

Results of Proficiency Test
mixed-Xylenes
October 2015

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

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Report: iis15C11

December 2015

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1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organized once every two years a proficiency test for Mixed-Xylenes. During the annual proficiency testing program 2015/2016, it was decided to organize again a round robin for the analysis of Mixed-Xylenes. In this interlaboratory study, 34 laboratories from 20 different countries have participated. See appendix 2 for the number of participants per country. In this report, the results of the 2015 Mixed-Xylenes proficiency test are presented and discussed. This report is also electronically available through the iis internet site www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. Sample analyses for fit-for-use and homogeneity testing were subcontracted. It was decided to send 2 samples of different composition (2 * 0.25 L glass bottles, labelled #15191 and #15192). Participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 (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 organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol is electronically available through the iis internet site 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

Two different mixtures of Xylenes were prepared: sample #15191 without Ethylbenzene and sample #15192 with Ethylbenzene. Both batches (sample #15191 and sample #15192), were prepared in pre-cleaned cans from bulk material of high purity Xylenes. By mixing appropriate amounts approximately 15 litres (13.2 kg) bulk of each mixture was prepared. See table 1 and table 2 respectively for sample #15191 and sample #15192.

	<i>Ethylbenzene in kg</i>	<i>p-Xylene in kg</i>	<i>m-Xylene in kg</i>	<i>o-Xylene in kg</i>
sample #15191	0.00	4.62	3.30	5.28

table 1: preparation table for subsamples #15191.

	<i>Ethylbenzene in kg</i>	<i>p-Xylene in kg</i>	<i>m-Xylene in kg</i>	<i>o-Xylene in kg</i>
sample #15192	1.98	2.77	5.54	2.90

table 2: preparation table for subsamples #15192.

Subsequently, each bulk sample was transferred to 54 subsamples of 250 mL brown glass bottles and labelled respectively #15191 and #15192. The homogeneity of the subsamples #15191 and #15192 was checked by determination of p-Xylene in accordance with test method ASTM D6563 on 8 stratified randomly selected samples.

	<i>p-Xylene in %M/M</i>		<i>p-Xylene in %M/M</i>
sample #15191-1	35.54	sample #15192-1	20.91
sample #15191-2	35.55	sample #15192-2	20.91
sample #15191-3	35.55	sample #15192-3	20.91
sample #15191-4	35.55	sample #15192-4	20.91
sample #15191-5	35.55	sample #15192-5	20.91
sample #15191-6	35.55	sample #15192-6	20.91
sample #15191-7	35.55	sample #15192-7	20.91
sample #15191-8	35.55	sample #15192-8	20.90

table 3: homogeneity tests results for subsamples #15191 and #15192

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

	<i>p-Xylene in %M/M</i>	<i>p-Xylene in %M/M</i>
r (sample #15191)	0.01	--
r (sample #15192)	--	0.01
Reference method	ASTM D6563:12	ASTM D6563:12
0.3 x R (ref. method)	0.33	0.20

Table 4: evaluation of repeatabilities of subsamples #15191 and #15192

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

To each of the participating laboratories 2 bottles were sent (one bottle of 250 mL, labelled #15191 and one bottle of 250 mL, labelled #15192), on September 23, 2015.

2.5 STABILITY OF THE SAMPLES

The stability of the materials, packed in the brown glass bottles, was checked. The materials were found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were asked to determine on both samples: Benzene, Toluene, Ethylbenzene p-Xylene, m-Xylene, o-Xylene, Sum of m+p Xylene, Cumene, Sum of C9+ aromatics and Nonaromatics.

To get comparable results a detailed report form, on which the units were prescribed as well as the required standards and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/.

A SDS and a form to confirm receipt of the samples were added to the sample package.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered via the data entry portal www.kmpd.co.uk/sgs-iis/. The original data are tabulated per determination in the appendix 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 results at that moment.

Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, version 3.3) of April 2014.

For statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '<...>' or '>...>' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, 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. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

According to ISO 5725 the original results per determination were submitted to Dixon's and/or 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 (see appendix 3; no 14). 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. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

Finally, the reproducibilities were calculated from the standard deviations by multiplying 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 analysis results are plotted. The corresponding laboratory numbers are under the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 3; nos.12 and 13). Also a normal Gauss curve was projected over the Kernel Density Graph.

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, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the spread of this interlaboratory study.

The target standard deviation was calculated from the target reproducibility (preferably taken from a standardized test method) by division with 2.8.

The z-scores were calculated in accordance with:

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

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

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

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

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

4 EVALUATION

In this interlaboratory study, a number of laboratories encountered problems with sample despatch. Five participants reported results after the final reporting date and five laboratories did not report any test results due to several reasons. Finally, 29 laboratories did report 546 numerical results. Observed were 42 outlying results, which is 7.7%. In proficiency studies outlier percentages of 3 - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section the results are discussed per test. The methods, which are used by the various laboratories, are in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 3.

Regretfully, a standardized test method that covers all components evaluated in this study does not exist and a variety of test methods is required to have target reproducibilities of most components: ASTM D2360, ASTM D5917, ASTM D6563. The Horwitz equation was used for the components that were not mentioned in these standardized test methods.

For many components only reproducibilities at one defined concentration were given in the literature standards. In order to calculate the z-scores, estimated target reproducibilities derived from the literature standards were used.

For laboratory 1250, both test results for o-Xylene and p-Xylene were outliers, so the test result for m-Xylene for sample #15191 was excluded.

For laboratory 1813 outliers were observed for sample #15191 for five of the nine reported components and for sample #15192 outliers were observed for seven of the nine reported components. Therefore all other components were excluded from statistical evaluation.

For laboratory 1040 outliers were observed for sample #15192 for six of the ten reported components. Therefore all other components were excluded from statistical evaluation.

Not all original 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.

General:

In this round robin many different GC methods were used to determine the major components of the mixtures as well as the impurities. This was also the case in the previous rounds. Meanwhile method ASTM D6563:12 was issued, in which the reproducibilities for mixed-Xylenes are identical to the reproducibilities in the obsolete test method ASTM D2306. This is remarkable as the methods are not technically equivalent. Below is an overview of the test methods used and its quantification principles in order to enable judgement of the applicability:

D2306:00 - This obsolete test method determines the relative distribution of the individual C8 aromatic hydrocarbon isomers by normalization (major components only)

D2360:11 - This test method covers the determination of the total nonaromatic hydrocarbons, and trace monocyclic aromatic hydrocarbons (upto 1 %M/M)

D5917:09 - This test method covers the determination of the total nonaromatic hydrocarbons and trace monocyclic aromatic hydrocarbons (upto 2.5 %M/M)

D6563:12 - This test method covers the determination of the total nonaromatic hydrocarbons, benzene, toluene, ethylbenzene, xylenes, and total C9 + aromatic hydrocarbons, and the relative distribution of the individual C8 aromatic hydrocarbon isomers (both impurities and major components)

D7504:09 - This test method covers the determination of the total nonaromatic hydrocarbons and trace monocyclic aromatic hydrocarbons (upto 2.5 %M/M)

Benzene:

For sample #15191, the benzene content of sample was near or below the limit of detection and too low to allow any significant conclusions.

For sample #15192, this determination was problematic. Two statistical outliers and two false negative test results were observed. Two test results were excluded. The calculated reproducibility after rejection of the suspect data, is not in agreement with the strict estimated reproducibility calculated using the Horwitz equation.

Toluene:

This determination was not problematic for both samples.

For sample #15191 two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2360:11.

For sample #15192 three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2360:11.

Ethylbenzene: For sample #15191 this determination was not problematic. One statistical outlier was observed and one test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in good agreement with the requirements of ASTM D2360:11.

For sample #15192 this determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D6563:12.

p-Xylene: This determination was problematic for a number of laboratories.

For sample #15191 four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D6563:12.

For sample #15192 three statistical outliers were observed and one test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in good agreement with the requirements of ASTM D6563:12.

m-Xylene: For sample #15191, this determination was problematic. Two statistical outliers were observed and one test result was excluded. The calculated reproducibility after rejection of the suspect data is in not agreement with the requirements of ASTM D6563:12.

