Institute for
Interlaboratory Studies

Results of Proficiency Test
Xylene (Ortho- / Para-)
October 2022

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. A. Ouwerkerk
Correctors: ing. M. Meijer & ing. R.J. Starink
Approved by: ing. A.S. Noordman-de Neef

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CONTENTS

1 INTRODUCTION

Since 1995 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Xylene (Ortho- / Para-) based on the latest version of ASTM D5471 (ortho-Xylene) and ASTM D5136 (para-Xylene) once every two years. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of Xylene (Ortho- / Para-).

In this interlaboratory study 30 laboratories in 19 countries registered for participation, see appendix 2 for the number of participants per country. In this report the results of the Xylene (Ortho- / Para) 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 two samples of Xylene: 1x 0.25 L bottle with o-Xylene labelled #22181 and 1x 0.5 L bottle with p-Xylene labelled #22182.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/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

For the preparation of the o-Xylene PT sample a batch of approximately 15 liters of o-Xylene was purchased from a local chemical supplier. After homogenization 50 amber glass bottles of 0.25 L were filled and labelled #22181.
The homogeneity of the subsamples was checked by determination of Density at 20 °C in accordance with ASTM D4052 and p-Xylene in accordance with ASTM D7504 on 8 stratified randomly selected subsamples.

	Density at 20 °C in kg/L	p-Xylene in %M/M
sample #22181-1	0.87963	0.1221
sample #22181-2	0.87963	0.1223
sample #22181-3	0.87963	0.1222
sample #22181-4	0.87962	0.1221
sample #22181-5	0.87965	0.1224
sample #22181-6	0.87964	0.1224
sample #22181-7	0.87965	0.1222
sample #22181-8	0.87963	0.1222

Table 1: homogeneity test results of subsamples #22181 (o-Xylene)

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	p-Xylene in %M/M
r (observed)	0.00003	0.0003
reference test method	ISO12185:96	ASTM D3797:05
0.3 x R (reference test method)	0.00015	0.0126

Table 2: evaluation of the repeatabilities of subsamples #22181 (o-Xylene)

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

For the preparation of the p-Xylene PT sample a batch of approximately 30 liters of p-Xylene was purchased from a local chemical supplier. After homogenization 50 amber glass bottles of 0.5 L were filled and labelled #22182.
The homogeneity of the subsamples was checked by determination of Density at 20 °C in accordance with ASTM D4052 and o-Xylene in accordance with ASTM D7504 on 8 stratified randomly selected subsamples.

	Density at 20 °C in kg/L	o-Xylene in %M/M
sample #22182-1	0.86095	0.0325
sample #22182-2	0.86095	0.0325
sample #22182-3	0.86095	0.0325
sample #22182-4	0.86095	0.0325
sample #22182-5	0.86095	0.0326
sample #22182-6	0.86096	0.0324
sample #22182-7	0.86095	0.0324
sample #22182-8	0.86095	0.0326

Table 3: homogeneity test results of subsamples #22182 (p-Xylene)

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	o-Xylene in %M/M
r (observed)	0.00001	0.0002
reference test method	ISO12185:96	ASTM D5917:15R19
0.3 x R (reference test method)	0.00015	0.0124

Table 4: evaluation of the repeatabilities of subsamples #22182 (p-Xylene)

The calculated repeatabilities are 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 0.25 L bottle of o-Xylene labelled #22181 and one 0.5 L bottle of p-Xylene labelled #22182 were sent on September 7, 2022. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Ortho- and Para-Xylene 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 #22181: Purity by GC, m-Xylene, p-Xylene, Ethylbenzene, n-Propylbenzene, iso-Propylbenzene (Cumene), Styrene, Sum of Ethyltoluenes, Toluene, C9 and heavier aromatics and Non-aromatics.
On sample #22182 it was requested to determine: Appearance, Organic Chlorides, Color Pt/Co, Density at 20 °C, Distillation (Initial Boiling Point, 50% recovered, Dry Point and Distillation Range), Sulfur, Purity by GC, o-Xylene, m-Xylene, Ethylbenzene, Styrene, Toluene and Non-aromatics.

It was explicitly requested to treat the samples as if they were routine samples 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 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.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. 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 them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported 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 (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

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 (derived from e.g. ISO or ASTM test methods), 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 in appendix 1.

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

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. When considering the test results of the two samples together one participant reported test results after the final reporting date and five other participants did not report any test results. Not all participants were able to report all tests requested.
In total 25 participants reported 425 numerical test results. Observed were 24 outlying test results, which is 5.6%. In proficiency tests 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 SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and 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.
Although test method ASTM D3797:05 was withdrawn the mentioned precision data in this test method was used for the evaluation of the GC-analysis because the precision data mentioned in test method ASTM D7504:21 is very strict. Also, for the evaluation of the GC analysis for para-Xylene it was decided to use the precision data from ASTM D5917:15R19 because of the very strict precision data from ASTM D7504:21.

Unfortunately, a suitable reference test method, providing the precision data, is not available for all determinations. For these tests the calculated reproducibility was compared against the estimated reproducibility calculated with the Horwitz equation.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D5917) and an added designation for the year that the test method was adopted or revised (e.g. D5917:15). When a method has been reapproved an “R” will be added and the year of approval (e.g. D5917:15R19).

sample #22181

Purity by GC: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D3797:05.

m-Xylene: 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 D3797:05.

p-Xylene: 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 D3797:05.

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 D3797:05.

n-Propylbenzene: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

iso-Propylbenzene (Cumene): This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D3797:05.

Styrene: 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 D3797:05.

Sum of Ethyltoluenes: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the estimated reproducibility calculated with the Horwitz equation (based on 3 components).

Toluene: This determination was not problematic. All reporting participants agreed on a value near or below the detection limit. Therefore, no z-scores are calculated.

C9 and heavier aromatics: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D7504:21.

Non-aromatics: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D3797:05.

sample #22182

Appearance: This determination was not problematic. All reporting participants agreed on the appearance of the sample as Pass (Bright & Clear).

Organic Chlorides: This determination was not problematic. All reporting participants agreed on a value near or below the detection limit. Therefore, no z-scores are calculated.

Color Pt/Co: 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 D5386:16 and ASTM D1209:05R19.

Density at 20 °C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO12185:96.

Distillation: This determination was not problematic. Four statistical outliers were observed and two other test results were excluded over three parameters. All calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM D850-A:21.

Sulfur: 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 D7183:18ae1 and ASTM D5453:19a.

Purity by GC: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D5917:15R19.

o-Xylene: 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 D5917:15R19.

m-Xylene: 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 D5917:15R19.

Ethylbenzene: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5917:15R19.

Styrene: This determination was not problematic. Almost all reporting participants agreed on a value near or below the detection limit. Therefore, no z-scores are calculated.

Toluene: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5917:15R19.

Non-aromatics: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5917:15R19.

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 reference methods are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R(target)
Purity by GC	%M/M	18	98.816	0.176	0.422
m-Xylene	%M/M	18	0.521	0.022	0.127
p-Xylene	%M/M	18	0.123	0.007	0.042
Ethylbenzene	%M/M	16	0.0010	0.0005	0.0005
n-Propylbenzene	%M/M	11	0.030	0.002	0.006
iso-Propylbenzene (Cumene)	%M/M	16	0.266	0.012	0.069
Styrene	%M/M	16	0.0019	0.0011	0.0008
Sum of Ethyltoluenes	%M/M	9	0.046	0.003	0.014
Toluene	%M/M	17	<0.005	n.e.	n.e.
C9 and heavier aromatics	%M/M	17	0.333	0.108	1.034
Non-aromatics	%M/M	18	0.190	0.045	0.140

Table 5: reproducibilities of tests on sample #22181 (o-Xylene)

Parameter	unit	n	average	2.8 * sd	R(target)
Appearance		21	Pass	n.a.	n.a.
Organic Chlorides	mg/kg	17	<1	n.e.	n.e.
Color Pt/Co		20	3.4	2.4	5.1
Density at 20 °C	kg/L	19	0.8610	0.0002	0.0005
Initial Boiling Point	°C	16	137.9	0.5	1.0
50% recovered	°C	16	138.3	0.1	0.4

Parameter	unit	n	average	2.8 * sd	R(target)
Dry Point	°C	16	138.4	0.1	0.4
Sulfur	mg/kg	15	0.20	0.11	0.16
Purity by GC	%M/M	19	99.794	0.047	0.042
o-Xylene	%M/M	21	0.031	0.003	0.040
m-Xylene	%M/M	21	0.113	0.058	0.037
Ethylbenzene	%M/M	22	0.036	0.005	0.008
Styrene	%M/M	11	<0.001	n.e.	n.e.
Toluene	%M/M	20	0.011	0.002	0.005
Non-aromatics	%M/M	19	0.011	0.007	0.025

Table 6: reproducibilities of tests on sample #22182 (p-Xylene)

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2022 WITH PREVIOUS PTS

	October 2022	October 2020	October 2018	October 2016	October 2014
Number of reporting laboratories	25	24	23	26	29
Number of test results	425	435	375	498	529
Number of statistical outliers	24	26	16	16	29
Percentage of statistical outliers	5.6%	6.0%	4.3%	3.2%	5.5%

Table 7: comparison with previous proficiency tests

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

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

Parameter	October 2022	October 2020	October 2018	October 2016	October 2014
Purity by GC	++	++	++	+	++
m-Xylene	++	++	++	+	++
p-Xylene	++	+	++	+/-	++
Ethylbenzene	+/-	+/-	+	+	++
n-Propylbenzene	++	-	+	-	+/-
iso-Propylbenzene (Cumene)	++	+	++	-	+
Styrene	-	+	+	+	+
Sum of Ethyltoluenes	++	+/-	-	-	+
Toluene	n.e.	n.e.	n.e.	+/-	+/-
C9 and heavier aromatics	++	++	++	++	n.e.
Non-aromatics	++	++	++	+/-	++

Table 8: comparison of determinations to the reference test methods of sample #22181 (o-Xylene)

Parameter	October 2022	October 2020	October 2018	October 2016	October 2014
Organic Chlorides	n.e.	++	++	++	++
Color Pt/Co	++	++	+	-	++
Density at 20 °C	++	++	++	++	++
Distillation	++	++	+	+	++
Sulfur	+	-	-	-	+/-
Purity by GC	+/-	+	-	+/-	++
o-Xylene	++	++	++	++	++
m-Xylene	-	+	-	+	+
Ethylbenzene	+	+	+	+	++
Styrene	n.e.	n.e.	n.e.	+/-	++
Toluene	++	++	++	+	++
Non-aromatics	++	++	++	++	++

Table 9: comparison of determinations to the reference test methods of sample #22182 (p-Xylene)

The following performance categories were used:

