D1078	197.1		0.26	197.6		0.12	198.1		0.28	
396	D1078	197.0		0.03	197.4		-0.58	198.0		0.07	
398	D1078	197.0		0.03	197.6		0.12	198.0		0.07	
444	D1078	196.8	fr 195	-0.44	197.6		0.12	197.9		-0.15	
528		----		----			----	----		----	
529		----		----			----	----		----	
551		----		----			----	----		----	
557		----		----			----	----		----	
558		----		----			----	----		----	
609		----		----			----	----		----	
657	D1078	196.9		-0.20	197.6		0.12	197.9		-0.15	
663	D1078	197.2		0.50	197.6		0.12	198.0		0.07	
823	D1078	197.2		0.50	197.5		-0.23	197.9		-0.15	
825	D1078	197.2		0.50	197.6		0.12	198.0		0.07	
857	D1078	197.0		0.03	197.6		0.12	197.8		-0.36	
860	D1078	197.0		0.03	197.6		0.12	198.3		0.72	
861	D1078	196.8		-0.44	197.4		-0.58	198.2		0.50	
862	D1078	196.9		-0.20	197.6		0.12	198.1		0.28	
865	D1078	197.0		0.03	197.6		0.12	197.8		-0.36	
867	D1078	196.8		-0.44	197.4		-0.58	198.1		0.28	
902	D1078	197.1		0.26	197.5		-0.23	198.0		0.07	
912	D1078	197		0.03	197.6		0.12	198		0.07	
913	D1078	196.6		-0.90	197.6		0.12	198.0		0.07	
962	D1078	197.1		0.26	196.6	ex	-3.38	198.0		0.07	
963	D1078	196.9		-0.20	197.6		0.12	197.9		-0.15	
1059	D1078	196.3		-1.60	196.6	DG(0.05)	-3.38	196.9	G(0.05)	-2.30	
1117	D1078	197.2		0.50	197.6		0.12	198.0		0.07	
1151	D1078	197.4		0.96	198.0		1.52	198.2		0.50	
1169	D1078	196.4		-1.37	196.7	G(0.05)	-3.03	197.3		-1.44	
1217		----		----			----	----		----	
1261	D1078	196.9		-0.20	197.6		0.12	198.1		0.28	
1351	D1078	196.78		-0.48	197.12		-1.56	197.71		-0.56	
1467		----		----			----	----		----	
1506	D1078	197.2		0.50	----		----	198.4		0.93	
1509	D1078	196.9		-0.20	197.3		-0.93	197.6		-0.79	
1515		----		----			----	----		----	
1603	in house	196.3		-1.60	196.8	G(0.01)	-2.68	197.0	G(0.01)	-2.08	
1614	D1078	197.1		0.26	197.5		-0.23	197.9		-0.15	
1623	D1078	197.2		0.50	197.6		0.12	198.2		0.50	
1814	D1078	197.7		1.66	198.6	G(0.05)	3.62	199.0	G(0.05)	2.22	
1866		----		----			----	----		----	
1922	D1078	197.0		0.03	197.6		0.12	198.0		0.07	
1932	D1078	197.0		0.03	197.3		-0.93	198.1		0.28	
3166		----		----			----	----		----	
9000		----		----			----	----		----	
9001		----		----			----	----		----	
9003		----		----			----	----		----	
9004		----		----			----	----		----	
9005		----		----			----	----		----	
9006		----		----			----	----		----	
9007		----		----			----	----		----	
9008		----		----			----	----		----	
9010		----		----			----	----		----	
9011		----		----			----	----		----	
9013		----		----			----	----		----	
normality		OK			not OK			not OK			
n		40			34			37			
outliers		0			4			3			
mean (n)		196.99			197.57			197.97			
st.dev. (n)		0.282			0.165			0.200			
R(calc.)		0.79			0.46			0.56			
R(E202:05)		1.20			0.80			1.30			

Lab 962 Result was excluded as Mid Boiling Point was smaller than IBP (typo error??)

### After barometric correction for mid-boiling point at 197.6°C

169	D1078	197.2	0.35	197.6	0.04	197.7	-0.65
323	D1078	197.0	-0.12	197.6	0.04	197.8	-0.43
396	D1078	197.2	0.35	197.6	0.04	198.2	0.43
861	D1078	197.0	-0.12	197.6	0.04	198.4	0.86
867	D1078	197.0	-0.12	197.6	0.04	198.3	0.65
1059	D1078	197.3	0.58	197.6	0.04	197.9	-0.22
1151	D1078	197.0	-0.12	197.6	0.04	197.8	-0.43
1169	D1078	197.3	0.58	197.6	0.04	198.2	0.43
1351	D1078	197.26	0.49	197.60	0.04	198.19	0.41
1509	D1078	197.2	0.35	197.6	0.04	197.9	-0.22
1603	in house	197.1	0.12	197.6	0.04	197.8	-0.43
1814	D1078	196.7	-0.82	197.6	0.04	198.0	0.00
1932	D1078	197.3	0.58	197.6	0.04	198.4	0.86
normality		not OK		not OK		not OK	
n		40		38		40	
outliers		0		0		0	
mean (n)		197.05		197.59		198.00	
st.dev. (n)		0.170		0.034		0.186	
R(calc.)		0.47		0.10		0.52	
R(E202:05)		1.20		0.80		1.30	



