Results of Proficiency Test
Styrene
October 2020

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1 INTRODUCTION

Since 1999 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for Styrene every year. During the annual proficiency testing program 2020/2021 it was decided to continue the round robin for the analysis of Styrene in accordance with the latest version of ASTM D2827.
In this interlaboratory study 41 laboratories in 19 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of the Styrene proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send 1 x 0.5L bottle with Styrene labelled #20180.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for the statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

A batch of approximately 25 liters of Styrene was obtained from a local supplier. This batch was spiked with tri-Chlorobenzene and Polystyrene. After homogenization about 50 amber glass bottles of 0.5L were filled and labelled #20180. The homogeneity of the subsamples was checked by determination of Density at 20°C in accordance with ASTM D4052 and by determination of Organic Chloride in accordance with ASTM D5808 on 8 stratified randomly selected subsamples.

	Density at 20°C in kg/L	Organic Chloride in mg/kg
sample #20180-1	0.90624	1.9
sample #20180-2	0.90624	1.8
sample #20180-3	0.90624	1.9
sample #20180-4	0.90624	1.9
sample #20180-5	0.90624	1.9
sample #20180-6	0.90625	1.9
sample #20180-7	0.90625	1.9
sample #20180-8	0.90626	2.0

Table 1: homogeneity test results of subsamples #20180

From the above test results the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibility of the reference test methods in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Density at 20°C in kg/L	Organic Chloride in mg/kg
r (observed)	0.00002	0.1
reference test method	ISO12185:96	D5808:18
0.3 x R (reference test method)	0.00015	0.4

Table 2: evaluation of the repeatabilities of subsamples #20180

The calculated repeatabilities were in agreement with 0.3 times the corresponding reproducibility of the reference test methods. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one sample Styrene labelled #20180 was sent on September 09, 2020. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Styrene packed in amber glass bottles was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6   ANALYZES

The participants were requested to determine on sample #20180: Aldehydes as Benzaldehyde, Appearance, Organic Chloride, Color Pt/Co, Density at 20°C, Inhibitor as TBC, Peroxides as H_2O_2, Polymer, Total Sulfur, Water, Purity by GC, Benzene, Toluene, Ethylbenzene, sum of m- and p-Xylenes, iso-Propylbenzene (Cumene), o-Xylene, n-Propylbenzene, sum of m- and p-Ethyltoluenes, alpha-Methylstyrene, 1,2-Diethylbenzene, sum of alpha-Methylstyrene and 1,2-Diethylbenzene, Phenylacetylene, 3/4-Methylstyrenes, sum of Phenylacetylene and 3/4-Methylstyrenes, Benzaldehyde and Non-aromatics.
It was also requested to report some analytical details on the determination of Aldehydes as Benzaldehyde.

It was explicitly requested to treat the sample as it was a routine sample and to report the test results using the indicated units on the report form and not to round the test results but report as much significant figures as possible. It was also requested not to report 'less than' test results, which are above the detection limit, because such test results cannot be used for meaningful statistical evaluations.

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3   RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the test result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1   STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

According to ISO5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

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

3.2   GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis, the reported test results are plotted. The corresponding laboratory numbers are on the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.
Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3   Z-SCORES

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

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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

The z-scores were calculated according to:

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

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

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

$$|z| < 1 \quad \text{good}$$
$$1 < |z| < 2 \quad \text{satisfactory}$$
$$2 < |z| < 3 \quad \text{questionable}$$
$$3 < |z| \quad \text{unsatisfactory}$$

4   EVALUATION

Some problems were encountered with the dispatch of the samples due to COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with one week. Two participants reported the test results after the final reporting date and four other participants did not report any test results. Not all laboratories were able to report all analyses requested.
In total 37 participants reported 498 numerical test results. Observed were 9 outlying test results, which is 1.8%. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER TEST

In this section the reported test results are discussed per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D2121) and if appropriate an indication of sub test method (e.g. D2121-A) and an added designation for the year that the test method was adopted or revised (e.g. D2121-A:16).

Aldehydes as Benzaldehyde: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D7704:16. Only two laboratories reported to have used ASTM D7704 as test method. All other participants reported the used of ASTM D2119 which was withdrawn in 2018.

Appearance: This determination was not problematic. All reporting participants agreed about the appearance of the sample as Pass (bright, clear and free from suspended matter).

Organic Chloride: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5808:18.

Color Pt/Co: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5386:16.

Density at 20°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12185:96.

Inhibitor as TBC: This determination was not problematic. No statisticals outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D4590:18.

Peroxides as H_2O_2: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D2340:18.

Polymer: This determination was not problematic. No statisticals outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D2121-A:16.

Total Sulfur: This determination was not problematic. All reporting laboratories agreed on a test result of less than 1 mg/kg. The Total Sulfur content was near or below the detection limt. Therefore, no z-scores were calculated.

Water: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirement of ASTM E1064:16.

Purity by GC: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5135:16e1.

Benzene: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The Benzene content was near or below the detection limt. Therefore, no z-scores were calculated.

Toluene: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The Toluene content was near or below the detection limt. Therefore, no z-scores were calculated.

Ethylbenzene: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ASTM D5135:16e1.

m- and p-Xylenes: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5135:16e1.

iso-Propylbenzene: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The iso-Propylbenzene content was near or below the detection limt. Therefore, no z-scores were calculated.

o-Xylene: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The o-Xylene content was near or below the detection limt. Therefore, no z-scores were calculated.

n-Propylbenzene: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The n-Propylbenzene content was near or below the detection limt. Therefore, no z-scores were calculated.

m- and p-Ethyltoluenes: This determination was not problematic. Almost all reporting laboratories agreed on a test result of less than 10 mg/kg. The sum of m- and p-Ethyltoluenes content was near or below the detection limt. Therefore, no z-scores were calculated.

alpha-Methylstyrene: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ASTM D5135:16e1.

<u>1,2-Diethylbenzene</u>: This determination was not problematic. Two reporting laboratories agreed on a test result of less than 10 mg/kg and one laboratory reported a test result of 15 mg/kg. Therefore, no z-scores were calculated.

<u>alpha-Methylstyrene and 1,2-Diethylbenzene</u>: This determination was problematic. No statistical outliers were observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D5135:16e1.

<u>Phenylacetylene</u>: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The Phenylacetylene content was near or below the detection limt. Therefore, no z-scores were calculated.

<u>3/4-Methylstyrenes</u>: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The 3/4-Methylstyrenes content was near or below the detection limt. Therefore, no z-scores were calculated.

<u>Phenylacetylene and 3/4-Methylstyrenes</u>: This determination was not problematic. All reporting laboratories agreed on a test result of less than 10 mg/kg. The sum of Phenylacetylene and 3/4-Methylstyrenes content was near or below the detection limt. Therefore, no z-scores were calculated.

<u>Benzaldehyde</u>: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D5135:16e1.

<u>Non-aromatics</u>: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D5135:16e1.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from literature reference test methods (in casu ASTM test methods) are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R(lit)
Aldehydes as Benzaldehyde	mg/kg	25	105.3	55.3	106
Appearance		35	pass	n.a.	n.a.
Organic Chloride	mg/kg	18	2.0	0.9	1.3
Color Pt/Co		36	8.4	4.6	5.9
Density at 20°C	kg/L	32	0.9063	0.0002	0.0005
Inhibitor as TBC	mg/kg	35	7.1	2.1	2.9
Peroxides as H_2O_2	mg/kg	27	27.3	20.0	13
Polymer	mg/kg	35	6.0	5.5	6.5

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Sulfur	mg/kg	28	<1	n.e.	n.e.
Water	mg/kg	34	172	27	45
Purity by GC	%M/M	31	99.948	0.024	0.031
Benzene	mg/kg	29	<10	n.e.	n.e.
Toluene	mg/kg	23	<10	n.e.	n.e.
Ethylbenzene	mg/kg	33	101.3	21.5	22.0
sum of m- and p-Xylenes	mg/kg	21	8.9	4.6	8.5
iso-Propylbenzene (Cumene)	mg/kg	29	<10	n.e.	n.e.
o-Xylene	mg/kg	30	<10	n.e.	n.e.
n-Propylbenzene	mg/kg	27	<10	n.e.	n.e.
sum of m- and p-Ethyltoluenes	mg/kg	15	<10	n.e.	n.e.
alpha-Methylstyrene	mg/kg	31	228.5	41.7	38.6
1,2-Diethylbenzene	mg/kg	2	<10	n.e.	n.e.
sum of alpha-Methylstyrene and 1,2-Diethylbenzene	mg/kg	5	215.3	48.9	38.0
Phenylacetylene	mg/kg	28	<10	n.e.	n.e.
3/4-Methylstyrenes	mg/kg	7	<10	n.e.	n.e.
sum of Phenylacetylene and 3/4-Methylstyrenes	mg/kg	6	<10	n.e.	n.e.
Benzaldehyde	mg/kg	17	82.4	36.5	30.9
Non-aromatics	mg/kg	17	51.3	82.6	59.8

Table 3: reproducibilities of tests on sample #20180

Without further statistical calculations, it could be concluded that for many tests there is a good compliance of the group of participating laboratories with the reference test methods. The components that are problematic have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2020 WITH PREVIOUS PTS

	October 2020	October 2019	October 2018	October 2017	October 2016
Number of reporting laboratories	37	29	39	38	38
Number of test results	498	468	649	524	521
Number of statistical outliers	9	10	25	24	14
Percentage of statistical outliers	1.8%	2.1%	3.9%	4.6%	2.7%

Table 4: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency test was compared against the requirements of the reference test methods. The conclusions are given in the following table.