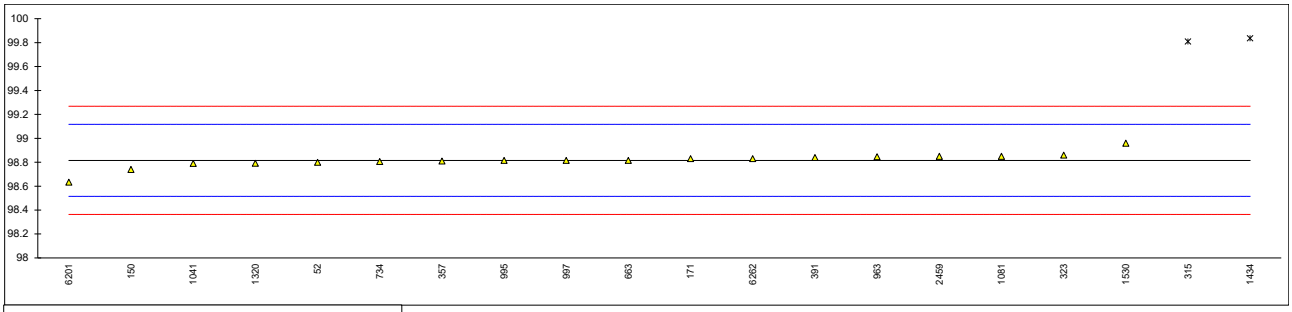
++ : group performed much better than the reference test method
+ : group performed better than the reference test method
+/- : group performance equals the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method
n.e.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

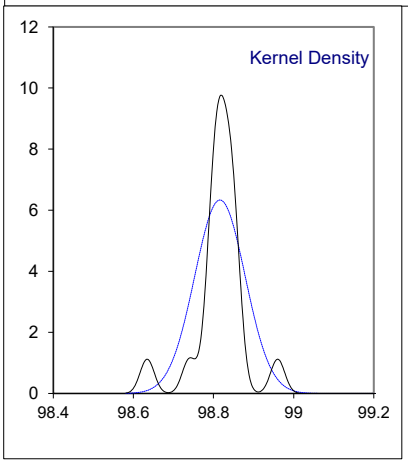
APPENDIX 1

Determination of Purity by GC of o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	98.80		-0.10	
150	D7504	98.7395		-0.51	
171	D7504	98.83		0.09	
315	D7504	99.81	R(0.01)	6.59	
323	D5917	98.86		0.29	
357	D7504	98.811	C	-0.03	first reported 99.081
391	D7504	98.84		0.16	
551		-----		-----	
558		-----		-----	
663	D7504	98.816		0.00	
734	D7504	98.80644		-0.06	
913		-----		-----	
963	D7504	98.846		0.20	
995	D7504	98.815		-0.01	
997	D7504	98.815		-0.01	
1011		-----		-----	
1041		98.790		-0.17	
1081	D3797	98.85		0.23	
1264		-----		-----	
1320	D7504	98.7916		-0.16	
1357	D7504	-----		-----	
1434	D3797	99.8359	C,R(0.01)	6.76	first reported 0.8359
1530	D7504	98.96	C	0.96	first reported 99.43
1688		-----		-----	
1880		-----		-----	
2459	Tti/Org/SOP-009	98.8491		0.22	
6134		-----		-----	
6201	D3797	98.6341		-1.20	
6262	D7504	98.8313		0.10	
9008		-----		-----	

normality	not OK
n	18
outliers	2
mean (n)	98.8158
st.dev. (n)	0.06297
R(calc.)	0.1763
st.dev.(D3797:05)	0.15085
R(D3797:05)	0.4224
Compare:	
R(D7504:21)	0.0554

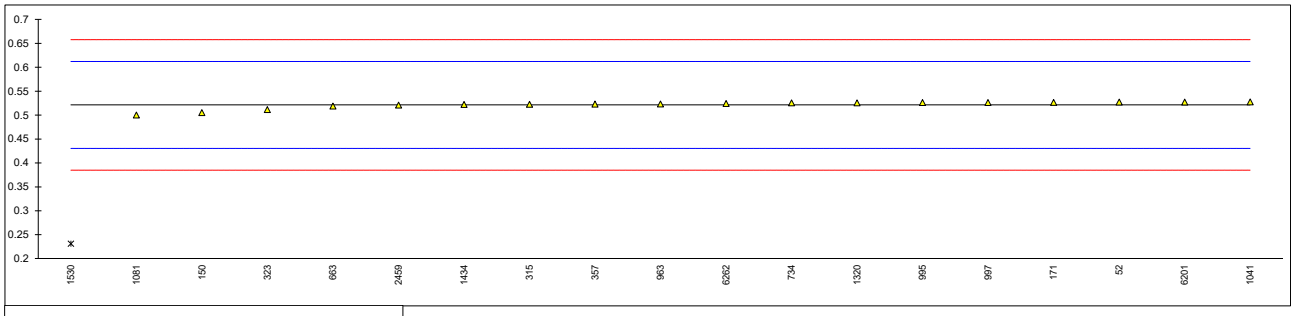


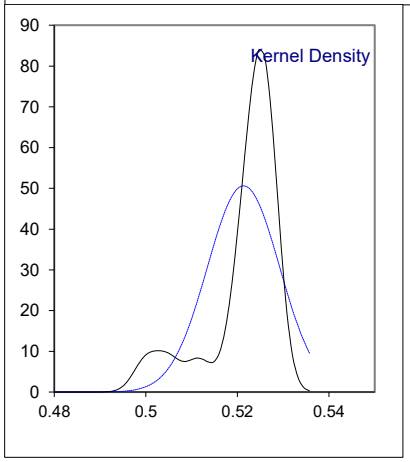


Determination of m-Xylene in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.5272		0.13	
150	D7504	0.505	C	-0.36	first reported 0.5431
171	D7504	0.5265		0.11	
315	D7504	0.5226		0.03	
323	D5917	0.5116		-0.21	
357	D7504	0.5230		0.04	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	0.51895		-0.05	
734	D7504	0.52530		0.09	
913		-----		-----	
963	D7504	0.5235		0.05	
995	D7504	0.5263		0.11	
997	D7504	0.5263		0.11	
1011		-----		-----	
1041		0.5275		0.14	
1081	D3797	0.5		-0.47	
1264		-----		-----	
1320	D7504	0.5254		0.09	
1357	D7504	-----		-----	
1434	D3797	0.5221		0.02	
1530	D7504	0.231	G(0.01)	-6.39	
1688		-----		-----	
1880		-----		-----	
2459		0.5211		-0.01	
6134		-----		-----	
6201	D3797	0.5273		0.13	
6262	D7504	0.5244		0.07	
9008		-----		-----	

	normality	not OK
	n	18
	outliers	1
	mean (n)	0.5213
	st.dev. (n)	0.00789
	R(calc.)	0.0221
	st.dev.(D3797:05)	0.04541
	R(D3797:05)	0.1272
Compare		
	R(D7504:21)	0.0205

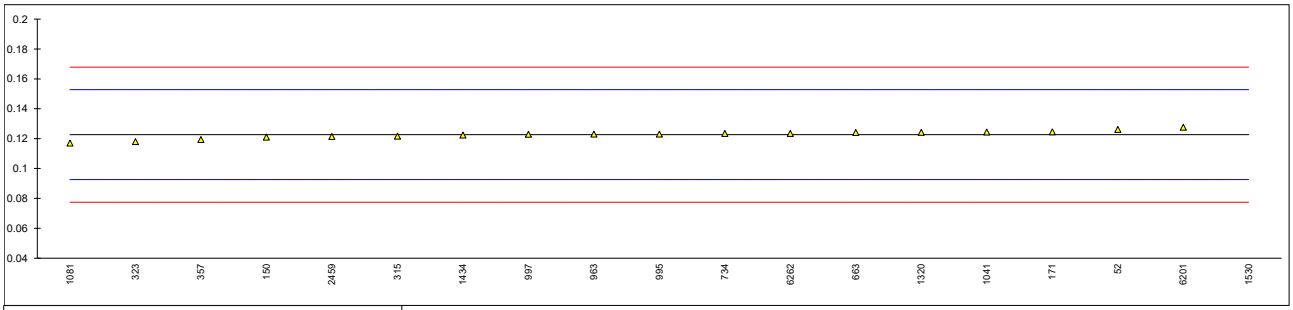


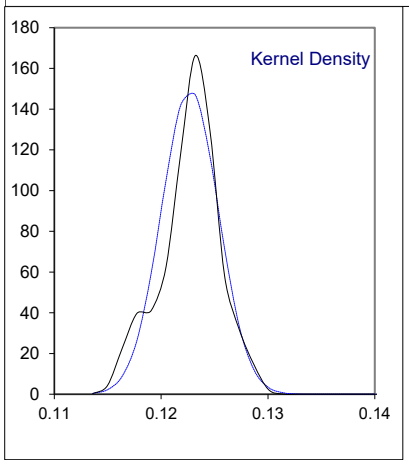


Determination of p-Xylene in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.1262		0.23	
150	D7504	0.121	C	-0.11	first reported 0.1292
171	D7504	0.1246		0.13	
315	D7504	0.1217		-0.07	
323	D5917	0.1180		-0.31	
357	D7504	0.1194		-0.22	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	0.12410		0.09	
734	D7504	0.12347		0.05	
913		-----		-----	
963	D7504	0.1231		0.03	
995	D7504	0.1231		0.03	
997	D7504	0.1230		0.02	
1011		-----		-----	
1041		0.1245		0.12	
1081	D3797	0.117		-0.38	
1264		-----		-----	
1320	D7504	0.1242		0.10	
1357	D7504	-----		-----	
1434	D3797	0.1224		-0.02	
1530	D7504	0.46	C,G(0.01)	22.39	first reported 0.229
1688		-----		-----	
1880		-----		-----	
2459		0.12145		-0.08	
6134		-----		-----	
6201	D3797	0.1277		0.33	
6262	D7504	0.1235		0.05	
9008		-----		-----	

normality	OK
n	18
outliers	1
mean (n)	0.1227
st.dev. (n)	0.00267
R(calc.)	0.0075
st.dev.(D3797:05)	0.01506
R(D3797:05)	0.0422
Compare	
R(D7504:21)	0.0070