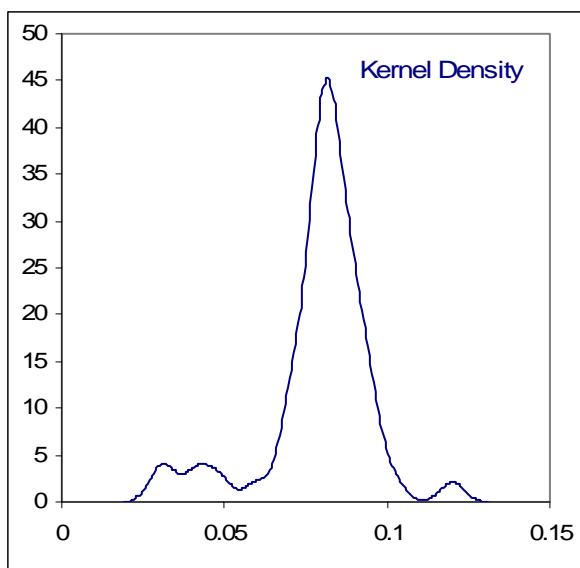
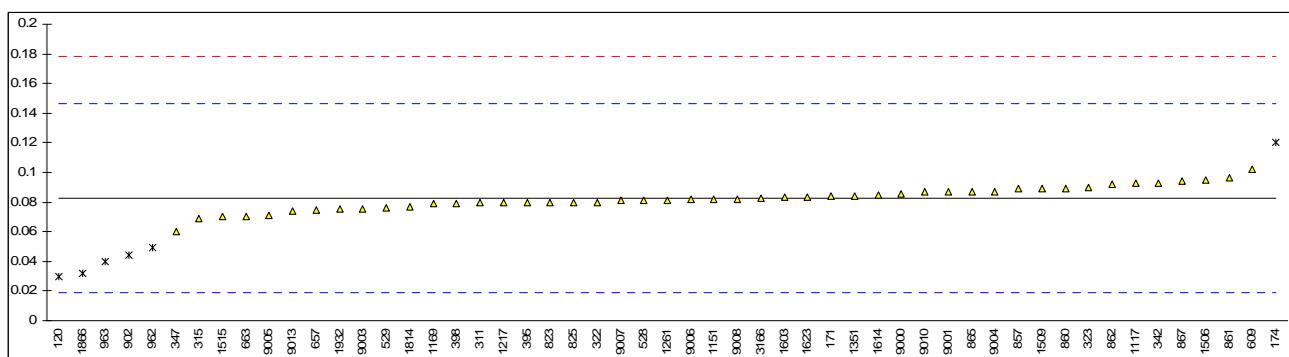
## Determination of Iron as Fe on sample #11092; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E202	0.03	DG(0.01)	-1.64	
150	D5863B	<0.1	C	<0.55	First reported 0.4
169		-----		-----	
171	E202	0.084		0.05	
174	E1615	0.12	G(0.01)	1.18	
311	E1615	0.08		-0.08	
315	E1615	0.0690		-0.42	
322	E1615	0.08		-0.08	
323	E1615	0.09		0.24	
342	E1615	0.0931		0.33	
343		-----		-----	
347	E394	0.060		-0.70	
395	E1615	0.08		-0.08	
396		-----		-----	
398	E1615	0.079		-0.11	
444	E1615	<0.001		<-2.55	False negative?
528	E1615	0.0811		-0.04	
529	E1615	0.076		-0.20	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E1615	0.102		0.61	
657	E1615	0.07466		-0.24	
663	E394	0.07		-0.39	
823	E202	0.08		-0.08	
825	E202	0.08		-0.08	
857	E1615	0.089		0.21	
860	E1615	0.089		0.21	
861	E1615	0.0966		0.44	
862	E1615	0.0917		0.29	
865	E394	0.087		0.14	
867	E1615	0.0943		0.37	
902	E1615	0.044	DG(0.01)	-1.20	
912		-----		-----	
913		-----		-----	
962	E1615	0.049	G(0.05)	-1.05	
963	E202	0.04	DG(0.01)	-1.33	
1059		-----		-----	
1117	E394	0.093		0.33	
1151	E394	0.0816		-0.03	
1169	E1615	0.07875		-0.12	
1217	E1615	0.08		-0.08	
1261	E394	0.0811		-0.04	
1351	E1615	0.0841		0.05	
1467		-----		-----	
1506	E394	0.095		0.39	
1509	E394	0.089		0.21	
1515	E394	0.07		-0.39	
1603	in house	0.083		0.02	
1614	E394	0.085		0.08	
1623	E203	0.083		0.02	
1814	E1615	0.0771		-0.17	
1866	E1615	0.032	DG(0.01)	-1.58	
1922	E394	<0.01		<-2.27	False negative?
1932	E1615	0.075		-0.23	
3166	INH-7040	0.0823		0.00	
9000	E1615	0.0854		0.09	
9001	E1615	0.0869		0.14	
9003	E1615	0.075		-0.23	
9004	E1615	0.087		0.14	
9005	E1615	0.0710		-0.36	
9006	E1615	0.08153		-0.03	
9007	E1615	0.08099		-0.05	
9008	E1615	0.082		-0.01	
9010	E1615	0.0869		0.14	
9011		-----		-----	
9013	E1615	0.0740		-0.26	

normality	OK
n	47
outliers	6
mean (n)	0.0825
st.dev. (n)	0.00806
R(calc.)	0.0226
R(E1615:08)	0.0894

Spike

Recovery &lt;121%

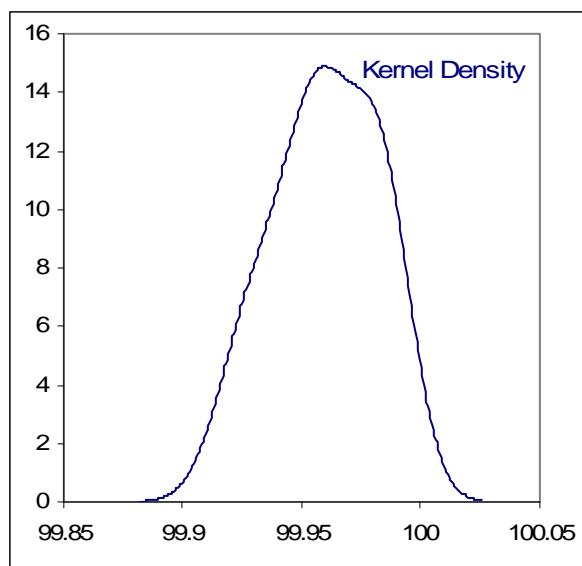
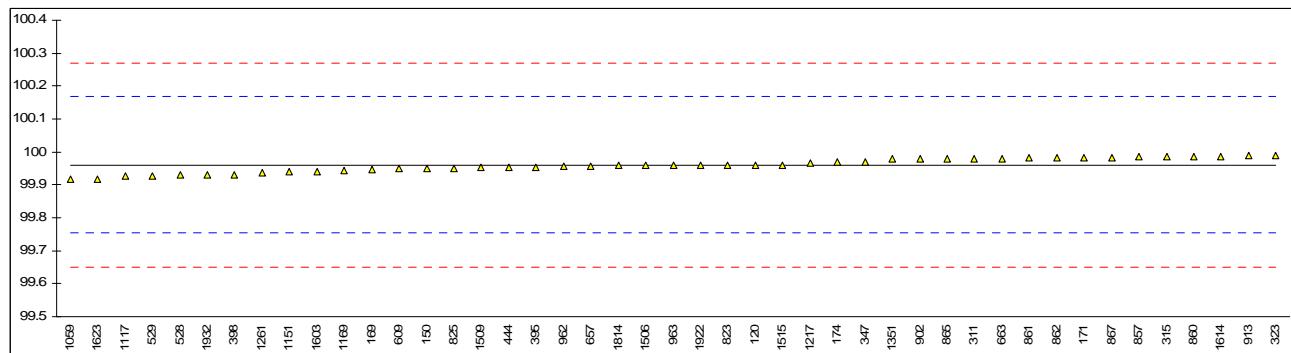