Parameter	October 2020	October 2019	October 2018	October 2017	October 2016
Aldehydes as Benzaldehyde	++	++	--	-	-
Organic Chloride	+	+/-	+	+	+
Color Pt/Co	+	+	+	++	+
Density at 20°C	++	++	++	++	++
Inhibitor as TBC	+	+	+/-	+	+/-
Peroxides as H_2O_2	-	-	-	-	-
Polymer	+	++	++	+	-
Total Sulfur	n.e.	-	+/-	+/-	+
Water	+	-	+	++	+
Purity by GC	+	-	--	+	+/-
Benzene	n.e.	+	+	++	-
Toluene	n.e.	+	+/-	n.e.	n.e.
Ethylbenzene	+/-	+	+	++	+
sum of m- and p-Xylenes	+	+/-	+	n.e.	n.e.
iso-Propylbenzene (Cumene)	n.e.	--	-	n.e.	n.e.
o-Xylene	n.e.	+	+	+	n.e.
n-Propylbenzene	n.e.	--	-	n.e.	+
sum of m- and p-Ethyltoluenes	n.e.	-	+	n.e.	+
alpha-Methylstyrene	+/-	+	-	+	--
1,2-Diethylbenzene	n.e.	n.e.	n.e.	n.e.	(--)
sum of alpha-Methylstyrene and 1,2-Diethylbenzene	-	n.e.	(--)	+/-	+/-
Phenylacetylene	n.e.	-	+/-	n.e.	n.e.
3/4-Methylstyrenes	n.e.	n.e.	+/-	n.e.	n.e.
sum of Phenylacetylene and 3/4-Methylstyrenes	n.e.	n.e.	(--)	n.e.	+
Benzaldehyde	-	-	--	+	-
Non-aromatics	-	-	+/-	+	--

Table 5: comparison determinations of sample #20180 against the reference test methods

Results between brackets should be used with due care

The following performance categories were used:

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

APPENDIX 1

Determination of Aldehydes as Benzaldehyde on sample #20180; results in mg/kg

lab	method	molarity NaOH	value	mark	z(targ)	remarks
150	D2119	---	130		0.65	
169	D2119	---	100	C	-0.14	First reported 0.010 mg/kg
171	D2119	---	94		-0.30	
173		---	-----		-----	
273		---	-----		-----	
311	D2119	0.05 N NaOH	110		0.13	
317		---	-----		-----	
323	D2119	0.05 N NaOH	115		0.26	
333	D2119	0.01 N NaOH	80		-0.67	
343	D2119	---	120		0.39	
347		---	-----		-----	
357	D2119	0.05 N NaOH	105		-0.01	
395		---	-----		-----	
446	D2119	0.05 N NaOH	98		-0.19	
551		---	-----		-----	
557		---	-----		-----	
857	D2119	0.05 N NaOH	120		0.39	
858	D2119	0.05 N NaOH	124		0.50	
860	D2119	0.05 N NaOH	120		0.39	
863	D2119	0.05 N NaOH	121		0.42	
868	D2119	0.05 N NaOH	122		0.44	
869	D2119	---	100		-0.14	
902	D2119	0.05 N NaOH	190	R(0.01)	2.24	
913		---	-----		-----	
1079	D2119	0.05 N NaOH	70.2		-0.93	
1117	D7704	0,02 N KOH	79.23		-0.69	
1135	D2119	0.05 N NaOH	100		-0.14	
1169		---	-----		-----	
1201		---	-----		-----	
1264	D2119	0.05 N NaOH	156		1.34	
1508		---	-----		-----	
1509	D2119	0.05 N NaOH	83.54		-0.57	
1515		---	-----		-----	
1823	D2119	0.05 N NaOH	119		0.36	
1880	D7704	0,02 N KOH	89.0		-0.43	
1935	D2119	0.05 N NaOH	97.4		-0.21	
6198	D2119	0.05 N NaOH	99		-0.17	
6202		---	-----		-----	
6262	D2119	0.05 N NaOH	79		-0.69	
7014		---	-----		-----	
9008		---	-----		-----	

normality	OK	
n	25	
outliers	1	
mean (n)	105.255	
st.dev. (n)	19.7461	
R(calc.)	55.289	
st.dev.(D7704:16)	37.8571	
R(D7704:16)	106	
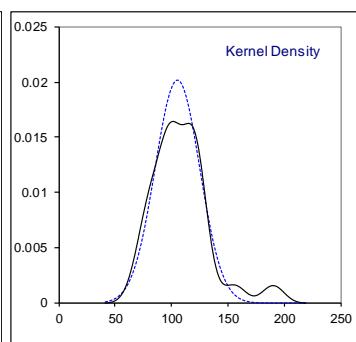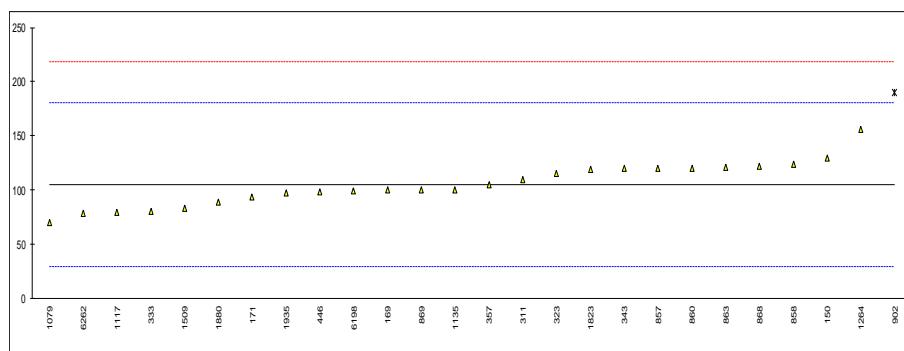
Determination of Appearance on sample #20180;

lab	method	value	mark	z(targ)	remarks
150	E2680	Pass		-----	
169	Visual	CBFSM		-----	
171	E2680	Pass		-----	
173	D4176	Pass		-----	
273	Visual	Bright & Clear		-----	
311	E2680	pass		-----	
317	D4176	pass		-----	
323	Visual	C&B		-----	
333		-----		-----	
343	E2680	pass		-----	
347	E2680	Pass		-----	
357	E2680	Pass		-----	
395	E2680	PASS		-----	
446	E2680	Pass		-----	
551		-----		-----	
557		-----		-----	
857	E2680	Pass		-----	
858	E2680	Pass		-----	
860	E2680	Pass		-----	
863	Visual	pass		-----	
868	E2680	pass		-----	
869	Visual	Clear and free from suspended matter.		-----	
902	E2680	PASS		-----	
913		-----		-----	
1079	Visual	clear & free		-----	
1117	D4176	PASS		-----	
1135	Visual	CFSM		-----	
1169		-----		-----	
1201	Visual	Br & CL		-----	
1264	Visual	Pass		-----	
1508		-----		-----	
1509	E2680	Clear & FFSM		-----	
1515	E2680	Pass		-----	
1823	D4176	Clear/FFSM/No free water		-----	
1880	Visual	Pass		-----	
1935	Visual	B&C		-----	
6198	D4176	Pass		-----	
6202	Visual	Clear		-----	
6262	Visual	clear and bright		-----	
7014	Visual	Clear		-----	
9008	Visual	Clear liquid		-----	
	normality	35			
	n	Pass			