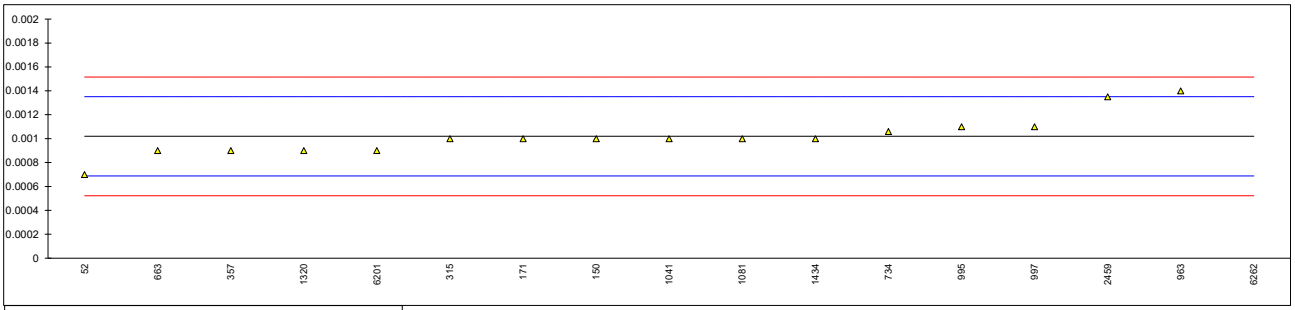


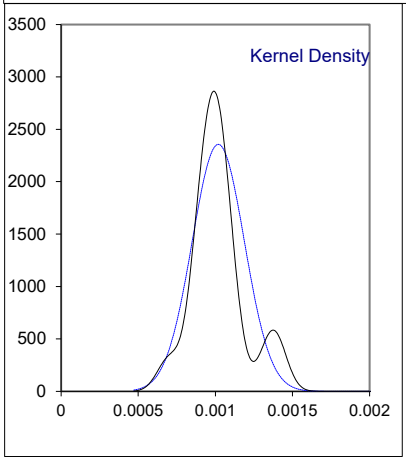


Determination of Ethylbenzene in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0007		-1.93	
150	D7504	0.0010		-0.12	
171	D7504	0.0010		-0.12	
315	D7504	0.0010		-0.12	
323	D5917	< 0.0010		-----	
357	D7504	0.0009		-0.72	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	0.00090		-0.72	
734	D7504	0.00106		0.25	
913		-----		-----	
963	D7504	0.0014		2.30	
995	D7504	0.0011		0.49	
997	D7504	0.0011		0.49	
1011		-----		-----	
1041		0.001		-0.12	
1081	D3797	0.001		-0.12	
1264		-----		-----	
1320	D7504	0.0009		-0.72	
1357		-----		-----	
1434	D3797	0.001		-0.12	
1530	D7504	<0.01	C	-----	first reported 0.106
1688		-----		-----	
1880		-----		-----	
2459		0.00135		2.00	
6134		-----		-----	
6201	D3797	0.0009		-0.72	
6262	D7504	0.0030	G(0.01)	11.97	
9008		-----		-----	

	normality	suspect
	n	16
	outliers	1
	mean (n)	0.00102
	st.dev. (n)	0.000169
	R(calc.)	0.00047
	st.dev.(D3797:05)	0.000165
	R(D3797:05)	0.00046
Compare		
	R(D7504:21)	0.00034

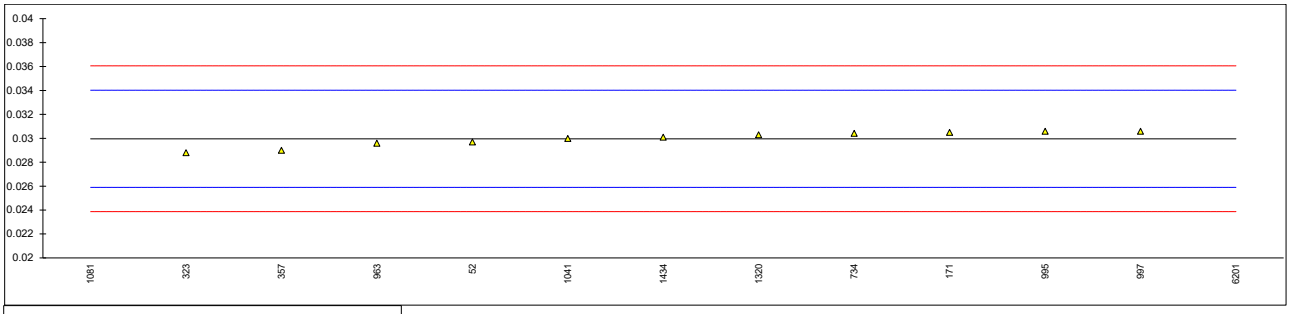


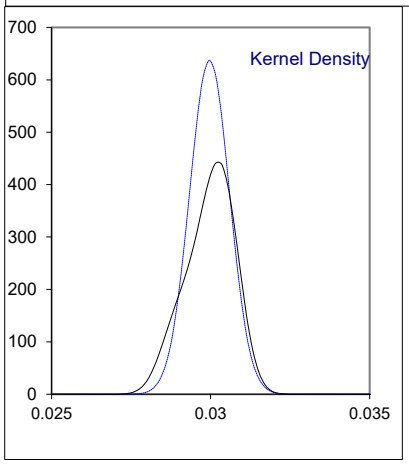


Determination of n-Propylbenzene in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0297		-0.13	
150		-----		-----	
171	D7504	0.0305		0.26	
315		-----		-----	
323	D5917	0.0288		-0.57	
357	D7504	0.0290		-0.48	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663		-----		-----	
734	D7504	0.03042		0.22	
913		-----		-----	
963	D7504	0.0296		-0.18	
995	D7504	0.0306		0.31	
997	D7504	0.0306		0.31	
1011		-----		-----	
1041		0.030		0.02	
1081	D3797	0.003	G(0.01)	-13.27	
1264		-----		-----	
1320	D7504	0.0303		0.16	
1357		-----		-----	
1434	D3797	0.0301		0.07	
1530		-----		-----	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.0497	G(0.01)	9.71	
6262		-----		-----	
9008		-----		-----	

normality	OK
n	11
outliers	2
mean (n)	0.0300
st.dev. (n)	0.00063
R(calc.)	0.0018
st.dev.(Horwitz)	0.00203
R(Horwitz)	0.0057

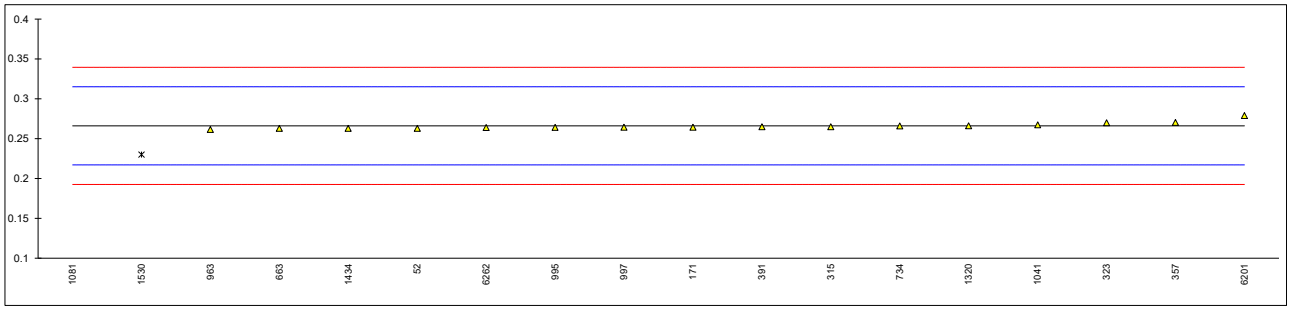


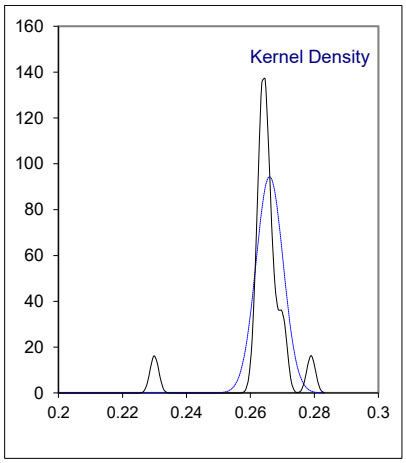


Determination of iso-Propylbenzene (Cumene) in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.2631		-0.12	
150		-----		-----	
171	D7504	0.2643		-0.07	
315	D7504	0.2650		-0.04	
323	D5917	0.2699		0.16	
357	D7504	0.2704		0.18	
391	D7504	0.265		-0.04	
551		-----		-----	
558		-----		-----	
663	D7504	0.26300		-0.12	
734	D7504	0.26608		0.00	
913		-----		-----	
963	D7504	0.2616		-0.18	
995	D7504	0.2641		-0.08	
997	D7504	0.2642		-0.07	
1011		-----		-----	
1041		0.2675		0.06	
1081	D3797	0.026	G(0.01)	-9.80	
1264		-----		-----	
1320	D7504	0.2663		0.01	
1357		-----		-----	
1434	D3797	0.2630		-0.12	
1530	D7504	0.23	C,G(0.01)	-1.47	first reported 0.229
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.2790		0.53	
6262	D7504	0.2640		-0.08	
9008		-----		-----	

	normality	not OK
	n	16
	outliers	2
	mean (n)	0.2660
	st.dev. (n)	0.00422
	R(calc.)	0.0118
	st.dev.(D3797:05)	0.02451
	R(D3797:05)	0.0686
Compare		
	R(D7504:21)	0.0122

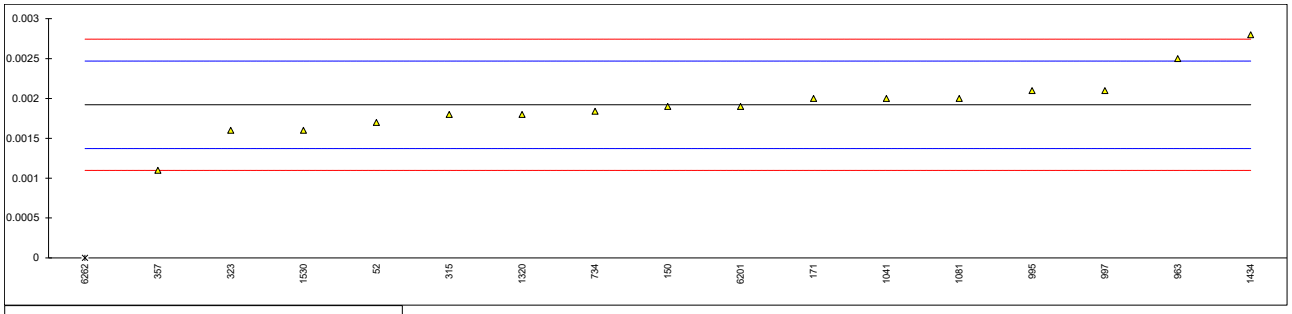


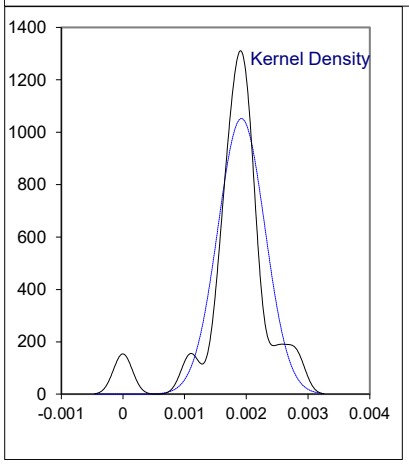


Determination of Styrene in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0017		-0.81	
150	D7504	0.0019		-0.08	
171	D7504	0.0020		0.29	
315	D7504	0.0018		-0.44	
323	D5917	0.0016		-1.17	
357	D7504	0.0011		-2.99	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663		-----		-----	
734	D7504	0.00184		-0.30	
913		-----		-----	
963	D7504	0.0025		2.11	
995	D7504	0.0021		0.65	
997	D7504	0.0021		0.65	
1011		-----		-----	
1041		0.002		0.29	
1081	D3797	0.002		0.29	
1264		-----		-----	
1320	D7504	0.0018		-0.44	
1357		-----		-----	
1434	D3797	0.0028		3.20	
1530	D7504	0.0016		-1.17	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.0019		-0.08	
6262	D7504	0	G(0.01)	-7.00	
9008		-----		-----	

normality	not OK
n	16
outliers	1
mean (n)	0.00192
st.dev. (n)	0.000379
R(calc.)	0.00106
st.dev.(D3797:05)	0.000274
R(D3797:05)	0.00077