## Determination of Purity on sample #11093; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E202	99.96		0.00	
150	E2409	99.95		-0.10	
169	INH-540	99.947		-0.12	
171	E202	99.983		0.22	
174	E2409	99.97		0.10	
311	E202	99.98		0.19	
315	in house	99.986		0.25	
322		----		----	
323	E202	99.99		0.29	
342		----		----	
343		----		----	
347	E202	99.970		0.10	
395	E2409	99.954		-0.06	
396		----		----	
398	E202	99.93		-0.29	
444	E2409	99.954		-0.06	
528	E202	99.929		-0.30	
529	E202	99.928		-0.31	
551		----		----	
557		----		----	
558		----		----	
609	E2409	99.95		-0.10	
657	E202	99.9580		-0.02	
663	E202	99.98		0.19	
823	E202	99.96		0.00	
825	E202	99.95		-0.10	
857	E2409	99.986		0.25	
860	E202	99.986		0.25	
861	E202	99.982		0.21	
862	E202	99.983		0.22	
865	E2409	99.980		0.19	
867	E202	99.9832		0.23	
902	E2409	99.98		0.19	
912		----		----	
913	E202	99.99		0.29	
962	E202	99.957		-0.03	
963	E2409	99.96		0.00	
1059	in house	99.918		-0.40	
1117	E202	99.928		-0.31	
1151	E202	99.9390		-0.20	
1169	E202	99.944		-0.15	
1217	E2409	99.967		0.07	
1261	INH-594	99.9361		-0.23	
1351	E202	99.979		0.18	
1467		----		----	
1506	E2409	99.960		0.00	
1509	E2409	99.954		-0.06	
1515	E2409	99.961		0.01	
1603	in house	99.94		-0.19	
1614	E2409	99.986		0.25	
1623	E2409	99.918		-0.40	
1814	E202	99.9596		0.00	
1866		----		----	
1922	in house	99.96		0.00	
1932	E202	99.93		-0.29	
3166		----		----	
9000		----		----	
9001		----		----	
9003		----		----	
9004		----		----	
9005		----		----	
9006		----		----	
9007		----		----	
9008		----		----	
9010		----		----	
9011		----		----	
9013		----		----	

normality      not OK  
 n                45  
 outliers        0  
 mean (n)      99.9599  
 st.dev. (n)    0.02099  
 R(calc.)      0.0588  
 R(E202:10)    0.2900

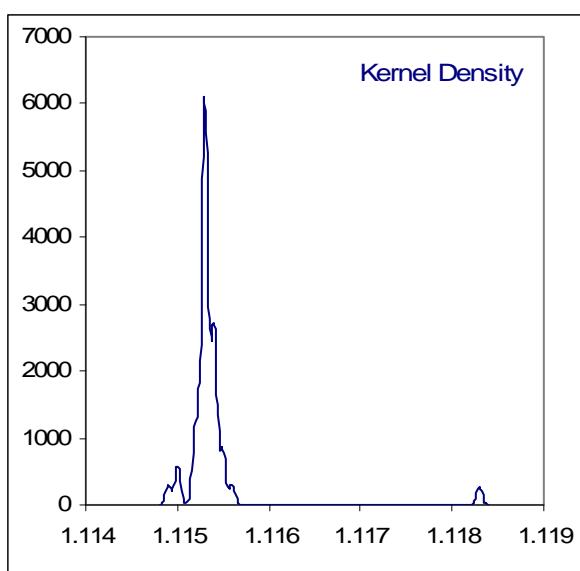
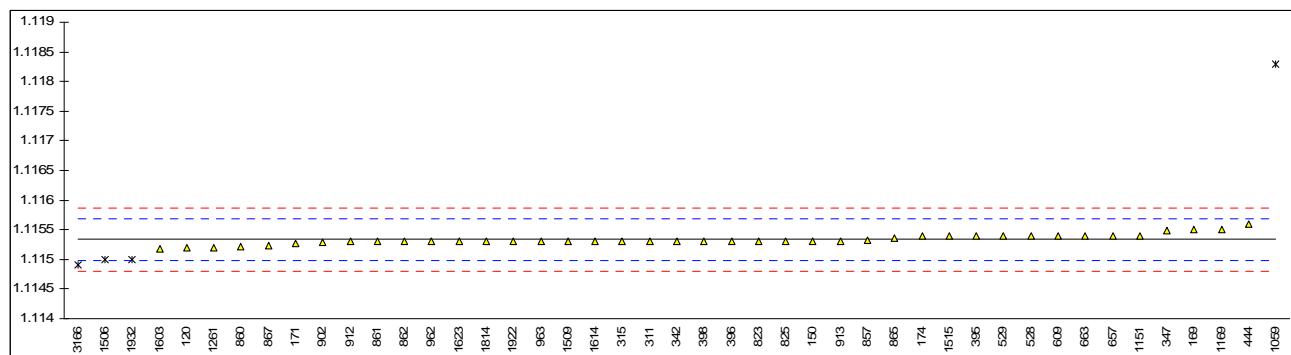
Compare R(iis10C10) = 0.0380