Determination of Organic Chloride on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D7359	2.2		0.51	
169		-----		-----	
171	D5808	1.47		-1.06	
173		-----		-----	
273		-----		-----	
311	D5808	2		0.08	
317	D5808	2.6		1.37	
323	UOP779	2		0.08	
333	UOP779	2.0		0.08	
343		-----		-----	
347		-----		-----	
357	D5808	2.1		0.30	
395		-----		-----	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857		-----		-----	
858		-----		-----	
860		-----		-----	
863		-----		-----	
868	D5808	2.1		0.30	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079	D5808	1.9		-0.13	
1117	D7359	2.12		0.34	
1135	UOP779	2.3		0.73	
1169		-----		-----	
1201	D5808	2.0		0.08	
1264	D5808	1.83		-0.28	
1508		-----		-----	
1509	D5808	2.30		0.73	
1515		-----		-----	
1823		-----		-----	
1880	D7359	1.70		-0.56	
1935	UOP779	1.36		-1.30	
6198	D5808	1.54		-0.91	
6202		-----		-----	
6262	UOP779	<1		-----	
7014		-----		-----	
9008	D5808	1.8		-0.35	

normality	OK
n	18
outliers	0
mean (n)	1.962
st.dev. (n)	0.3125
R(calc.)	0.875
st.dev.(D5808:18)	0.4643
R(D5808:18)	1.3
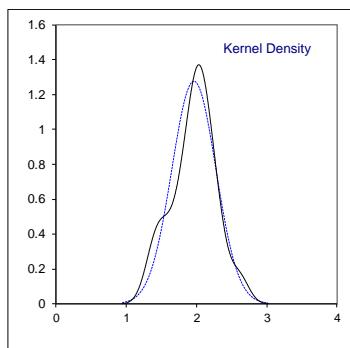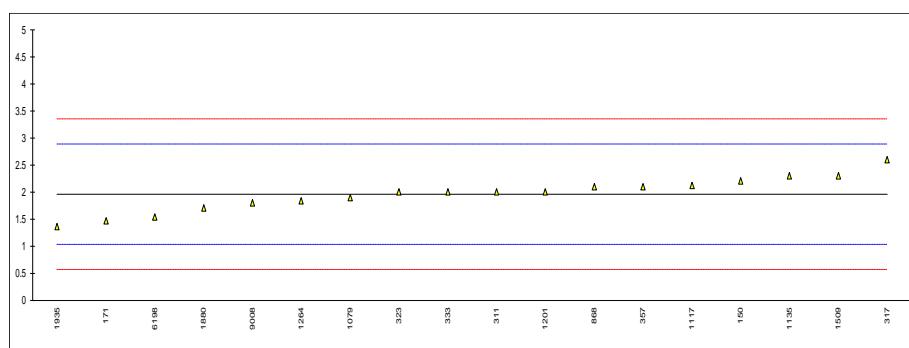
Determination of Color Pt/Co on sample #20180;

lab	method	value	mark	z(targ)	remarks
150	D5386	8		-0.18	
169	D5386	9		0.29	
171	D5386	8.6		0.10	
173	D5386	4		-2.08	
273	D1209	5		-1.61	
311	D5386	10		0.77	
317	D1209	5		-1.61	
323	D5386	8		-0.18	
333	D5386	6		-1.13	
343	D5386	10		0.77	
347	D5386	7		-0.66	
357	D5386	9		0.29	
395	D1209	<10		-----	
446	D5386	7		-0.66	
551		-----		-----	
557		-----		-----	
857	D5386	9		0.29	
858	D5386	8.6		0.10	
860	D5386	9.3		0.44	
863	D5386	9		0.29	
868	D5386	10.3		0.91	
869	D1209	10		0.77	
902	D5386	9		0.29	
913		-----		-----	
1079	D5386	10.3		0.91	
1117	D1209	8		-0.18	
1135	D5386	9		0.29	
1169	D5386	9.0		0.29	
1201	D5386	10.1		0.81	
1264	D1209	9		0.29	
1508		-----		-----	
1509	D1209	10		0.77	
1515	D1209	9		0.29	
1823	D5386	9.2		0.39	
1880	D5386	9.22		0.40	
1935	D1209	5		-1.61	
6198	D5386	9.1		0.34	
6202	D1209	7.10		-0.61	
6262	D5386	8		-0.18	
7014	D1209	8.5		0.06	
9008	D5386	9.5		0.53	

normality	OK	
n	36	
outliers	0	
mean (n)	8.38	
st.dev. (n)	1.635	
R(calc.)	4.58	
st.dev.(D5386:16)	2.106	
R(D5386:16)	5.90	
compare		
R(D1209:05)	7	
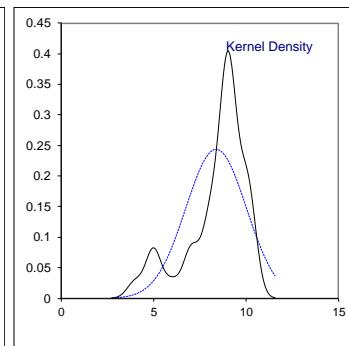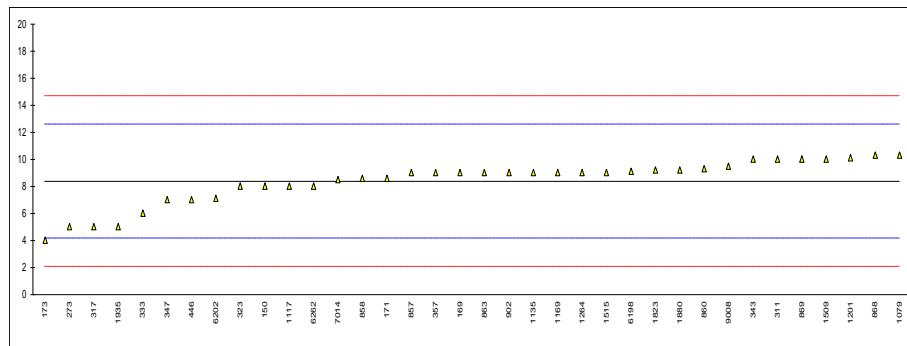
Determination of Density at 20°C on sample #20180; results in kg/L

lab	method	value	mark	z(targ)	remarks
150	D4052	0.9063		-0.06	
169	D4052	0.9064		0.50	
171	D4052	0.90629		-0.11	
173	D4052	0.9062		-0.62	
273	D4052	0.9062		-0.62	
311	D4052	0.9063		-0.06	
317	D4052	0.9063		-0.06	
323	D4052	0.9063		-0.06	
333		-----		-----	
343	D4052	0.9063		-0.06	
347	D4052	0.9063		-0.06	
357	D4052	0.90637		0.33	
395	D4052	0.9063		-0.06	
446	D4052	0.9063		-0.06	
551		-----		-----	
557		-----		-----	
857	D4052	0.90632		0.05	
858	D4052	0.9063		-0.06	
860	D4052	0.90631		0.00	
863	D4052	0.90631		0.00	
868	D4052	0.90633		0.11	
869	D4052	0.90626		-0.28	
902	ISO12185	0.9063		-0.06	
913		-----		-----	
1079	ISO12185	0.90629		-0.11	
1117	D4052	0.9064	C	0.50	First reported 906.4 kg/L
1135	ISO12185	0.9064		0.50	
1169		-----		-----	
1201	ISO12185	0.9063		-0.06	
1264	D4052	0.90643		0.67	
1508		-----		-----	
1509	D4052	0.90631		0.00	
1515		-----		-----	
1823	D4052	0.9063		-0.06	
1880	D4052	0.9062		-0.62	
1935	D4052	0.90634		0.17	
6198	D4052	0.9063		-0.06	
6202		-----		-----	
6262	D4052	0.9064		0.50	
7014	D4052	0.90628		-0.17	
9008		-----		-----	