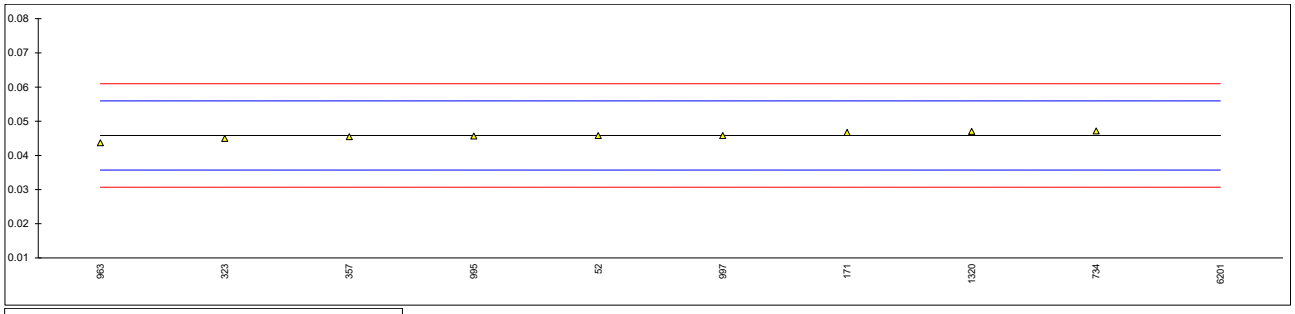


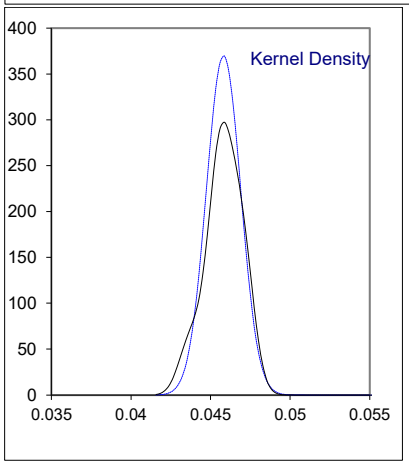


Determination of Sum of Ethyltoluenes in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0458		0.00	
150		-----		-----	
171	D7504	0.0467		0.17	
315		-----		-----	
323	D5917	0.0450		-0.16	
357	D7504	0.0455		-0.06	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663		-----		-----	
734	D7504	0.04718		0.27	
913		-----		-----	
963	D7504	0.0437		-0.42	
995	D7504	0.0457		-0.02	
997	D7504	0.0458		0.00	
1011		-----		-----	
1041		-----		-----	
1081		-----		-----	
1264		-----		-----	
1320	D7504	0.0470		0.23	
1357		-----		-----	
1434		-----		-----	
1530		-----		-----	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.1079	G(0.01)	12.30	
6262		-----		-----	
9008		-----		-----	

normality	OK
n	9
outliers	1
mean (n)	0.0458
st.dev. (n)	0.00108
R(calc.)	0.0030
st.dev.(Horwitz 3 comp)	0.00505
R(Horwitz 3 comp)	0.0141





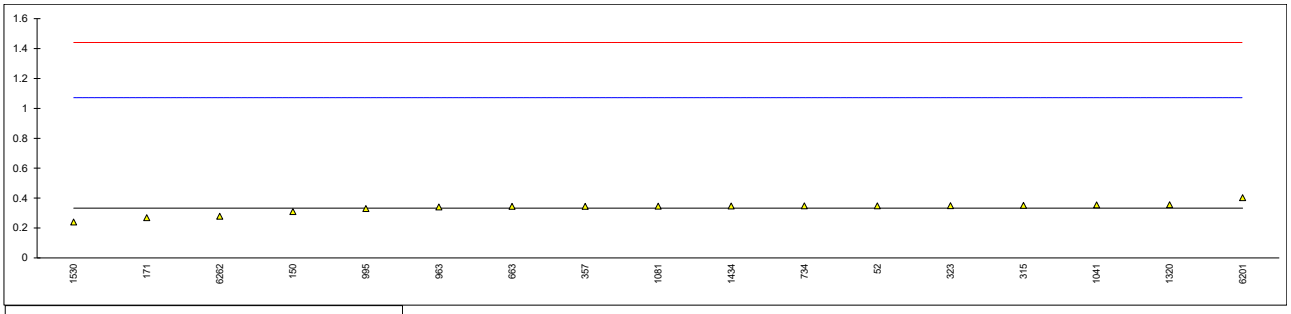
Determination of Toluene in o-Xylene sample #22181; results in %M/M

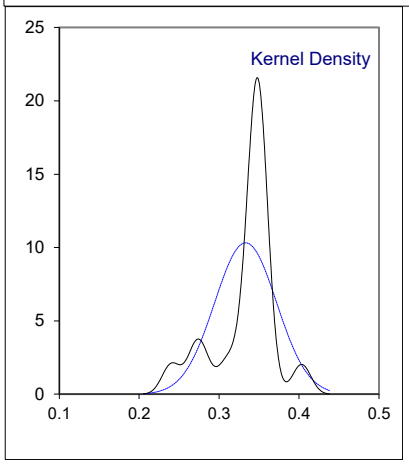
lab	method	value	mark	z(targ)	remarks
52	D7504	<0.0002		-----	
150	D7504	0.0004		-----	
171	D7504	0.0031		-----	
315	D7504	<0.0002		-----	
323	D5917	< 0.0010		-----	
357	D7504	<0,0002		-----	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	<0.0002		-----	
734	D7504	0.0000		-----	
913		-----		-----	
963	D7504	<0.0002		-----	
995	D7504	0.0003		-----	
997	D7504	0.0003		-----	
1011		-----		-----	
1041		<0,001		-----	
1081	D3797	0		-----	
1264		-----		-----	
1320		-----		-----	
1357		-----		-----	
1434	D3797	0.0000		-----	
1530	D7504	<0,005		-----	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0		-----	
6262	D7504	0.0010		-----	
9008		-----		-----	
	n	17			
	mean (n)	<0.005			

Determination of C9 and heavier aromatics in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.3483		0.04	
150	D7504	0.3092	C	-0.06	first reported 0.0936
171	D7504	0.2690		-0.17	
315	D7504	0.3508		0.05	
323	UOP720	0.3490		0.04	
357	D7504	0.3449		0.03	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	0.34485		0.03	
734	D7504	0.34812		0.04	
913		-----		-----	
963	D7504	0.3408		0.02	
995	D7504	0.3299		-0.01	
997		-----		-----	
1011		-----		-----	
1041		0.3545		0.06	
1081	D3797	0.346		0.04	
1264		-----		-----	
1320	D7504	0.3563		0.06	
1357		-----		-----	
1434	D3797	0.3475		0.04	
1530	D7504	0.24	C	-0.25	first reported 0.233
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.4030		0.19	
6262	D7504	0.2787		-0.15	
9008		-----		-----	

normality	suspect
n	17
outliers	0
mean (n)	0.3330
st.dev. (n)	0.03868
R(calc.)	0.1083
st.dev.(D7504:21)	0.36930
R(D7504:21)	1.0340

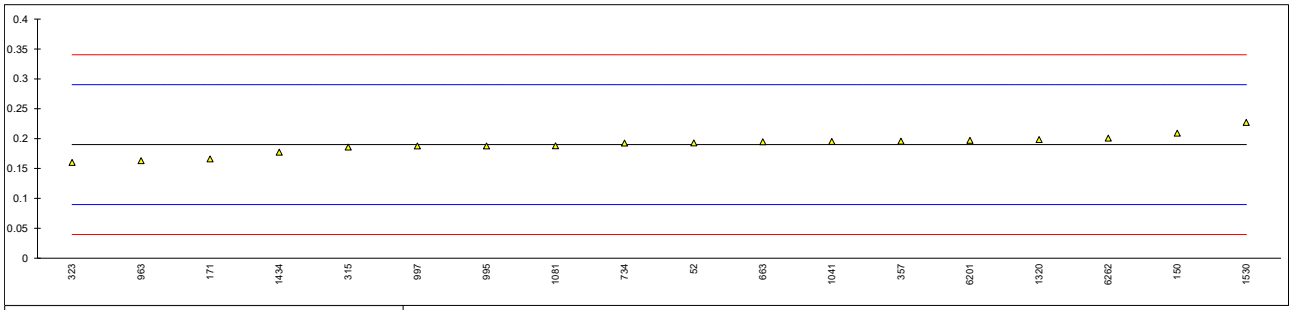


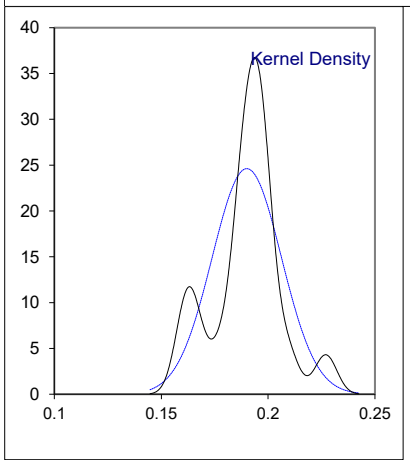


Determination of Non-aromatics in o-Xylene sample #22181; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.1929		0.06	
150	D7504	0.2094	C	0.39	first reported 0.2904
171	D7504	0.1661		-0.48	
315	D7504	0.1860		-0.08	
323	UOP720	0.1603		-0.59	
357	D7504	0.1960		0.12	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D7504	0.19480		0.09	
734	D7504	0.19259		0.05	
913		-----		-----	
963	D7504	0.1630		-0.54	
995	D7504	0.1879		-0.04	
997	D7504	0.1878		-0.05	
1011		-----		-----	
1041		0.1955		0.11	
1081	D3797	0.188		-0.04	
1264		-----		-----	
1320	D7504	0.1985		0.17	
1357		-----		-----	
1434	D3797	0.1773		-0.25	
1530	D7504	0.227		0.74	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D3797	0.1972		0.14	
6262	D7504	0.2009		0.22	
9008		-----		-----	

	normality	OK
	n	18
	outliers	0
	mean (n)	0.1901
	st.dev. (n)	0.01621
	R(calc.)	0.0454
	st.dev.(D3797:05)	0.05014
	R(D3797:05)	0.1404
Compare		
	R(D7504:21)	0.0220





