Results of Proficiency Test
Styrene
October 2006

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

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1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organised a proficiency test for the analysis of Styrene. As part of the annual proficiency test program of 2006/2007, the Institute decided to continue this proficiency test on Styrene. In this international interlaboratory study 31 laboratories in 18 different countries have participated. See appendix 4 for a list of participants in alphabetical country order. In this report the results of the proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (i.i.s.) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. It was decided to send 2 different samples, one sample (1*500 mL, labelled #0658) and one sample (1*250 mL, labelled #0659). 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 agreement with ISO guide 43 and ILAC-G13:2000, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This ensures 100% confidentially of participant's data. Also customer's satisfaction is measured on a regular basis by sending 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 'i.i.s. Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (i.i.s.-protocol, version 3.0) of November 2003.

2.3 SAMPLES

The necessary bulk material was obtained from a local trader. The first batch, approx. 50 litre bulk sample was homogenised and divided over 48 brown glass bottles of 500 mL with inner and outer caps (labelled #0658). The homogeneity of the sub samples #0658 was checked by determination of Peroxide in accordance with ASTM D 2340:03 and by determination of Density @ 15˚C in accordance with ASTM D 4052:02e1 on 4 stratified random selected samples.

	Density @15˚C in kg/L	Peroxide in mg/kg
sample #0658-1	0.9109	97
sample #0658-2	0.9109	98
sample #0658-3	0.9109	98
sample #0658-4	0.9109	99

Table 1: homogeneity test of subsamples #0658

From the results in table 1 the repeatabilities were calculated by multiplication of the standard deviations by 2.8:

	Density @15˚C in kg/L	Peroxide in mg/kg
r sample #0658	0.0000	2.3
Reference method	ASTM D 4052:02e1	D 2340:03
r(Reference method)	0.0001	6.0

Table 2: repeatabilities of subsamples #0658

The repeatabilities of the results for Density@15°C and Peroxide were in agreement with the requirements as mentioned in the respective standards. Therefore, homogeneity of the sub samples #0658 was assumed.

The second batch, approx. 10 litre bulk sample was homogenised and divided over 36 brown glass bottles of 250 mL with inner and outer caps (labelled #0659). The homogeneity of the sub samples #0659 was checked by determination of n-Propylbenzene in accordance with ASTM D5135:02e1 on 4 stratified random selected samples.

	n-Propylbenzene in mg/kg
sample #0659-1	40
sample #0659-2	40
sample #0659-3	40
sample #0659-4	40

Table 3: homogeneity test of subsamples #0659

From the results in table 3 the repeatabilities were calculated by multiplication of the standard deviations by 2.8:

	n-Propylbenzene in mg/kg
r sample #0659	0.0
Reference method	D 5135:02e1
r(Reference method)	1.3

Table 4: repeatabilities of subsamples #0659

The repeatability of the result for n-Propylbenzene was in agreement with the requirements as mentioned in the respective standards. Therefore, homogeneity of the sub samples #0659 was assumed.

To each of the participating laboratories, 1 bottle of 500 mL (labelled #0658) and 1 bottle of 250 mL (labelled #0659) was sent on September 13, 2006.

2.4 STABILITY OF THE SAMPLES

In order to be sure that the material, which was used in this proficiency test, was stable for the valid period, the stability of the material, packed in the brown glass bottles, was checked prior to use.

2.5 ANALYSES

The participants were asked to determine on sample #0658: Aldehydes as Benzaldehyde, Colour Pt/Co, Inhibitor, Density, Peroxide as H_2O_2, Polymer, Sulphur, Water, Purity and the Impurities: Benzene, Ethylbenzene, m+p-Xylenes, Cumene, o-Xylene, n-Propylbenzene, m+p-Ethyltoluenes, alpha-Methylstyrene, Phenylacetylene, Benzaldehyde and Nonaromatics. On sample #0659: Purity and the Impurities: Benzene, Ethylbenzene, m+p-Xylenes, Cumene, o-Xylene, n-Propylbenzene, m+p-Ethyltoluenes, alpha-Methylstyrene, Phenylacetylene, Benzaldehyde and Nonaromatics. To get comparable results a detailed report form, on which the units and the standard methods were printed, was sent together with each set of samples. Also a letter of instructions and a MSDS 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 were 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 results.
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 results. Additional or corrected results were used for data analysis and original results were 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 November 2003 (i.i.s.-protocol, version 3.0).

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 did not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

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

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

3.2 GRAPHICS

In order to visualise the results against the reproducibilities from literature, Gauss plots were made, using the sorted data for each determination (see appendix 1). On the Y-axis the analytical results were plotted. The corresponding laboratory numbers were under the X-axis. A straight line presented the average of the reported data. Two striped lines presented the reproducibility limits of the selected standard, calculated as mean ± target reproducibility, parallel to the average line. Outliers and other data, which were excluded from the calculations, were represented as a cross. Accepted data were represented as a triangle.

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 result was 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:

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

The $z_{(target)}$ scores for the average results of the samples #0658 and #0659 are listed 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 was as follows:

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

4 EVALUATION

In this proficiency test no problem was encountered with the despatch of the samples. From the total of 31 participants, four participants did send in their results after the deadline for reporting. The 31 reporting laboratories did send in 675 numerical results. Observed were 32 outlying results, which is 4.7%. In proficiency studies outlier percentages of 3 % - 7.5 % are quite normal.

4.1 EVALUATION PER TEST

In this section the results were discussed per test. The mentioned standard reproducibilities for the tested impurities were extrapolated from the reproducibility values, which are mentioned in the standard ASTM D 5135:02e1 (tables 3 and 4). Not all data sets proved to have a normal distribution. Not normal distributions were found with the following determinations: Inhibitor and Density. Therefore, the statistical evaluation for these determinations should be used with care.

Aldehydes: It is difficult to draw a significant conclusion, as the data seems bimodally divided. This was also noticed in last year's round robin. Therefore the participants were requested to send in some critical details of the Aldehydes determination (see appendix 2). Some items of these details seem to have a rather high impact on the final result. The concentration of NaOH in this determination varies from 0.01 till 0.1 N., although only 0.05 N is allowed by ASTM D2119. The spreads of the volumes of the titrations are large (0.01 - 2.9 ml). By using very small amount of volumes during the titration is not accurate and will influence the results. As this determination was also problematic in previous Styrene round robins, it is strongly advised to follow the ASTM D 1219:03 more precisely.

Colour: This determination was somewhat problematic. No results were outside the reproducibility limits. However the calculated reproducibility is not in full agreement with the requirements of ASTM D 1209:05.

Inhibitor: This determination was very problematic for some individual laboratories. The calculated reproducibility of the results found with ASTM D4590 version 2000 is, after excluding of six statistical outliers, in agreement with the requirements of the standard. Six results were outside the reproducibility limits. The calculated reproducibility of the results found with ASTM D4590 version 2006 is, after excluding of the statistical outliers, not at all in agreement with the requirements of the standard. Five results were outside the reproducibility limits. Note: please follow more precisely in the ASTM D4590, especially the procedure quote at point 10.6.

Density: This determination is not problematic. Only two results were outside the reproducibility limits and the calculated reproducibility is, after rejection of the statistical outliers, in agreement with the requirements of ASTM D 4052:02e1.

Peroxides: This determination was very problematic. Seven results were outside the reproducibility limits and the calculated reproducibility is, after rejection of the statistical outlier, not at all in agreement with the estimated reproducibility calculated using the Horwitz equation.

Polymer: This determination was not problematic. Only two results were outside the reproducibility limits and the calculated reproducibility is, after rejection of the statistical outliers, in full agreement with ASTM D 2121:00.

Sulphur: This determination was not problematic. No results were outside the reproducibility limits and the calculated reproducibility is in agreement with the requirements of ASTM D 5453:06.

Water This determination was not problematic. Only one result was outside the reproducibility limits and the calculated reproducibility is, after rejection of the statistical outliers, in full agreement with the requirements of ASTM E 1064:05.

Purity: This determination was problematic. Four results of #0658 and two results of #0659 were outside the reproducibility limits. The calculated reproducibility of #0658 is, after rejection of the statistical outliers, not in agreement with the requirements of ASTM D 5135:02e1. The calculated reproducibility of #0659 is, after rejection of the statistical outliers, in agreement with the requirements of ASTM D 5135:02e1.
It was remarkable that some participants reported GC or in house while the available ASTM D 5135:02e1 let the user free in choice of GC, detector, column and internal standard to be used. Only the use of an internal standard for quantification is mandatory.

Benzene: For sample #0658 and #0659, too few numerical results were reported for meaningful conclusions.

Ethylbenzene: No analytical problems were observed. No results were outside the reproducibility limits and the calculated reproducibilities were both in good agreement with the requirements of ASTM D 5135:02e1.

m+p-Xylenes: This determination is problematic. In total fourteen results were outside the reproducibility limits. The calculated reproducibilities were, after rejection of the statistical outliers, both not in agreement with the requirements of ASTM D 5135:02e1. The reproducibility mentioned in ASTM D 5135:02e1 is not applicable for concentrations below 20 mg/kg.

Cumene: This determination is very problematic. In total seven results were outside the reproducibility limits. The calculated reproducibilities were, after rejection of the statistical outliers, both not at all in agreement with the requirements of ASTM D 5135:02e1.

o-Xylene: This determination is not problematic. No results were outside the reproducibility limits and the calculated reproducibilities are, after rejection of the statistical outlier, both in good agreement with the requirements of ASTM D 5135:02e1.

n-Propylbenzene: This determination is not problematic. In total only three results were outside the reproducibility limits. For #0659, the calculated reproducibility is in full agreement with the requirements of ASTM D 5135:02e1. For #0658, the calculated reproducibility is, after rejection of the statistical outlier, not at all in agreement with the requirements of ASTM D 5135:02e1. The reproducibility mentioned in ASTM D 5135:02e1 is not applicable for concentrations below 20 mg/kg.

m+p-Ethyltoluenes: This determination is problematic. For sample #0658, the group reported results near or below the detection limits of the test method, therefore it is difficult to draw a meaningful conclusion. For sample #0659, no results were outside the reproducibility limits. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5135:02e1.

α-Methylstyrene: This determination is problematic. Seven results of #0658 were outside the reproducibility limits and for #0659 only one result. For #0658 no significant conclusions can be concluded as this sample seems to be bimodally divided. The calculated reproducibility of #0659 is, after rejection of the statistical outlier, in agreement with the requirements of ASTM D 5135:02e1.

Phenylacetylene: This determination is problematic. In total only two results were outside the reproducibility limits. However the calculated reproducibilities are both not in agreement with the estimated requirements calculated using the strict Horwitz equation.

Benzaldehyde: This determination is problematic. In total three results were outside the reproducibility limits. The calculated reproducibilities are both not at all in agreement with the estimated requirements calculated using the strict Horwitz equation.

Nonaromatics: For this determination some analytical problems were observed. Almost all participants that did send us a chromatogram agreed on the location of the Nonaromatics in the chromatogram (all peaks before the Ethylbenzene peak except the Benzene and Toluene peak). However, some participants detected less than 5 peaks, other participants even

more than 10 peaks (see appendix 3). So obviously the results of this determination depend strongly on the column, the GC and the (integration) threshold.

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 tables.

Parameter	unit	n	average	2.8 *sd_R	R (lit)
Aldehydes	mg/kg	19	250.72	228.78	100.29
Colour		25	10.5	7.7	7.0
Inhibitor (D4590:00)	mg/kg	18	2.04	1.65	1.90
Inhibitor (D4590:06)	mg/kg	10	2.45	1.28	0.49
Density	kg/l	24	0.90655	0.00029	0.00050
Peroxides as H_2O_2	mg/kg	20	127.21	69.14	27.48
Polymer	mg/kg	15	0.45	0.71	1.00
Sulphur	mg/kg	15	1.00	0.58	0.58
Water	mg/kg	24	317.36	34.19	50.46
Purity	%M/M	25	99.876	0.054	0.033
Benzene	mg/kg	7	0.44	1.15	Unknown
Ethylbenzene	mg/kg	29	114.58	17.11	32.74
m+p-Xylenes	mg/kg	15	11.67	6.26	0.65
Cumene	mg/kg	26	156.72	29.19	19.59
o-Xylene	mg/kg	24	130.95	27.00	183.34
n-Propylbenzene	mg/kg	19	15.24	6.62	3.81
m+p-Ethyltoluenes	mg/kg	7	7.31	10.10	2.61
α-Methylstyrene	mg/kg	27	95.24	30.19	13.61
Phenylacetylene	mg/kg	22	12.38	4.10	3.80
Benzaldehyde	mg/kg	17	475.05	163.77	84.16
Nonaromatics	mg/kg	15	102.08	134.20	Unknown

Table 6: reproducibilities of sample #0658

Parameter	unit	n	average	2.8 *sd_R	R (lit)
Purity	%M/M	25	99.866	0.032	0.033
Benzene	mg/kg	5	0.19	0.48	Unknown
Ethylbenzene	mg/kg	29	126.97	18.42	36.28
m+p-Xylenes	mg/kg	22	112.90	9.84	6.32
Cumene	mg/kg	25	219.95	34.92	27.47
o-Xylene	mg/kg	24	275.58	33.39	385.81
n-Propylbenzene	mg/kg	22	35.38	6.14	8.85
m+p-Ethyltoluenes	mg/kg	19	30.37	13.51	10.85
a-Methylstyrene	mg/kg	26	134.32	17.10	19.19
Phenylacetylene	mg/kg	12	6.44	3.93	2.18
Benzaldehyde	mg/kg	18	276.10	86.94	53.08
Nonaromatics	mg/kg	13	60.96	114.83	Unknown

Table 7: reproducibilities of sample #0659

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

For the GC components Youden-plots are made. In these plots the results for the components of sample #0658 and #0659 are plotted against each other. Accepted results are represented by a triangle and a cross represents rejected results.
The results for Purity, m+p-Xylenes, Cumene, o-Xylene, n-Propylbenzene, alpha-Methylstyrene, Phenylacetylene and Nonaromatics are found in a circular cloud, which points at random errors dominating over systematic errors.
The results for Ethylbenzene, m+p-Ethyltoluenes and Benzaldehyde are found in a line, which points at dominating systematic errors.
See appendix 1 for the plots.

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2006 WITH PREVIOUS PT'S

	October 2006	*October 2005*	*October 2004*	*October 2003*
Number of reporting labs	31	28	28	22
Number of results reported	675 [1)]	566 [1)]	325	322
Statistical outliers	32	18	15	13
Percentage outliers	4.7 %	3.2 %	4.6 %	4.1 %

Table 8: comparison with previous proficiency tests

[1)] Two samples were sent out

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	*October 2006*	*October 2005*	*October 2004*	*October 2003*
Aldehydes	--	--	--	--
Colour	-	+	++	+
Inhibitor (Old version)	--	-	-	--
Inhibitor (New version)	--	n.d.	n.d.	n.d.
Density	++	n.d.	n.d.	n.d.
Peroxides as H_2O_2	--	--	-	++
Polymer	++	+/-	+/-	-
Sulphur	+/-	n.e.	-	n.e.
Water	++	+	++	+/-
Purity	-	+	+	++
Ethylbenzene	++	++	++	++
m+p-Xylenes	--	--	--	--
Cumene	--	--	+	+/-
o-Xylene	++	++	++	++
n-Propylbenzene	--	+	--	+/-
m+p-Ethyltoluenes	--	+	--	--
alpha-Methylstyrene	--	+	n.e.	+/-
Phenylacetylene	-	--	n.e.	n.e.
Benzaldehyde	--	--	n.d.	n.d.
Nonaromatics	n.e.	n.e.	n.e.	n.e.