For sample #15192, this determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D6563:12.

o-Xylene: This determination was not problematic for both samples (#15191 and #15192). In total six statistical outliers were observed. For both samples the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D6563:12.

Cumene: This determination was problematic for both samples (#15191 and #15192). In total six statistical outliers were observed. For both samples the calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D2360:11.

Sum m+p-Xylene: This determination was not problematic for both samples (#15191 and #15192). In total four statistical outliers were observed and one test result

was excluded for sample #15192. For both samples the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D6563:12.

Sum C9+ arom.: For both samples 15191 and #15192 the C9+ concentrations were very low (0.03-0.04 %M/M). For such low concentrations no reproducibility values are given in ASTM D6563:12. Therefore no significant conclusions were drawn.

Nonaromatics: This determination was very problematic for both samples (#15191 and #15192). In total one statistical outlier was observed and two test results were excluded. For both samples the calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ASTM D2360:11.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories. The average results per sample, calculated reproducibilities and reproducibilities derived from literature standards (in casu ASTM standards), are compared in the next tables.

	unit	n	average	2.8 *sd _r	R(lit)
Benzene	%M/M	27	<0.002	n.a.	n.a.
Toluene	%M/M	26	0.009	0.002	0.002
Ethylbenzene	%M/M	27	0.045	0.009	0.017
p-Xylene	%M/M	24	34.51	0.20	0.33
m-Xylene	%M/M	25	25.40	0.29	0.21
o-Xylene	%M/M	26	39.89	0.32	0.43
Cumene	%M/M	25	0.031	0.005	0.004
Sum m+p-Xylene	%M/M	25	59.93	0.32	0.39
Sum C9 ⁺ aromatics	%M/M	24	0.048	0.028	(0.012)
Nonaromatics	%M/M	28	0.085	0.055	0.027

Table 5: reproducibilities of sample #15191

	unit	n	average	2.8 *sd _R	R (lit)
Benzene	%M/M	17	0.006	0.002	0.002
Toluene	%M/M	24	0.007	0.002	0.002
Ethylbenzene	%M/M	27	14.72	0.22	0.13
p-Xylene	%M/M	24	20.89	0.11	0.20
m-Xylene	%M/M	25	42.04	0.27	0.35
o-Xylene	%M/M	26	22.26	0.22	0.24
Cumene	%M/M	23	0.019	0.004	0.003
Sum m+p-Xylene	%M/M	26	62.93	0.27	0.40
Sum C9 ⁺ aromatics	%M/M	25	0.034	0.040	(0.008)
Nonaromatics	%M/M	27	0.059	0.044	0.019

Table 6: reproducibilities of sample #15192

* Reproducibilities (between brackets) are for consensus values below the application range.

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

4.3 COMPARISON OF THE OCTOBER 2015 PROFICIENCY TEST WITH PREVIOUS PTS

	<i>October 2015</i>	<i>September 2013</i>	<i>September 2011</i>	<i>September 2009</i>
Number of reporting labs	29	29	29	24
Number of results reported	546	519	519	430
Statistical outliers	42	57	36	26
Percentage outliers	7.7%	11.0%	6.9%	6.1%

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 against the requirements of the respective standards. The conclusions are given the following table:

	<i>October 2015</i>		<i>September 2013</i>		<i>September 2011</i>		<i>September 2009</i>
Benzene	n.e.	-	n.e.	(--)	--	n.e.	(--)
Toluene	+	+/-	++	--	+/-	++	++
Ethylbenzene	++	--	+/-	++	--	++	--
p-Xylene	+	++	-	++	++	++	++
m-Xylene	-	+	-	++	+/-	-	+/-
o-Xylene	+	+	--	+/-	--	+/-	--
Cumene	-	-	+	--	--	+	-
Sum of m+p Xylene	+	+	n.e.	n.e.	n.e.	n.e.	n.e.
C9 ⁺ aromatics	n.e.	n.e.	+	--	--	--	--
Nonaromatics	--	--	--	--	--	-	-

table 8: comparison of performances against the standard requirements over the last PTs

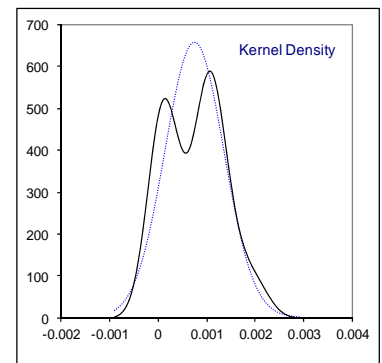
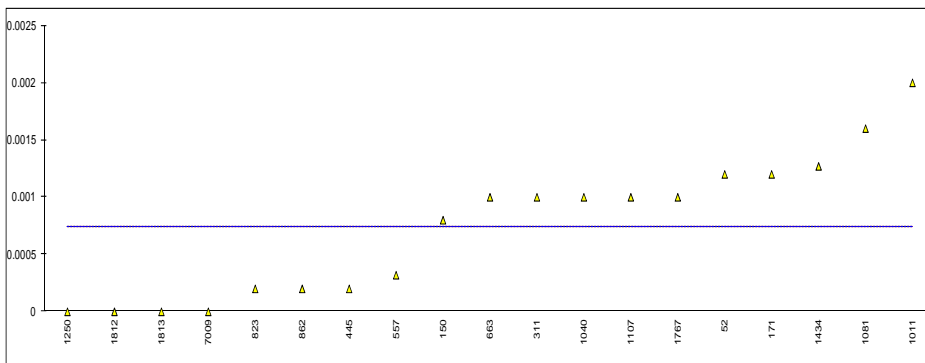
The performance of the determinations against the requirements of the respective standards is listed in the above table. The following performance categories were used:

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

APPENDIX 1

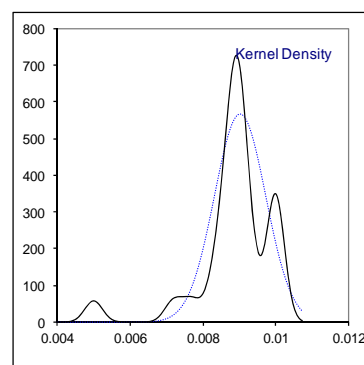
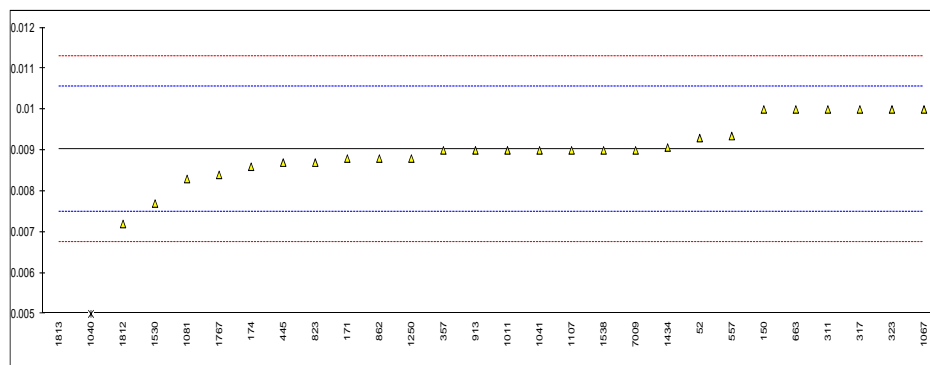
Determination of Benzene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0012		----	
150	D2360	0.0008		----	
158		----		----	
171	D6563	0.0012		----	
174	D6563	<0.0010		----	
311	D2360	0.001		----	
317	D6563	<0.01		----	
323	D6563	<0.01		----	
357	D6563	<0.001		----	
445	D2360	0.0002		----	
446	D6563	<0.01		----	
551		----		----	
555		----		----	
557	UOP798	0.00032		----	
621		----		----	
663	D6563	0.001		----	
823	D6563	0.0002		----	
862	D2360	0.0002		----	
913		----		----	
1011	D5917	0.002		----	
1040	D2360	0.001		----	
1041		<0.01		----	
1067	D6563	<0.01		----	
1081	D6563	0.0016		----	
1107	D6563	0.001	C	----	first reported:0.013
1250	D2360	0		----	
1434	D2360	0.00127		----	
1530		<0.001		----	
1538		----		----	
1767	D2360	0.0010		----	
1812		0.0000		----	
1813	D6563	0.00	ex	----	see § 4.1
1866		----		----	
7009	D2306	0.000		----	
normality		n.a.			
n		27			
outliers		n.a.			
mean (n)		<0.002			
st.dev. (n)		n.a.			
R(calc.)		n.a.			
R(Horwitz)		n.a.			