## Determination of Specific Gravity 20/20°C on sample #11093;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.1152		-0.74	
150	D4052	1.1153		-0.18	
169	D4052	1.1155		0.94	
171	D4052	1.11527		-0.35	
174	D4052	1.1154		0.38	
311	E202	1.1153		-0.18	
315	D4052	1.1153		-0.18	
322		----		----	
323		----		----	
342	D4052	1.1153		-0.18	
343		----		----	
347	D4052	1.11549		0.88	
395	E202	1.1154		0.38	
396	E202	1.1153		-0.18	
398	E202	1.1153		-0.18	
444	D4052	1.1156		1.50	
528	INH-DD	1.1154		0.38	
529	D4052	1.1154		0.38	
551		----		----	
557		----		----	
558		----		----	
609	D4052	1.1154		0.38	
657	D4052	1.1154		0.38	
663	D4052	1.1154		0.38	
823	E202	1.1153		-0.18	
825	E202	1.1153		-0.18	
857	D4052	1.11533		-0.02	
860	D4052	1.11522		-0.63	
861	E202	1.1153		-0.18	
862	E202	1.1153		-0.18	
865	D4052	1.11535		0.10	
867	E202	1.11523		-0.58	
902	D4052	1.11529		-0.24	
912	D4052	1.1153		-0.18	
913	D4052	1.11531		-0.13	
962	E202	1.1153		-0.18	
963	D4052	1.1153		-0.18	
1059	D4052	1.1183	G(0.01)	16.62	
1117		----		----	
1151	D4052	1.1154		0.38	
1169	E202	1.1155		0.94	
1217		----		----	
1261	D4052	1.1152		-0.74	
1351		----		----	
1467		----		----	
1506	D4052	1.1150	DG(0.01)	-1.86	
1509	D4052	1.1153		-0.18	
1515	D4052	1.1154		0.38	
1603	in house	1.11518		-0.86	
1614	D4052	1.1153		-0.18	
1623	D891	1.1153		-0.18	
1814	D4052	1.1153		-0.18	
1866		----		----	
1922	E202	1.1153		-0.18	
1932	E202	1.1150	DG(0.01)	-1.86	
3166	INH-51	1.1149	C,G(0.05)	-2.42	First reported 1.115
9000		----		----	
9001		----		----	
9003		----		----	
9004		----		----	
9005		----		----	
9006		----		----	
9007		----		----	
9008		----		----	
9010		----		----	
9011		----		----	
9013		----		----	

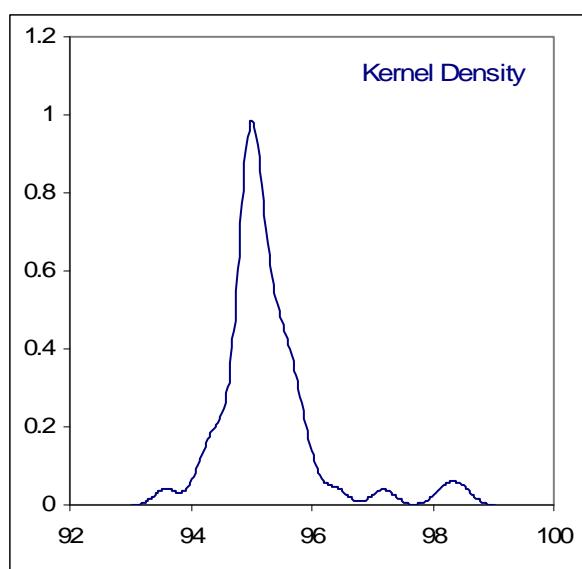
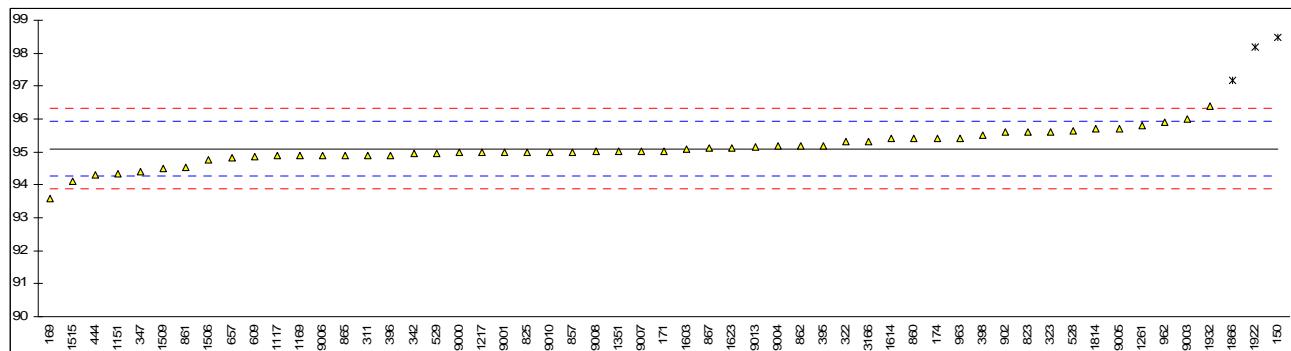
normality	not OK
n	41
outliers	4
mean (n)	1.11533
st.dev. (n)	0.000087
R(calc.)	0.00024
R(E202:10)	0.00050