Determination of Appearance of p-Xylene sample #22182;

lab	method	value	mark	z(targ)	remarks
52	D4176	Pass		-----	
150	Visual	Pass, Clear & Bright		-----	
171	Visual	Clear and Free , Pass		-----	
315	E2680	pass		-----	
323	E2680	C&B		-----	
357	E2680	Pass		-----	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	E2680	Pass		-----	
734	E2680	Pass		-----	
913		-----		-----	
963	EN15769	Pass		-----	
995	E2680	Pass		-----	
997	E2680	PASS C&B		-----	
1011		-----		-----	
1041	Visual	CFSM		-----	
1081	Visual	Bright and clear		-----	
1264		-----		-----	
1320		-----		-----	
1357	Visual	Bright&Clear		-----	
1434	Visual	clear liq		-----	
1530	Visual	C&B		-----	
1688	Visual	Clear		-----	
1880	D4176	Pass		-----	
2459		-----		-----	
6134	E2680	Clear & Bright free from suspended particles		-----	
6201	Visual	Br/CL		-----	
6262	Visual	Bright and clear		-----	
9008		-----		-----	
	n	21			
	mean (n)	Pass (Bright & Clear)			

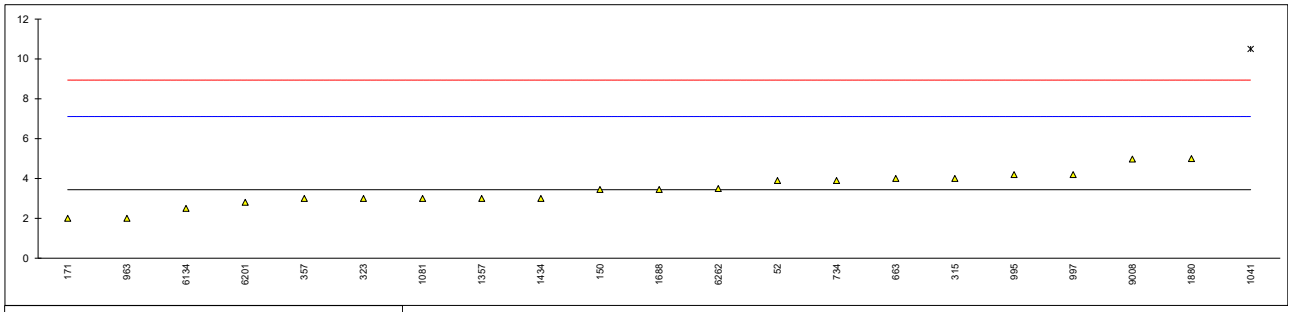
Determination of Organic Chlorides in p-Xylene sample #22182; results in mg/kg

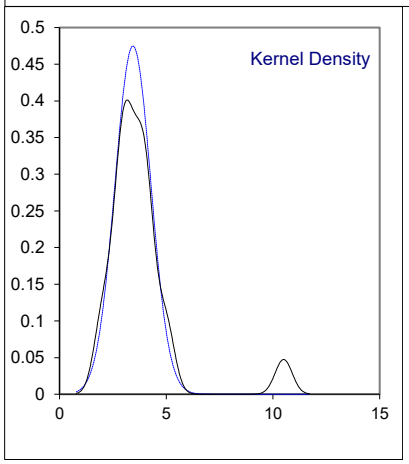
lab	method	value	mark	z(targ)	remarks
52	D7536	<0.2		-----	
150	D7359	<0.1		-----	
171	D5808	<1.0		-----	
315	D5808	<0.7		-----	
323	UOP779	< 1		-----	
357	D5808	<0,2		-----	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5808	<0.7		-----	
734		-----		-----	
913		-----		-----	
963	D5808	0.02		-----	
995		-----		-----	
997		-----		-----	
1011		-----		-----	
1041		-----		-----	
1081	D5808	<0.5		-----	
1264		-----		-----	
1320	D5808	< 0.10		-----	
1357	UOP779	<0.5		-----	
1434		-----		-----	
1530		-----		-----	
1688	D5808	0.26		-----	
1880	D7359	<0.1		-----	
2459		-----		-----	
6134	D5808	0.514		-----	
6201	D5808	<1		-----	
6262	UOP779	0		-----	
9008	D5808	<0.1		-----	
	n	17			
	mean (n)	<1			

Determination of Color Pt/Co of p-Xylene sample #22182;

lab	method	value	mark	z(targ)	remarks
52	D5386	3.9		0.25	
150	D5386	3.45		0.00	
171	D1209	2		-0.79	
315	D5386	4		0.30	
323	D5386	3		-0.24	
357	D5386	3		-0.24	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5386	4		0.30	
734	D1209	3.9		0.25	
913		-----		-----	
963	D5386	2		-0.79	
995	D5386	4.2		0.41	
997	D1209	4.2		0.41	
1011		-----		-----	
1041		10.5	R(0.01)	3.85	
1081	D5386	3		-0.24	
1264		-----		-----	
1320		-----		-----	
1357	D1209	3.0		-0.24	
1434	D1209	3		-0.24	
1530	D5386	<3		-----	
1688	D1209	3.45		0.00	
1880	D5386	5.0		0.85	
2459		-----		-----	
6134	D1209	2.5		-0.51	
6201	D5386	2.8		-0.35	
6262	D1209	3.5		0.03	
9008	D5386	4.98		0.84	

	normality	OK
	n	20
	outliers	1
	mean (n)	3.44
	st.dev. (n)	0.841
	R(calc.)	2.35
	st.dev.(D5386:16)	1.833
	R(D5386:16)	5.13
Compare		
	R(D1209:05R19)	7

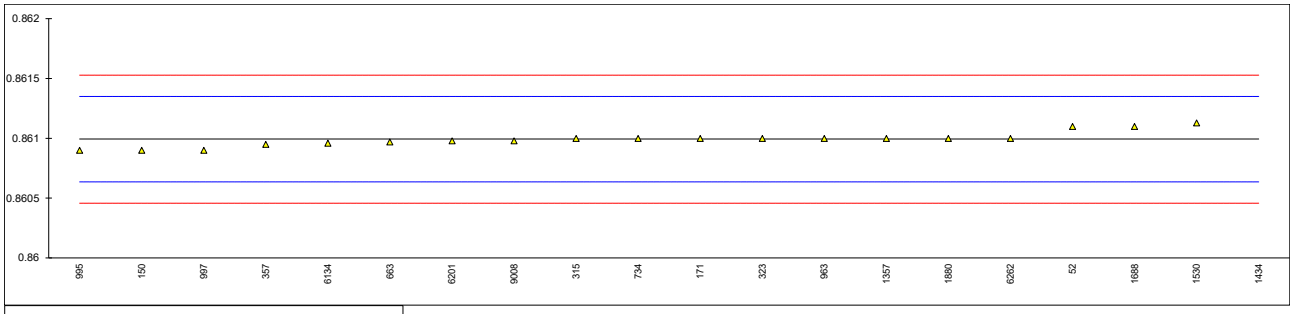


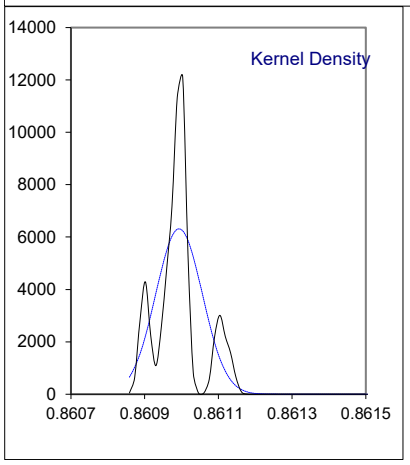


Determination of Density at 20 °C of p-Xylene sample #22182; results in kg/L

lab	method	value	mark	z(targ)	remarks
52	D4052	0.8611		0.60	
150	D4052	0.8609		-0.52	
171	D4052	0.8610		0.04	
315	D4052	0.8610	C	0.04	first reported 8610 kg/L
323	D4052	0.8610		0.04	
357	D4052	0.86095		-0.24	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D4052	0.86097		-0.13	
734	D4052	0.8610		0.04	
913		-----		-----	
963	ISO3675	0.8610		0.04	
995	ISO12185	0.8609		-0.52	
997	ISO12185	0.8609		-0.52	
1011		-----		-----	
1041		-----		-----	
1081		-----		-----	
1264		-----		-----	
1320		-----		-----	
1357	D4052	0.8610	C	0.04	first reported 861.0 kg/L
1434	D4052	0.8645	R(0.01)	19.64	
1530	D4052	0.86113		0.77	
1688	D4052	0.8611		0.60	
1880	D4052	0.8610		0.04	
2459		-----		-----	
6134	D4052	0.86096	C	-0.19	first reported 860.96 kg/L
6201	ISO12185	0.86098		-0.07	
6262	D4052	0.8610		0.04	
9008	D4052	0.86098		-0.07	

normality	OK
n	19
outliers	1
mean (n)	0.86099
st.dev. (n)	0.000063
R(calc.)	0.00018
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005



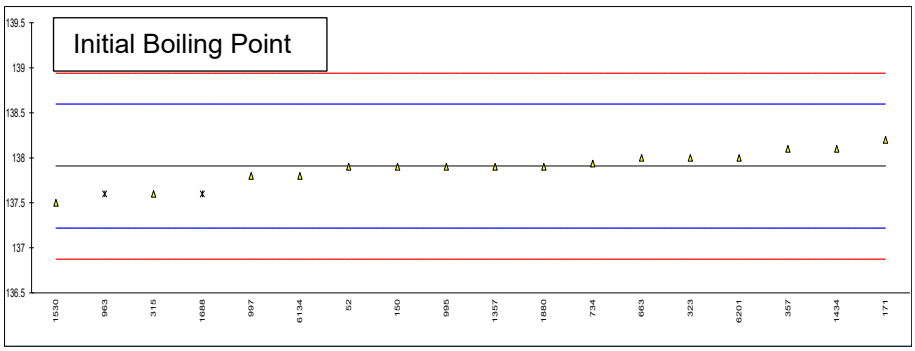


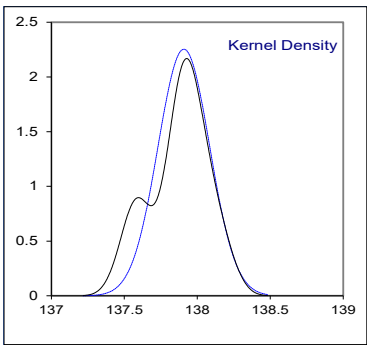
Determination of Distillation of p-Xylene sample #22182; results in °C