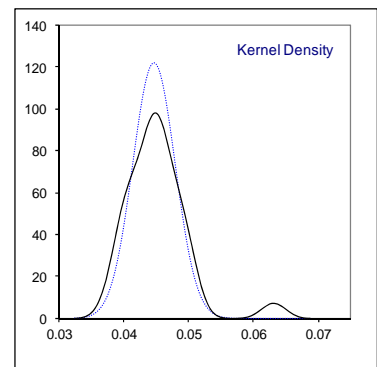
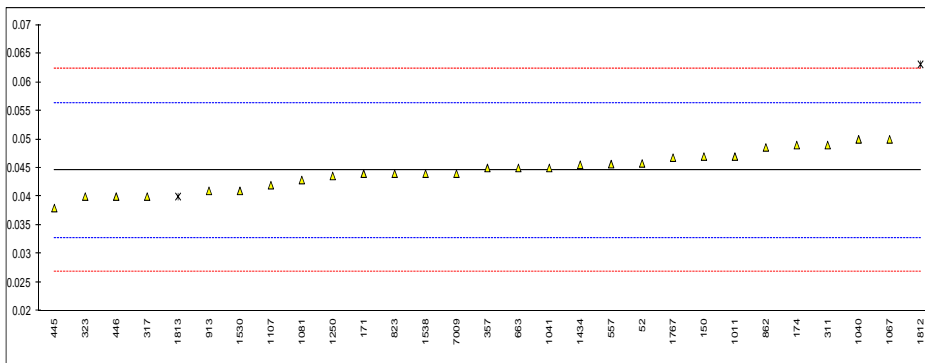
Determination of Toluene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0093		0.36	
150	D2360	0.010		1.28	
158		----		----	
171	D6563	0.0088		-0.30	
174	D6563	0.0086		-0.56	
311	D2360	0.010		1.28	
317	D6563	0.01		1.28	
323	D6563	0.01		1.28	
357	D6563	0.009		-0.04	
445	D2360	0.0087		-0.43	
446	D6563	<0.01		----	
551		----		----	
555		----		----	
557	UOP798	0.00935		0.42	
621		----		----	
663	D6563	0.010		1.28	
823	D6563	0.0087		-0.43	
862	D2360	0.0088		-0.30	
913	D6563	0.0090		-0.04	
1011	D5917	0.009		-0.04	
1040	D2360	0.005	R(0.01)	-5.30	
1041		0.009		-0.04	
1067	D6563	0.01		1.28	
1081	D6563	0.0083		-0.96	
1107	D6563	0.009		-0.04	
1250	D2360	0.0088		-0.30	
1434	D2360	0.00907		0.06	
1530	D2360	0.0077		-1.75	
1538	D2360	0.009		-0.04	
1767	D2360	0.0084		-0.83	
1812		0.0072		-2.40	
1813	D6563	0.00	R(0.01)	-11.88	
1866		----		----	
7009	D2306	0.009		-0.04	
normality		OK			
n		26			
outliers		2			
mean (n)		0.00903			
st.dev. (n)		0.000705			
R(calc.)		0.00197			
R(D2360:11)		0.00213			



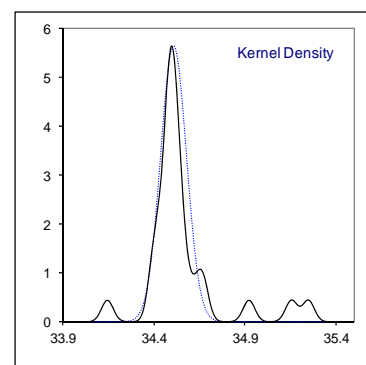
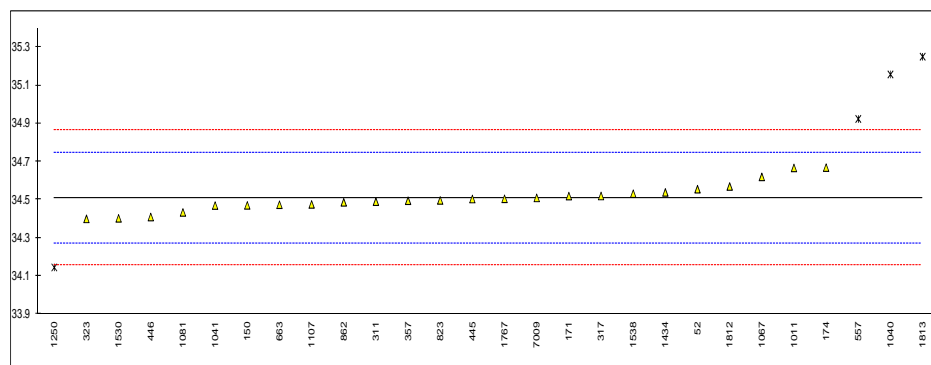
Determination of Ethylbenzene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0458		0.21	
150	D6563	0.047		0.41	
158		-----		-----	
171	D6563	0.0440		-0.10	
174	D6563	0.049		0.75	
311	D2360	0.049		0.75	
317	D6563	0.04		-0.78	
323	D6563	0.04		-0.78	
357	D6563	0.045		0.07	
445	D6563	0.038		-1.12	
446	D6563	0.04		-0.78	
551		-----		-----	
555		-----		-----	
557	UOP798	0.04567		0.18	
621		-----		-----	
663	D6563	0.045		0.07	
823	D6563	0.0440		-0.10	
862	D2360	0.0486		0.68	
913	D6563	0.0410		-0.61	
1011	D5917	0.047		0.41	
1040	D2360	0.050		0.92	
1041		0.045		0.07	
1067	D6563	0.05		0.92	
1081	D6563	0.0429		-0.29	
1107	D6563	0.042		-0.44	
1250	D2360	0.0436		-0.17	
1434	in house	0.04556		0.16	
1530	D2360	0.041		-0.61	
1538	D2360	0.044		-0.10	
1767	D2360	0.0468		0.37	
1812	D6563	0.0631	R(0.01)	3.14	
1813	D6563	0.04	ex	-0.78	see § 4.1
1866		-----		-----	
7009	D2306	0.044		-0.10	
normality		OK			
n		27			
outliers		1 + 1 excl.			
mean (n)		0.0446			
st.dev. (n)		0.00327			
R(calc.)		0.0092			
R(D2360:11)		0.0165			