## Determination of UV Transmittance at 350 nm on sample #11091; results in %Transmittance

lab	method	value	mark	z(targ)	remarks
120		----			
150	E2193-N	98.48	G(0.01)	8.20	
169	E2193-N	93.58		-3.69	
171	E2193-N	95.02		-0.20	
174	E2193-N	95.4		0.72	
311	E2193-N	94.9		-0.49	
315		----			
322	E2193-N	95.3		0.48	
323	E2193-N	95.6		1.21	
342	E2193-N	94.96		-0.34	
343		----			
347	E2193-N	94.41		-1.68	
395	E2193-N	95.2		0.24	
396	E2193	94.9		-0.49	
398	E2193	95.5		0.97	
444	E2193-N	94.3		-1.95	
528	E2193-N	95.64		1.31	
529	E2193	94.97		-0.32	
551		----			
557		----			
558		----			
609	E2193-N	94.869		-0.57	
657	E2193-N	94.84		-0.64	
663		----			
823	E2193-N	95.6		1.21	
825	E2193-N	95.0		-0.25	
857	E2193-N	95.0		-0.25	
860	E2193-N	95.4		0.72	
861	E2193-N	94.54		-1.36	
862	E2193-N	95.2		0.24	
865	E2193-N	94.9		-0.49	
867	E2193-N	95.12		0.04	
902	E2193-N	95.6		1.21	
912		----			
913		----			
962	E2193-N	95.9		1.94	
963	E2193-N	95.4		0.72	
1059		----			
1117	E2193-N	94.88		-0.54	
1151	E2193-N	94.34		-1.85	
1169	E2193-N	94.886		-0.52	
1217	E2193	95.0		-0.25	
1261	INH-577-N	95.8		1.69	
1351	E2193-Y	95.01		-0.22	
1467		----			
1506	E2193-N	94.76		-0.83	
1509	E2193-N	94.51		-1.44	
1515	E2193-N	94.1		-2.43	
1603	in house-N	95.1		0.00	
1614	E2193-N	95.40		0.72	
1623	E2193	95.125		0.06	
1814	E2193	95.7		1.45	
1866	E2193-N	97.18	G(0.01)	5.04	
1922	E2193-Y	98.2	G(0.01)	7.52	
1932	E2193	96.4		3.15	
3166	INH-51-N	95.3		0.48	
9000	E2193	94.98		-0.30	
9001	E2193-N	95.0		-0.25	
9003	E2193-N	96.0		2.18	
9004	E2193-N	95.2		0.24	
9005	E2193-N	95.7		1.45	
9006	E2193-N	94.8901		-0.51	
9007	E2193-N	95.016		-0.21	
9008	E2193-N	95.01		-0.22	
9010	E2193	95.0		-0.25	
9011		----			
9013	E2193-N	95.15		0.12	

normality	not OK
n	52
outliers	3
mean (n)	95.10
st.dev. (n)	0.491
R(calc.)	1.38
R(E2193:08)	1.15
unsparged	
Compare R(E2193:sparged) = 0.94	



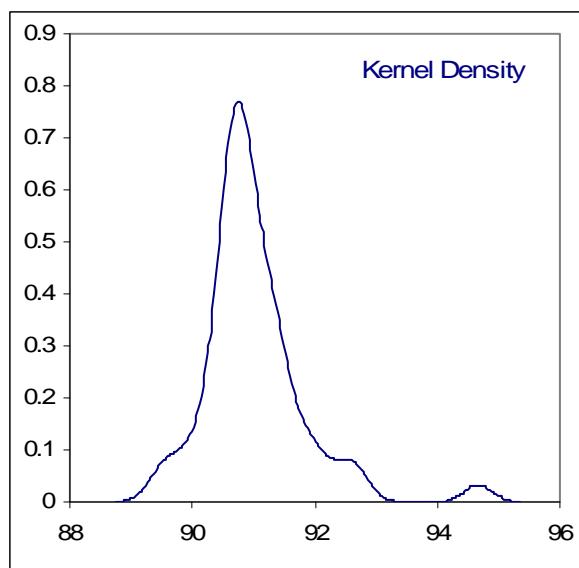
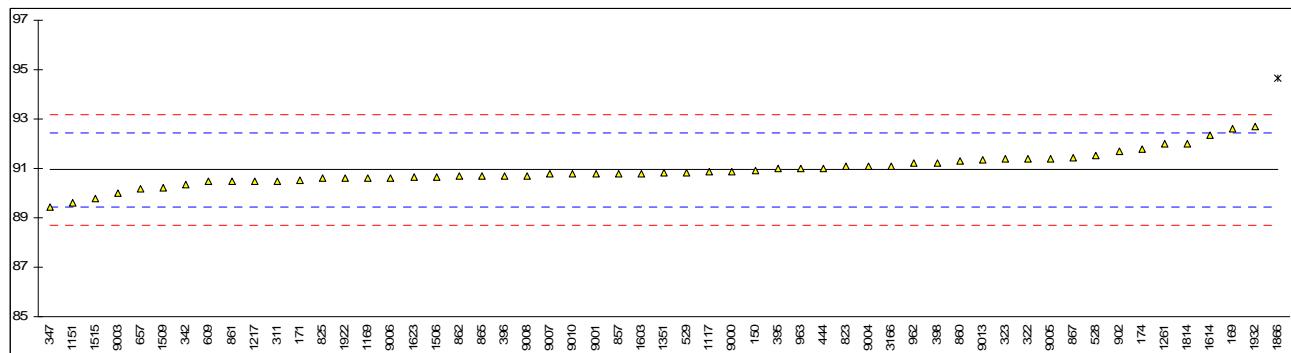
## Determination of UV Transmittance at 275 nm on sample #11091; results in %Transmittance

lab	method	value	mark	z(targ)	remarks
120		----		----	
150	E2193-N	90.91		-0.04	
169	E2193-N	92.60		2.21	
171	E2193-N	90.53		-0.54	
174	E2193-N	91.8		1.15	
311	E2193-N	90.5		-0.58	
315		----		----	
322	E2193-N	91.4		0.62	
323	E2193-N	91.4		0.62	
342	E2193-N	90.36		-0.77	
343		----		----	
347	E2193-N	89.43		-2.00	
395	E2193-N	91.0		0.08	
396	E2193	90.7		-0.32	
398	E2193	91.2		0.35	
444	E2193-N	91.0		0.08	
528	E2193-N	91.53		0.79	
529	E2193	90.84		-0.13	
551		----		----	
557		----		----	
558		----		----	
609	E2193-N	90.460		-0.63	
657	E2193-N	90.16		-1.03	
663		----		----	
823	E2193-N	91.1		0.22	
825	E2193-N	90.6		-0.45	
857	E2193-N	90.8		-0.18	
860	E2193-N	91.3		0.48	
861	E2193-N	90.46		-0.63	
862	E2193-N	90.7		-0.32	
865	E2193-N	90.7		-0.32	
867	E2193-N	91.43		0.66	
902	E2193-N	91.7		1.02	
912		----		----	
913		----		----	
962	E2193-N	91.2		0.35	
963	E2193-N	91.0		0.08	
1059		----		----	
1117	E2193-N	90.88		-0.08	
1151	E2193-N	89.62		-1.75	
1169	E2193-N	90.615		-0.43	
1217	E2193	90.5		-0.58	
1261	INH-577-N	92.0		1.41	
1351	E2193-Y	90.84		-0.13	
1467		----		----	
1506	E2193-N	90.65		-0.38	
1509	E2193-N	90.23		-0.94	
1515	E2193-N	89.8		-1.51	
1603	in house-N	90.8		-0.18	
1614	E2193-N	92.35		1.88	
1623	E2193	90.632		-0.41	
1814	E2193	92.0		1.41	
1866	E2193-N	94.67	G(0.01)	4.97	
1922	E2193-Y	90.6		-0.45	
1932	E2193	92.7		2.35	
3166	INH-51-N	91.1		0.22	
9000	E2193	90.89		-0.06	
9001	E2193-N	90.8		-0.18	
9003	E2193-N	90.0		-1.25	
9004	E2193-N	91.1		0.22	
9005	E2193-N	91.4		0.62	
9006	E2193-N	90.6153		-0.43	
9007	E2193-N	90.798		-0.18	
9008	E2193-N	90.71		-0.30	
9010	E2193	90.8		-0.18	
9011		----		----	
9013	E2193-N	91.35		0.55	