Table 9: comparison determinations against the standard

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

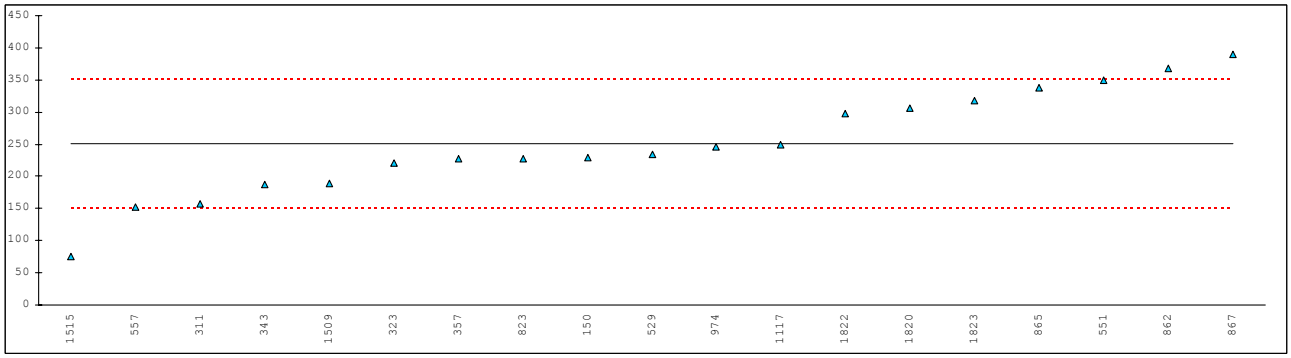
++: group performed much better than the standard
+ : group performed better than the standard
+/-: group performance equals the standard
- : group performed worse than the standard
-- : group performed much worse than the standard
n.e.: not evaluated
n.d.: not determined

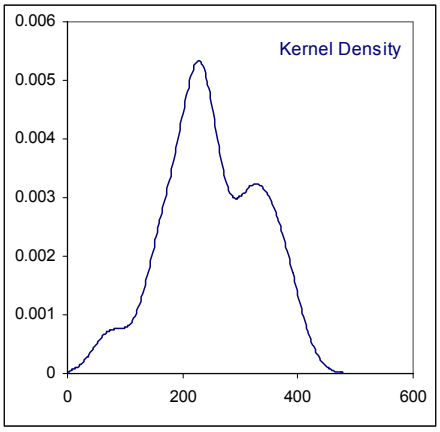
APPENDIX 1

Determination of Aldehydes as Benzaldehyde on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150	D 2119	230		-0.58	
171		-----		-----	
174		-----		-----	
311	D 2119	158		-2.59	
323	D 2119	221		-0.83	
333		-----		-----	
343	D 2119	186.9		-1.78	
347		-----		-----	
357	D 2119	227		-0.66	
359		-----		-----	
395		-----		-----	
396		-----		-----	
446		-----		-----	
529	D 2119	233.8		-0.47	
551	D 2119	350		2.77	
557	D 2119	152		-2.76	
823	D 2119	228		-0.63	
862	D 2119	368		3.27	
865	D 2119	338		2.44	
867	D 2119	390		3.89	
886		-----		-----	
963		-----		-----	
974	D 2119	245.8230		-0.14	
1085		-----		-----	
1117	D 2119	249		-0.05	
1509	D 2119	189.6		-1.71	
1515	D 2119	75		-4.91	
1806		-----		-----	
1820	INHOUSE	306		1.54	
1822	INHOUSE	297		1.29	
1823	D 2119	318.6		1.90	

normality	OK
n	19
outliers	0
mean (n)	250.72
st.dev. (n)	81.706
R(calc.)	228.78
R(D 2119:03)	100.29

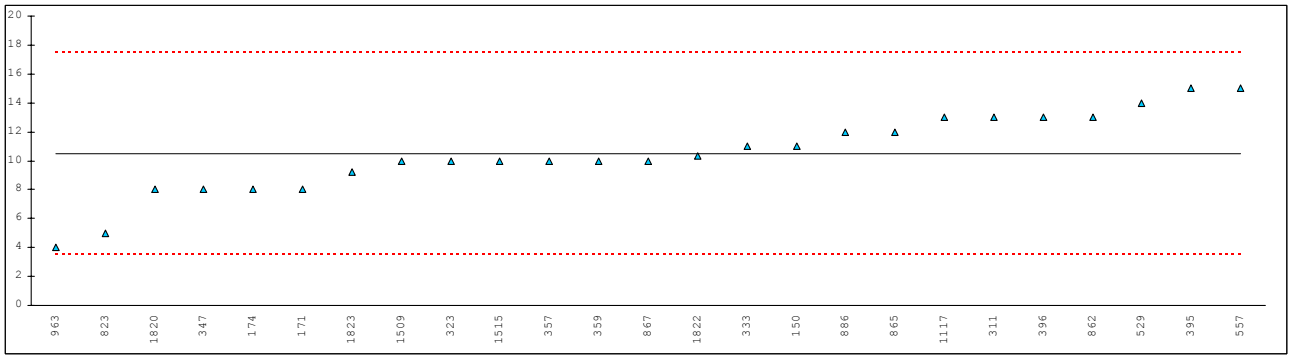


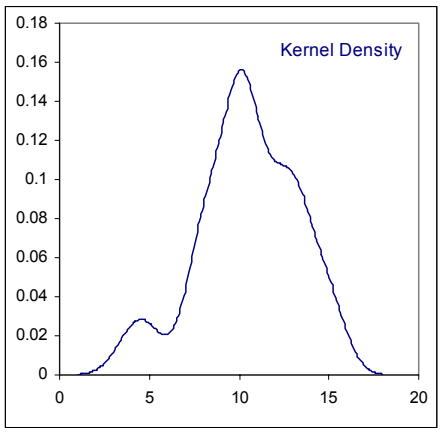


Determination of Colour on sample #0658;

lab	method	value	mark	Z(targ)	remarks
150	D 1209	11		0.20	
171	D 1209	8		-1.00	
174	D 1209	8		-1.00	
311	D 1209	13		1.00	
323	D 1209	10		-0.20	
333	D 1209	11		0.20	
343		-----		-----	
347	D 1209	8		-1.00	
357	D 1209	10		-0.20	
359	D 1209	10		-0.20	
395	D 1209	15		1.80	
396	D 1209	13		1.00	
446	D 1209	<5		-----	False negative
529	D 1209	14		1.40	
551		-----		-----	
557	D 1209	15		1.80	
823	D 1209	5		-2.20	
862	D 1209	13		1.00	
865	D 1209	12		0.60	
867	D 1209	10		-0.20	
886	D 1209	12		0.60	
963	D 1209	4		-2.60	
974	D 1209	<20		-----	
1085		-----		-----	
1117	D 1209	13		1.00	
1509	D 1209	10		-0.20	
1515	D 1209	10		-0.20	
1806	D 1209	<5		-----	False negative
1820	D 5386	8		-1.00	
1822	INHOUSE	10.3		-0.08	
1823	D 1209	9.2		-0.52	

normality	OK
n	25
outliers	0
mean (n)	10.5
st.dev. (n)	2.76
R(calc.)	7.7
R(D 1209:05)	7.0

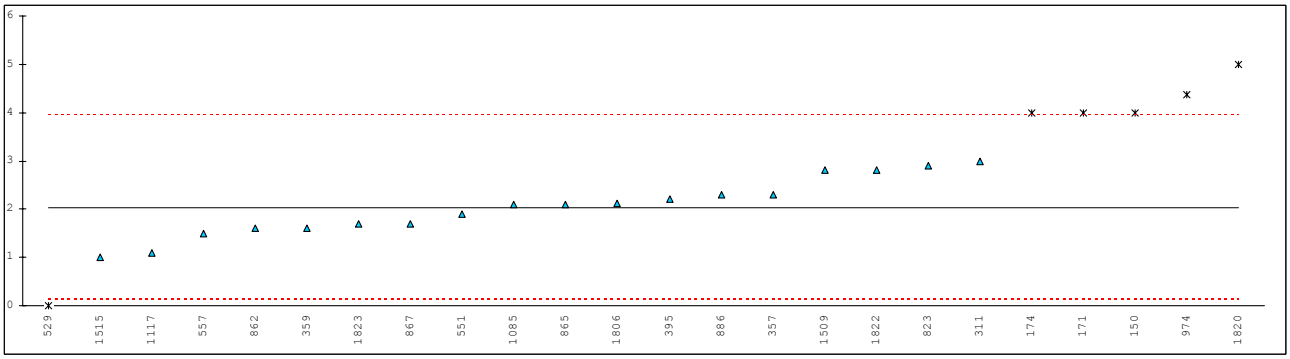


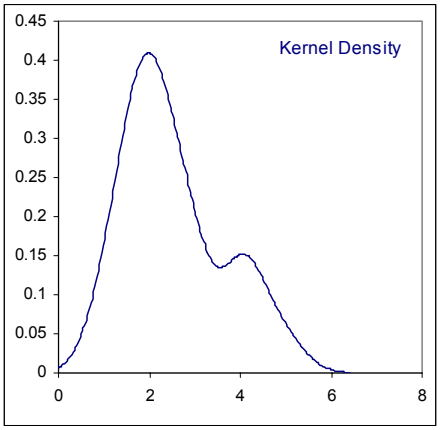


Determination of Inhibitor (D 4590:00) as (p-TBC) on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150	D4590	4	DG(0.05)	2.89	
171	D4590-00	4.0	DG(0.05)	2.89	
174	D4590-00	4	DG(0.05)	2.89	
311	D4590-00	3		1.42	
323		-----		-----	
333		-----		-----	
343		-----		-----	
347		-----		-----	
357	D4590-00	2.3		0.38	
359	D4590-00	1.6		-0.65	
395	D4590-00	2.2		0.24	
396		-----		-----	
446	D4590-00	<1		-----	False negative
529	D4590-00	0	DG(0.05)	-3.00	No true value
551	D4590-00	1.9		-0.21	
557	INHOUSE	1.5		-0.79	
823	D4590-00	2.9		1.27	
862	D4590-00	1.6		-0.65	
865	D4590-00	2.1		0.09	
867	D4590-00	1.7		-0.50	
886	D4590-00	2.29		0.37	
963		-----		-----	
974	D4590-00	4.37	DG(0.05)	3.43	
1085	D4590-00	2.10		0.09	
1117	D4590-00	1.1		-1.38	
1509	D4590-00	2.8		1.12	
1515	D4590-00	1.0		-1.53	
1806	D4590-00	2.118		0.12	
1820	D4590-00	5	DG(0.05)	4.36	
1822	D4590-00	2.8		1.12	
1823	D4590-00	1.7		-0.50	

normality	OK
n	18
outliers	6
mean (n)	2.04
st.dev. (n)	0.588
R(calc.)	1.65
R(D4590:00)	1.90

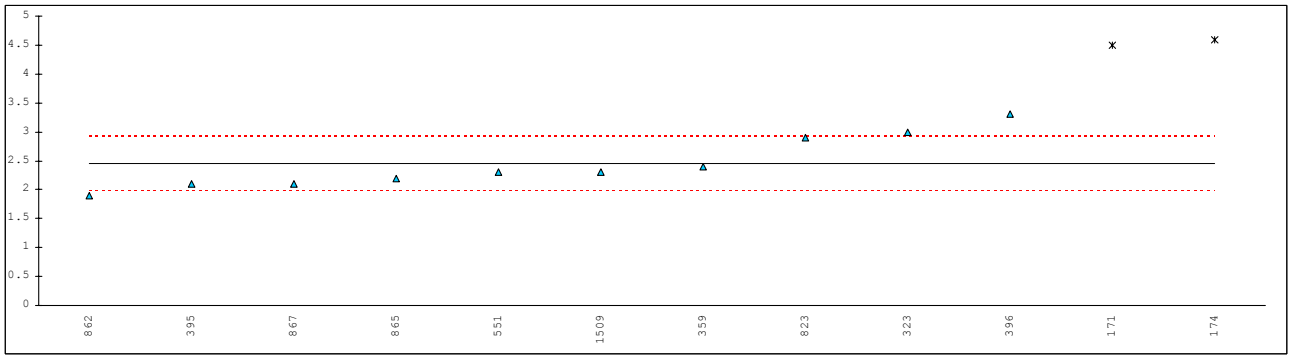


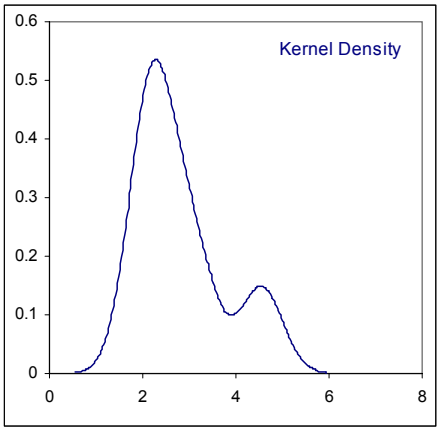


Determination of Inhibitor (D 4590:06) as (p-TBC) on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150		-----		-----	
171	D 4590-06	4.5	DG(0.05)	11.71	
174	D 4590-06	4.6	DG(0.05)	12.29	
311		-----		-----	
323	D 4590	3		3.14	
333		-----		-----	
343		-----		-----	
347		-----		-----	
357		-----		-----	
359	D 4590-06	2.4		-0.29	
395	D 4590-06	2.1		-2.00	
396	D 4590-06	3.3		4.86	
446	D 4590-06	<1		-----	False negative
529		-----		-----	
551	D 4590-06	2.3		-0.86	
557		-----		-----	
823	D 4590-06	2.9		2.57	
862	D 4590-06	1.9		-3.14	
865	D 4590-06	2.2		-1.43	
867	D 4590-06	2.1		-2.00	
886		-----		-----	
963		-----		-----	
974		-----		-----	
1085		-----		-----	
1117		-----		-----	
1509	D 4590-06	2.3		-0.86	
1515		-----		-----	
1806		-----		-----	
1820		-----		-----	
1822		-----		-----	
1823		-----		-----	

normality	OK
n	10
outliers	2
mean (n)	2.45
st.dev. (n)	0.458
R(calc.)	1.28
R(D 4590:06)	0.49

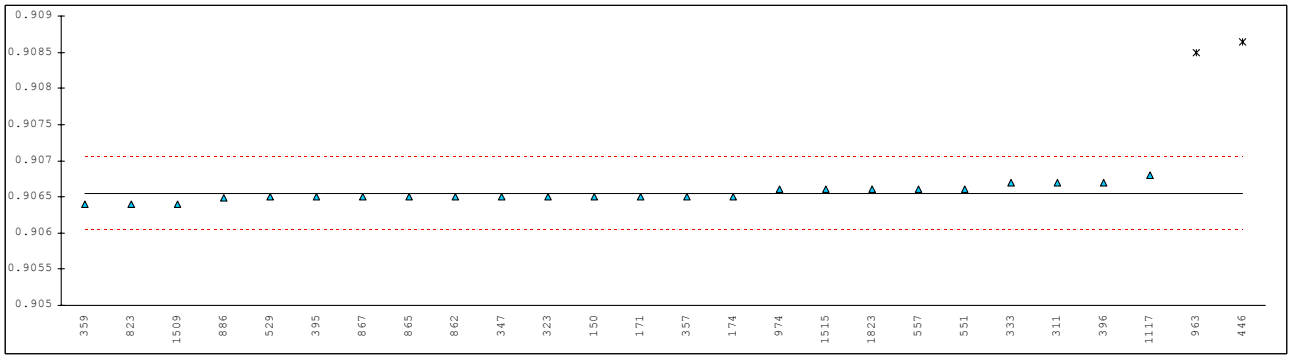


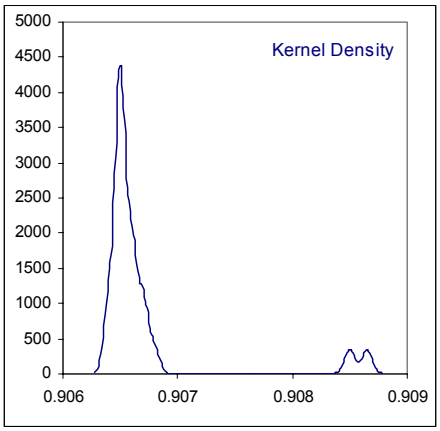


Determination of Density at 20 °C on sample #0658; results in kg/L.

lab	method	value	mark	Z(targ)	remarks
150	D 4052	0.9065		-0.25	
171	D 4052	0.9065		-0.25	
174	D 4052	0.9065		-0.25	
311	D 4052	0.9067		0.87	
323	D 4052	0.9065		-0.25	
333	D 4052	0.9067		0.87	
343		-----		-----	
347	D 4052	0.9065		-0.25	
357	D 4052	0.9065		-0.25	
359	D 4052	0.9064		-0.81	
395	D 4052	0.9065		-0.25	
396	D 4052	0.9067		0.87	
446	D 4052	0.9087	G(0.01)	11.79	
529	D 4052	0.9065		-0.25	
551	D 4052	0.9066		0.31	
557	D 4052	0.9066		0.31	
823	D 4052	0.9064	C	-0.81	First reported 0.9109
862	D 4052	0.9065		-0.25	
865	D 4052	0.9065		-0.25	
867	D 4052	0.9065		-0.25	
886	D 4052	0.90649		-0.31	
963	D 4052	0.9085	G(0.01)	10.95	
974	D 4052	0.9066		0.31	
1085		-----		-----	
1117	D 4052	0.9068		1.43	
1509	D 4052	0.9064		-0.81	
1515	D 4052	0.9066	U	0.31	Reported wrong unit 906.6
1806		-----		-----	
1820		-----		-----	
1822		-----		-----	
1823	D 4052	0.9066		0.31	

normality	not OK
n	24
outliers	2
mean (n)	0.90655
st.dev. (n)	0.000102
R(calc.)	0.00029
R(D 4052:02e1)	0.00050

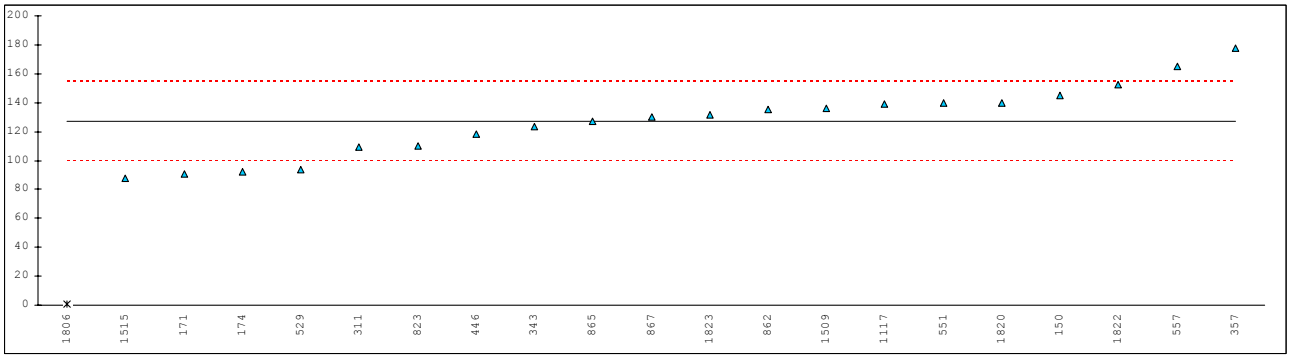


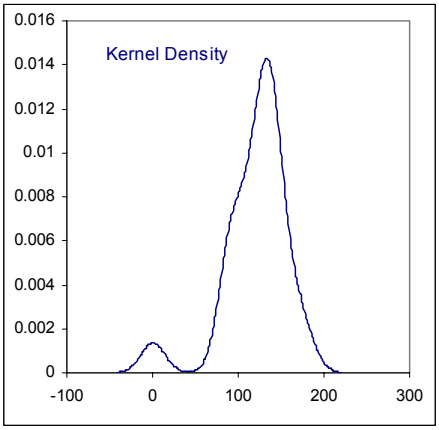


Determination of Peroxides as H_2O_2 on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150	D 2340	145		1.81	
171	D 2340	90.6		-3.73	
174	D 2340	92		-3.59	
311	D 2340	109		-1.86	
323		-----		-----	
333		-----		-----	
343	D 2340	123.6		-0.37	
347		-----		-----	
357	D 2340	178		5.17	
359		-----		-----	
395		-----		-----	
396		-----		-----	
446	D 2340	118		-0.94	
529	D 2340	93.83		-3.40	
551	D 2340	140		1.30	
557	D 2340	165.0		3.85	
823	D 2340	110		-1.75	
862	D 2340	135		0.79	
865	D 2340	127		-0.02	
867	D 2340	130		0.28	
886		-----		-----	
963		-----		-----	
974		-----		-----	
1085		-----		-----	
1117	D 2340	139.4		1.24	
1509	D 2340	136.0		0.90	
1515	D 2340	87.7		-4.03	
1806	D 2340	0.769	G(0.01)	-12.88	
1820	D 2340	140		1.30	
1822	INHOUSE	152.5		2.58	
1823	D 2340	131.6		0.45	

normality	OK
n	20
outliers	1
mean (n)	127.21
st.dev. (n)	24.693
R(calc.)	69.14
R(Horwitz)	27.48