normality	OK	
n	32	
outliers	0	
mean (n)	0.90631	
st.dev. (n)	0.000055	
R(calc.)	0.00015	
st.dev.(ISO12185:96)	0.000179	
R(ISO12185:96)	0.0005	
compare		
R(D4052:18)	0.0005	
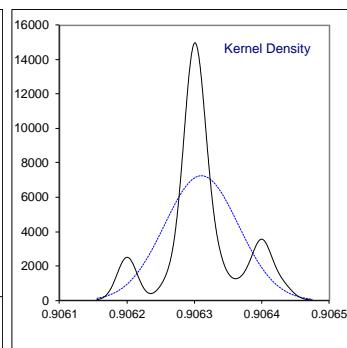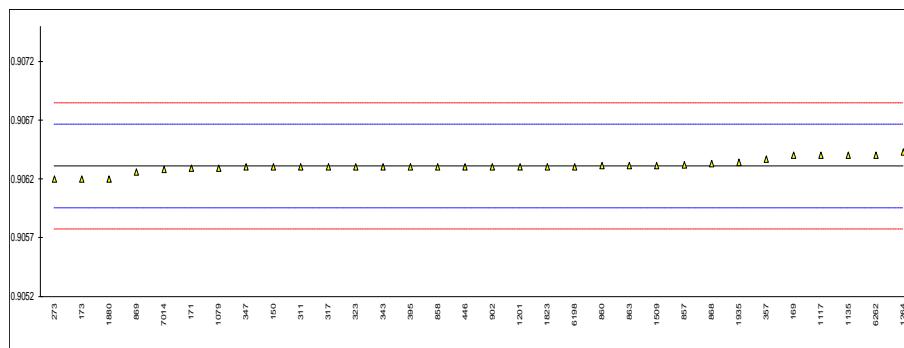
Determination of Inhibitor as TBC on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D4590	7		-0.07	
169	D4590	7		-0.07	
171		-----		-----	
173		-----		-----	
273	D4590	5.93		-1.11	
311	D4590	7.6		0.51	
317	D4590	7.3		0.22	
323	D4590	7		-0.07	
333	D4590	7.2		0.12	
343	D4590	5.8		-1.23	
347	D4590	6.5		-0.55	
357	D4590	6.7		-0.36	
395	D4590	7.3		0.22	
446	D4590	9.2		2.06	
551		-----		-----	
557		-----		-----	
857	D4590	6.6		-0.46	
858	D4590	6.6		-0.46	
860	D4590	6.9		-0.17	
863	D4590	7.1		0.03	
868	D4590	6.5		-0.55	
869	D4590	6.7		-0.36	
902	D4590	7.8		0.70	
913		-----		-----	
1079	D4590	7.9		0.80	
1117	D4590	8.27		1.16	
1135	D4590	7		-0.07	
1169	D4590	7.1		0.03	
1201	D4590	7.5	C	0.41	First reported 2.3
1264	D4590	5.6		-1.42	
1508		-----		-----	
1509	D4590	7.8897		0.79	
1515	D4590	6.4905		-0.56	
1823	D4590	7.16		0.08	
1880	D4590	6.0		-1.04	
1935	D4590	7.33		0.25	
6198	D4590	8.60		1.48	
6202	D4590	6.275		-0.77	
6262	D4590	7.0		-0.07	
7014	D4590	7.74		0.64	
9008	D4590	7		-0.07	

normality	OK
n	35
outliers	0
mean (n)	7.074
st.dev. (n)	0.7657
R(calc.)	2.144
st.dev.(D4590:18)	1.0345
R(D4590:18)	2.897

Determination of Peroxides as H_2O_2 on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D2340	151	R(0.01)	26.64	
169	D2340	28		0.15	
171	D2340	23.3		-0.87	
173	D2340	22		-1.15	
273		-----		-----	
311	D2340	36		1.87	
317		-----		-----	
323	D2340	26		-0.28	
333	D2340	21		-1.36	
343		-----		-----	
347	D2340	38		2.30	
357	D2340	38.1		2.32	
395		-----		-----	
446	D2340	34		1.44	
551		-----		-----	
557		-----		-----	
857	D2340	29		0.36	
858	D2340	29		0.36	
860	D2340	30		0.58	
863	D2340	31		0.79	
868	D2340	33		1.22	
869	D2340	30		0.58	
902		-----		-----	
913		-----		-----	
1079	D2340	36.2		1.91	
1117	D2340	20		-1.58	
1135	D2340	16		-2.44	
1169		-----		-----	
1201	D2340	13.7		-2.93	
1264	D2340	30		0.58	
1508		-----		-----	
1509	D2340	20.85		-1.39	
1515		-----		-----	
1823	D2340	28.04		0.16	
1880	D2340	33.3		1.29	
1935	D2340	10.42		-3.64	
6198	D2340	24.57		-0.59	
6202		-----		-----	
6262	D2340	27.1		-0.05	
7014		-----		-----	
9008	D2340	29		0.36	

normality	OK	
n	27	
outliers	1	
mean (n)	27.318	
st.dev. (n)	7.1525	
R(calc.)	20.027	
st.dev.(D2340:18)	4.6429	
R(D2340:18)	13	
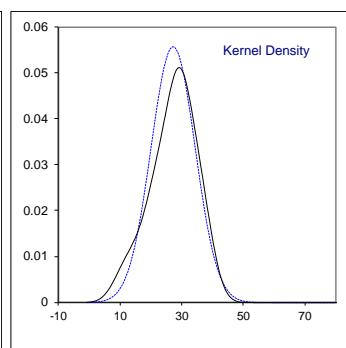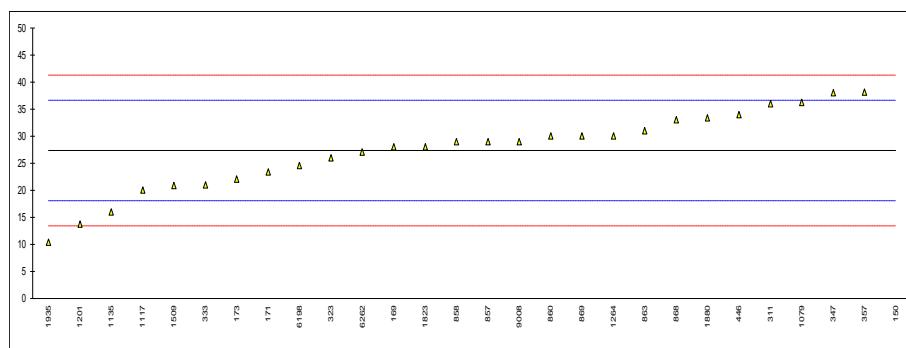
Determination of Polymer on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D2121-A	3		-1.32	
169	D2121-A	6		-0.02	
171	D2121-A	1.65		-1.91	
173		-----		-----	
273	D2121-A	1.0		-2.19	
311	D2121-A	7		0.41	
317	D2121-A	8		0.85	
323	D2121-A	4		-0.89	
333	D2121-A	3		-1.32	
343		-----		-----	
347	D2121-A	8.5		1.07	
357	D2121-A	8.3		0.98	
395	D2121-A	5.2		-0.37	
446	D2121-A	5		-0.45	
551		-----		-----	
557		-----		-----	
857	D2121-A	6.1		0.02	
858	D2121-A	6.7		0.28	
860	D2121-A	7.0		0.41	
863	D2121-A	6.1		0.02	
868	D2121-A	7.2		0.50	
869	D2121-A	6.9		0.37	
902	D2121-A	7		0.41	
913		-----		-----	
1079	D2121-A	5.4		-0.28	
1117	D2121-A	6.9		0.37	
1135	D2121-A	8		0.85	
1169	D2121-A	6.3		0.11	
1201	D2121-A	9.3		1.41	
1264	D2121-A	5.9		-0.06	
1508		-----		-----	
1509	D2121-A	8.831		1.21	
1515	D2121-A	2.7831		-1.42	
1823	D2121-A	5.10		-0.41	
1880	D2121-A	5.8		-0.11	
1935	D2121-A	6.45		0.18	
6198	D2121-A	6.2		0.07	
6202	D2121-A	6.238		0.08	
6262	D2121-A	8.1		0.89	
7014	D2121	7.31		0.55	
9008	In house	5.3		-0.32	

	normality	OK	
	n	35	
	outliers	0	
	mean (n)	6.045	
	st.dev. (n)	1.9635	
	R(calc.)	5.498	
	st.dev.(D2121-A:16)	2.3036	
	R(D2121-A:16)	6.450	
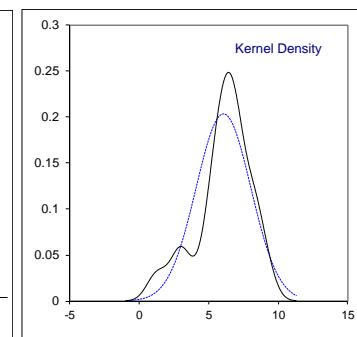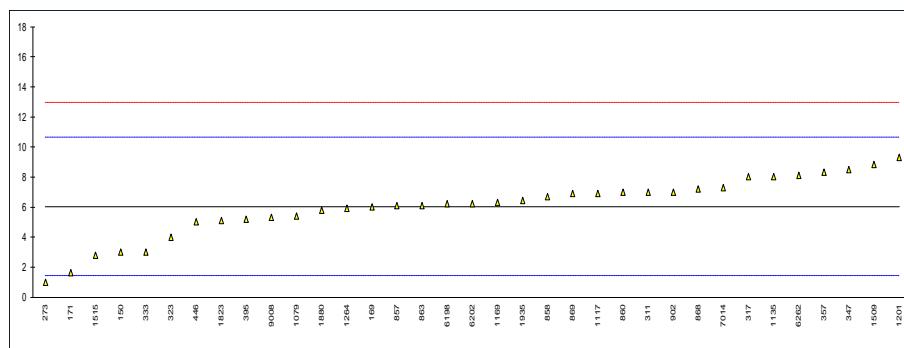
Determination of Total Sulfur on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5453	<1.0		-----	
169		-----		-----	
171	D5453	<1.0		-----	
173		-----		-----	
273		-----		-----	
311	D5453	<1		-----	
317	D5453	<1.0		-----	
323	D5453	< 1		-----	
333	D5453	<0.5		-----	
343	D5453	<1.0		-----	
347	D5453	<1		-----	
357	D5453	< 1		-----	
395		-----		-----	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857	D5453	<1		-----	
858	D5453	<1		-----	
860	D3120	<1		-----	
863	D5453	<1		-----	
868	D5453	<1		-----	
869		-----		-----	
902	D5453	<0,5		-----	
913		-----		-----	
1079	D5453	0.05		-----	
1117	D5453	<0,1		-----	
1135	D5453	0.13		-----	
1169		-----		-----	
1201	D5453	0.2		-----	
1264	D5453	0.59		-----	
1508		-----		-----	
1509	D5453	0.029		-----	
1515		-----		-----	
1823	D5453	<1.0		-----	
1880	D5453	<0.1		-----	
1935	D5453	0.138		-----	
6198	D5453	0.08		-----	
6202		-----		-----	
6262	D5453	0.0		-----	
7014	D5453	<1		-----	
9008	D5453	<0.1		-----	
	n	28			
	mean (n)	<1			