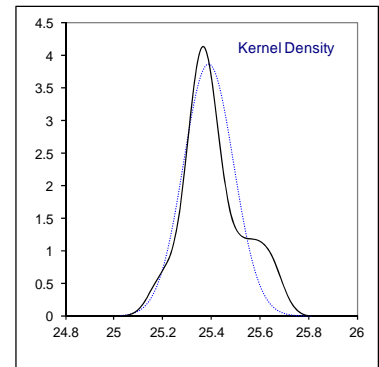
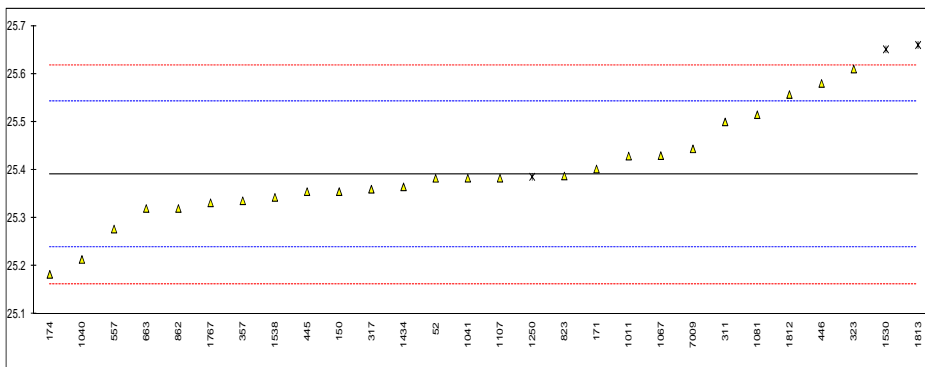
Determination of p-Xylene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	34.5558		0.40	
150	D6563	34.471		-0.32	
158		----		----	
171	D6563	34.5195		0.09	
174	D6563	34.669	C	1.36	first reported:34.948
311	D2306	34.49		-0.16	
317	D6563	34.52		0.09	
323	D6563	34.40		-0.92	
357	D6563	34.495		-0.12	
445	D6563	34.504		-0.04	
446	D6563	34.41		-0.84	
551		----		----	
555		----		----	
557	UOP798	34.92359	R(0.01)	3.51	
621		----		----	
663	D6563	34.474		-0.30	
823	D6563	34.4968		-0.10	
862	D6563	34.487		-0.19	
913		----		----	
1011	D5917	34.667		1.34	
1040	D7504	35.157	R(0.01)	5.49	
1041		34.470		-0.33	
1067	D6563	34.62		0.94	
1081	D6563	34.434		-0.64	
1107	D6563	34.476		-0.28	
1250	D2360	34.1456	R(0.01)	-3.08	
1434	in house	34.53894		0.25	
1530	D6563	34.403		-0.90	
1538	D6563	34.532		0.19	
1767	D6563	34.5054		-0.03	
1812	D6563	34.570		0.52	
1813	D6563	35.25	R(0.01)	6.28	
1866		----		----	
7009	D2306	34.510		0.01	
	normality	OK			
	n	24			
	outliers	4			
	mean (n)	34.5091			
	st.dev. (n)	0.07087			
	R(calc.)	0.1984			
	R(D6563:12)	0.3304			



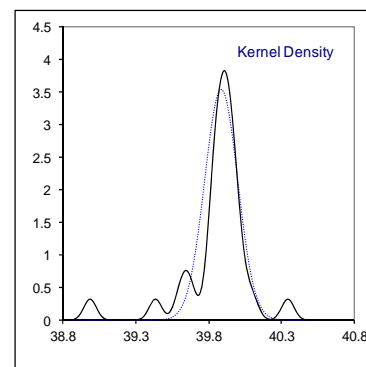
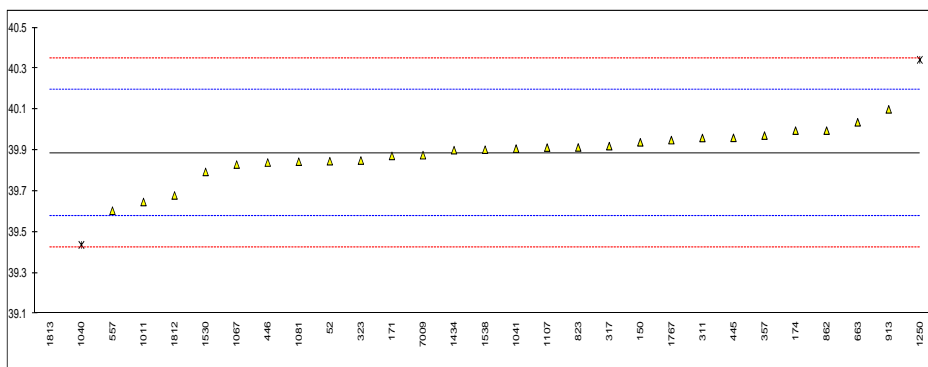
Determination of m-Xylene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	25.3828		-0.10	
150	D6563	25.355		-0.47	
158		-----		-----	
171	D6563	25.4021		0.15	
174	D6563	25.183	C	-2.73	first reported:25.805
311	D2306	25.50		1.44	
317	D6563	25.36		-0.40	
323	D6563	25.61		2.89	
357	D6563	25.336		-0.72	
445	D6563	25.355		-0.47	
446	D6563	25.58		2.50	
551		-----		-----	
555		-----		-----	
557	UOP798	25.27721		-1.49	
621		-----		-----	
663	D6563	25.320		-0.93	
823	D6563	25.3875		-0.04	
862	D6563	25.320		-0.93	
913		-----		-----	
1011	D5917	25.429		0.51	
1040	D7504	25.214		-2.33	
1041		25.383		-0.10	
1067	D6563	25.43		0.52	
1081	D6563	25.515		1.64	
1107	D6563	25.383		-0.10	
1250	D2360	25.3858	ex	-0.06	see § 4.1
1434	in house	25.36490		-0.34	
1530	D6563	25.651	R(0.05)	3.43	
1538	D6563	25.343		-0.63	
1767	D6563	25.3318		-0.77	
1812	D6563	25.557		2.19	
1813	D6563	25.66	R(0.05)	3.55	
1866		-----		-----	
7009	D2306	25.444		0.70	
normality		OK			
n		25			
outliers		2 + 1 excl.			
mean (n)		25.3905			
st.dev. (n)		0.10314			
R(calc.)		0.2888			
R(D6563:12)		0.2125			



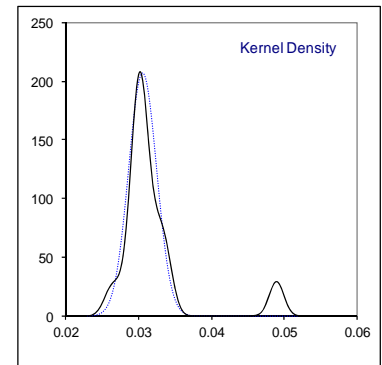
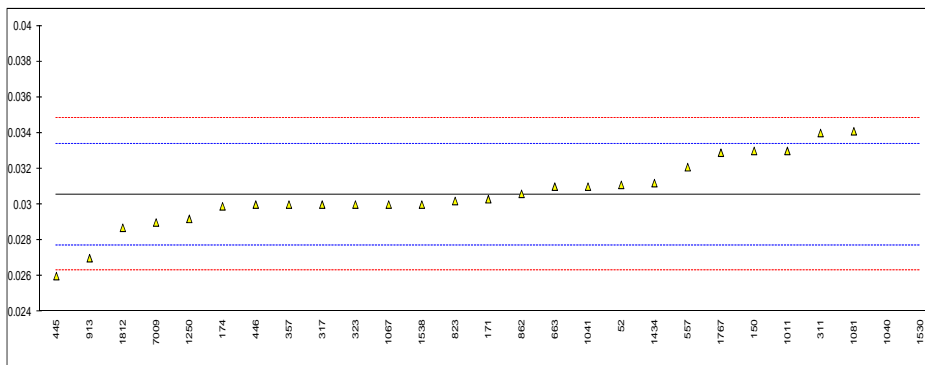
Determination of o-Xylene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	39.8467		-0.26	
150	D6563	39.939		0.34	
158		----		----	
171	D6563	39.8724		-0.09	
174	D6563	39.996	C	0.71	first reported:39.07
311	D2306	39.96		0.48	
317	D6563	39.92		0.22	
323	D6563	39.85		-0.24	
357	D6563	39.972		0.55	
445	D6563	39.961		0.48	
446	D6563	39.84		-0.30	
551		----		----	
555		----		----	
557	UOP798	39.60424		-1.83	
621		----		----	
663	D6563	40.037		0.98	
823	D6563	39.9137		0.18	
862	D6563	39.996		0.71	
913	D6563	40.10		1.38	
1011	D5917	39.647		-1.55	
1040	D2360	39.437	R(0.05)	-2.92	
1041		39.908		0.14	
1067	D6563	39.83		-0.37	
1081	D6563	39.844		-0.28	
1107	D6563	39.913		0.17	
1250	D2360	40.3423	R(0.05)	2.96	
1434	in house	39.90037		0.09	
1530	D6563	39.794		-0.60	
1538	D6563	39.903		0.11	
1767	D6563	39.9496		0.41	
1812	D6563	39.679		-1.35	
1813	D6563	38.99	R(0.01)	-5.81	
1866		----		----	
7009	D2306	39.876		-0.07	
normality		suspect			
n		26			
outliers		3			
mean (n)		39.8866			
st.dev. (n)		0.11309			
R(calc.)		0.3167			
R(D6563:12)		0.4318			