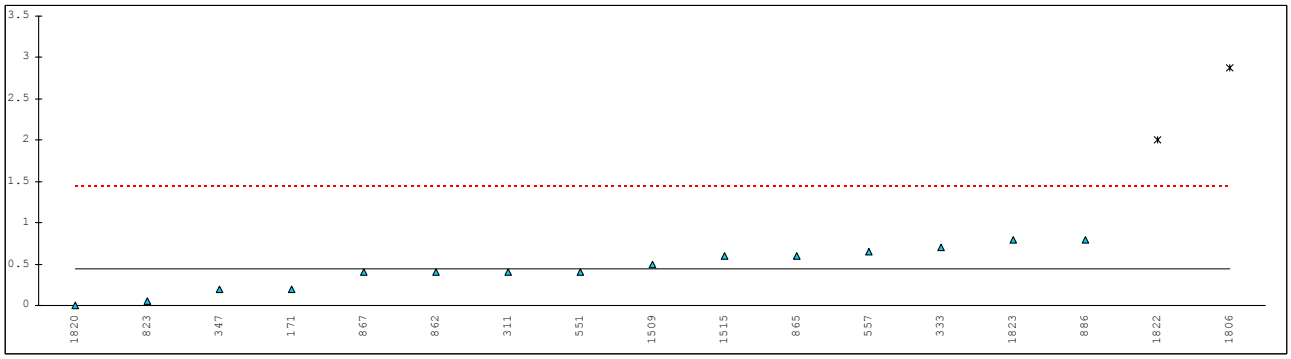


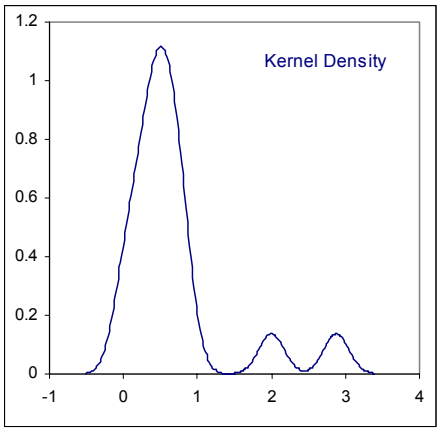


Determination of Polymers on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150	D 2121	<1		-----	
171	D 2121	0.2		-0.69	
174	D 2121	<1		-----	
311	D 2121	0.4		-0.13	
323	D 2121	<1		-----	
333	D 2121	0.7		0.71	
343		-----		-----	
347	D 2121	0.20		-0.69	
357	D 2121	<1		-----	
359	D 2121	<1		-----	
395	D 2121	<1		-----	
396	D 2121	<1		-----	
446	D 2121	<1		-----	
529		-----		-----	
551	D 2121	0.4		-0.13	
557	D 2121	0.6508		0.57	
823	D 2121	0.05		-1.11	
862	D 2121	0.4		-0.13	
865	D 2121	0.6		0.43	
867	D 2121	0.4		-0.13	
886	D 2121	0.8		0.99	
963		-----		-----	
974		-----		-----	
1085		-----		-----	
1117	D 2121	<1		-----	
1509	D 2121	0.5		0.15	
1515	D 2121	0.6		0.43	
1806	D 2121	2.877	G(0.01)	6.80	
1820	D 2121	0		-1.25	
1822	INHOUSE	2	G(0.01)	4.35	
1823	D 2121	0.8		0.99	

normality	OK
n	15
outliers	2
mean (n)	0.45
st.dev. (n)	0.253
R(calc.)	0.71
R(D 2121:00)	1.00

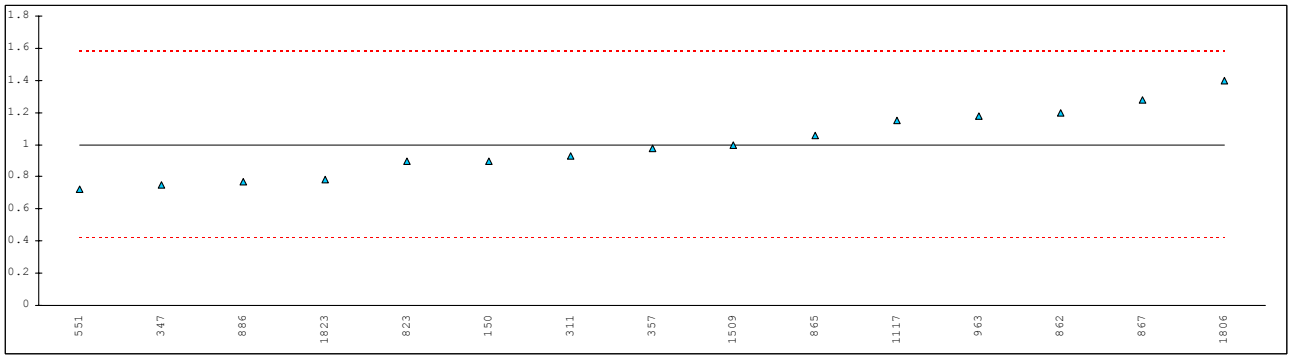


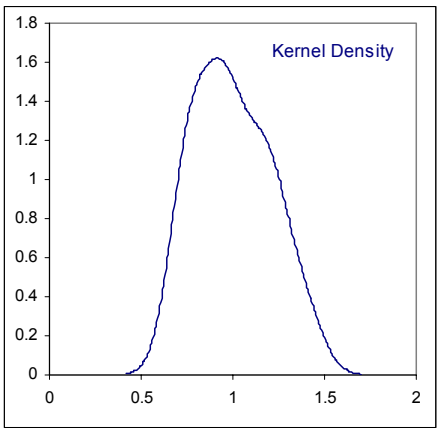


Determination of Sulphur on sample #0658; results in mg/kg.

lab	method	value	mark	Z(targ)	remarks
150	D 5453	0.9		-0.48	
171		-----		-----	
174		-----		-----	
311	D 3961	0.93		-0.34	
323	D 5453	<1		-----	
333	D 5453	<1		-----	
343		-----		-----	
347	D 5453	0.75		-1.21	
357	D 5453	0.98		-0.10	
359		-----		-----	
395	IP 373	<1		-----	
396		-----		-----	
446		-----		-----	
529		-----		-----	
551	D 3120	0.72		-1.35	
557		-----		-----	
823	D 5453	0.9		-0.48	
862	D 5453	1.2		0.97	
865	INHOUSE	1.06		0.29	
867	D 5453	1.28		1.35	
886	D 5453	0.77		-1.11	
963	D 4045	1.18	C	0.87	First reported 2.18
974		-----		-----	
1085		-----		-----	
1117	D 5453	1.15		0.72	
1509	D 3961	1.0		0.00	
1515		-----		-----	
1806	D 5453	1.4		1.93	
1820		-----		-----	
1822		-----		-----	
1823	D 3961	0.78		-1.06	

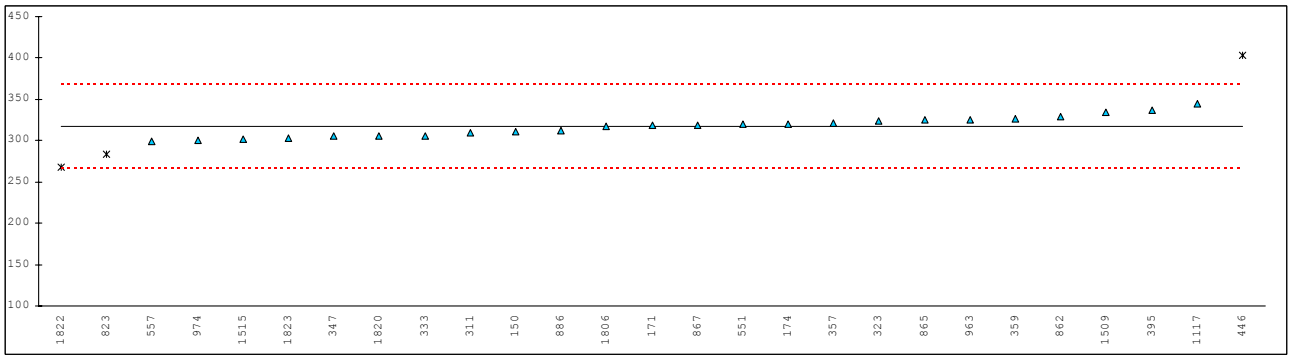
normality	OK
n	15
outliers	0
mean (n)	1.00
st.dev. (n)	0.208
R(calc.)	0.58
R(D5453:06)	0.58

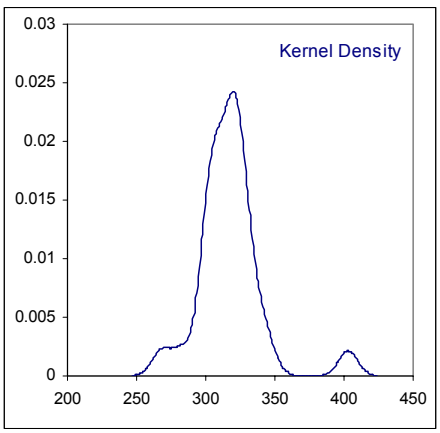




Determination of Water on sample #0658; results in mg/kg

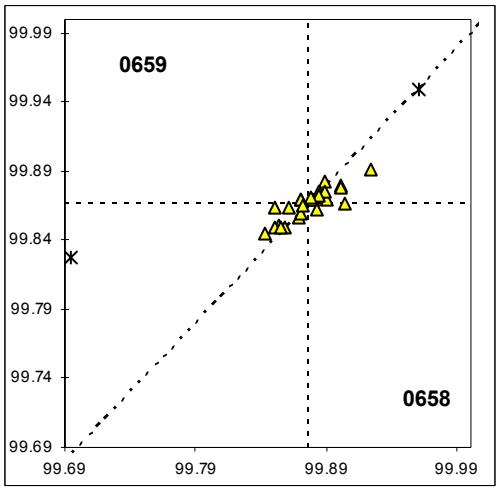
lab	method	value	mark	Z(targ)	remarks
150	E 1064	311		-0.35	
171	E 1064	319		0.09	
174	E 1064	320		0.15	
311	E 1064	310		-0.41	
323	E 1064	324		0.37	
333	D 1364	306		-0.63	
343		-----		-----	
347	E 1064	305		-0.69	
357	E 1064	321		0.20	
359	E 203	326		0.48	
395	E 1064	337.4		1.11	
396		-----		-----	
446	E 203	403	G(0.01)	4.75	
529		-----		-----	
551	E 1064	320		0.15	
557	E 1064	299.7		-0.98	
823	E 203	283	DG(0.05)	-1.91	
862	E 1064	329		0.65	
865	E 1064	325		0.42	
867	E 1064	319		0.09	
886	E 1064	312.6		-0.26	
963	E 1064	325		0.42	
974	E 1064	300	C	-0.96	First reported 0.030
1085		-----		-----	
1117	E 1064	345		1.53	
1509	E 1064	334		0.92	
1515	E 1064	302		-0.85	
1806	E 1064	317		-0.02	
1820	E 1064	306		-0.63	
1822	INHOUSE	267.905	DG(0.05)	-2.74	
1823	E 1064	303		-0.80	
					Only ASTM E 1064 data:
	normality	OK			OK
	n	24			22
	outliers	3			0
	mean (n)	317.36			317.49
	st.dev. (n)	12.211			12.394
	R(calc.)	34.19			34.70
	R(E 1064:05)	50.46			50.46

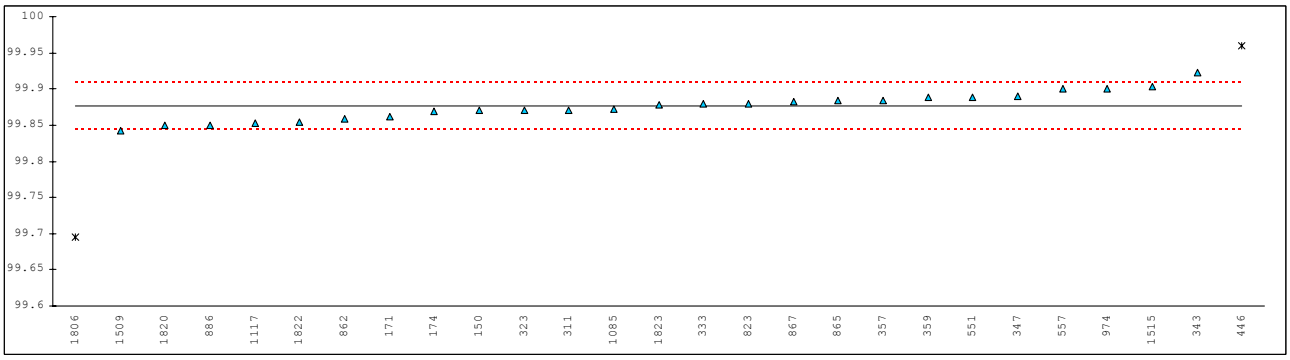




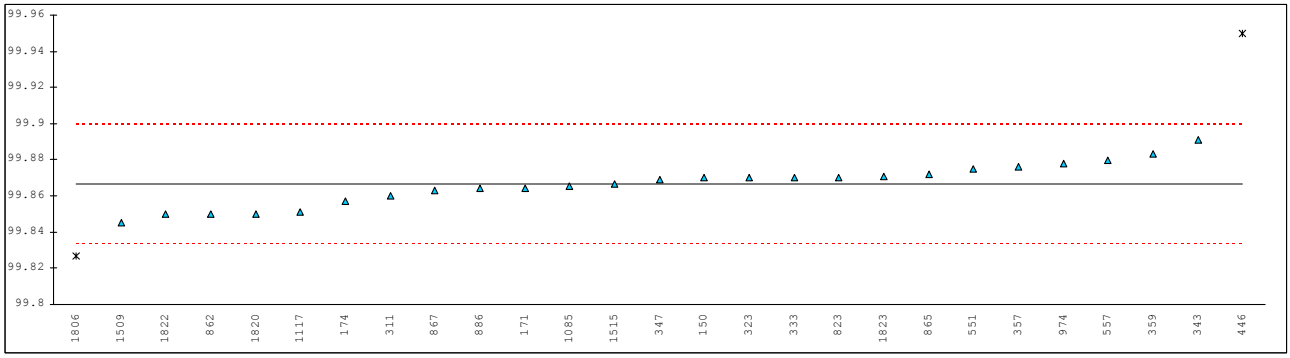
Determination of Purity on sample #0658 and #0659; results in %M/M.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	99.87		-0.53		99.87		0.30	
171	D 5135	99.861		-1.29		99.864		-0.21	
174	GC	99.869		-0.61		99.857		-0.80	
311	D 5135	99.87		-0.53		99.86		-0.55	
323	D 5135	99.87		-0.53		99.87		0.30	
333	D 5135	99.88		0.32		99.87		0.30	
343	D 5135	99.923	C	3.97	First reported 99.95	99.891	C	2.09	First reported 99.923
347	D 5135	99.890		1.17		99.869		0.22	
357	D 5135	99.884		0.66		99.876		0.81	
359	D 5135	99.889		1.09		99.883		1.41	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446	D 5135	99.96	G(0.01)	7.12		99.95	G(0.01)	7.10	
529		-----		-----		-----		-----	
551	D 5135	99.889		1.09		99.875		0.73	
557	D 5135	99.90		2.02		99.88	C	1.15	First reported 99.90
823	D 5135	99.88		0.32		99.87		0.30	
862	D 5135	99.858		-1.55		99.850		-1.40	
865	GC	99.884		0.66		99.872		0.47	
867	D 5135	99.883		0.58		99.863		-0.29	
886	D 5135	99.85		-2.23		99.864		-0.21	
963		-----		-----		-----		-----	
974	D 5135	99.90		2.02		99.878		0.98	
1085	INHOUSE	99.8724		-0.32		99.8654		-0.09	
1117	D 5135	99.853		-1.97		99.851		-1.31	
1509	D 5135	99.843		-2.82		99.845		-1.82	
1515	INHOUSE	99.9035		2.32		99.8666		0.01	
1806	D 5135	99.695	G(0.01)	-15.39		99.827	G(0.01)	-3.35	
1820	D 5135	99.85		-2.23		99.85		-1.40	
1822	INHOUSE	99.855		-1.80		99.85		-1.40	
1823	D 5135	99.878		0.15		99.871		0.39	
	normality	OK				OK			
	n	25				25			
	outliers	2				2			
	mean (n)	99.876				99.866			
	st.dev. (n)	0.0194				0.0114			
	R(calc.)	0.054				0.032			
	R(D 5135:02e1)	0.033				0.033			