Determination of Water on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	E1064	207	R(0.05)	2.16	
169	E1064	270	R(0.01)	6.09	
171	E1064	164		-0.52	
173	E1064	170		-0.15	
273	E1064	174		0.10	
311	E1064	170		-0.15	
317	E1064	190		1.10	
323	E1064	175		0.16	
333	D1364	174		0.10	
343	E1064	160		-0.77	
347	E1064	164		-0.52	
357	E1064	210	R(0.05)	2.35	
395	E1064	184.2		0.74	
446	D1364	192		1.23	
551		-----		-----	
557		-----		-----	
857	E1064	170		-0.15	
858	E1064	170		-0.15	
860	E1064	170		-0.15	
863	E1064	170		-0.15	
868	E1064	166		-0.40	
869	E1064	170		-0.15	
902	E1064	183		0.66	
913		-----		-----	
1079	D1364	172		-0.02	
1117	E1064	164		-0.52	
1135	E1064	153		-1.21	
1169	E1064	191		1.16	
1201	E1064	174		0.10	
1264	E1064	170		-0.15	
1508		-----		-----	
1509	E1064	180.2		0.49	
1515	E1064	174		0.10	
1823	E1064	164.54		-0.49	
1880	E1064	159		-0.83	
1935	E1064	163.5		-0.55	
6198	E1064	175		0.16	
6202	D6304	190.567		1.14	
6262	D1364	181		0.54	
7014	E1064	174.52		0.13	
9008	D6304	158		-0.90	

normality	OK	
n	34	
outliers	3	
mean (n)	172.37	
st.dev. (n)	9.757	
R(calc.)	27.32	
st.dev.(E1064:16)	16.021	
R(E1064:16)	44.86	
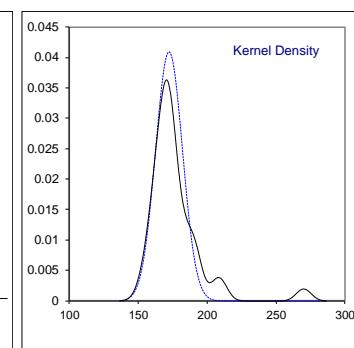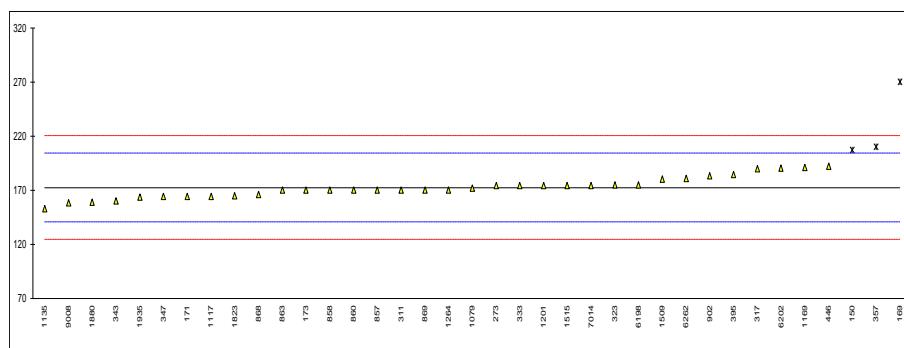
Determination of Purity by GC on sample #20180; results in %M/M

lab	method	value	mark	z(targ)	remarks
150	D5135	99.94		-0.68	
169	D5135	99.90	R(0.01)	-4.31	
171		-----		-----	
173		-----		-----	
273	D5135	99.94		-0.68	
311	D5135	99.95		0.22	
317	D7504	99.96		1.13	
323	D5135	99.93		-1.59	
333	D5135	99.96		1.13	
343		-----		-----	
347	D5135	99.942		-0.50	
357	D5135	99.951		0.31	
395	D5135	99.97		2.03	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857	D5135	99.944		-0.32	
858	D5135	99.9439		-0.33	
860	D5135	99.940		-0.68	
863	D5135	99.946		-0.14	
868	D7504	99.942		-0.50	
869	D5135	99.95		0.22	
902	D5135	99.95		0.22	
913		-----		-----	
1079	In house	99.954		0.58	
1117	D5135	99.94		-0.68	
1135	D5135	99.95		0.22	
1169		-----		-----	
1201	D5135	99.95		0.22	
1264	D5135	99.953		0.49	
1508		-----		-----	
1509	D5135	99.956		0.77	
1515	D5135	99.9568		0.84	
1823	D5135	99.9496		0.19	
1880	D5135	99.948		0.04	
1935	In house	99.943		-0.41	
6198	D5135	99.9475		0.00	
6202	D5135	99.9319		-1.42	
6262	D5135	99.9387		-0.80	
7014	D5135	99.957		0.86	
9008	D5135	99.94		-0.68	

normality	OK	
n	31	
outliers	1	
mean (n)	99.9475	
st.dev. (n)	0.00857	
R(calc.)	0.0240	
st.dev.(D5135:16e1)	0.01104	
R(D5135:16e1)	0.0309	
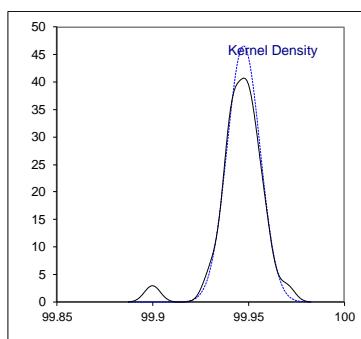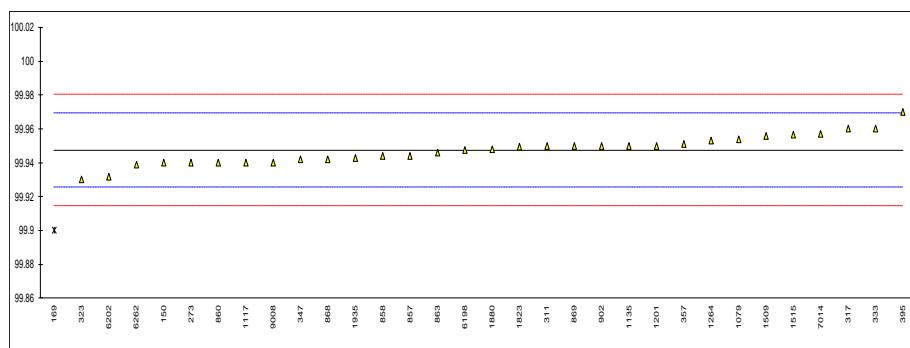
Determination of Benzene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169	D5135	0.10		-----	
171	D6229	<1		-----	
173		-----		-----	
273		-----		-----	
311	D6229	<1.0		-----	
317		-----		-----	
323	D5135	< 1		-----	
333	D5135	<1.0		-----	
343	INH-1456	<1.00		-----	
347		-----		-----	
357	D5135	< 10		-----	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	<10		-----	
858	D5135	<10		-----	
860	D5135	3		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869	D5135	<10		-----	
902	INH-123	<1		-----	
913		-----		-----	
1079	In house	0		-----	
1117	In house	< 0,5		-----	
1135	In house	<1		-----	
1169		-----		-----	
1201	D5135	0		-----	
1264	D5135	2.5		-----	
1508		-----		-----	
1509	D5135	1.81		-----	
1515		1.69		-----	Benzene peak was co-eluting
1823	INH-2922	<0.5		-----	
1880	D4534	<1		-----	
1935	In house	<1		-----	
6198	GB/T12688.9	<0.2		-----	
6202		-----		-----	
6262	D6229	<1		-----	
7014	D5135	<1		-----	
9008	In house	ND		-----	
	n	29			
	mean (n)	<10			