normality      OK  
 n                54  
 outliers        1  
 mean (n)      90.94  
 st.dev. (n)     0.656  
 R(calc.)      1.84  
 R(E2193:08)    2.11

unsparged

Compare R(E2193: sparged) = 1.10



## Determination of UV Transmittance at 250 nm on sample #11091; results in %Transmittance

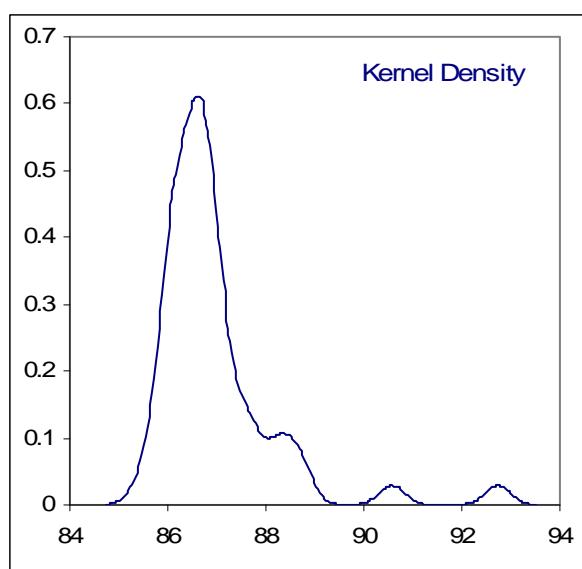
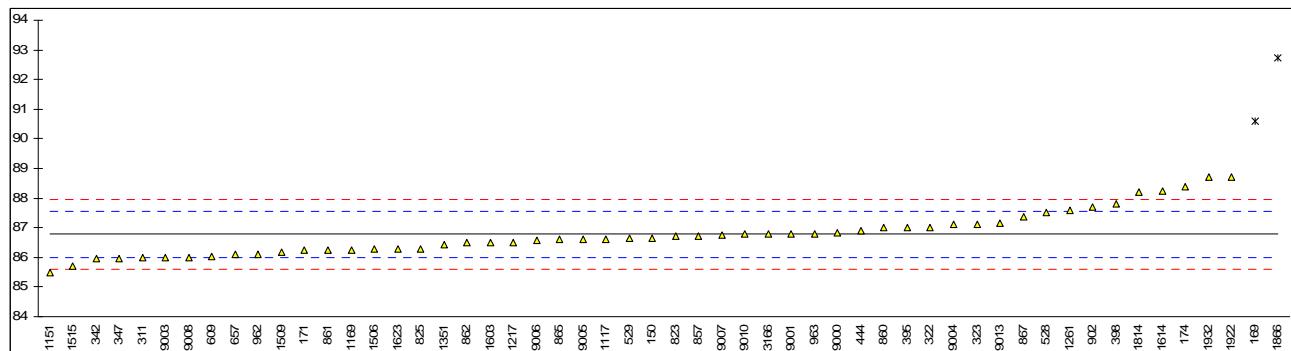
lab	method	value	mark	z(targ)	remarks
120		----		----	
150	E2193-N	86.65		-0.32	
169	E2193-N	90.58	G(0.01)	9.66	
171	E2193-N	86.23		-1.39	
174	E2193-N	88.4		4.13	
311	E2193-N	86.0		-1.97	
315		----		----	
322	E2193-N	87.0		0.57	
323	E2193-N	87.1		0.82	
342	E2193-N	85.95		-2.10	
343		----		----	
347	E2193-N	85.95		-2.10	
395	E2193-N	87.0		0.57	
396		----		----	
398	E2193	87.8		2.60	
444	E2193-N	86.9		0.31	
528	E2193-N	87.51		1.86	
529	E2193	86.63		-0.37	
551		----		----	
557		----		----	
558		----		----	
609	E2193-N	86.029		-1.90	
657	E2193-N	86.10		-1.72	
663		----		----	
823	E2193-N	86.7		-0.19	
825	E2193-N	86.3		-1.21	
857	E2193-N	86.7		-0.19	
860	E2193-N	87.0		0.57	
861	E2193-N	86.25		-1.34	
862	E2193-N	86.5		-0.70	
865	E2193-N	86.6		-0.45	
867	E2193-N	87.38		1.53	
902	E2193-N	87.7		2.35	
912		----		----	
913		----		----	
962	E2193-N	86.1		-1.72	
963	E2193-N	86.8		0.06	
1059		----		----	
1117	E2193-N	86.62		-0.40	
1151	E2193-N	85.49		-3.27	
1169	E2193-N	86.258		-1.32	
1217	E2193	86.5		-0.70	
1261	INH-577-N	87.6		2.09	
1351	E2193-N	86.42		-0.91	Reported 89.14 with sparging
1467		----		----	
1506	E2193-N	86.28		-1.26	
1509	E2193-N	86.19		-1.49	
1515	E2193-N	85.7		-2.74	
1603	in house-N	86.5		-0.70	
1614	E2193-N	88.25		3.74	
1623	E2193	86.292		-1.23	
1814	E2193	88.2		3.62	
1866	E2193-N	92.74	G(0.01)	15.15	
1922	E2193-Y	88.7		4.89	
1932	E2193	88.7		4.89	
3166	INH-51-N	86.8		0.06	
9000	E2193	86.82		0.11	
9001	E2193-N	86.8		0.06	
9003	E2193-N	86.0		-1.97	
9004	E2193-N	87.1		0.82	
9005	E2193-N	86.6		-0.45	
9006	E2193-N	86.5722		-0.52	
9007	E2193-N	86.753		-0.06	
9008	E2193-N	86.01		-1.95	
9010	E2193	86.8		0.06	
9011		----		----	
9013	E2193-N	87.14		0.92	