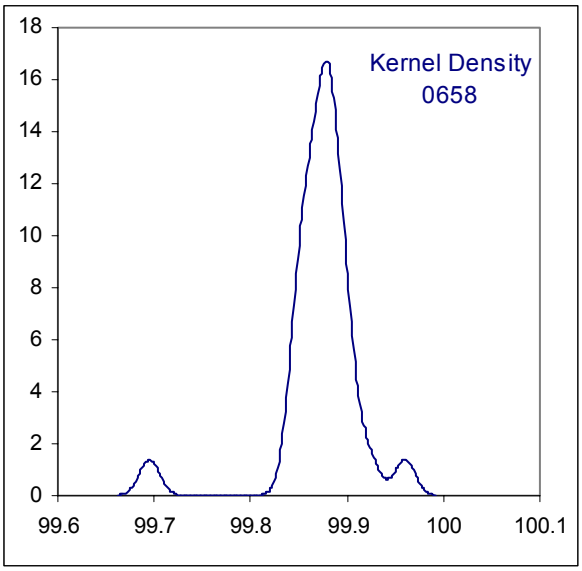


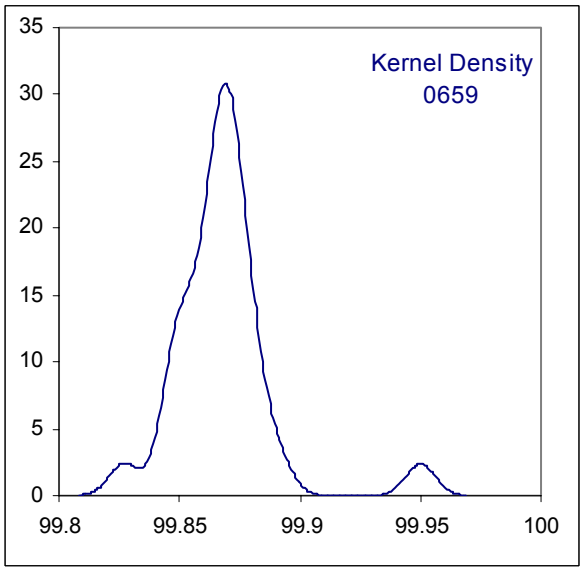


Results of sample #0658



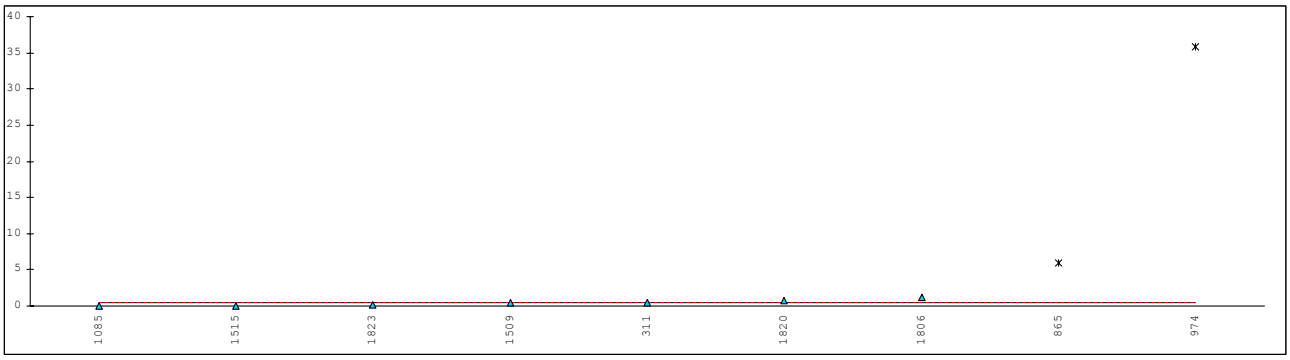
Results of sample #0659



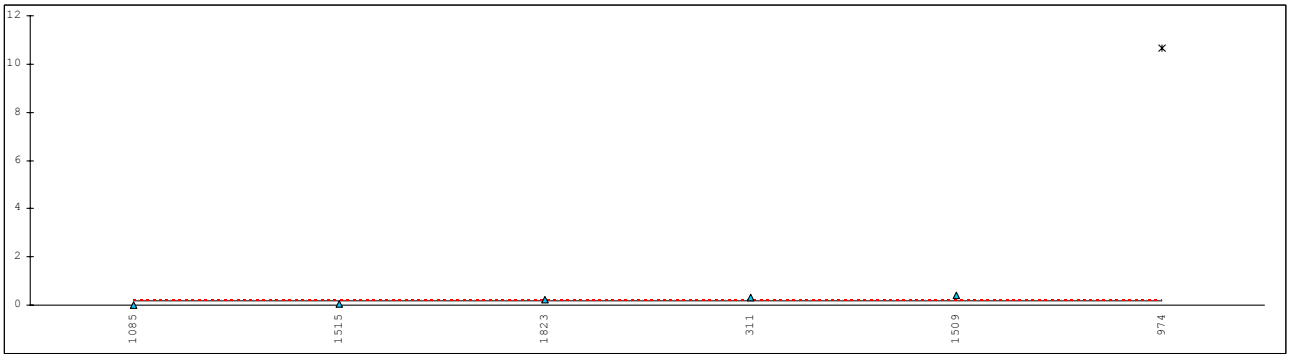


Determination of Benzene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	<10		-----		<10		-----	
171	D 5135	<10		-----		<10		-----	
174	GC	<10		-----		<10		-----	
311	INHOUSE	0.5		-----		0.3		-----	
323	D 4534	<1		-----		<1		-----	
333	INHOUSE	<1		-----		<1		-----	
343	GC	<1		-----		<1		-----	
347		-----		-----		-----		-----	
357	INHOUSE	<1		-----		<1		-----	
359	INHOUSE	<1		-----		<1		-----	
395	D 5135	<1	C	-----	First reported 30	<1		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	<5		-----		<5		-----	
557		-----		-----		-----		-----	
823	D 5135MOD.	ND	C	-----	First reported 7.5	ND		-----	
862		-----		-----		-----		-----	
865	GC	6	CG(0.01)	-----	First reported 14	<10		-----	
867	GC	<10		-----		<10		-----	
886	D 5135	<5		-----		<5		-----	
963		-----		-----		-----		-----	
974	D 5135	35.890	CG(0.01)	-----	First reported 39.5875	10.670	CG(0.01)	-----	First reported 11.7718
1085	INHOUSE	0		-----		0		-----	
1117	INHOUSE	<0.5		-----		<0.5		-----	
1509	INHOUSE	0.45		-----		0.41		-----	
1515	INHOUSE	0.07	C	-----	First reported 0.0003	0.04	C	-----	First reported 0.0003
1806	D 5135	1.18		-----		<1		-----	
1820		0.7		-----		<0.5		-----	
1822	INHOUSE	<1		-----		<1		-----	
1823	INHOUSE	0.180		-----		0.208		-----	
	normality	OK				OK			
	n	7				5			
	outliers	2				1			
	mean (n)	0.44				0.19			
	st.dev. (n)	0.412				0.173			
	R(calc.)	1.15				0.48			
	R(lit)	Unknown				Unknown			



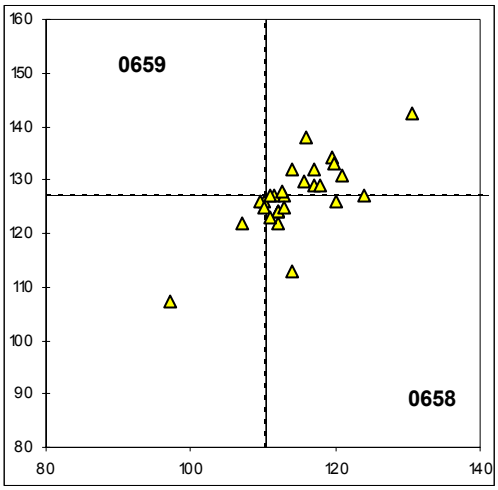
Results of sample #0658

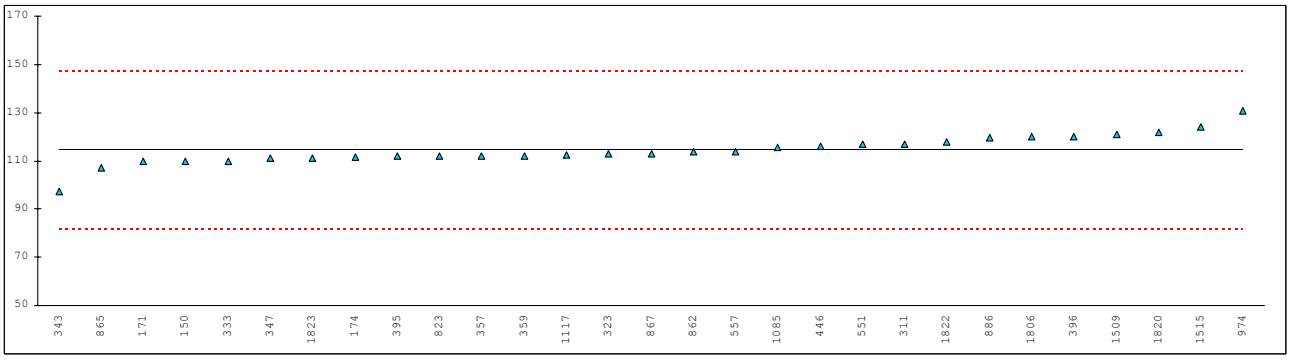


Results of sample #0659

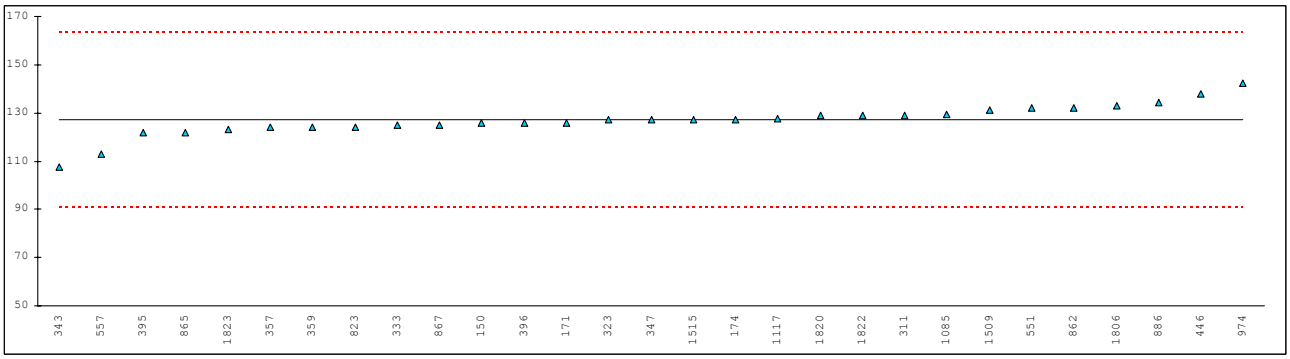
Determination of Ethylbenzene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	110		-0.39		126		-0.08	
171	D 5135	109.7		-0.42		126.0		-0.08	
174	GC	111.6		-0.25		127.1		0.01	
311	D 5135	117		0.21		129		0.16	
323	D 5135	113		-0.14		127		0.00	
333	D 5135	110		-0.39		125		-0.15	
343	D 5135	97.2		-1.49		107.4		-1.51	
347	D 5135	111		-0.31		127		0.00	
357	D 5135	112		-0.22		124		-0.23	
359	D 5135	112		-0.22		124		-0.23	
395	D 5135	112		-0.22		122		-0.38	
396	D 5135	120		0.46		126		-0.08	
446	D 5135	116		0.12		138		0.85	
529		-----		-----		-----		-----	
551	D 5135	117		0.21		132		0.39	
557	D 5135	114		-0.05		113		-1.08	
823	D 5135	112		-0.22		124		-0.23	
862	D 5135	114		-0.05		132		0.39	
865	GC	107		-0.65		122		-0.38	
867	D 5135	113		-0.14		125		-0.15	
886	D 5135	119.6		0.43		134.1		0.55	
963		-----		-----		-----		-----	
974	D 5135	130.5317		1.36		142.332		1.19	
1085	INHOUSE	115.7		0.10		129.6		0.20	
1117	D 5135	112.6		-0.17		127.7		0.06	
1509	D 5135	121		0.55		131		0.31	
1515	INHOUSE	124	U	0.81	Fr. 0.0124	127	U	0.00	Fr. 0.0127
1806	D 5135	119.92		0.46		132.95		0.46	
1820	D 5135	122		0.63		129		0.16	
1822	INHOUSE	118		0.29		129		0.16	
1823	D 5135	111		-0.31		123		-0.31	
	normality	OK				OK			
	n	29				29			
	outliers	0				0			
	mean (n)	114.58				126.97			
	st.dev. (n)	6.110				6.577			
	R(calc.)	17.11				18.42			
	R(D 5135:02e1)	32.74				36.28			