Determination of Toluene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169		-----		-----	
171	D5135	<10		-----	
173		-----		-----	
273		-----		-----	
311	D5135Mod.	<10		-----	
317	D7504	10		-----	
323	D5135	< 1		-----	
333		-----		-----	
343		-----		-----	
347		-----		-----	
357	D5135	< 10		-----	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	<10		-----	
858	D5135	<10		-----	
860	D5135	1		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869		-----		-----	
902	D5135	<10		-----	
913		-----		-----	
1079	In house	0		-----	
1117	D5135	1.5		-----	
1135	D5135	0		-----	
1169		-----		-----	
1201	D5135	0		-----	
1264	D5135	1.1		-----	
1508		-----		-----	
1509	D5135	0		-----	
1515	D5135	<0.0001		-----	Possibly reported in %M/M?
1823	D5135	<10		-----	
1880		-----		-----	
1935	In house	<1		-----	
6198	D5135	<10		-----	
6202		-----		-----	
6262	D5135	15		-----	
7014	D5135	<1		-----	
9008	In house	ND		-----	
	n	23			
	mean (n)	<10			

Determination of Ethylbenzene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	109		0.98	
169	D5135	98.8		-0.32	
171	D5135	103		0.22	
173		-----		-----	
273		-----		-----	
311	D5135	100		-0.17	
317	D7504	82		-2.46	
323	D5135	108		0.85	
333	D5135	115		1.74	
343		-----		-----	
347	D5135	103		0.22	
357	D5135	110		1.11	
395	D5135	97.3		-0.51	
446	D5135	52	R(0.01)	-6.28	
551		-----		-----	
557		-----		-----	
857	D5135	106		0.60	
858	D5135	102		0.09	
860	D5135	105		0.47	
863	D5135	97		-0.55	
868	D7504	102		0.09	
869	D5135	104		0.34	
902	D5135	120		2.38	
913		-----		-----	
1079	In house	109		0.98	
1117	D5135	100.6		-0.09	
1135	D5135	83		-2.33	
1169	D5135	98		-0.42	
1201	D5135	97.4		-0.50	
1264	D5135	99.7		-0.20	
1508		-----		-----	
1509	D5135	100.86		-0.06	
1515	D5135	89		-1.57	
1823	D5135	101.46		0.02	
1880	D5135	100		-0.17	
1935	In house	105.5		0.53	
6198	D5135	103		0.22	
6202	D5135	92.667		-1.10	
6262	D5135	103		0.22	
7014	D5135	95.58		-0.73	
9008	D5135	102		0.09	

normality	suspect
n	33
outliers	1
mean (n)	101.299
st.dev. (n)	7.6846
R(calc.)	21.517
st.dev.(D5135:16e1)	7.8541
R(D5135:16e1)	21.991
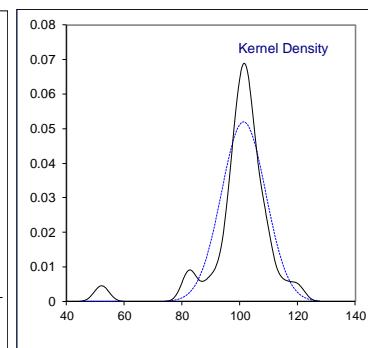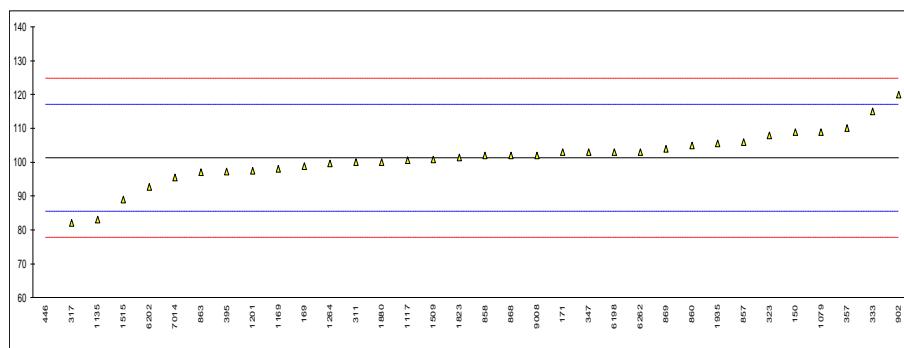
Determination of sum of m- and p-Xylenes on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	12		1.03	
169		-----		-----	
171	D5135	10		0.37	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	7		-0.63	
323	D5135	< 10		-----	
333	D5135	15	R(0.05)	2.02	
343		-----		-----	
347	D5135	<10		-----	
357	D5135	11		0.70	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	9		0.03	
858	D5135	8		-0.30	
860	D5135	8		-0.30	
863	D5135	9		0.03	
868	D7504	<10		-----	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079	In house	7		-0.63	
1117	D5135	11.5		0.86	
1135	D5135	8		-0.30	
1169	D5135	8.3		-0.20	
1201	D5135	7		-0.63	
1264	D5135	8.9		0.00	
1508		-----		-----	
1509	D5135	9.26		0.12	
1515	D5135	8		-0.30	
1823	D5135	<10		-----	
1880	D5135	<10		-----	
1935	In house	6.2		-0.89	
6198	D5135	<10		-----	
6202	D5135	8.900		0.00	
6262	D5135	11		0.70	
7014	D5135	7.76		-0.38	
9008	D5135	11		0.70	

normality	OK
n	21
outliers	1
mean (n)	8.896
st.dev. (n)	1.6428
R(calc.)	4.600
st.dev.(D5135:16e1)	3.0208
R(D5135:16e1)	8.458
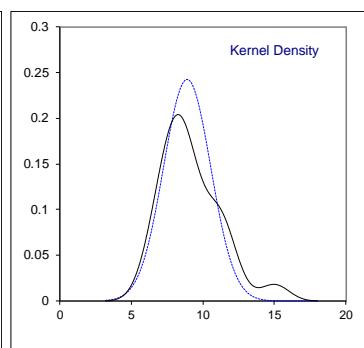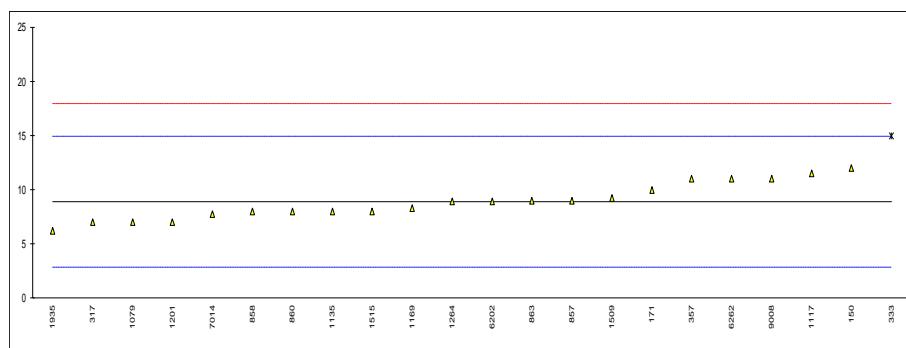
Determination of iso-Propylbenzene (Cumene) on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169		-----		-----	
171		-----		-----	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	<2		-----	
323	D5135	< 10		-----	
333	D5135	<10		-----	
343		-----		-----	
347	D5135	<10		-----	
357	D5135	5		-----	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	5		-----	
858	D5135	6		-----	
860	D5135	5		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869	D5135	<10		-----	
902		-----		-----	
913		-----		-----	
1079	In house	6		-----	
1117	D5135	4.4		-----	
1135	D5135	4		-----	
1169		-----		-----	
1201	D5135	4		-----	
1264	D5135	5.0		-----	
1508		-----		-----	
1509	D5135	5.04		-----	
1515	D5135	4		-----	
1823	D5135	<10		-----	
1880	D5135	<10		-----	
1935	In house	7.2		-----	
6198	D5135	<10		-----	
6202	D5135	4.967		-----	
6262	D5135	5		-----	
7014	D5135	3.74		-----	
9008	D5135	<10		-----	
	n	29			
	mean (n)	<10			

Determination of o-Xylene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169		-----		-----	
171	D5135	<10		-----	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	4		-----	
323	D5135	< 10		-----	
333	D5135	<10		-----	
343		-----		-----	
347	D5135	<10		-----	
357	D5135	5		-----	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	5		-----	
858	D5135	5		-----	
860	D5135	5		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079	In house	7		-----	
1117	D5135	5.9		-----	
1135	D5135	4		-----	
1169	D5135	6.1		-----	
1201	D5135	6	C	-----	First reported 10
1264	D5135	5.7		-----	
1508		-----		-----	
1509	D5135	6.44		-----	
1515	D5135	4		-----	
1823	D5135	<10		-----	
1880	D5135	<10		-----	
1935	In house	9.0		-----	
6198	D5135	<10		-----	
6202	D5135	4.667		-----	
6262	D5135	7		-----	
7014	D5135	4.18		-----	
9008	D5135	<10		-----	
	n	30			
	mean (n)	<10			