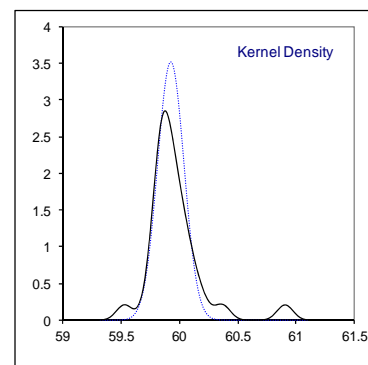
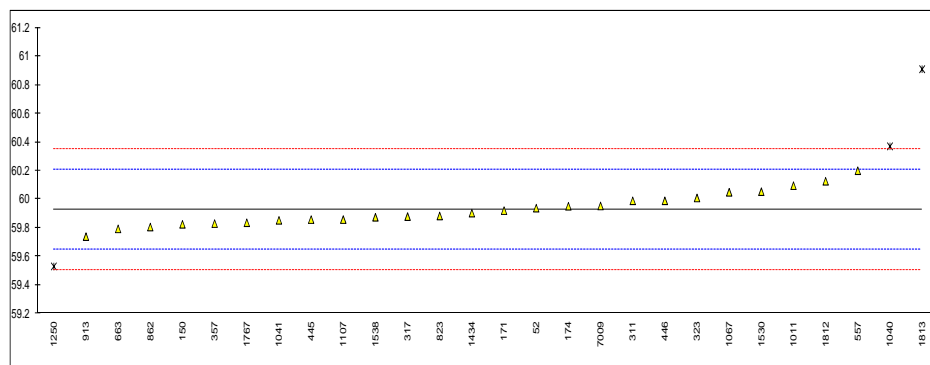
Determination of Cumene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0311		0.37	
150	D2360	0.033		1.71	
158		----		----	
171	D6563	0.0303		-0.19	
174	D6563	0.0299		-0.47	
311	D2360	0.034		2.42	
317	D6563	0.03		-0.40	
323	D6563	0.03		-0.40	
357	D6563	0.030		-0.40	
445	D6563	0.026		-3.22	
446	D6563	0.03		-0.40	
551		----		----	
555		----		----	
557	UOP798	0.03209		1.07	
621		----		----	
663	D6563	0.031		0.30	
823	D6563	0.0302		-0.26	
862	D2360	0.0306		0.02	
913	D6563	0.0270		-2.52	
1011	D5917	0.033		1.71	
1040	D2360	0.049	R(0.01)	12.98	
1041		0.031		0.30	
1067	D6563	0.03		-0.40	
1081	D6563	0.0341		2.49	
1107		----		----	
1250	D2360	0.0292		-0.97	
1434	in house	0.03120		0.44	
1530	D2360	0.049	R(0.01)	12.98	
1538	D2360	0.030		-0.40	
1767	D2360	0.0329		1.64	
1812	D6563	0.0287		-1.32	
1813		----		----	
1866		----		----	
7009	D2306	0.029		-1.11	
normality		OK			
n		25			
outliers		2			
mean (n)		0.0306			
st.dev. (n)		0.00192			
R(calc.)		0.0054			
R(D2360:11)		0.0040			



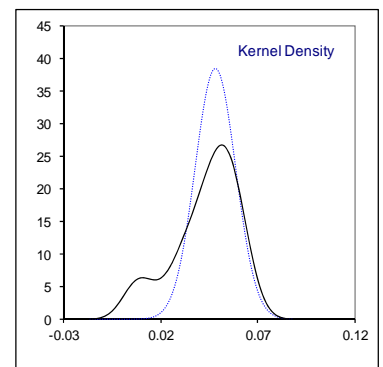
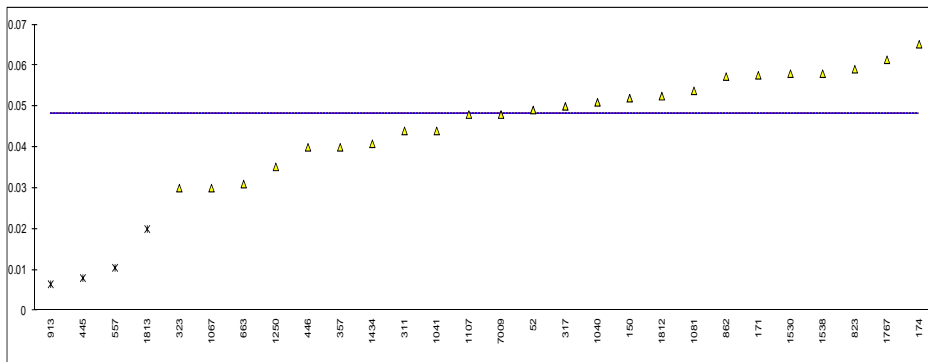
Determination of Sum m+p-Xylene on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	59.9386		0.07	
150	D6563	59.826		-0.74	
158		-----		-----	
171	D6563	59.9216		-0.06	
174	D6563	59.952	C	0.16	first reported:60.753
311	D2306	59.99		0.43	
317	D6563	59.88		-0.35	
323	D6563	60.01	C	0.57	first reported:99.86
357	D6563	59.831	C	-0.70	first reported:59.381
445	D6563	59.859		-0.50	
446	D6563	59.99		0.43	
551		-----		-----	
555		-----		-----	
557	UOP798	60.2008		1.93	
621		-----		-----	
663	D6563	59.794		-0.96	
823	D6563	59.8844		-0.32	
862	D6563	59.807		-0.87	
913	D6563	59.74		-1.35	
1011	D5917	60.096		1.19	
1040	D2360	60.371	R(0.05)	3.15	
1041		59.854		-0.54	
1067	D6563	60.05	C	0.86	first reported:99.88
1081		-----		-----	
1107	D6563	59.859		-0.50	
1250	D2360	59.5314	R(0.05)	-2.84	
1434	in house	59.90384		-0.18	
1530	D6563	60.054		0.89	
1538	D6563	59.875		-0.39	
1767	D6563	59.8372		-0.66	
1812	D6563	60.127		1.41	
1813	D6563	60.91	R(0.01)	6.99	
1866		-----		-----	
7009	D2306	59.954		0.18	
	normality	OK			
	n	25			
	outliers	3			
	mean (n)	59.9294			
	st.dev. (n)	0.11317			
	R(calc.)	0.3169			
	R(D6563:12)	0.3929			