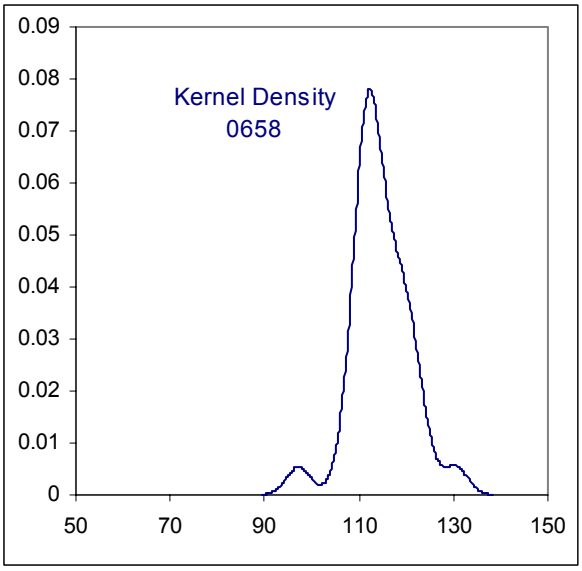


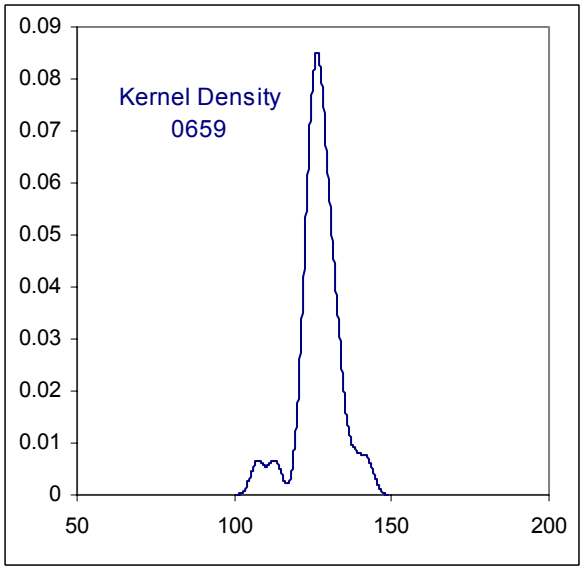


Results of sample #0658



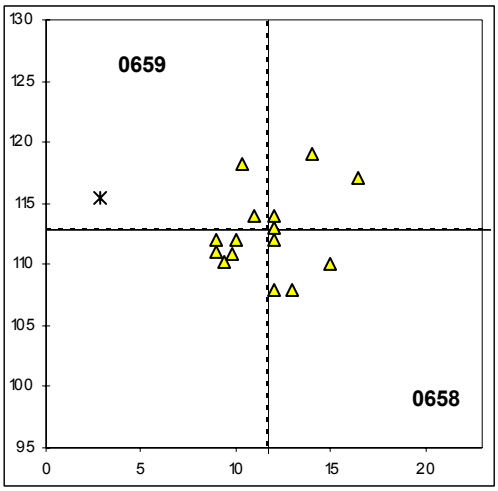
Results of sample #0659

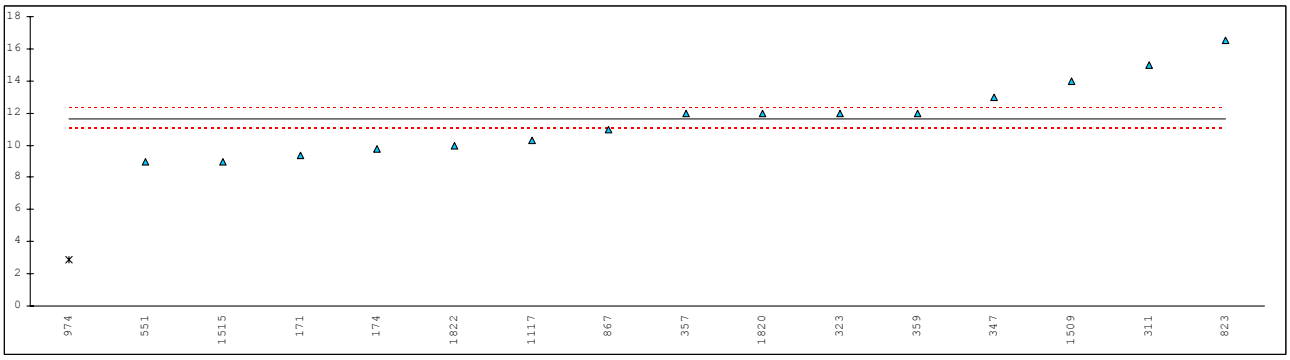




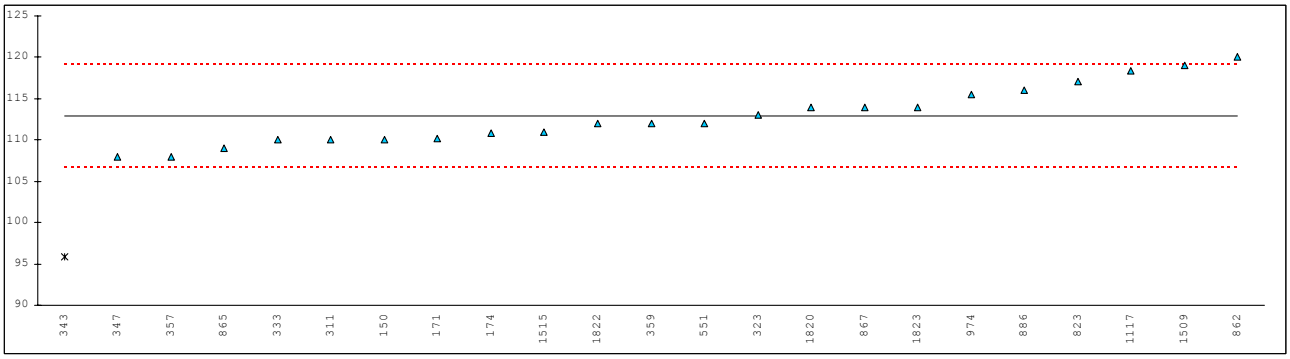
Determination of m+p-Xylenes on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	<10		-----		110		-1.28	
171	D 5135	9.4		-9.71		110.2		-1.19	
174	GC	9.8		-8.00		110.8	C	-0.93	Fr. 11
311	D 5135	15		14.29		110		-1.28	
323	D 5135	12		1.43		113		0.05	
333	D 5135	<10		-----		110		-1.28	
343	D 5135	<10		-----		95.8	CG(0.01)	-7.57	Fr. 89.9
347	D 5135	13		5.71		108		-2.17	
357	D 5135	12		1.43		108		-2.17	
359	D 5135	12		1.43		112		-0.40	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	9		-11.43		112		-0.40	
557		-----	W	-----	Result withdrawn, fr.5	-----	W	-----	Result withdrawn, fr.83
823	D 5135	16.5		20.71		117	C	1.82	Fr. 54.7
862	D 5135	<10		-----		120		3.15	
865	GC	<10		-----		109		-1.73	
867	D 5135	11		-2.86		114		0.49	
886	D 5135	<5		-----	False negative	116.0		1.37	
963		-----		-----		-----		-----	
974	D 5135	2.880	CG(0.05)	-37.66	Fr. 3.1767	115.4457		1.13	
1085		-----		-----		-----		-----	
1117	D 5135	10.3		-5.86		118.3		2.39	
1509	D 5135	14		10.00		119		2.70	
1515	INHOUSE	9	C	-11.43	Fr. 0.0009	111	C	-0.84	Fr. 0.0111
1806		-----		-----		-----		-----	
1820	D 5135	12		1.43		114		0.49	
1822	INHOUSE	10		-7.14		112		-0.40	
1823	D 5135	<10		-----		114		0.49	
	normality	OK				OK			
	n	15				22			
	outliers	1				1			
	mean (n)	11.67				112.90			
	st.dev. (n)	2.237				3.515			
	R(calc.)	6.26				9.84			
	R(D 5135:02e1)	0.65				6.32			

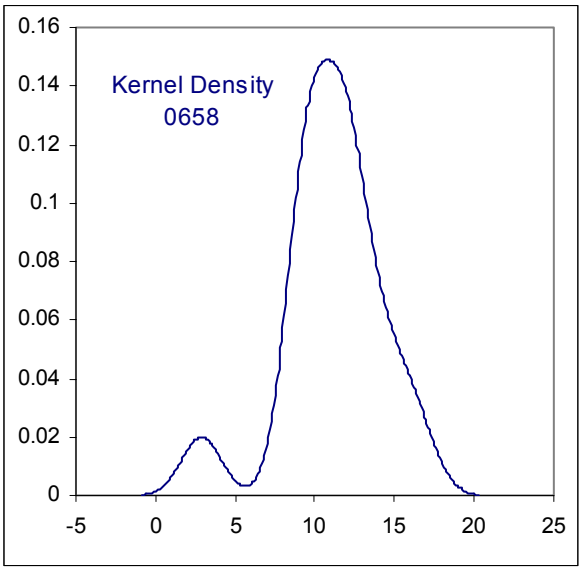


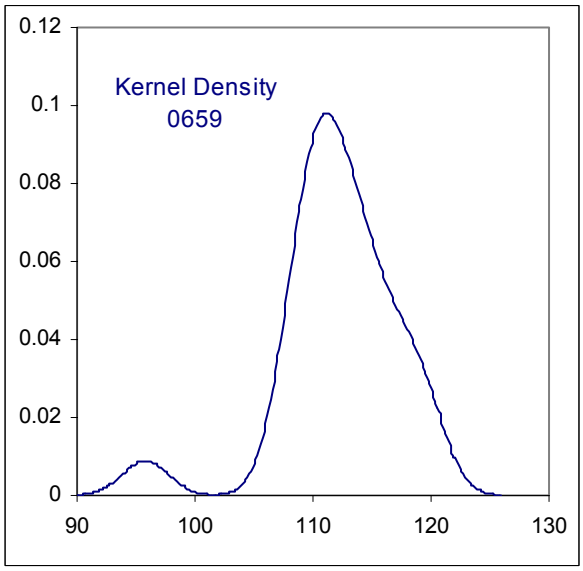


Results of sample #0658



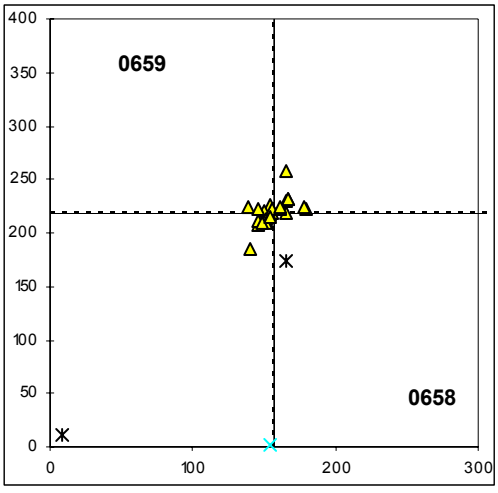
Results of sample #0659

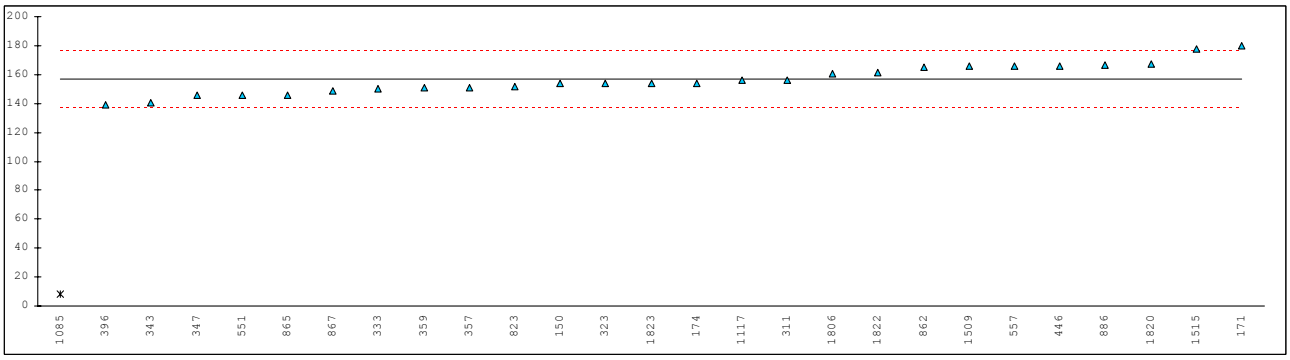




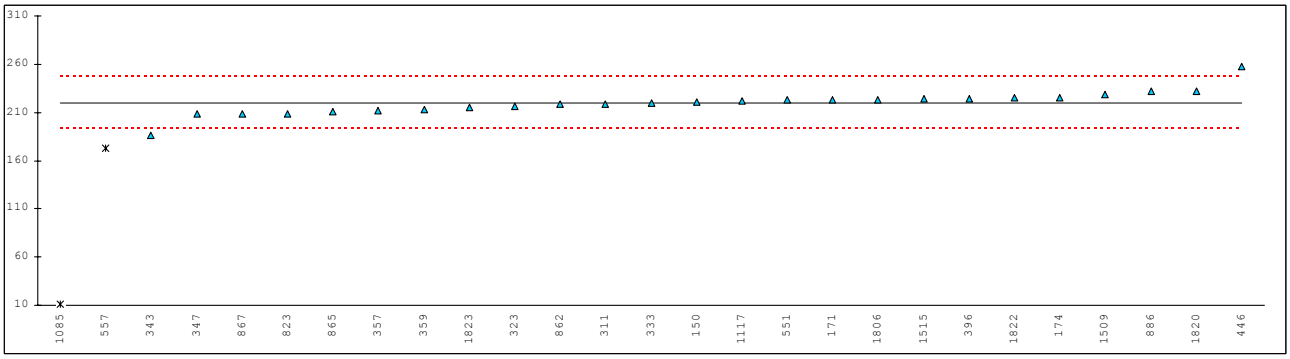
Determination of Cumene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	154		-0.39		221		0.11	
171	D 5135	180.11	C	3.34	First reported 104.1	223.1		0.32	
174	GC	154.1	C	-0.37	First reported 107	225.3		0.55	
311	D 5135	156		-0.10		219		-0.10	
323	D 5135	154		-0.39		216		-0.40	
333	D 5135	150		-0.96		220		0.01	
343	D 5135	140.3		-2.35		185.7	C	-3.49	First reported 195.9
347	D 5135	146		-1.53		208		-1.22	
357	D 5135	151		-0.82		212		-0.81	
359	D 5135	151		-0.82		213		-0.71	
395		-----		-----		-----		-----	
396	D 5135	139		-2.53		224		0.41	
446	D 5135	166		1.33		258		3.88	
529		-----		-----		-----		-----	
551	D 5135	146	C	-1.53	First reported 189	223		0.31	
557	D 5135	166	C	1.33	First reported 121	173	CG(0.05)	-4.78	First reported 165
823	D 5135	152		-0.67		209		-1.12	
862	D 5135	165		1.18		219		-0.10	
865	GC	146		-1.53		211		-0.91	
867	D 5135	149		-1.10		209		-1.12	
886	D 5135	166.6		1.41		232.0		1.23	
963		-----		-----		-----		-----	
974		-----		-----		-----		-----	
1085	INHOUSE	8.5	G(0.01)	-21.19		10.9	G(0.01)	-21.31	
1117	D 5135	155.8		-0.13		222.3		0.24	
1509	D 5135	166		1.33		229		0.92	
1515	INHOUSE	178	U	3.04	First reported 0.0178	224	U	0.41	First reported 0.0224
1806	D 5135	160.77		0.58		223.25		0.34	
1820	D 5135	167		1.47		232		1.23	
1822	INHOUSE	161		0.61		225		0.52	
1823	D 5135	154		-0.39		215		-0.50	
	normality	OK				OK			
	n	26				25			
	outliers	1				2			
	mean (n)	156.72				219.95			
	st.dev. (n)	10.423				12.472			
	R(calc.)	29.19				34.92			
	R(D 5135:02e1)	19.59				27.47			

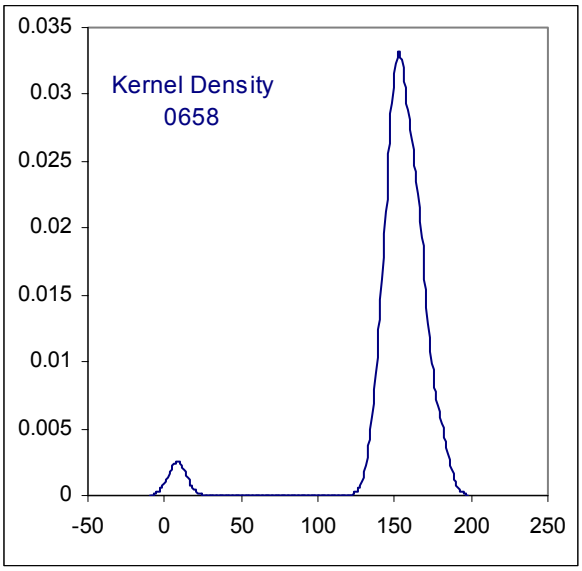


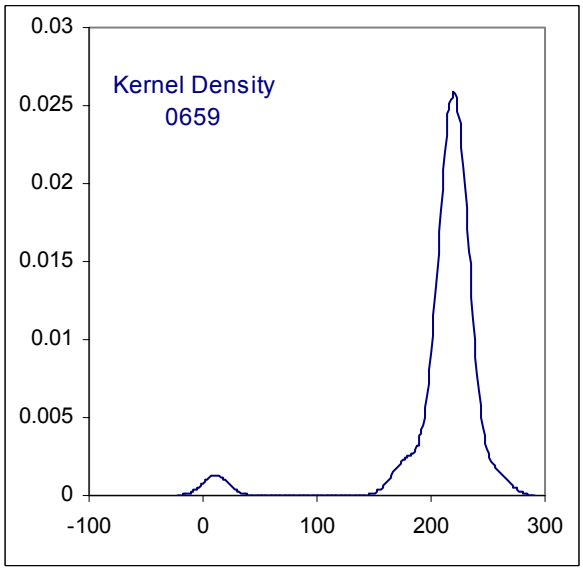


Results of sample #0658



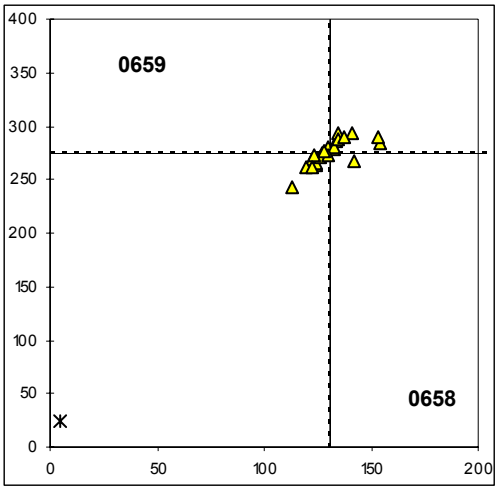
Results of sample #0659

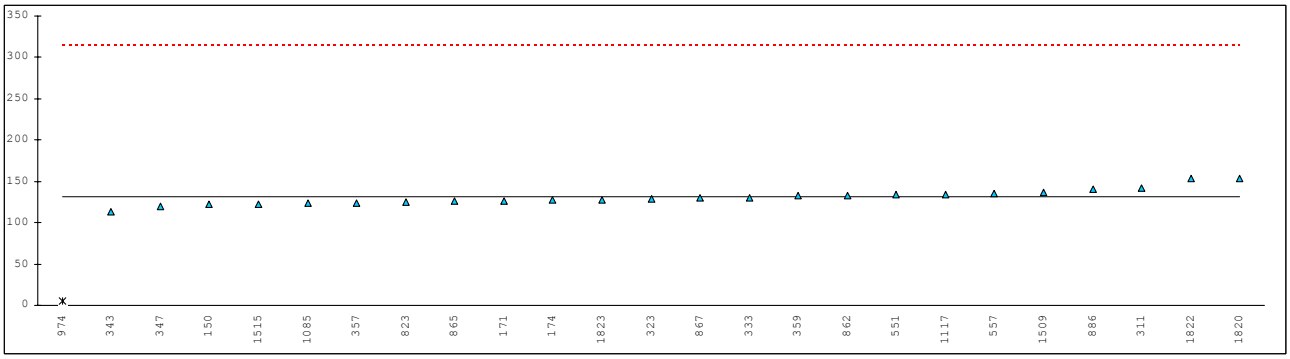




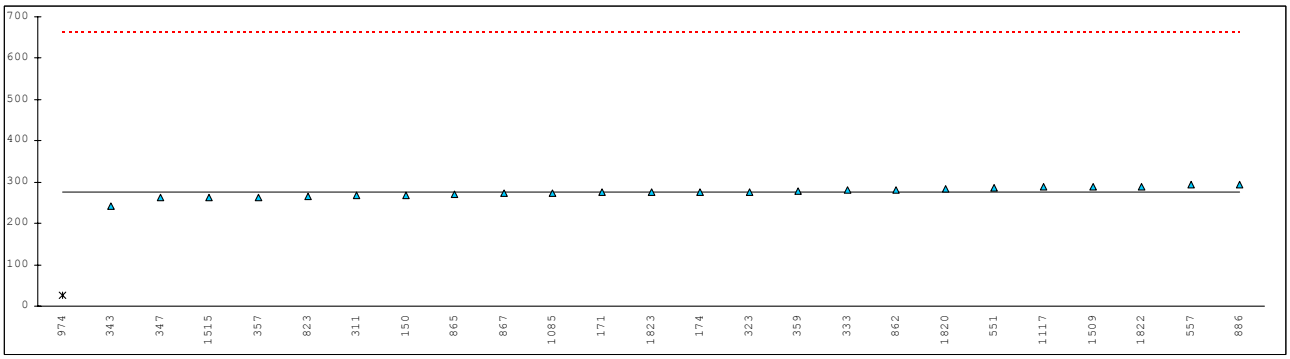
Determination of o-Xylene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	122		-0.14		269		-0.05	
171	D 5135	126.8		-0.06		275.4		0.00	
174	GC	127.8		-0.05		276.2		0.00	
311	D 5135	142		0.17		267		-0.06	
323	D 5135	129		-0.03		277		0.01	
333	D 5135	130		-0.01		280		0.03	
343	D 5135	113.0		-0.27		242.4		-0.24	
347	D 5135	120		-0.17		262		-0.10	
357	D 5135	124		-0.11		263		-0.09	
359	D 5135	133		0.03		279		0.02	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	134		0.05		286		0.08	
557	D 5135	135	C	0.06	Fr. 169	293	C	0.13	Fr. 356
823	D 5135	124.5		-0.10		265		-0.08	
862	D 5135	133		0.03		280		0.03	
865	GC	126		-0.08		271		-0.03	
867	D 5135	130		-0.01		273		-0.02	
886	D 5135	141.0		0.15		293.2		0.13	
963		-----		-----		-----		-----	
974	D 5135	4.815	CG(0.01)	-1.93	Fr. 5.3111	24.960	CG(0.01)	-1.82	Fr. 27.5375
1085	INHOUSE	123.4		-0.12		273.0		-0.02	
1117	D 5135	134.4		0.05		287.6		0.09	
1509	D 5135	137		0.09		289		0.10	
1515	INHOUSE	122	U	-0.14	Fr. 0.0122	262	U	-0.10	Fr. 0.0262
1806		-----		-----		-----		-----	
1820	D 5135	154		0.35		284		0.06	
1822	INHOUSE	153		0.34		290		0.10	
1823	D 5135	128		-0.05		276		0.00	
	normality	OK				OK			
	n	24				24			
	outliers	1				1			
	mean (n)	130.95				275.58			
	st.dev. (n)	9.642				11.924			
	R(calc.)	27.00				33.39			
	R(D 5135:02e1)	183.34				385.81			