Determination of n-Propylbenzene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169		-----		-----	
171	D5135	<10		-----	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	<2		-----	
323	D5135	< 10		-----	
333	D5135	<10		-----	
343		-----		-----	
347	D5135	<10		-----	
357	D5135	4		-----	
395		-----		-----	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857	D5135	<10		-----	
858	D5135	<10		-----	
860	D5135	<10		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079	In house	5		-----	
1117	D5135	4.2		-----	
1135	D5135	3		-----	
1169		-----		-----	
1201	D5135	3		-----	
1264	D5135	4.5		-----	
1508		-----		-----	
1509	D5135	4.90		-----	
1515	D5135	3		-----	
1823	D5135	<10		-----	
1880	D5135	<10		-----	
1935	In house	4.2		-----	
6198	D5135	<10		-----	
6202	D5135	3.100		-----	
6262		-----		-----	
7014	D5135	2.98		-----	
9008	D5135	<10		-----	
	n	27			
	mean (n)	<10			

Determination of sum of m- and p-Ethyltoluenes on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
169		-----		-----	
171	D5135	<10		-----	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	<4		-----	
323	D5135	< 10		-----	
333		-----		-----	
343		-----		-----	
347		-----		-----	
357	D5135	< 10		-----	
395		-----		-----	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857		-----		-----	
858		-----		-----	
860	D5135	<10		-----	
863		-----		-----	
868	D7504	<10		-----	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079		-----		-----	
1117	D5135	0		-----	
1135	D5135	0		-----	
1169		-----		-----	
1201		-----		-----	
1264	D5135	1.7		-----	
1508		-----		-----	
1509	D5135	0		-----	Only p-Ethyltoluene reported
1515	D5135	<0.0001		-----	Possibly reported in %M/M
1823		-----		-----	
1880	D5135	<10		-----	
1935	In house	16.0		-----	
6198		-----		-----	
6202		-----		-----	
6262		-----		-----	
7014	D5135	<1		-----	
9008	D5135	ND		-----	
	n	15			
	mean (n)	<10			

Determination of alpha-Methylstyrene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	238		0.69	
169	D5135	224.2		-0.31	
171	D5135	264		2.58	
173		-----		-----	
273		-----		-----	
311	D5135	230	C	0.11	First reported <10
317	D7504	193		-2.57	
323	D5135	241		0.91	
333	D5135	256		2.00	
343		-----		-----	
347	D5135	231		0.18	
357	D5135	232		0.26	
395		-----		-----	
446	D5135	121	R(0.01)	-7.79	
551		-----		-----	
557		-----		-----	
857	D5135	237		0.62	
858	D5135	220		-0.61	
860	D5135	234		0.40	
863	D5135	217		-0.83	
868	D7504	234		0.40	
869	D5135	218		-0.76	
902	D5135	250		1.56	
913		-----		-----	
1079	In house	237		0.62	
1117	D5135	226.6		-0.13	
1135		-----		-----	
1169	D5135	217		-0.83	
1201	D5135	209		-1.41	
1264	D5135	222.5		-0.43	
1508		-----		-----	
1509	D5135	228.38		-0.01	
1515	D5135	204		-1.77	
1823	D5135	236.57		0.59	
1880	D5135	228		-0.03	
1935	In house	204.0		-1.77	
6198	D5135	236.49		0.58	
6202	D5135	225.40		-0.22	
6262	D5135	229		0.04	
7014	D5135	219		-0.69	
9008	D5135	240		0.84	

normality	OK
n	31
outliers	1
mean (n)	228.456
st.dev. (n)	14.8981
R(calc.)	41.715
st.dev.(D5135:16e1)	13.8010
R(D5135:16e1)	38.643
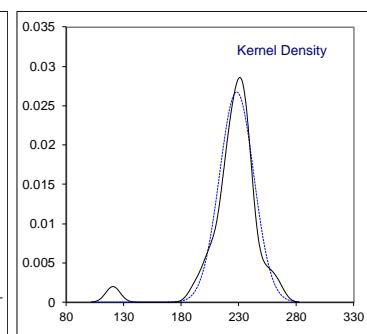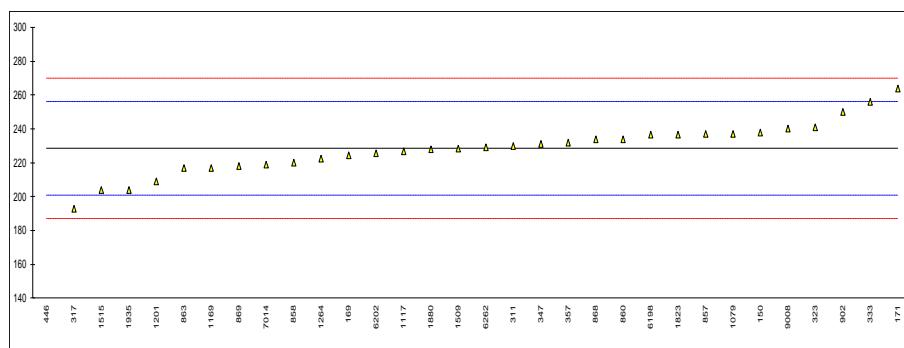
Determination of 1,2-Diethylbenzene and sum of alpha-Methylstyrene + 1,2-Diethylbenzene on sample #20180; results in mg/kg

lab	method	1,2-DeB	mark	z(targ)	Sum a-MS + 1,2-DeB	mark	z(targ)	remarks
150		-----		-----	-----		-----	
169		-----		-----	-----		-----	
171		-----		-----	-----		-----	
173		-----		-----	-----		-----	
273		-----		-----	-----		-----	
311		-----		-----	-----		-----	
317	D7504	15		-----	208		-0.54	
323		-----		-----	-----		-----	
333		-----		-----	-----		-----	
343		-----		-----	-----		-----	
347		-----		-----	-----		-----	
357		-----		-----	-----		-----	
395		-----		-----	-----		-----	
446		-----		-----	-----		-----	
551		-----		-----	-----		-----	
557		-----		-----	-----		-----	
857		-----		-----	-----		-----	
858		-----		-----	-----		-----	
860		-----		-----	-----		-----	
863		-----		-----	-----		-----	
868		-----		-----	-----		-----	
869		-----		-----	-----		-----	
902		-----		-----	-----		-----	
913		-----		-----	-----		-----	
1079		-----		-----	-----		-----	
1117	D5135	< 5		-----	226.6		0.83	
1135	D5135	-----		-----	198		-1.28	
1169		-----		-----	-----		-----	
1201		-----		-----	-----		-----	
1264		-----		-----	-----		-----	
1508		-----		-----	-----		-----	
1509		-----		-----	-----		-----	
1515	D5135	<0.0001		-----	204		-0.83	1,2-DeB in %M/M?
1823		-----		-----	-----		-----	
1880		-----		-----	-----		-----	
1935		-----		-----	-----		-----	
6198		-----		-----	-----		-----	
6202		-----		-----	-----		-----	
6262		-----		-----	-----		-----	
7014		-----		-----	-----		-----	
9008	D5135	ND		-----	240		1.82	

	normality				unknown			
	n	2			5			
	outliers				0			
	mean (n)	<10			215.320			
	st.dev. (n)				17.4503			
	R(calc.)				48.861			
	st.dev.(D5135:16e1)				13.5603			
	R(D5135:16e1)				37.969			