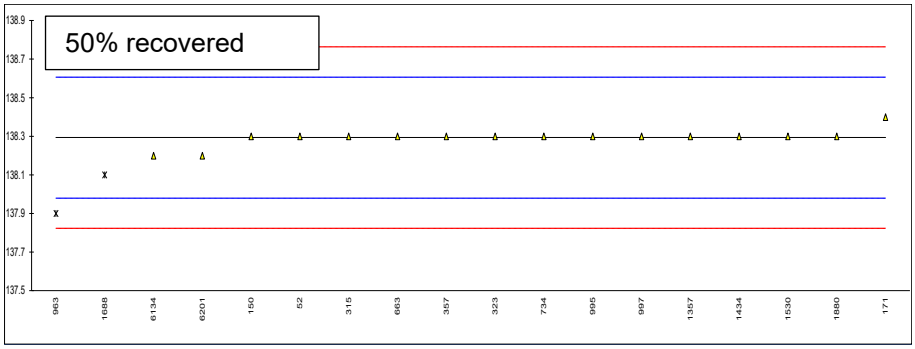
lab	method	IBP	mark	z(targ)	50%rec	mark	z(targ)	DP	mark	z(targ)	range
52	D850-automated	137.9		-0.02	138.3		0.04	138.4		-0.09	0.5
150	D850	137.9	C	-0.02	138.3		0.04	138.5		0.62	1.6
171	D1078	138.2		0.85	138.4		0.68	138.4		-0.09	0.2
315	D850-automated	137.6	C	-0.90	138.3		0.04	138.4		-0.09	1.1
323	D850-automated	138.0		0.27	138.3		0.04	138.4		-0.09	0.4
357	D850-automated	138.1		0.56	138.3		0.04	138.4		-0.09	0.3
391		-----		-----	-----		-----	-----		-----	-----
551		-----		-----	-----		-----	-----		-----	-----
558		-----		-----	-----		-----	-----		-----	-----
663	D850-automated	138.0		0.27	138.3		0.04	138.4		-0.09	0.4
734	D850-automated	137.935		0.08	138.30		0.04	138.41		-0.02	0.475
913		-----		-----	-----		-----	-----		-----	-----
963	D850-automated	137.6	ex	-0.90	137.9	G(0.01)	-2.51	138.2	DG(0.01)	-1.53	0.6
995	D850-manual	137.9		-0.02	138.3		0.04	138.5		0.62	0.6
997	D850-manual	137.8		-0.31	138.3		0.04	138.5		0.62	0.7
1011		-----		-----	-----		-----	-----		-----	-----
1041		-----		-----	-----		-----	-----		-----	-----
1081		-----		-----	-----		-----	-----		-----	-----
1264		-----		-----	-----		-----	-----		-----	-----
1320		-----		-----	-----		-----	-----		-----	-----
1357	D850-automated	137.9		-0.02	138.3		0.04	138.4		-0.09	0.5
1434	D850-automated	138.1		0.56	138.3		0.04	138.4		-0.09	0.3
1530	D850-automated	137.5		-1.19	138.3		0.04	138.4		-0.09	0.9
1688	D850-automated	137.6	ex	-0.90	138.1	G(0.05)	-1.24	138.2	DG(0.01)	-1.53	0.65
1880	D850-automated	137.9		-0.02	138.3		0.04	138.4		-0.09	0.5
2459		-----		-----	-----		-----	-----		-----	-----
6134	D850-manual	137.8		-0.31	138.2		-0.60	138.4		-0.09	0.6
6201	D850-manual	138.0		0.27	138.2		-0.60	138.3		-0.81	0.3
6262		-----		-----	-----		-----	-----		-----	-----
9008		-----		-----	-----		-----	-----		-----	-----

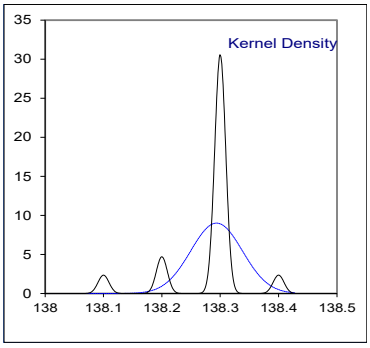
normality	suspect	not OK	suspect
n	16	16	16
outliers	0 + 2ex	2	2
mean (n)	137.91	138.29	138.41
st.dev. (n)	0.177	0.044	0.050
R(calc.)	0.50	0.12	0.14
st.dev.(D850-A:21)	0.344	0.157	0.139
R(D850-A:21)	0.96	0.44	0.39

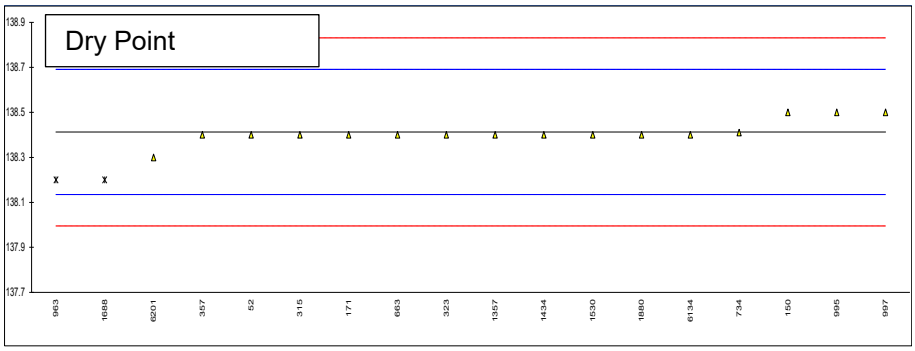
Lab 150 first reported 136.9 for IBP
Lab 315 first reported 137.3 for IBP
Lab 963 test result excluded as statistical outliers in related parameters
Lab 1688 test result excluded as statistical outliers in related parameters

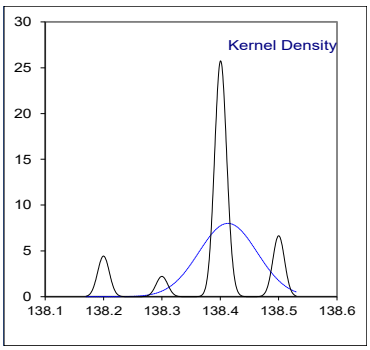

Initial Boiling Point
139.5
139
138.5
138
137.5
137
136.5
1530 963 315 1688 997 6134 52 150 995 1357 1880 734 663 323 6201 357 1434 171


Kernel Density
2.5
2
1.5
1
0.5
0
137 137.5 138 138.5 139


50% recovered
138.9
138.7
138.5
138.3
138.1
137.9
137.7
137.5
963 1688 6134 6201 150 52 315 663 357 323 734 995 997 1357 1434 1630 1880 171


Kernel Density
35
30
25
20
15
10
5
0
138 138.1 138.2 138.3 138.4 138.5

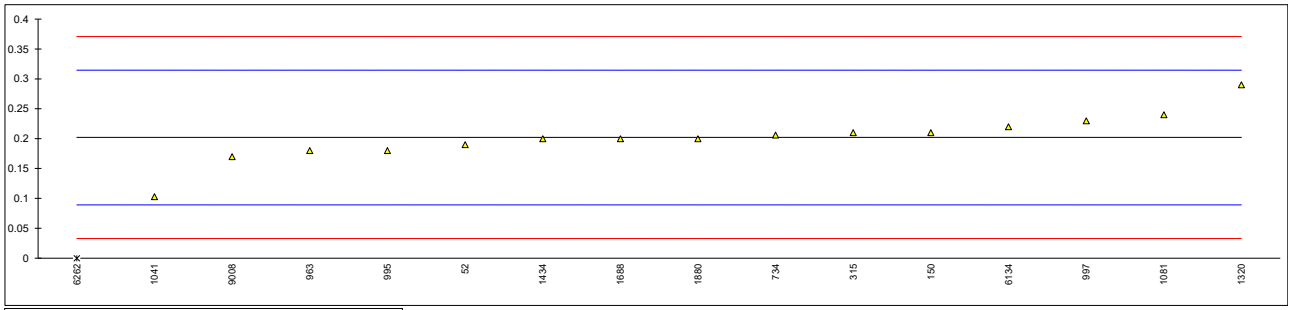

Dry Point
138.9
138.7
138.5
138.3
138.1
137.9
137.7
963 1688 6201 357 52 315 171 663 323 1357 1434 1630 1880 6134 734 150 995 997

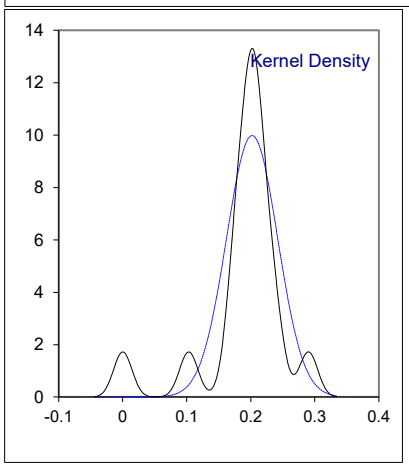

Kernel Density
30
25
20
15
10
5
0
138.1 138.2 138.3 138.4 138.5 138.6

Determination of Sulfur in p-Xylene sample #22182; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	D7183	0.19		-0.21	
150	D7183	0.21		0.14	
171	D5453	<0.5		-----	
315	D7183	0.21		0.14	
323	D5453	< 1		-----	
357	D5453	<1		-----	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5453	<1.0		-----	
734	D7183	0.206		0.07	
913		-----		-----	
963	D7183	0.18	C	-0.39	first reported 0.39
995	D7183	0.18		-0.39	
997	D7183	0.23		0.50	
1011		-----		-----	
1041	D5453	0.103		-1.76	
1081	D7183	0.24		0.68	
1264		-----		-----	
1320	ISO20846	0.29		1.56	
1357	D5453	<0.2		-----	
1434	D7183	0.2		-0.03	
1530	D5453	<1		-----	
1688	D7183	0.20		-0.03	
1880	D5453	0.20		-0.03	
2459		-----		-----	
6134	D7183	0.22		0.32	
6201	D7183	<0.5	C	-----	first reported 0.43
6262	D5453	0	G(0.01)	-3.59	
9008	D5453	0.17		-0.57	

	normality	not OK
	n	15
	outliers	1
	mean (n)	0.202
	st.dev. (n)	0.0400
	R(calc.)	0.112
	st.dev.(D7183:18ae1)	0.0563
	R(D7183:18ae1)	0.158
Compare		
	R(D5453:19a)	0.175