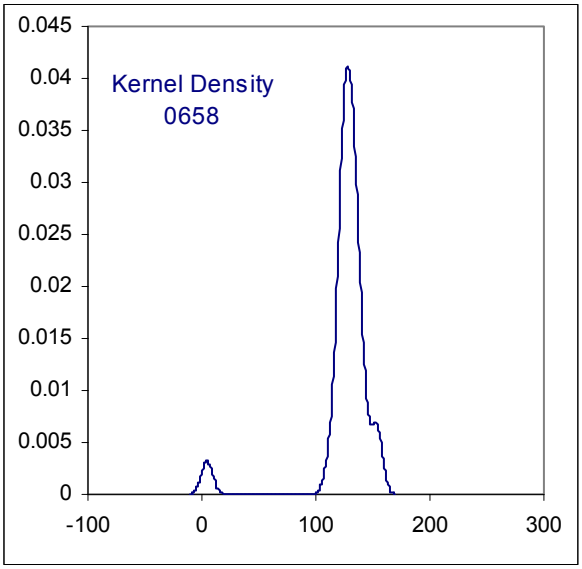


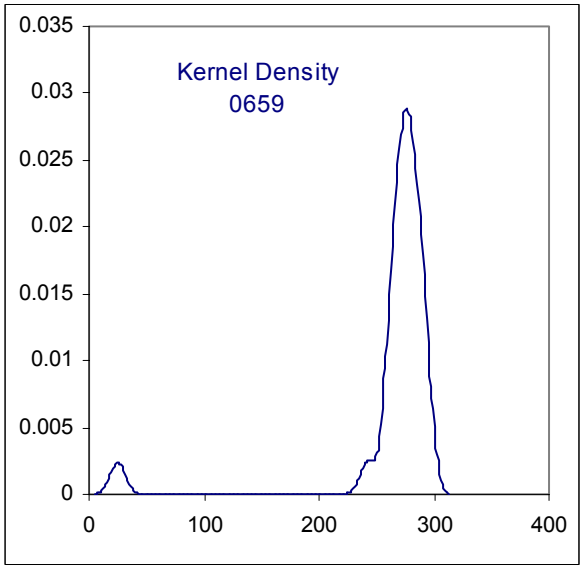


Results of sample #0658



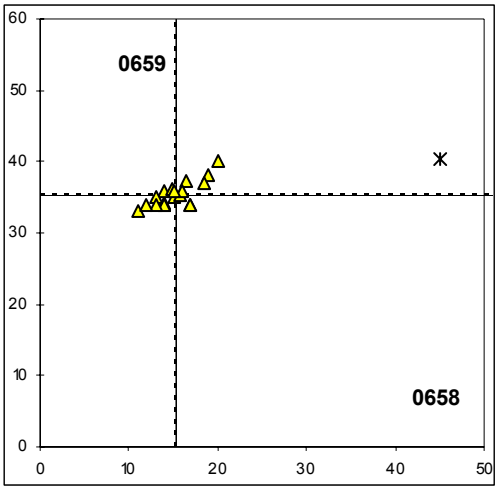
Results of sample #0659

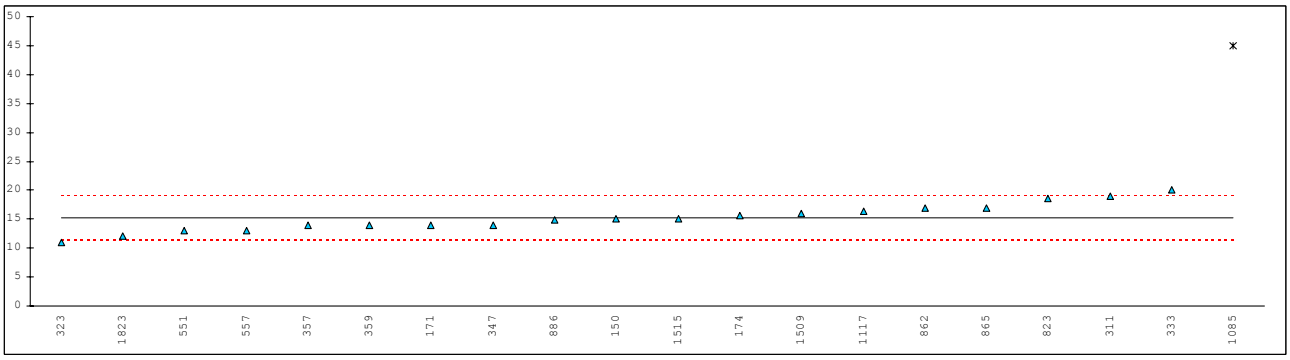




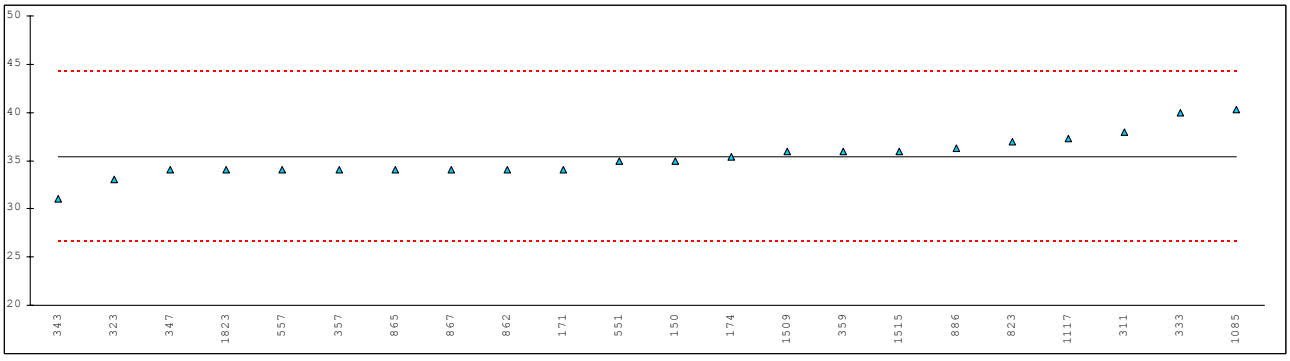
Determination of n-Propylbenzene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	15		-0.17		35		-0.12	
171	D 5135	14.0		-0.91		34.1		-0.41	
174	GC	15.7		0.34		35.4		0.01	
311	D 5135	19		2.77		38		0.83	
323	D 5135	11		-3.11		33		-0.75	
333	D 5135	20		3.50		40		1.46	
343	D 5135	<10		-----	False negative	31.0	C	-1.39	Fr. 23.4
347	D 5135	14		-0.91		34		-0.44	
357	D 5135	14		-0.91		34		-0.44	
359	D 5135	14		-0.91		36		0.20	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	13		-1.64		35		-0.12	
557	D 5135	13		-1.64		34	C	-0.44	Fr. 23
823	D 5135	18.5		2.40		37	C	0.51	Fr. 317
862	D 5135	17		1.30		34		-0.44	
865	GC	17		1.30		34		-0.44	
867	D 5135	<10		-----	False negative	34		-0.44	
886	D 5135	14.9		-0.25		36.3		0.29	
963		-----		-----		-----		-----	
974		-----		-----		-----		-----	
1085	INHOUSE	45.0	G(0.01)	21.88		40.3		1.56	
1117	D 5135	16.4		0.85		37.3		0.61	
1509	D 5135	16		0.56		36		0.20	
1515	INHOUSE	15	U	-0.17	Fr. 0.0015	36	U	0.20	Fr. 0.0036
1806		-----		-----		-----		-----	
1820		-----		-----		-----		-----	
1822		-----		-----		-----		-----	
1823	D 5135	12		-2.38		34		-0.44	
	normality	OK				OK			
	n	19				22			
	outliers	1				0			
	mean (n)	15.24				35.38			
	st.dev. (n)	2.365				2.191			
	R(calc.)	6.62				6.14			
	R(D 5135:02e1)	3.81				8.85			

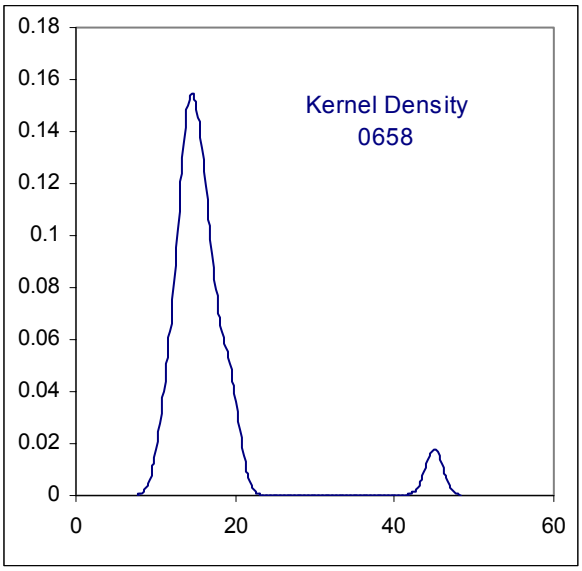


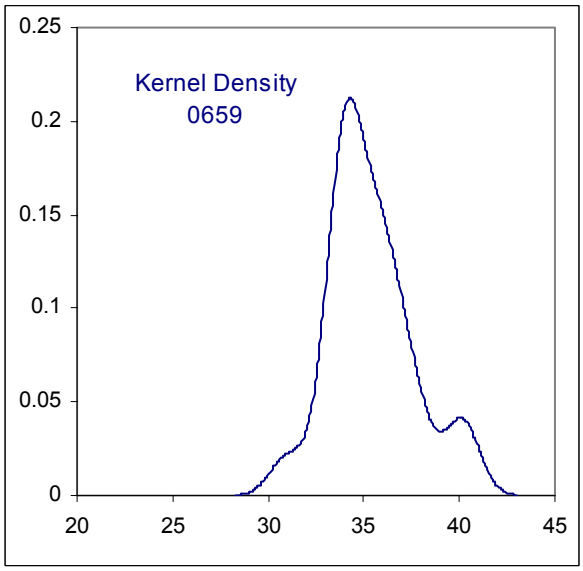


Results of sample #0658



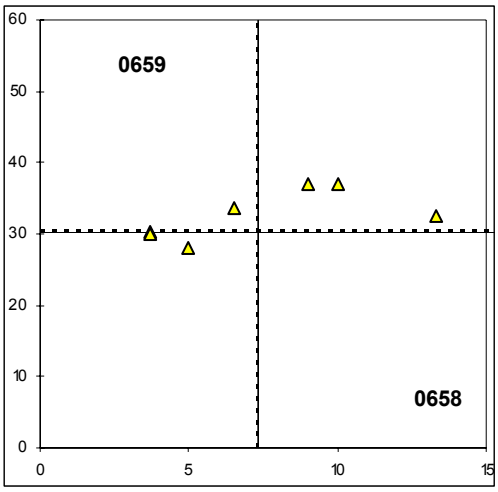
Results of sample #0659

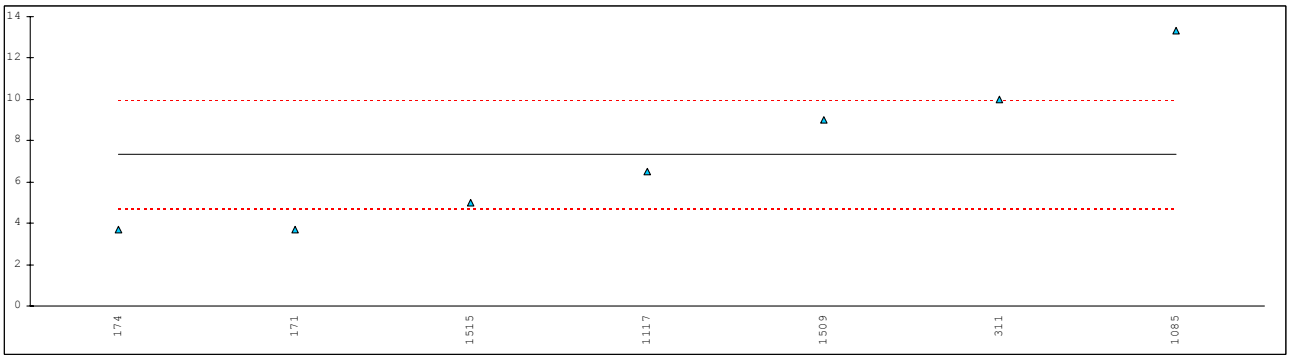




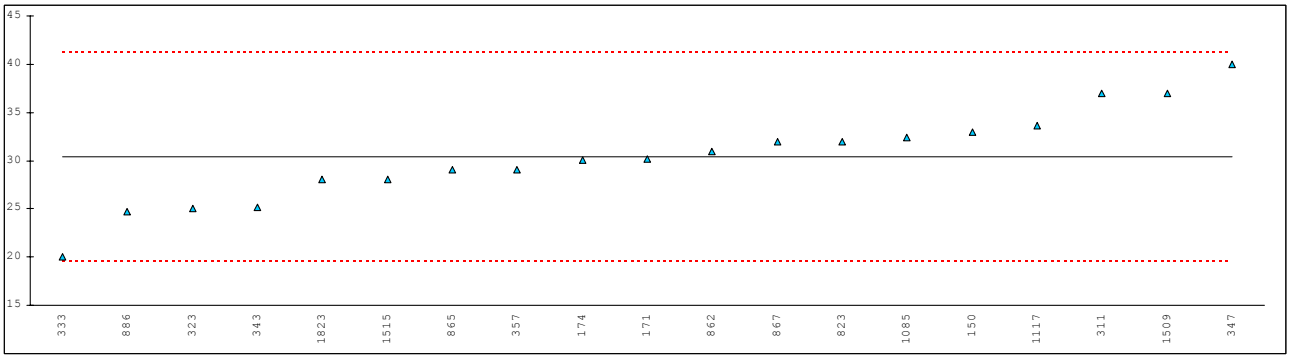
Determination of m+p-Ethyltoluenes on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	<10		-----		33		0.68	
171	D 5135	3.7		-3.87		30.2		-0.04	
174	GC	3.7		-3.87		30.1		-0.07	
311	D 5135	10	C	2.88	Fr. 81	37		1.71	
323	D 5135	<10		-----		25		-1.39	
333	D 5135	<10		-----		20		-2.68	
343	D 5135	<10		-----		25.1		-1.36	
347	D 5135	<10		-----		40		2.48	
357	D 5135	<10		-----		29	C	-0.35	Fr. 47
359		-----		-----		-----		-----	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551		-----		-----		-----		-----	
557		-----		-----		-----		-----	
823	D 5135	ND		-----		32		0.42	
862	D 5135	<10		-----		31		0.16	
865	GC	<10		-----		29		-0.35	
867	D 5135	<10		-----		32		0.42	
886		-----		-----		24.7		-1.46	
963		-----		-----		-----		-----	
974		-----		-----		-----		-----	
1085	INHOUSE	13.3		6.42		32.4		0.52	
1117	D 5135	6.5		-0.87		33.6		0.83	
1509	D 5135	9		1.81		37		1.71	
1515	INHOUSE	5	C	-2.48	Fr. <0.0005	28	U	-0.61	Fr. 0.0028
1806		-----		-----		-----		-----	
1820		-----		-----		-----		-----	
1822		-----		-----		-----		-----	
1823	D 5135	<10		-----		28		-0.61	
	normality	OK				OK			
	n	7				19			
	outliers	0				0			
	mean (n)	7.31				30.37			
	st.dev. (n)	3.606				4.826			
	R(calc.)	10.10				13.51			
	R(D 5135:02e1)	2.61				10.85			