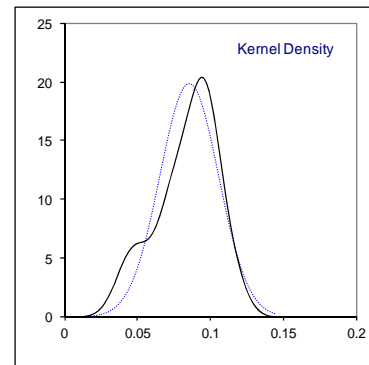
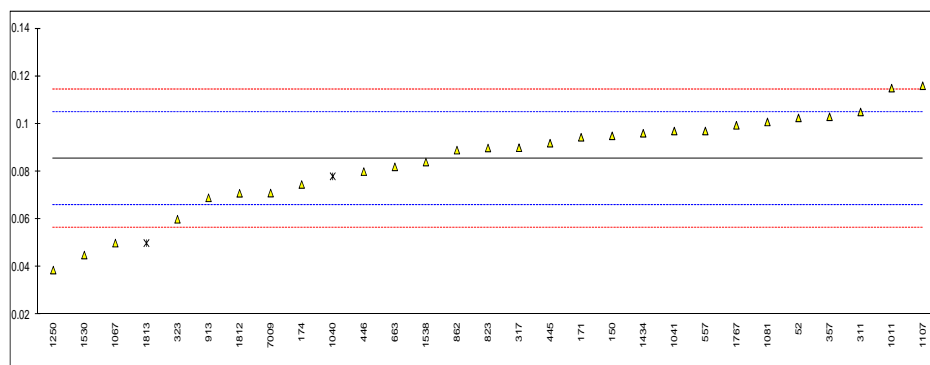
Determination of Sum of C9+ aromatics on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0491		----	
150	D6563	0.052		----	
158		----		----	
171	D6563	0.0576		----	
174	D6563	0.0652		----	
311	D2360	0.044		----	
317	D6563	0.05		----	
323	D6563	0.03		----	
357	D6563	0.040		----	
445	D6563	0.008	C,R(0.05)	----	first reported:0.017
446	D6563	0.04		----	
551		----		----	
555		----		----	
557	UOP798	0.0105049	R(0.05)	----	
621		----		----	
663	D6563	0.031		----	
823	D6563	0.0591		----	
862	D6563	0.0573		----	
913	D6563	0.0065	R(0.05)	----	
1011		----		----	
1040	D2360	0.051		----	
1041		0.044	C	----	first reported:0.08
1067	D6563	0.03		----	
1081	D6563	0.0538		----	
1107	D6563	0.048		----	
1250	D2360	0.0352	C	----	first reported:0
1434	in house	0.04086		----	
1530	D6563	0.058		----	
1538	D6563	0.058		----	
1767	D6563	0.0614		----	
1812	D6563	0.0525		----	
1813	D6563	0.02	ex	----	see § 4.1
1866		----		----	
7009	D2306	0.048		----	
normality		OK			
n		24			
outliers		3 + 1 excl.			
mean (n)		0.0482			
st.dev. (n)		0.01016			
R(calc.)		0.0284			
R(D6563:12)		(0.0116)			



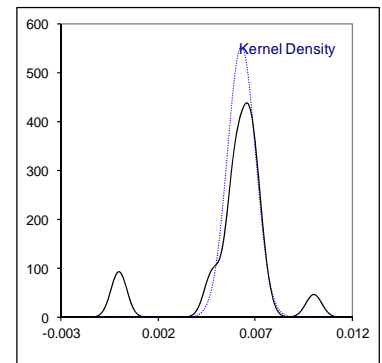
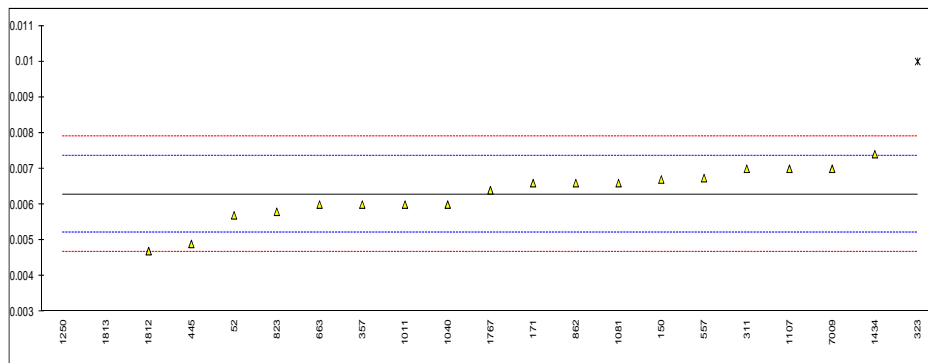
Determination of Nonaromatics on sample #15191; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.1025		1.79	
150	D2360	0.095		1.01	
158		-----		-----	
171	D6563	0.0944		0.95	
174	D6563	0.0746		-1.09	
311	D2360	0.105		2.04	
317	D6563	0.09		0.50	
323	D2360	0.06		-2.60	
357	D6563	0.103		1.84	
445	D6563	0.0919		0.69	
446	D6563	0.08		-0.54	
551		-----		-----	
555		-----		-----	
557	UOP798	0.09703		1.22	
621		-----		-----	
663	D6563	0.082		-0.33	
823	D6563	0.0899		0.49	
862	D2360	0.0890		0.39	
913	D6563	0.0690		-1.67	
1011	D5917	0.115		3.08	
1040	D2360	0.078		-0.74	
1041		0.097		1.22	
1067	D6563	0.05		-3.63	
1081	D6563	0.1008		1.61	
1107	D6563	0.116		3.18	
1250	D2360	0.0387	C	-4.80	first reported:0
1434	in house	0.09608		1.12	
1530	D2360	0.045		-4.15	
1538	D2360	0.084		-0.12	
1767	D2360	0.0994		1.47	
1812	D6563	0.0709		-1.47	
1813	D6563	0.05	ex	-3.63	see § 4.1
1866		-----		-----	
7009	D2306	0.071		-1.46	
normality		OK			
n		28			
outliers		0 + 1 excl.			
mean (n)		0.0852			
st.dev. (n)		0.01972			
R(calc.)		0.0552			
R(D2360:11)		0.0271			



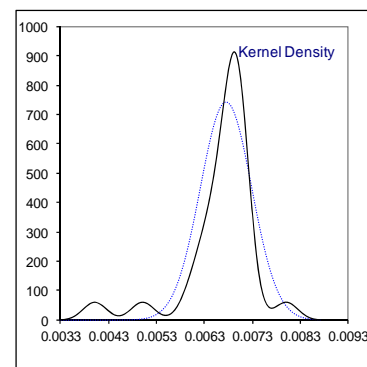
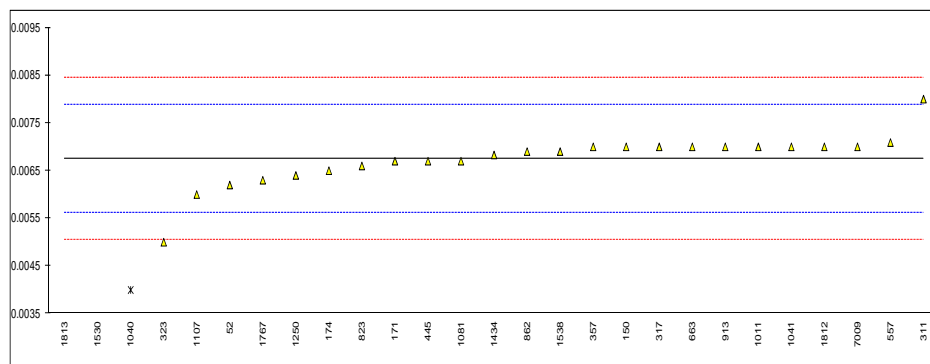
Determination of Benzene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0057		-1.12	
150	D2360	0.0067		0.73	
158		-----		-----	
171	D6563	0.0066		0.55	
174	D6563	<0.0010		<-9.89	false negative test result?
311	D2360	0.007		1.29	
317	D6563	<0.01		-----	
323	D6563	0.01	R(0.01)	6.84	no unrounded test result was reported
357	D6563	0.006		-0.56	
445	D2360	0.0049		-2.60	
446	D6563	<0.01		-----	
551		-----		-----	
555		-----		-----	
557	UOP798	0.00674		0.81	
621		-----		-----	
663	D6563	0.006		-0.56	
823	D6563	0.0058		-0.93	
862	D2360	0.0066		0.55	
913		-----		-----	
1011	D5917	0.006		-0.56	
1040	D2360	0.006	ex	-0.56	see § 4.1
1041		<0.01		-----	
1067	D6563	<0.01		-----	
1081	D6563	0.0066		0.55	
1107	D6563	0.007		1.29	
1250	D2360	0	ex	-11.66	result excluded, zero is not a real value
1434	D2360	0.00741		2.05	
1530		<0.001		<-9.89	false negative test result?
1538		-----		-----	
1767	D2360	0.0064		0.18	
1812		0.0047		-2.97	
1813	D6563	0.00	R(0.01)	-11.66	
1866		-----		-----	
7009	D2306	0.007		1.29	
normality		OK			
n		17			
outliers		2 + 2 excl.			
mean (n)		0.0063			
st.dev. (n)		0.00074			
R(calc.)		0.0021			
R(Horwitz)		0.0015			