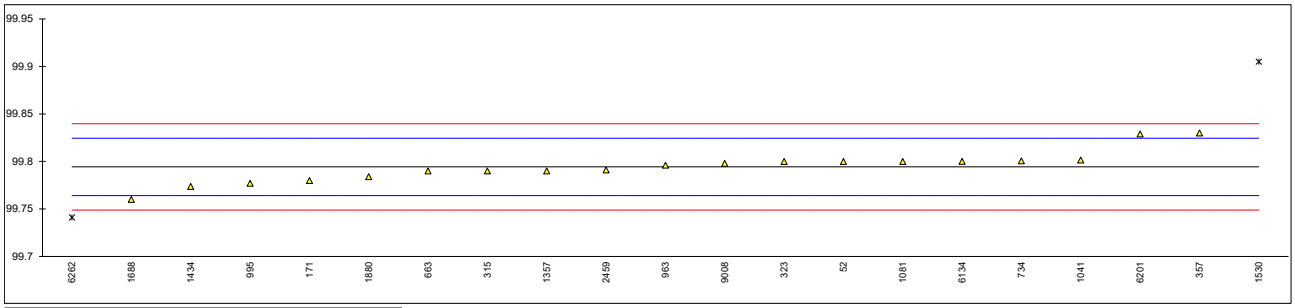


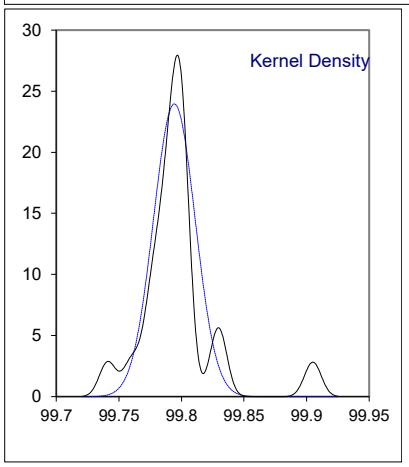


Determination of Purity by GC in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	99.80		0.38	
150		-----		-----	
171	D7504	99.78		-0.94	
315	D7504	99.79		-0.28	
323	D5917	99.80		0.38	
357	D5917	99.83		2.36	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	99.790		-0.28	
734	D5917	99.8006		0.42	
913		-----		-----	
963	D7504	99.796		0.11	
995	D5917	99.777		-1.14	
997		-----		-----	
1011		-----		-----	
1041		99.8015		0.48	
1081	D3798	99.80		0.38	
1264		-----		-----	
1320		-----		-----	
1357	D7504	99.79		-0.28	
1434	D7504	99.7737		-1.36	
1530	D7504	99.905	C,D(0.01)	7.31	first reported 99.902
1688	D7504	99.76		-2.26	
1880	D5917	99.784		-0.68	
2459	Tti/Org/SOP-009	99.79105		-0.21	
6134	D7504	99.8002		0.39	
6201	D5917	99.829		2.29	
6262	D7504	99.7410	D(0.05)	-3.52	
9008	UOP720	99.798		0.25	

	normality	suspect
	n	19
	outliers	2
	mean (n)	99.7943
	st.dev. (n)	0.01666
	R(calc.)	0.0466
	st.dev.(D5917:15R19)	0.01514
	R(D5917:15R19)	0.0424
Compare		
	R(D7504:21)	0.0173

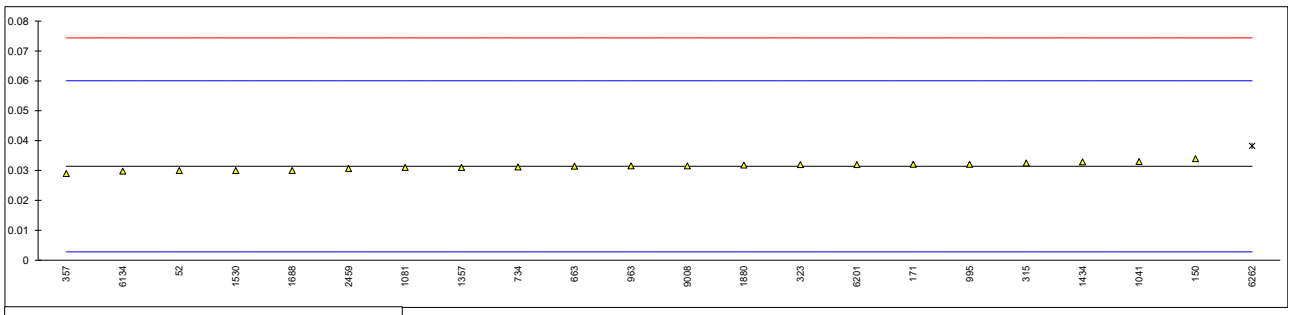


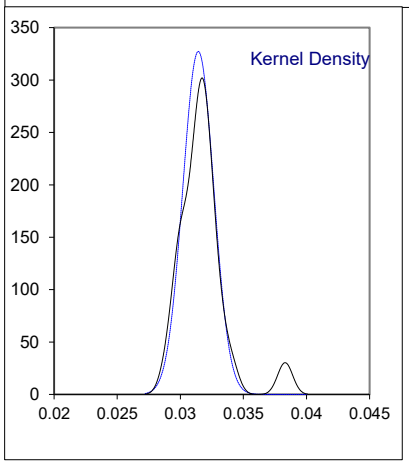


Determination of o-Xylene in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	0.030		-0.10	
150	D5917	0.034	C	0.18	first reported 0.0420
171	D7504	0.0321		0.05	
315	D7504	0.0325		0.08	
323	D5917	0.0320		0.04	
357	D5917	0.029		-0.17	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	0.0315		0.01	
734	D5917	0.03121		-0.01	
913		-----		-----	
963	D7504	0.0316		0.01	
995	D5917	0.0321		0.05	
997		-----		-----	
1011		-----		-----	
1041		0.033		0.11	
1081	D3798	0.031		-0.03	
1264		-----		-----	
1320		-----		-----	
1357	D7504	0.031		-0.03	
1434	D7504	0.0329		0.10	
1530	D7504	0.030	C	-0.10	first reported 0.0277
1688	D7504	0.03		-0.10	
1880	D5917	0.0318		0.03	
2459		0.030735		-0.05	
6134	D7504	0.0298		-0.11	
6201	D5917	0.0320		0.04	
6262	D7504	0.0383	R(0.01)	0.48	
9008	UOP720	0.0316		0.01	

	normality	OK
	n	21
	outliers	1
	mean (n)	0.03142
	st.dev. (n)	0.001219
	R(calc.)	0.00341
	st.dev.(D5917:15R19)	0.014311
	R(D5917:15R19)	0.04007
Compare		
	R(D7504:21)	0.00255

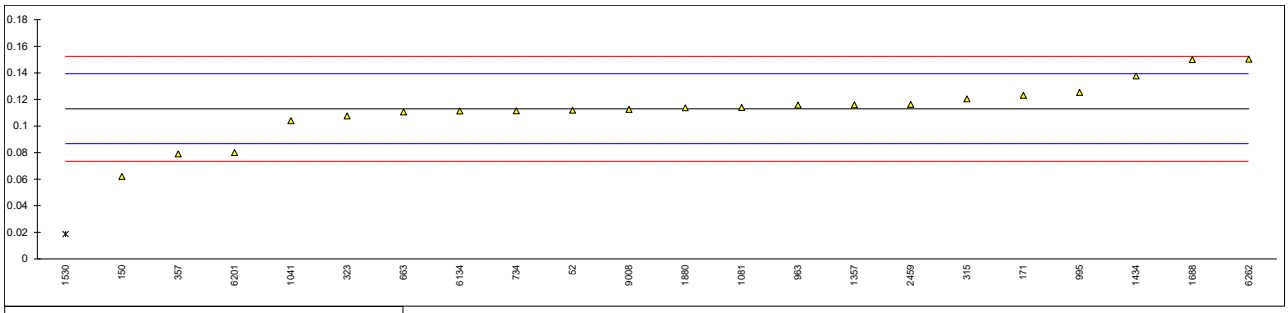


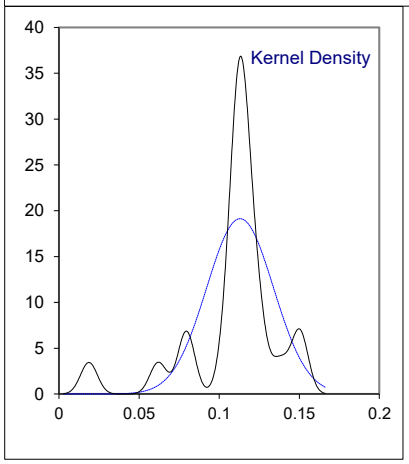


Determination of m-Xylene in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	0.112		-0.08	
150	D5917	0.062	C	-3.87	first reported 0.0647
171	D7504	0.1232		0.77	
315	D7504	0.1206		0.57	
323	D5917	0.1076		-0.41	
357	D5917	0.079		-2.58	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	0.1106		-0.18	
734	D5917	0.11140		-0.12	
913		-----		-----	
963	D7504	0.1158		0.21	
995	D5917	0.1253		0.93	
997		-----		-----	
1011		-----		-----	
1041		0.104		-0.69	
1081	D3798	0.114		0.07	
1264		-----		-----	
1320		-----		-----	
1357	D7504	0.116		0.23	
1434	D7504	0.1378		1.88	
1530	D7504	0.0187	C,R(0.01)	-7.16	first reported 0.018
1688	D7504	0.15		2.80	
1880	D5917	0.1138		0.06	
2459		0.1163		0.25	
6134	D7504	0.1113		-0.13	
6201	D5917	0.0800		-2.51	
6262	D7504	0.1504		2.84	
9008	UOP720	0.1126		-0.03	

	normality	suspect
	n	21
	outliers	1
	mean (n)	0.1130
	st.dev. (n)	0.02085
	R(calc.)	0.0584
	st.dev.(D5917:15R19)	0.01318
	R(D5917:15R19)	0.0369
Compare		
	R(D7504:21)	0.0150