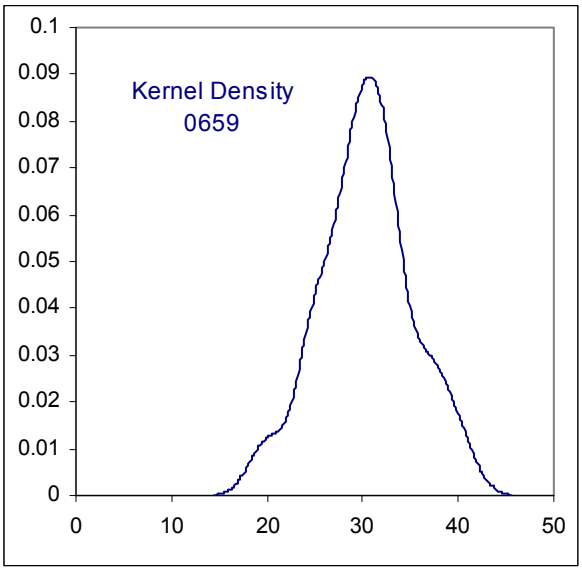




Results of sample #0658

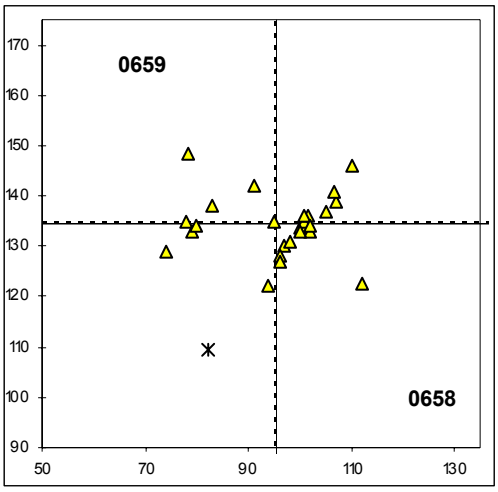


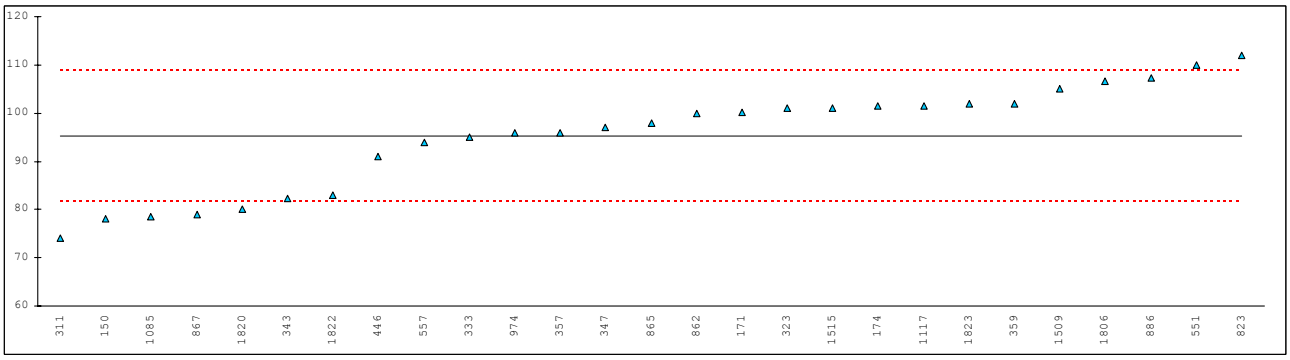
Results of sample #0659



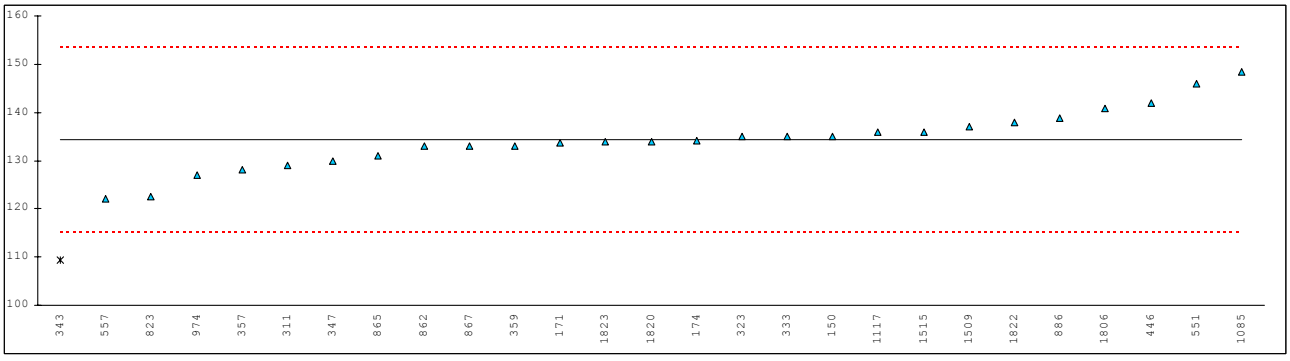
Determination of alpha-Methylstyrene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	78		-3.55		135		0.10	
171	D 5135	100.2		1.02		133.6		-0.11	
174	GC	101.4		1.27		134.1		-0.03	
311	D 5135	74		-4.37		129		-0.78	
323	D 5135	101		1.18		135		0.10	
333	D 5135	95		-0.05		135		0.10	
343	D 5135	82.2		-2.68		109.4	G(0.05)	-3.64	
347	D 5135	97		0.36		130		-0.63	
357	D 5135	96		0.16		128		-0.92	
359	D 5135	102		1.39		133		-0.19	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446	D 5135	91		-0.87		142		1.12	
529		-----		-----		-----		-----	
551	D 5135	110		3.04		146		1.70	
557	D 5135	94		-0.26		122		-1.80	
823	D 5135	112		3.45		122.6		-1.71	
862	D 5135	100		0.98		133		-0.19	
865	GC	98		0.57		131		-0.48	
867	D 5135	79		-3.34		133		-0.19	
886	D 5135	107.2		2.46		138.9		0.67	
963		-----		-----		-----		-----	
974	D 5135	95.9960		0.16		126.956		-1.07	
1085	INHOUSE	78.5		-3.45		148.4		2.05	
1117	D 5135	101.5		1.29		136.0		0.24	
1509	D 5135	105		2.01		137		0.39	
1515	INHOUSE	101	U	1.18	Fr. 0.0101	136	U	0.24	Fr. 0.0136
1806	D 5135	106.54		2.33		140.84		0.95	
1820	D 5135	80		-3.14		134		-0.05	
1822	INHOUSE	83		-2.52		138		0.54	
1823	D 5135	102		1.39		134		-0.05	
	normality	OK				OK			
	n	27				26			
	outliers	0				1			
	mean (n)	95.24				134.32			
	st.dev. (n)	10.782				6.106			
	R(calc.)	30.19				17.10			
	R(D 5135:02e1)	13.61				19.19			

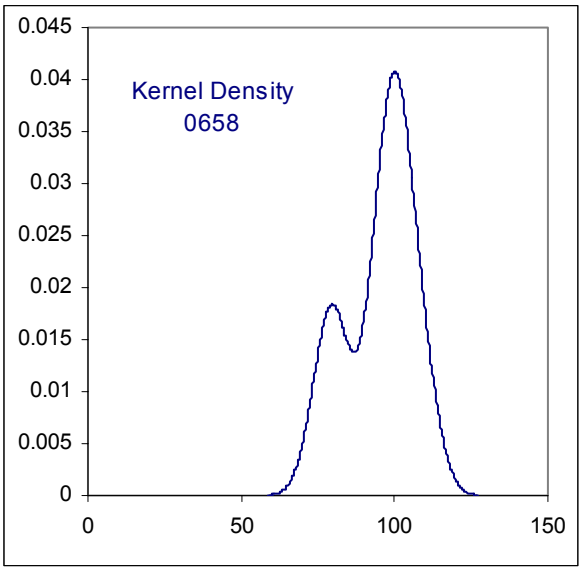


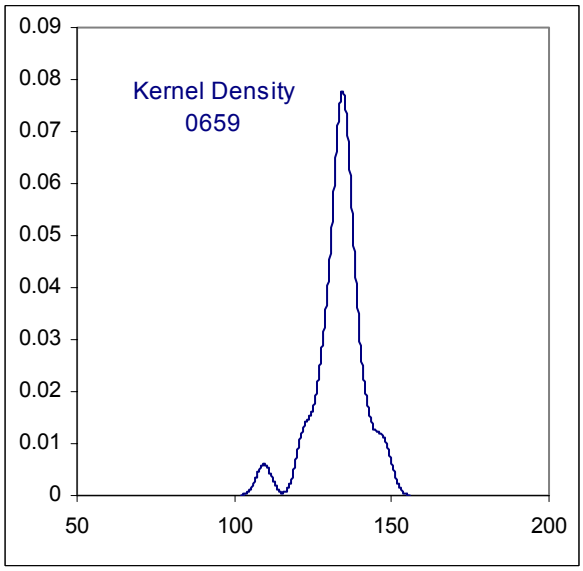


Results of sample #0658



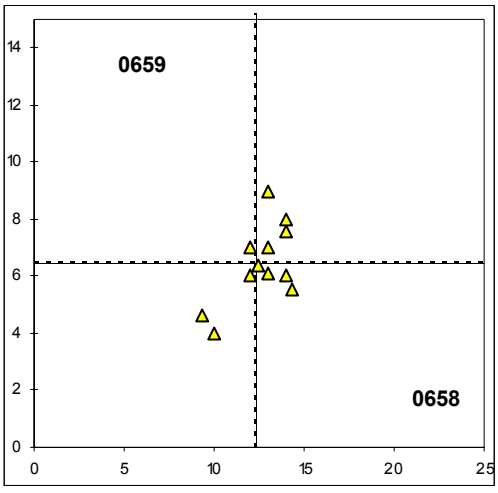
Results of sample #0659

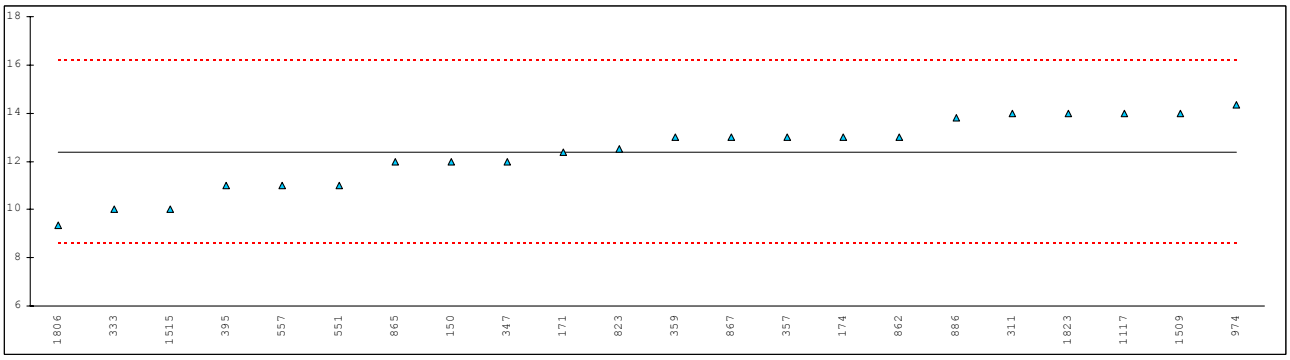




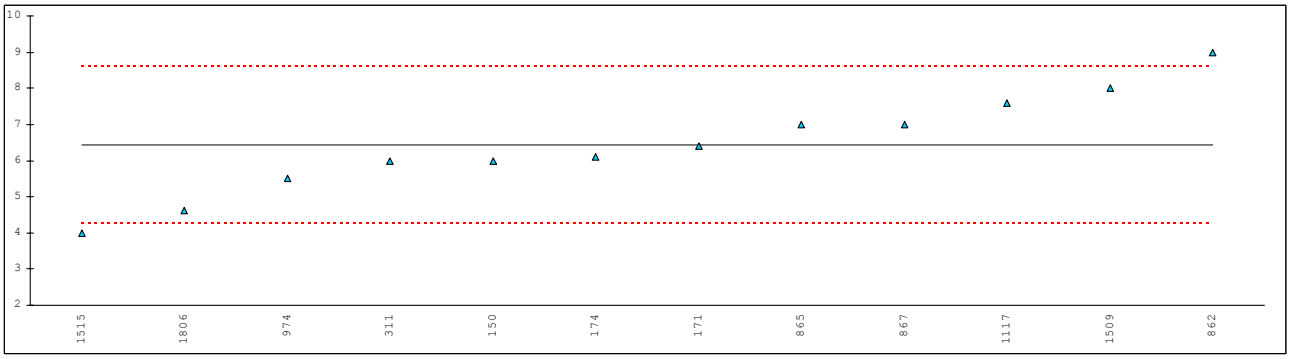
Determination of Phenylacetylene on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	12		-0.28		6		-0.56	
171	D 5135	12.4		0.01		6.4		-0.05	
174	GC	13		0.46		6.1		-0.43	
311	D 5135	14		1.19		6		-0.56	
323	D 5135	<10		-----		<10		-----	
333	D 5135	10		-1.75		<10		-----	
343	D 5135	<10		-----		<10		-----	
347	D 5135	12		-0.28		<10		-----	
357	D 5135	13		0.46		<10		-----	
359	INHOUSE	13		0.46		<10		-----	
395	D 5135	11		-1.02		<10		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	11		-1.02		<10		-----	
557	D 5135	11	C	-1.02	Fr. 8	ND	C	-----	Fr. 2
823	D 5135Mod.	12.5		0.09		ND		-----	
862	D 5135	13		0.46		9		3.29	
865	GC	12		-0.28		7		0.73	
867	GC	13		0.46		7		0.73	
886	D 5135	13.8		1.05		<5		-----	
963		-----		-----		-----		-----	
974		14.3392		1.44		5.5163		-1.18	
1085		-----		-----		-----		-----	
1117	D 5135	14.0		1.19		7.6		1.50	
1509	D 5135	14		1.19		8		2.01	
1515	INHOUSE	10	U	-1.75	Fr. 0.0010	4	U	-3.13	Fr. 0.0004
1806		9.33		-2.25		4.61		-2.34	
1820		-----		-----		-----		-----	
1822		-----		-----		-----		-----	
1823	D 5135	14		1.19		<10		-----	
	normality	OK				OK			
	n	22				12			
	outliers	0				0			
	mean (n)	12.38				6.44			
	st.dev. (n)	1.465				1.402			
	R(calc.)	4.10				3.93			
	R(Horwitz)	3.80				2.18			