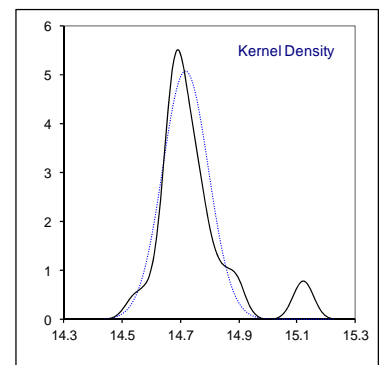
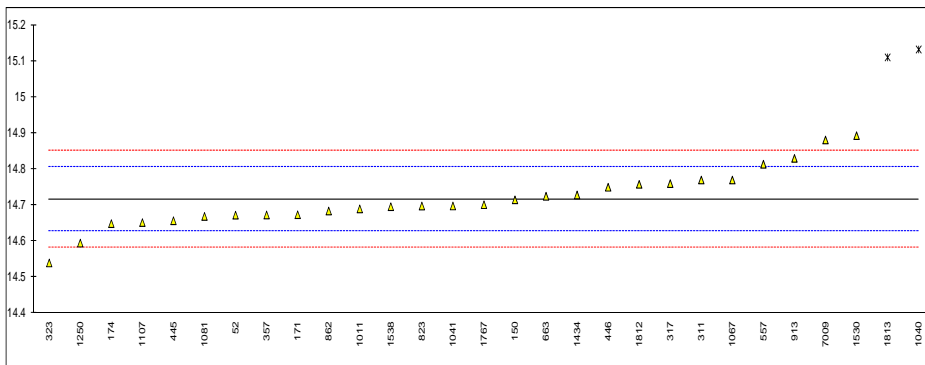
Determination of Toluene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0062		-0.96	
150	D2360	0.007		0.45	
158		----		----	
171	D6563	0.0067		-0.07	
174	D6563	0.0065		-0.43	
311	D2360	0.008		2.22	
317	D6563	0.007	C	0.45	first reported:0.01
323	D6563	0.005	C	-3.07	first reported:0.01
357	D6563	0.007		0.45	
445	D2360	0.0067		-0.07	
446	D6563	<0.01		----	
551		----		----	
555		----		----	
557	UOP798	0.00709		0.61	
621		----		----	
663	D6563	0.007		0.45	
823	D6563	0.0066		-0.25	
862	D2360	0.0069		0.28	
913	D6563	0.0070		0.45	
1011	D5917	0.007		0.45	
1040	D2360	0.004	R(0.01)	-4.83	
1041		0.007		0.45	
1067	D6563	<0.01		----	
1081	D6563	0.0067		-0.07	
1107	D6563	0.006		-1.31	
1250	D2360	0.0064		-0.60	
1434	D2360	0.00683		0.15	
1530	D2360	0.0011	R(0.01)	-9.94	
1538	D2360	0.0069		0.28	
1767	D2360	0.0063		-0.78	
1812		0.007	C	0.45	first reported:0.005
1813	D6563	0.00	R(0.01)	-11.88	
1866		----		----	
7009	D2306	0.007		0.45	
	normality	not OK			
	n	24			
	outliers	3			
	mean (n)	0.0067			
	st.dev. (n)	0.00054			
	R(calc.)	0.0015			
	R(D2360:11)	0.0016			



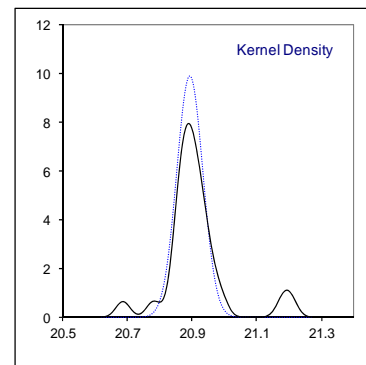
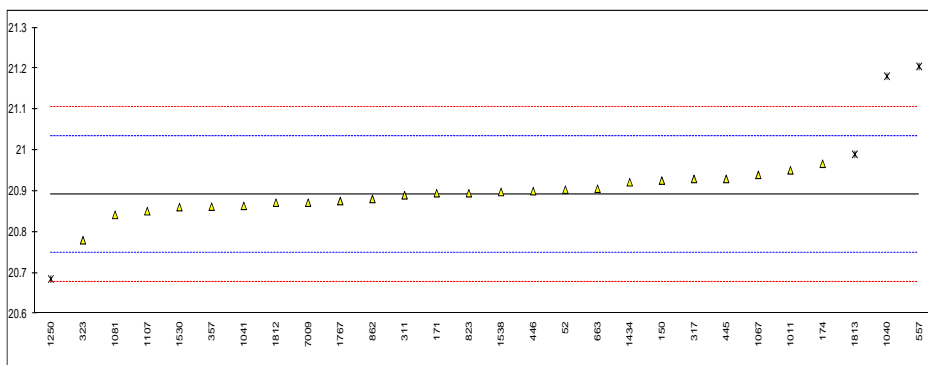
Determination of Ethylbenzene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	14.6725		-0.98	
150	D6563	14.715		-0.03	
158		-----		-----	
171	D6563	14.6737		-0.95	
174	D6563	14.649	C	-1.50	first reported:13.847
311	D2306	14.77		1.19	
317	D6563	14.76		0.97	
323	D6563	14.54		-3.93	
357	D6563	14.673		-0.97	
445	D6563	14.657		-1.32	
446	D6563	14.75		0.75	
551		-----		-----	
555		-----		-----	
557	UOP798	14.81381		2.17	
621		-----		-----	
663	D6563	14.725		0.19	
823	D6563	14.6979		-0.41	
862	D6563	14.684		-0.72	
913	D6563	14.83		2.53	
1011	D5917	14.690		-0.59	
1040	D2360	15.132	R(0.01)	9.27	
1041		14.698		-0.41	
1067	D6563	14.77		1.19	
1081	D6563	14.669		-1.06	
1107	D6563	14.652		-1.44	
1250	D2360	14.5951		-2.70	
1434	in house	14.72853		0.27	
1530	D6563	14.893		3.94	
1538	D6563	14.696		-0.46	
1767	D6563	14.7016		-0.33	
1812	D6563	14.758		0.93	
1813	D6563	15.11	R(0.01)	8.78	
1866		-----		-----	
7009	D2306	14.881		3.67	
normality		OK			
n		27			
outliers		2			
mean (n)		14.7164			
st.dev. (n)		0.07854			
R(calc.)		0.2199			
R(D6563:12)		0.1256			



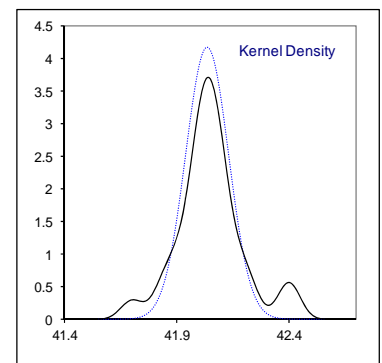
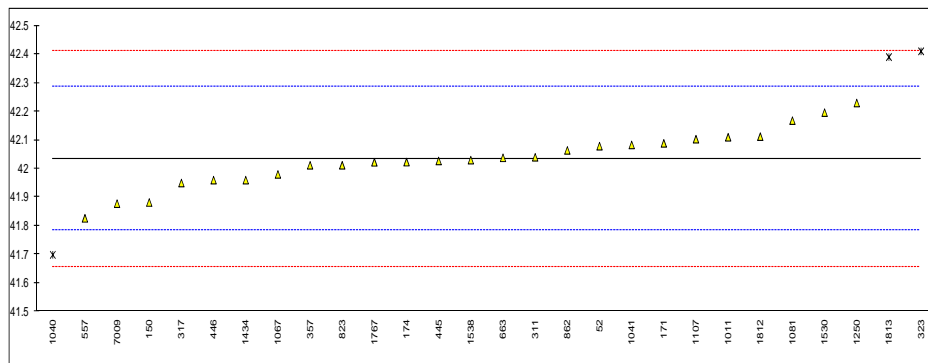
Determination of p-Xylene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	20.9036		0.16	
150	D6563	20.926		0.47	
158		-----		-----	
171	D6563	20.8950		0.04	
174	D6563	20.967	C	1.05	first reported:21.157
311	D2306	20.89		-0.03	
317	D6563	20.93		0.53	
323	D6563	20.78		-1.57	
357	D6563	20.862		-0.42	
445	D6563	20.930		0.53	
446	D6563	20.90		0.11	
551		-----		-----	
555		-----		-----	
557	UOP798	21.20495	R(0.01)	4.38	
621		-----		-----	
663	D6563	20.906		0.19	
823	D6563	20.8951		0.04	
862	D6563	20.881		-0.16	
913		-----		-----	
1011	D5917	20.951		0.82	
1040	D7504	21.181	R(0.01)	4.04	
1041		20.864		-0.40	
1067	D6563	20.94		0.67	
1081	D6563	20.842		-0.70	
1107	D6563	20.851		-0.58	
1250	D2360	20.6851	R(0.01)	-2.90	
1434	in house	20.92185		0.41	
1530	D6563	20.861		-0.44	
1538	D6563	20.898		0.08	
1767	D6563	20.8757		-0.23	
1812	D6563	20.872		-0.28	
1813	D6563	20.99	ex	1.37	see § 4.1
1866		-----		-----	
7009	D2306	20.872		-0.28	
normality		suspect			
n		24			
outliers		3 + 1 excl.			
mean (n)		20.8923			
st.dev. (n)		0.04030			
R(calc.)		0.1128			
R(D6563:12)		0.2000			