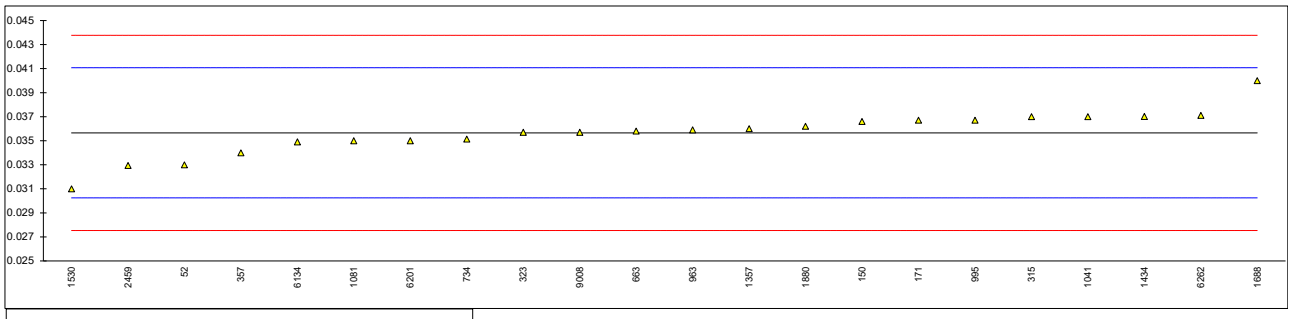


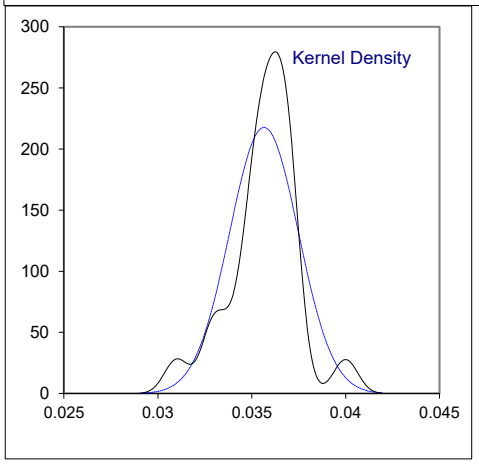


Determination of Ethylbenzene in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	0.033		-0.98	
150	D5917	0.0366		0.35	
171	D7504	0.0367		0.39	
315	D7504	0.0370		0.50	
323	D5917	0.0357		0.02	
357	D5917	0.034		-0.61	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	0.0358		0.05	
734	D5917	0.03514		-0.19	
913		-----		-----	
963	D7504	0.0359		0.09	
995	D5917	0.0367		0.39	
997		-----		-----	
1011		-----		-----	
1041		0.037		0.50	
1081	D3798	0.035		-0.24	
1264		-----		-----	
1320		-----		-----	
1357	D7504	0.036		0.13	
1434	D7504	0.03702		0.50	
1530	D7504	0.031	C	-1.72	first reported 0.0303
1688	D7504	0.04		1.61	
1880	D5917	0.0362		0.20	
2459		0.03294		-1.00	
6134	D7504	0.0349		-0.28	
6201	D5917	0.0350		-0.24	
6262	D7504	0.0371		0.53	
9008	UOP720	0.0357		0.02	

	normality	suspect
	n	22
	outliers	0
	mean (n)	0.0357
	st.dev. (n)	0.00183
	R(calc.)	0.0051
	st.dev.(D5917:15R19)	0.00271
	R(D5917:15R19)	0.0076
Compare		
	R(D7504:21)	0.0042





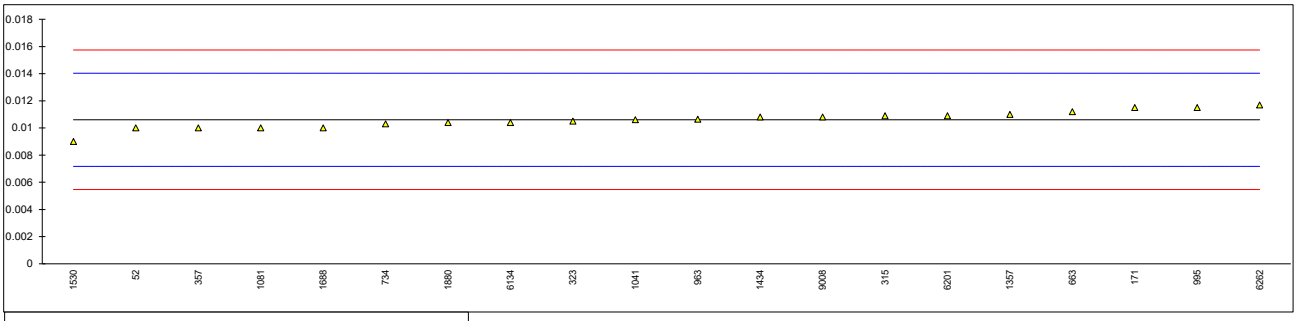
Determination of Styrene in p-Xylene sample #22182; results in %M/M

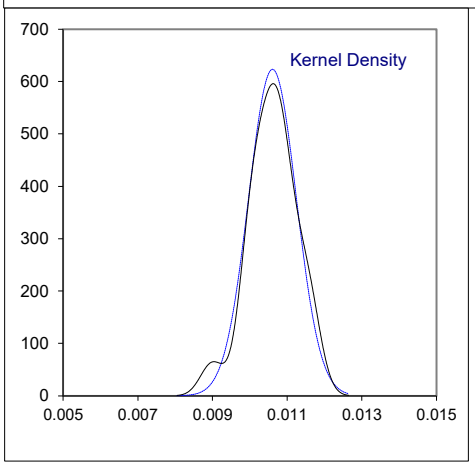
lab	method	value	mark	z(targ)	remarks
52	D5917	<0.001		-----	
150	D5917	<0.1		-----	
171	D7504	<0.0005		-----	
315	D7504	<0.0002		-----	
323	D5917	< 0.0010		-----	
357	D5917	< 0,001		-----	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663		-----		-----	
734	D7504	0.00022		-----	
913		-----		-----	
963	D7504	0.0010		-----	
995	D5917	0.0003		-----	
997		-----		-----	
1011		-----		-----	
1041		<0,001		-----	
1081		-----		-----	
1264		-----		-----	
1320		-----		-----	
1357		-----		-----	
1434	D7504	0.0000		-----	
1530	D7504	<0,005		-----	
1688		-----		-----	
1880		-----		-----	
2459		-----		-----	
6134		-----		-----	
6201	D5917	<0.001		-----	
6262	D7504	0		-----	
9008		-----		-----	
	n	11			
	mean (n)	<0.001			

Determination of Toluene in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	0.010		-0.35	
150	D5917	<0.1		-----	
171	D7504	0.0115		0.52	
315	D7504	0.0109		0.17	
323	D5917	0.0105		-0.06	
357	D5917	0.010		-0.35	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	0.0112		0.35	
734	D5917	0.01030		-0.18	
913		-----		-----	
963	D7504	0.01065		0.02	
995	D5917	0.0115		0.52	
997		-----		-----	
1011		-----		-----	
1041		0.0106		0.00	
1081	D3798	0.010		-0.35	
1264		-----		-----	
1320		-----		-----	
1357	D7504	0.011		0.23	
1434	D7504	0.0108		0.11	
1530	D7504	0.009		-0.94	
1688	D7504	0.01		-0.35	
1880	D5917	0.0104		-0.12	
2459		-----		-----	
6134	D7504	0.0104		-0.12	
6201	D5917	0.0109		0.17	
6262	D7504	0.0117		0.64	
9008	UOP720	0.0108		0.11	

	normality	OK
	n	20
	outliers	0
	mean (n)	0.01061
	st.dev. (n)	0.000640
	R(calc.)	0.00179
	st.dev.(D5917:15R19)	0.001715
	R(D5917:15R19)	0.00480
Compare		
	R(D7504:21)	0.00090

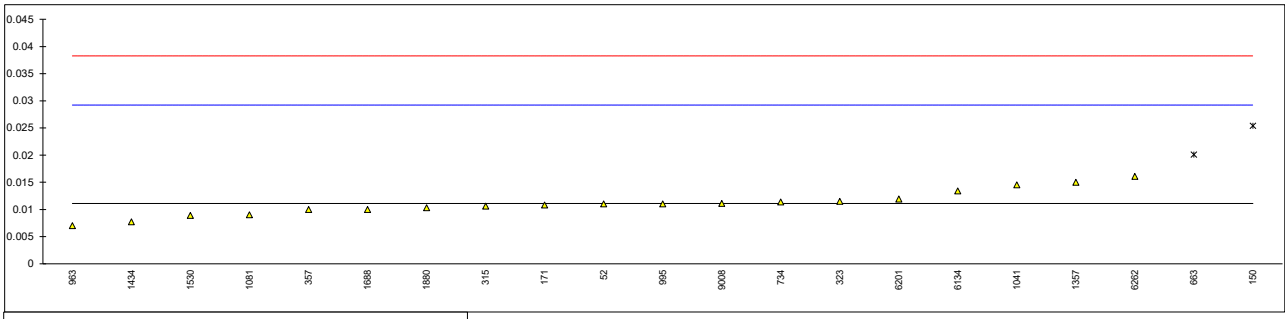


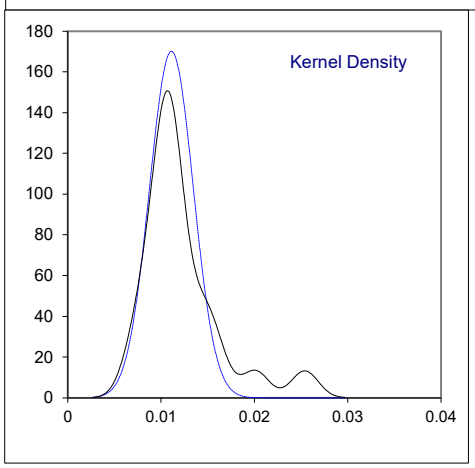


Determination of Non-aromatics in p-Xylene sample #22182; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D5917	0.011		-0.01	
150	D5917	0.0254	R(0.01)	1.58	
171	D7504	0.0108		-0.03	
315	D7504	0.0106		-0.06	
323	D5917	0.0115		0.04	
357	D5917	0.010		-0.12	
391		-----		-----	
551		-----		-----	
558		-----		-----	
663	D5917	0.0201	R(0.05)	0.99	
734	D5917	0.01137		0.03	
913		-----		-----	
963	D7504	0.007		-0.45	
995	D5917	0.0110		-0.01	
997		-----		-----	
1011		-----		-----	
1041		0.0145		0.37	
1081	D3798	0.009		-0.23	
1264		-----		-----	
1320		-----		-----	
1357	D7504	0.015		0.43	
1434	D7504	0.0077		-0.38	
1530	D7504	0.0089		-0.24	
1688	D7504	0.01		-0.12	
1880	D5917	0.0103		-0.09	
2459		-----		-----	
6134	D7504	0.0134		0.25	
6201	D5917	0.0119		0.09	
6262	D7504	0.0161		0.55	
9008	UOP720	0.0111		0.00	

	normality	OK
	n	19
	outliers	2
	mean (n)	0.01111
	st.dev. (n)	0.002345
	R(calc.)	0.00657
	st.dev.(D5917:15R19)	0.009055
	R(D5917:15R19)	0.02535
Compare		
	R(D7504:21)	0.01770





APPENDIX 2

Number of participants per country

2 labs in	BELGIUM
2 labs in	BRAZIL
1 lab in	CANADA
1 lab in	FINLAND
2 labs in	GEORGIA
2 labs in	GERMANY
2 labs in	INDIA
1 lab in	ISRAEL
1 lab in	ITALY
1 lab in	KAZAKHSTAN
2 labs in	KUWAIT
3 labs in	NETHERLANDS
1 lab in	OMAN
1 lab in	PAKISTAN
1 lab in	PORTUGAL
3 labs in	SAUDI ARABIA
1 lab in	SLOVAKIA
1 lab in	THAILAND
2 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
E	= calculation difference between reported test result and result calculated by iis
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
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
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