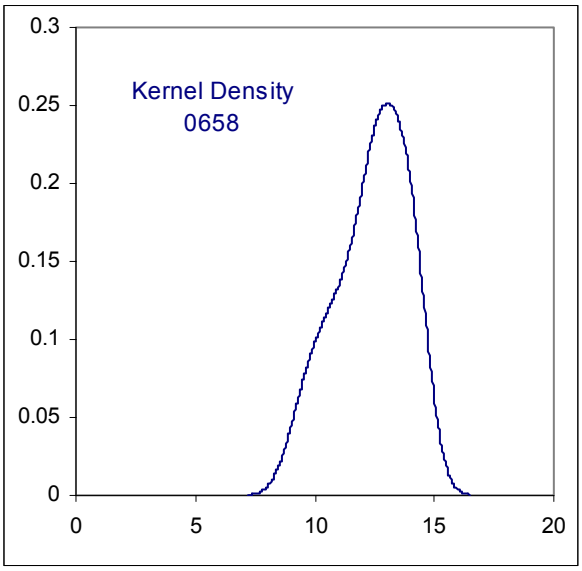


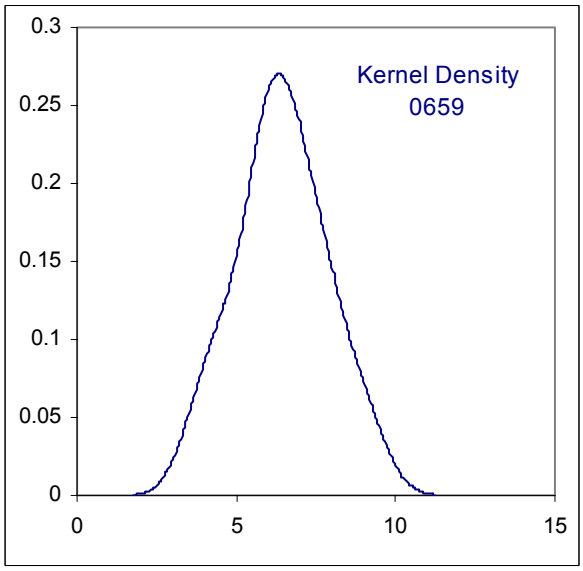


Results of sample #0658



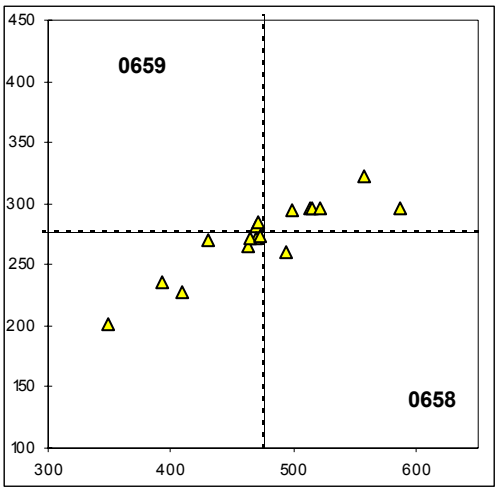
Results of sample #0659

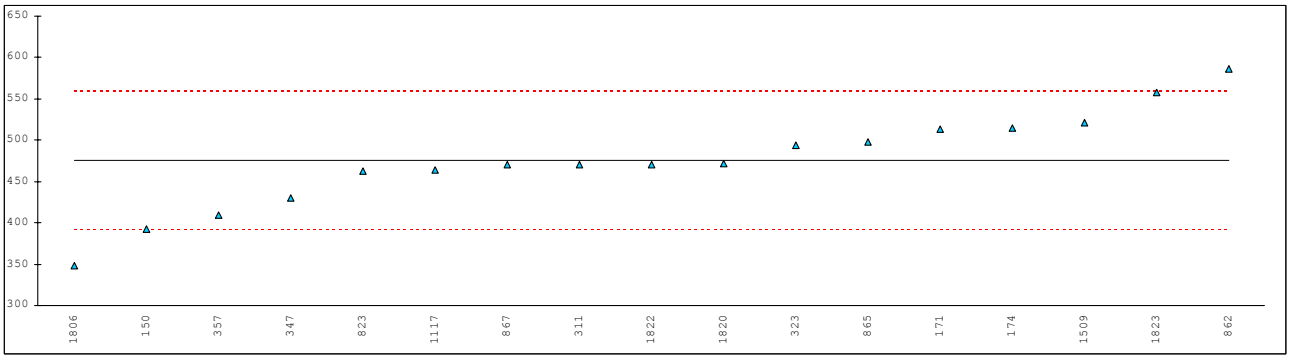




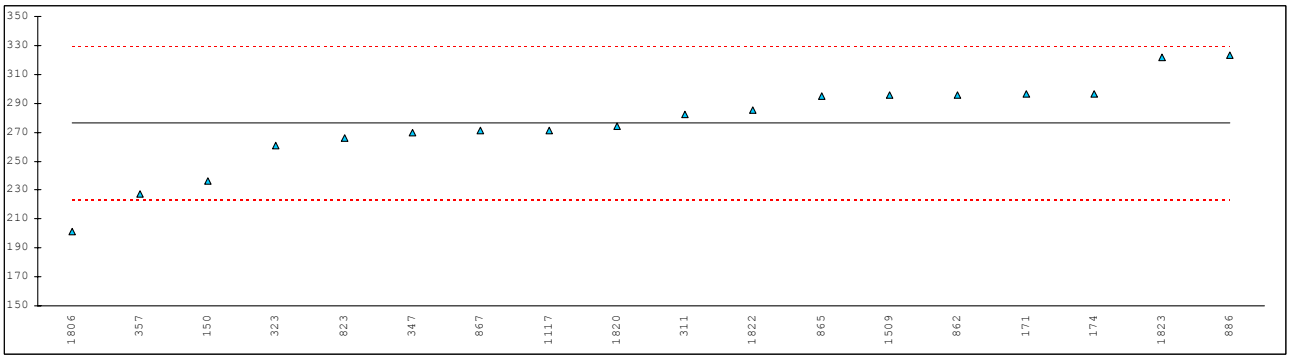
Determination of Benzaldehyde on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	393		-2.73		236		-2.12	
171	D 5135	512.9		1.26		296.4		1.07	
174	GC	515.3		1.34		296.5		1.08	
311	D 5135	470		-0.17		282		0.31	
323	D 5135	494		0.63		261		-0.80	
333		-----		-----		-----		-----	
343		-----		-----		-----		-----	
347	D 5135	430		-1.50		270		-0.32	
357	D 5135	409		-2.20		227		-2.59	
359		-----		-----		-----		-----	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551		-----		-----		-----		-----	
557		-----		-----		-----		-----	
823	D 5135Mod.	463		-0.40		266		-0.53	
862	D 5135	586		3.69		296	C	1.05	First reported 346
865	GC	498		0.76		295		1.00	
867	GC	470		-0.17		271		-0.27	
886		-----		-----		323.1		2.48	
963		-----		-----		-----		-----	
974		-----		-----		-----		-----	
1085		-----		-----		-----		-----	
1117	D 5135	464.2		-0.36		271.1		-0.26	
1509	D 5135	521		1.53		296		1.05	
1515		-----		-----		-----		-----	
1806		348.43		-4.21		201.65		-3.93	
1820	D 5135	472		-0.10		274		-0.11	
1822	INHOUSE	471		-0.13		285		0.47	
1823	D 5135	558		2.76		322		2.42	
	normality	OK				OK			
	n	17				18			
	outliers	0				0			
	mean (n)	475.05				276.10			
	st.dev. (n)	58.490				31.0517			
	R(calc.)	163.77				86.94			
	R(Horwitz)	84.16				53.08			

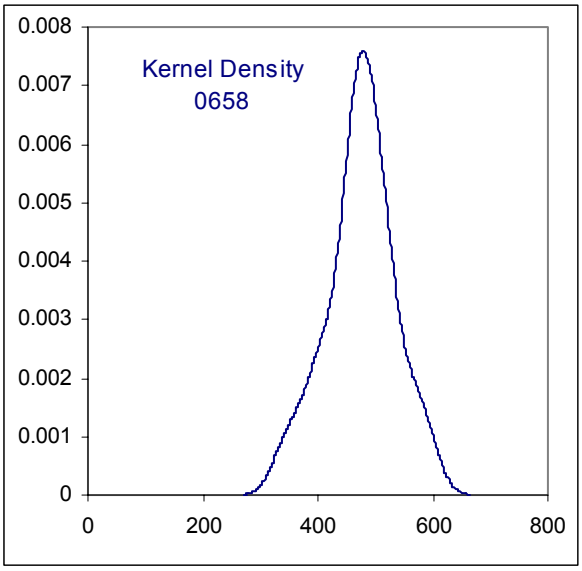


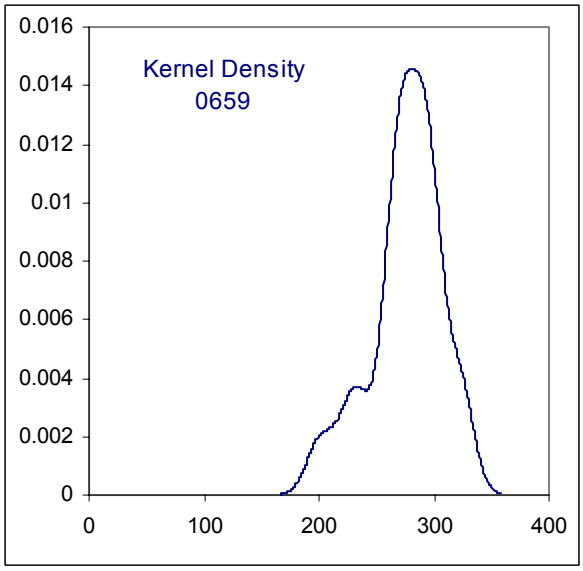


Results of sample #0658



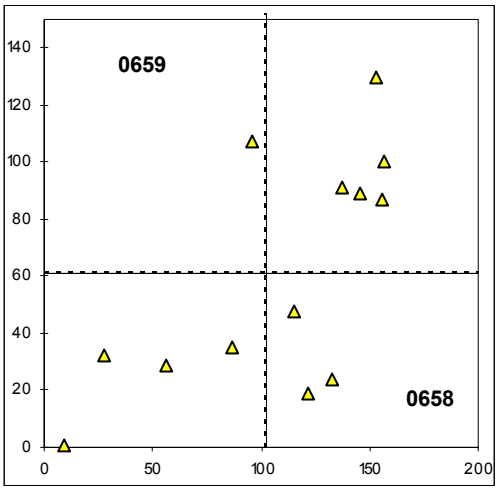
Results of sample #0659

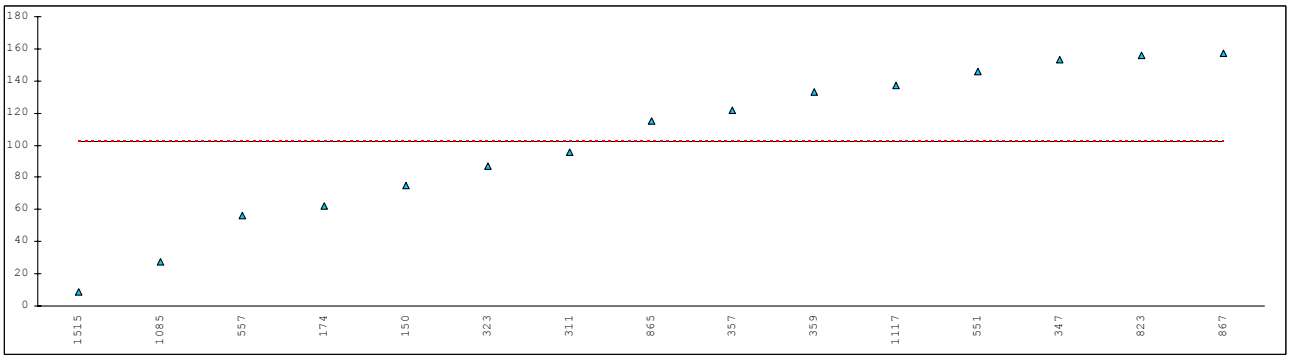




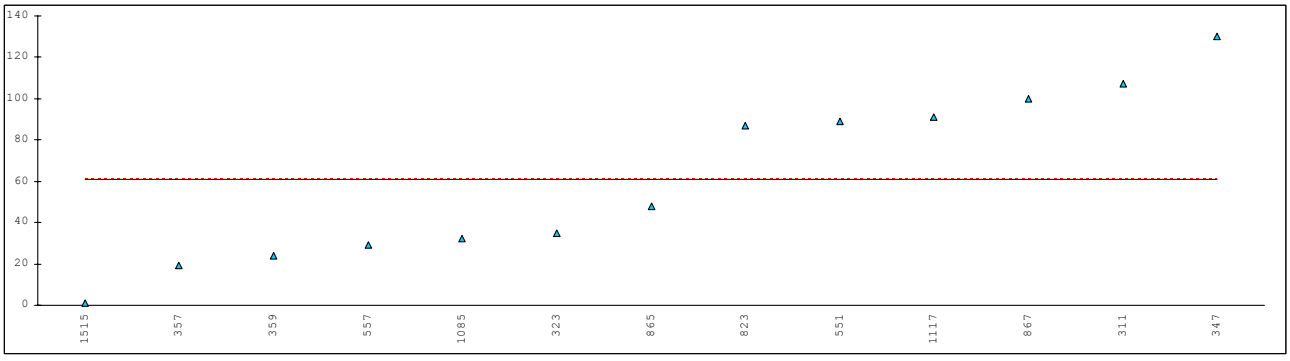
Determination of Nonaromatics on sample #0658 and #0659; results in mg/kg.

lab	method	#0658	mark	Z(targ)	remarks	#0659	mark	Z(targ)	remarks
150	D 5135	75		-----		<10		-----	
171		-----		-----		-----		-----	
174	GC	62		-----		<10		-----	
311	D 5135	96		-----		107		-----	
323	D 5135	87		-----		35		-----	
333		-----		-----		-----		-----	
343		-----		-----		-----		-----	
347	D 5135	153		-----		130		-----	
357	D 5135	122		-----		19		-----	
359	INHOUSE	133		-----		24		-----	
395		-----		-----		-----		-----	
396		-----		-----		-----		-----	
446		-----		-----		-----		-----	
529		-----		-----		-----		-----	
551	D 5135	146		-----		89		-----	
557	D 5135	56		-----		29		-----	
823	D 5135Mod.	156		-----		87		-----	
862		-----		-----		-----		-----	
865	GC	115		-----		48		-----	
867	GC	157		-----		100		-----	
886		-----		-----		-----		-----	
963		-----		-----		-----		-----	
974		-----		-----		-----		-----	
1085	INHOUSE	27.3		-----		32.4		-----	
1117	D 5135	136.9		-----		91.1		-----	
1509		-----		-----		-----		-----	
1515	INHOUSE	9	U	-----	Fr. 0.0009	1	U	-----	Fr. 0.0001
1806		-----		-----		-----		-----	
1820		-----		-----		-----		-----	
1822		-----		-----		-----		-----	
1823		-----		-----		-----		-----	
	normality	OK				OK			
	n	15				13			
	outliers	0				0			
	mean (n)	102.08				60.96			
	st.dev. (n)	47.929				41.0121			
	R(calc.)	134.20				114.83			
	R(lit)	Unknown				Unknown			

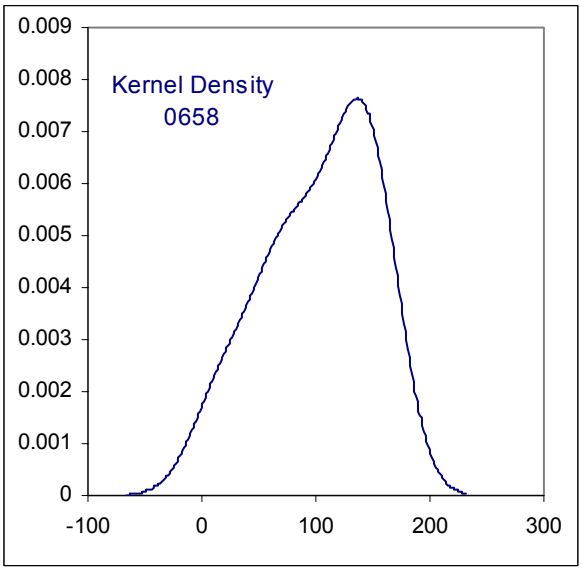


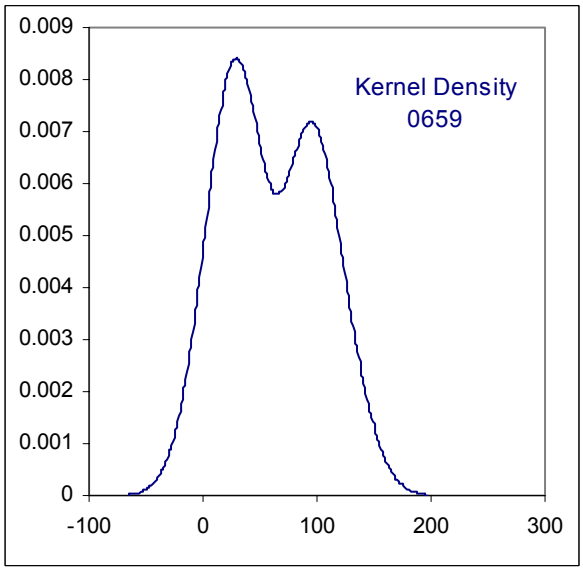


Results of sample #0658



Results of sample #0659





APPENDIX 2

Details Aldehydes determination

Lab	Date HHS prepared	Date TBHS prepared	Temp (°C)	Volume of NaOH before HHS (mL)	Volume step 1 (mL)	Volume step 2 (mL)	Volume blanc (mL)	Normality of NaOH (N)	Density of Styrene (kg/L)
150	16-08-06	13-07-06	Ambient		0.7	0.3		0.05	0.9080
171	--								
174	--								
311	13-08-06	01-02-06	21.3		0.37	0.02	0.05	0.1001	0.90
323	05-10-06	20-01-06	21	0.01	0.52	1.03	0.09	0.0502	0.905
333	--								
343	06-09-06	28-08-06	23	0	0.7	0.2	0.1	0.05	0.9075
347	--								
357	08-08-06	10-03-06	20.1	0	0.84	0.31	0.18	0.05	0.9065
359	--								
395	--								
396	--								
446	--								
529	--								
551	04-10-06	04-10-06	21.9	0	1.01	0.62	0.12	0.04967	0.9055
557	04-10-06	10-09-06	26.5	0.30	2.86	0.02	0.42	0.01	0.9055
823	10-10-06	10-10-06	22	0.04	1.09		0.15	0.05	0.9109
862	30-08-06	03-06-06	23.6	0	0.90	0.70	0.08	0.05056	0.9065
865	09-10-06	30-09-06	25	0	0.81	0.71	0.05	0.04915	0.9065
867	29-06-06	26-09-06	20	0	0.90	0.75	0	0.0502	0.9065
886	--								
963	--								
974	--								
1085	--								
1117	13-09-06	04-09-06	21	0.03	2.546	2.878	0.928	0.0101	0.9068
1509	21-09-06	27-09-06	19.0	0	2.080	2.148	0.093	0.0105	0.9063
1515	06-06-06	Oct 2006	19		1.70		0.10	0.01	0.9065
1806	--								
1820	--								
1822	--								
1823	11-10-06	28-09-06	25	2.15	0.66	0.48	0.05	0.04934	0.906

APPENDIX 3

Reported response factor and peaks for nonaromatics determination

labnrs	response factor	Peaks for non-aromatics 0659
150	1	> 10 peaks
174		< 10 peaks
323	1.00	> 10 peaks
357	1	7 peaks
359	1	< 5 peaks
551	1.0000	> 10 peaks
557	1	< 5 peaks
823	0.93	> 10 peaks
865	1	> 10 peaks
867	1.0	< 5 peaks
1085		8 peaks
1117		> 10 peaks
1515	1	8 peaks
1822		7 peaks

APPENDIX 4

Number of laboratories	Country
1 laboratory in	BELGIUM
2 laboratories in	BRASIL
1 laboratory in	CANADA
2 laboratories	FINLAND
1 laboratory in	FRANCE
2 laboratories in	ITALY
1 laboratory in	KOREA
1 laboratory in	MEXICO
4 laboratories in	P.R. of CHINA
1 laboratory in	SAUDI ARABIA
1 laboratory in	SINGAPORE
3 laboratories in	SPAIN
1 laboratory in	TAIWAN R.O.C.
4 laboratories in	THE NETHERLANDS
1 laboratory in	U.A.E.
4 laboratories in	U.S.A.
1 laboratory in	UNITED KINGDOM

APPENDIX 5

Abbreviations:

C	= final result after checking of first reported suspect result
C(0.01)	= outlier in Cochran's outlier test
C(0.05)	= straggler in Cochran's outlier test
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 wrong unit
W	= result withdrawn on request of participant
ex	= excluded from calculations
n.a.	= not applicable
n.d.	= not detected
Fr.	= first reported

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