sum of alpha-Methylstyrene + 1,2-Diethylbenzene
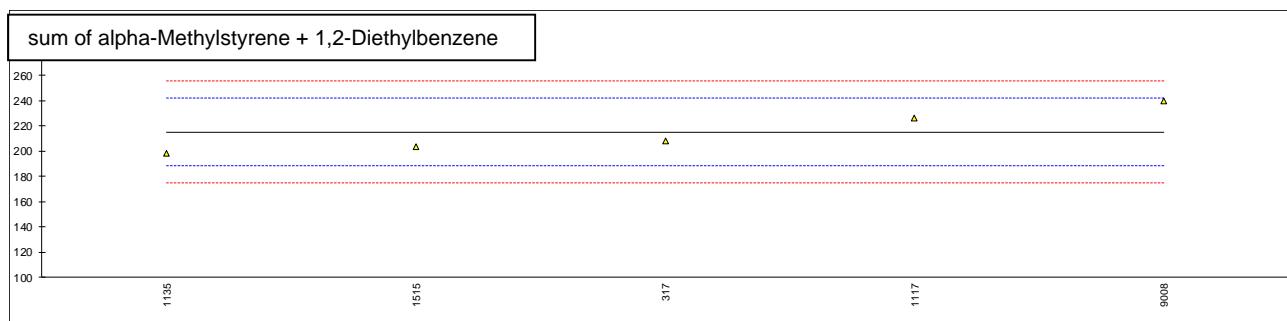
Determination of Phenylacetylene on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	<10		-----	
169		-----		-----	
171	D5135	<10		-----	
173		-----		-----	
273		-----		-----	
311	D5135	<10		-----	
317	D7504	3		-----	
323	D5135	< 10		-----	
333		-----		-----	
343		-----		-----	
347		-----		-----	
357	D5135	< 10		-----	
395		-----		-----	
446	D5135	<10		-----	
551		-----		-----	
557		-----		-----	
857	D5135	<10		-----	
858	D5135	<10		-----	
860	D5135	5		-----	
863	D5135	<10		-----	
868	D7504	<10		-----	
869	D5135	<10		-----	
902	D5135	<10	C	-----	First reported 10
913		-----		-----	
1079		-----		-----	
1117	D5135	7.6		-----	
1135	D5135	0		-----	
1169	D5135	2.3		-----	
1201		-----		-----	
1264	D5135	4.9		-----	
1508		-----		-----	
1509	D5135	4.91		-----	
1515	D5135	<0.0001		-----	Possibly reported in %M/M
1823	D5135	<10		-----	
1880	D5135	<10		-----	
1935	In house	<1		-----	
6198	D5135	2.544		-----	
6202	D5135	1.733		-----	
6262	D5135	5		-----	
7014	D5135	6.02		-----	
9008	D5135	<10		-----	
	n	28			
	mean (n)	<10			

Determination of 3/4-Methylstyrenes and sum of Phenylacetylene + 3/4-Methylstyrenes on sample #20180; results in mg/kg

lab	method	3/4-Met.St.	mark	z(targ)	Sum Phenyl + 3/4-MS	mark	z(targ)	remarks
150		-----		-----	-----		-----	
169		-----		-----	-----		-----	
171	D5135	<10		-----	<10		-----	
173		-----		-----	-----		-----	
273		-----		-----	-----		-----	
311		-----		-----	-----		-----	
317	D7504	<4		-----	<6		-----	
323		-----		-----	-----		-----	
333		-----		-----	-----		-----	
343		-----		-----	-----		-----	
347		-----		-----	-----		-----	
357		-----		-----	-----		-----	
395		-----		-----	-----		-----	
446		-----		-----	-----		-----	
551		-----		-----	-----		-----	
557		-----		-----	-----		-----	
857		-----		-----	-----		-----	
858		-----		-----	-----		-----	
860		-----		-----	-----		-----	
863		-----		-----	-----		-----	
868		-----		-----	-----		-----	
869		-----		-----	-----		-----	
902		-----		-----	-----		-----	
913		-----		-----	-----		-----	
1079		-----		-----	-----		-----	
1117	D5135	0		-----	7.6		-----	
1135	D5135	0		-----	0		-----	
1169		-----		-----	-----		-----	
1201		-----		-----	-----		-----	
1264		-----		-----	-----		-----	
1508		-----		-----	-----		-----	
1509		-----		-----	-----		-----	
1515	D5135	6		-----	6		-----	
1823		-----		-----	-----		-----	
1880		-----		-----	-----		-----	
1935	In house	<1		-----	-----		-----	
6198		-----		-----	-----		-----	
6202	D5135	6.710		-----	8.443		-----	
6262		-----		-----	-----		-----	
7014		-----		-----	-----		-----	
9008		-----		-----	-----		-----	
	n	7			6			
	mean (n)	<10			<10			

Determination of Benzaldehyde on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	84		0.15	
169		-----		-----	
171	D5135	91		0.78	
173		-----		-----	
273		-----		-----	
311	D5135	80		-0.21	
317	D7504	<2		-----	
323		-----		-----	
333		-----		-----	
343		-----		-----	
347	D5135	91		0.78	
357		-----		-----	
395		-----		-----	
446		-----		-----	
551		-----		-----	
557		-----		-----	
857	D5135	92		0.87	
858	D5135	94		1.06	
860	D5135	92		0.87	
863	D5135	89		0.60	
868	D7504	97		1.33	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079		-----		-----	
1117	D5135	76.2		-0.56	
1135	D5135	69		-1.21	
1169		-----		-----	
1201	D5135	67		-1.39	
1264		-----		-----	
1508		-----		-----	
1509	D5135	75.21		-0.65	
1515		-----		-----	
1823		-----		-----	
1880		-----		-----	
1935		-----		-----	
6198	D5135	104.927		2.05	
6202	D5135	73.80		-0.78	
6262	D5135	56		-2.39	
7014		-----		-----	
9008	D5135	68		-1.30	

normality	OK	
n	17	
outliers	0	
mean (n)	82.361	
st.dev. (n)	13.0490	
R(calc.)	36.537	
st.dev.(D5135:16e1)	11.0305	
R(D5135:16e1)	30.885	
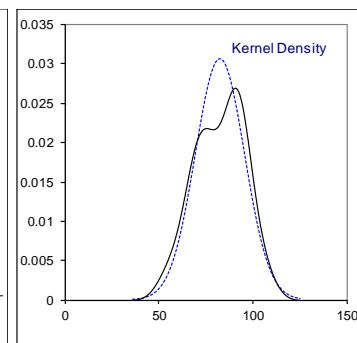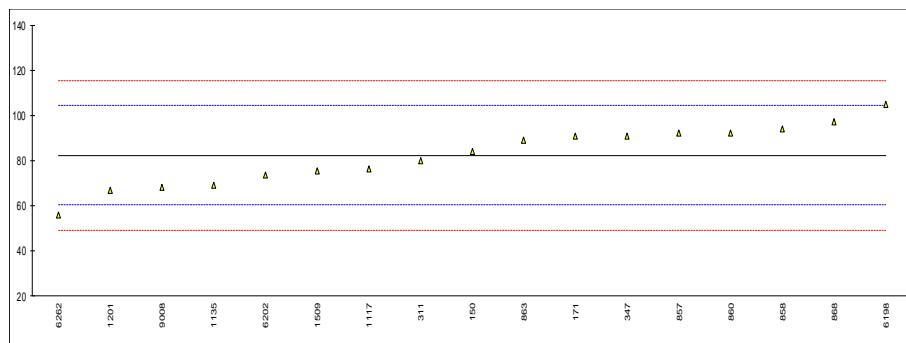
Determination of Non-aromatics on sample #20180; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5135	86		1.62	
169		-----		-----	
171	D5135	66		0.69	
173		-----		-----	
273		-----		-----	
311	D5135	40		-0.53	
317	D7504	10		-1.93	
323	D5135	69		0.83	
333		-----		-----	
343		-----		-----	
347	D5135	49		-0.11	
357	D5135	58		0.31	
395		-----		-----	
446	D5135	26		-1.18	
551		-----		-----	
557		-----		-----	
857		-----		-----	
858		-----		-----	
860		-----		-----	
863		-----		-----	
868		-----		-----	
869		-----		-----	
902		-----		-----	
913		-----		-----	
1079		-----		-----	
1117	D5135	109		2.70	
1135	D5135	57		0.27	
1169		-----		-----	
1201		-----		-----	
1264	D5135	55.6		0.20	
1508		-----		-----	
1509		-----		-----	
1515	D5135	20		-1.46	
1823	D5135	14.98		-1.70	
1880		-----		-----	
1935	In house	26.9		-1.14	
6198		-----		-----	
6202	D5135	22.448		-1.35	
6262	D5135	61		0.45	
7014		-----		-----	
9008	D5135	101		2.33	

normality	OK
n	17
outliers	0
mean (n)	51.290
st.dev. (n)	29.5044
R(calc.)	82.612
st.dev.(D5135:16e1)	21.3708
R(D5135:16e1)	59.838

APPENDIX 2

Number of participants per country

        4 labs in BELGIUM
        2 labs in BRAZIL
         1 lab in CANADA
        8 labs in CHINA, People's Republic
        2 labs in FINLAND
         1 lab in FRANCE
         1 lab in INDIA
         1 lab in INDONESIA
         1 lab in IRAN, Islamic Republic of
         1 lab in ITALY
        2 labs in KUWAIT
        4 labs in NETHERLANDS
        2 labs in SAUDI ARABIA
         1 lab in SINGAPORE
         1 lab in SOUTH AFRICA
        2 labs in SPAIN
         1 lab in TURKEY
         1 lab in UNITED KINGDOM
        5 labs in UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
f+?	= possibly false positive test result?
f-?	= possibly false negative test result?
SDS	= Safety Data Sheet

Literature

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