normality  
n  
outliers  
mean (n)  
st.dev. (n)  
R(calc.)  
R(E2193:08)

not OK  
52  
2  
86.78  
0.742  
2.08  
1.10

unsparged

Compare R(E2193: sparged) = 2.06



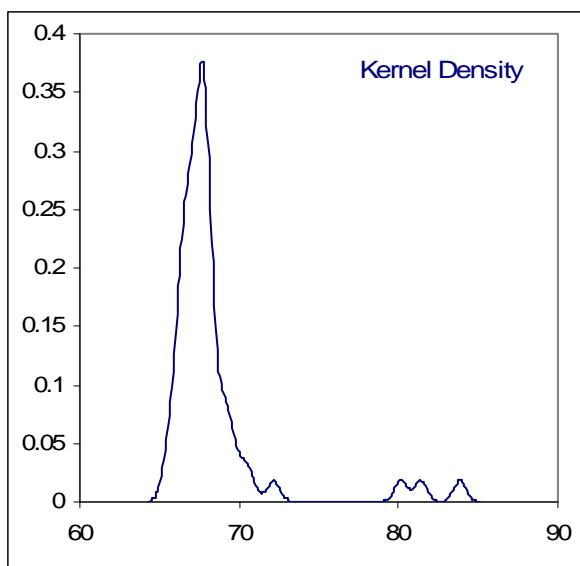
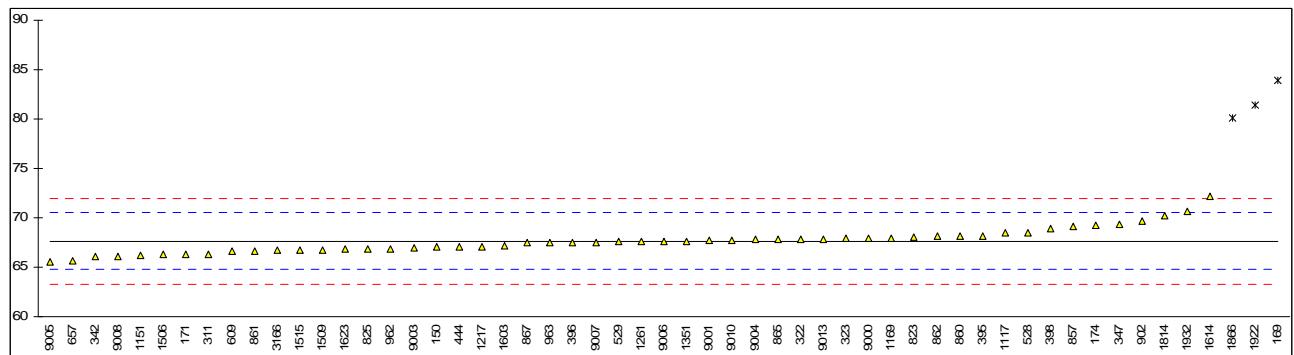
## Determination of UV Transmittance at 220 nm on sample #11091; results in %Transmittance

lab	method	value	mark	z(targ)	remarks
120		----		----	
150	E2193-N	67.10		-0.38	
169	E2193-N	83.86	G(0.01)	11.22	
171	E2193-N	66.30		-0.93	
174	E2193-N	69.2		1.08	
311	E2193-N	66.3		-0.93	
315		----		----	
322	E2193-N	67.8		0.11	
323	E2193-N	67.9		0.18	
342	E2193-N	66.10		-1.07	
343		----		----	
347	E2193-N	69.33		1.17	
395	E2193-N	68.2		0.38	
396	E2193	67.5		-0.10	
398	E2193	68.9		0.87	
444	E2193-N	67.1		-0.38	
528	E2193-N	68.53		0.61	
529	E2193	67.57		-0.05	
551		----		----	
557		----		----	
558		----		----	
609	E2193-N	66.609		-0.72	
657	E2193-N	65.61		-1.41	
663		----		----	
823	E2193-N	68.0		0.25	
825	E2193-N	66.9		-0.52	
857	E2193-N	69.1		1.01	
860	E2193-N	68.1		0.31	
861	E2193-N	66.63		-0.70	
862	E2193-N	68.1		0.31	
865	E2193-N	67.8		0.11	
867	E2193-N	67.50		-0.10	
902	E2193-N	69.7		1.42	
912		----		----	
913		----		----	
962	E2193-N	66.9		-0.52	
963	E2193-N	67.5		-0.10	
1059		----		----	
1117	E2193-N	68.46		0.56	
1151	E2193-N	66.23		-0.98	
1169	E2193-N	67.983		0.23	
1217	E2193	67.1		-0.38	
1261	INH-577-N	67.6		-0.03	
1351	E2193-N	67.66		0.01	Reported 80.94 with sparging
1467		----		----	
1506	E2193-N	66.29		-0.94	
1509	E2193-N	66.71		-0.65	
1515	E2193-N	66.7		-0.65	
1603	in house-N	67.2		-0.31	
1614	E2193-N	72.15		3.12	
1623	E2193	66.876		-0.53	
1814	E2193	70.2		1.77	
1866	E2193-N	80.16	G(0.01)	8.66	
1922	E2193-Y	81.4	G(0.01)	9.52	
1932	E2193	70.7		2.11	
3166	INH-51-N	66.7		-0.65	
9000	E2193	67.94		0.20	
9001	E2193-N	67.7		0.04	
9003	E2193-N	67.0		-0.45	
9004	E2193-N	67.8		0.11	
9005	E2193-N	65.5		-1.48	
9006	E2193-N	67.6033		-0.03	
9007	E2193-N	67.531		-0.08	
9008	E2193-N	66.10		-1.07	
9010	E2193	67.7		0.04	
9011		----		----	
9013	E2193-N	67.87		0.16	

normality      not OK  
 n                52  
 outliers        3  
 mean (n)      67.65  
 st.dev. (n)     1.261  
 R(calc.)      3.53  
 R(E2193:08)    4.05

unsparged

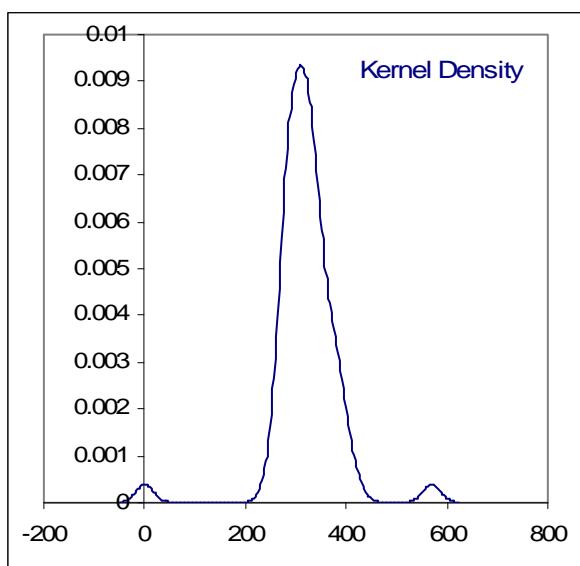
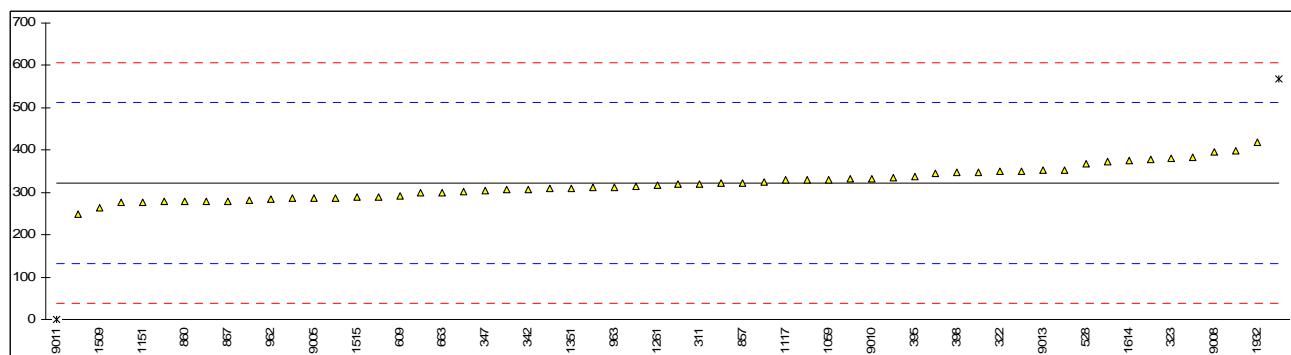
Compare R(E2193: sparged) = 9.68



## Determination of Water on sample #11091; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		----		----	
150	E1064	286		-0.38	
169	E1064	287.5		-0.36	
171	E1064	397.4		0.80	
174	E1064	324		0.02	
311	E1064	320		-0.02	
315	E203	319		-0.03	
322	E1064	349		0.29	
323	E1064	380		0.61	
342	E1064	308		-0.15	
343		----		----	
347	E1064	304		-0.19	
395	E1064	336.2		0.15	
396		----		----	
398	E1064	347		0.27	
444	E1064	569	G(0.01)	2.61	
528	E1064	367.6		0.48	
529	E1064	383.02		0.65	
551		----		----	
557		----		----	
558		----		----	
609	E1064	290.9		-0.33	
657	E1064	378.4		0.60	
663	E1064	300		-0.23	
823	E1064	315		-0.07	
825	E1064	306		-0.17	
857	E1064	322		0.00	
860	E1064	280		-0.44	
861	E1064	248		-0.78	
862	E1064	280		-0.44	
865	E1064	321		-0.01	
867	E1064	280.2		-0.44	
902	E1064	335		0.14	
912		----		----	
913		----		----	
962	E1064	284		-0.40	
963	E1064	312		-0.10	
1059	E1064	330		0.09	
1117	E1064	329.7		0.08	
1151	E1064	276.5		-0.48	
1169	E1064	282.4		-0.42	
1217	E1064	290	C	-0.34	First reported 0.0290 (unit error?)
1261	E1064	317		-0.05	
1351	E1064	310.6		-0.12	
1467		----		----	
1506	E1064	311.33		-0.11	
1509	E1064	264		-0.61	
1515	E1064	289		-0.35	
1603	in house	344		0.23	
1614	E1064	375		0.56	
1623	E202	374		0.55	
1814	E203	351.2		0.31	
1866	E3193	303		-0.20	
1922	E1064	330		0.09	
1932	E1064	418		1.01	
3166	INH-9217	353		0.33	
9000	E1064	275.2		-0.49	
9001	E1064	333		0.12	
9003	E1064	300		-0.23	
9004	E1064	279.4		-0.45	
9005	E1064	286.1		-0.38	
9006	E1064	309.61		-0.13	
9007	E1064	348.1		0.28	
9008	E1064	394.7		0.77	
9010	E1064	333		0.12	
9011	E1064	126	C,G(0.05)	-3.39	First reported 0.0126 (unit error?)
9013	E1064	352		0.32	

normality	OK
n	56
outliers	2
mean (n)	321.8
st.dev. (n)	37.38
R(calc.)	104.7
R(E202:10)	265.7



**APPENDIX 2****Number of participants per country**

1 laboratory in BELGIUM  
3 laboratories in BRAZIL  
5 laboratories in CANADA  
1 laboratory in GERMANY  
5 laboratories in INDIA  
3 laboratories in ITALY  
2 laboratories in KOREA  
2 laboratories in KUWAIT  
1 laboratory in MALAYSIA  
2 laboratories in MEXICO  
8 laboratories in P.R. of CHINA  
7 laboratories in SAUDI ARABIA  
3 laboratories in SINGAPORE  
1 laboratory in SLOVENIA  
3 laboratories in SPAIN  
1 laboratory in THAILAND  
5 laboratories in THE NETHERLANDS  
1 laboratory in TURKEY  
11 laboratories in U.S.A.  
1 laboratory in UNITED KINGDOM  
1 laboratory in VENEZUELA

## 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
on db	= on dry basis
ex	= excluded from calculations
E	= probably error in calculations
U	= probably reported in different unit
n.a.	= not applicable
fr.	= first reported
W	= withdrawn on request of the participant

### Literature:

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