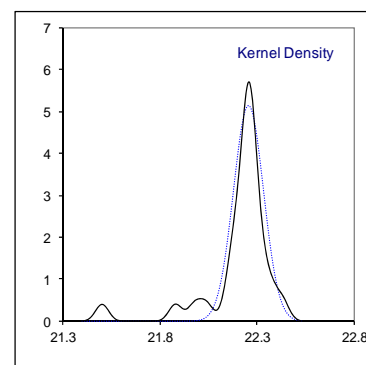
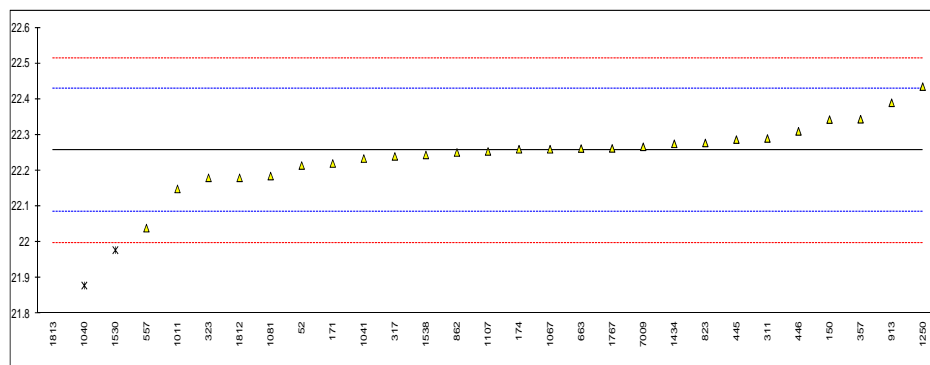
Determination of m-Xylene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	42.0788		0.35	
150	D6563	41.882		-1.22	
158		-----		-----	
171	D6563	42.0887		0.43	
174	D6563	42.023	C	-0.10	first reported:43.106
311	D2306	42.04		0.04	
317	D6563	41.95		-0.68	
323	D6563	42.41	R(0.05)	2.98	
357	D6563	42.012		-0.18	
445	D6563	42.027		-0.06	
446	D6563	41.96		-0.60	
551		-----		-----	
555		-----		-----	
557	UOP798	41.82667		-1.66	
621		-----		-----	
663	D6563	42.038		0.02	
823	D6563	42.0121		-0.18	
862	D6563	42.064		0.23	
913		-----		-----	
1011	D5917	42.110		0.60	
1040	D7504	41.699	R(0.05)	-2.67	
1041		42.083		0.38	
1067	D6563	41.98		-0.44	
1081	D6563	42.168		1.06	
1107	D6563	42.103		0.54	
1250	D2360	42.2296		1.55	
1434	in house	41.96012		-0.60	
1530	D6563	42.196		1.28	
1538	D6563	42.030		-0.04	
1767	D6563	42.0224		-0.10	
1812	D6563	42.112		0.61	
1813	D6563	42.39	R(0.05)	2.83	
1866		-----		-----	
7009	D2306	41.878		-1.25	
normality		OK			
n		25			
outliers		3			
mean (n)		42.0350			
st.dev. (n)		0.09575			
R(calc.)		0.2681			
R(D6563:12)		0.3518			



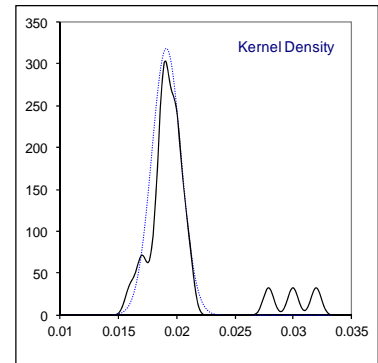
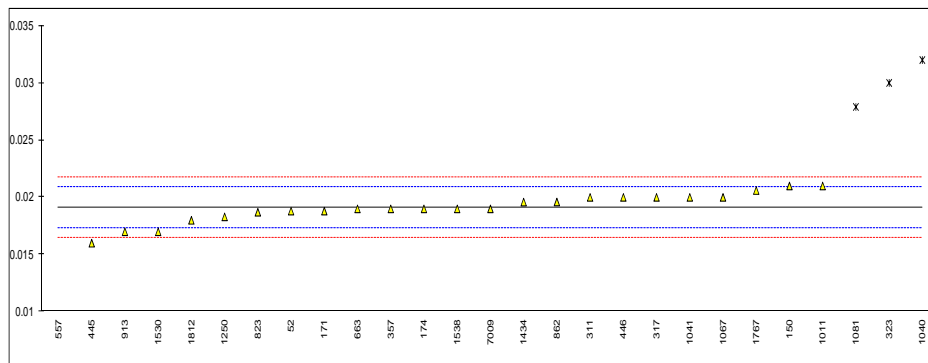
Determination of o-Xylene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	22.2146		-0.48	
150	D6563	22.343		1.01	
158		-----		-----	
171	D6563	22.2202		-0.42	
174	D6563	22.260	C	0.05	first reported:21.788
311	D2306	22.29		0.40	
317	D6563	22.24		-0.19	
323	D6563	22.18		-0.88	
357	D6563	22.344		1.02	
445	D6563	22.287		0.36	
446	D6563	22.31		0.63	
551		-----		-----	
555		-----		-----	
557	UOP798	22.03942		-2.52	
621		-----		-----	
663	D6563	22.262		0.07	
823	D6563	22.2776		0.25	
862	D6563	22.251		-0.06	
913	D6563	22.39		1.56	
1011	D5917	22.149		-1.24	
1040	D2360	21.879	R(0.05)	-4.38	
1041		22.234		-0.25	
1067	D6563	22.26		0.05	
1081	D6563	22.185		-0.82	
1107	D6563	22.254		-0.02	
1250	D2360	22.4350		2.08	
1434	in house	22.27514		0.22	
1530	D6563	21.978	R(0.05)	-3.23	
1538	D6563	22.244		-0.14	
1767	D6563	22.2623		0.07	
1812	D6563	22.180		-0.88	
1813	D6563	21.50	R(0.01)	-8.79	
1866		-----		-----	
7009	D2306	22.267		0.13	
	normality	not OK			
	n	26			
	outliers	3			
	mean (n)	22.2559			
	st.dev. (n)	0.07753			
	R(calc.)	0.2171			
	R(D6563:12)	0.2409			



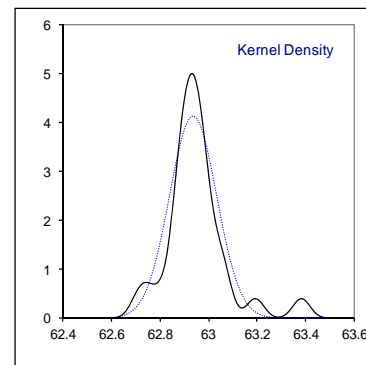
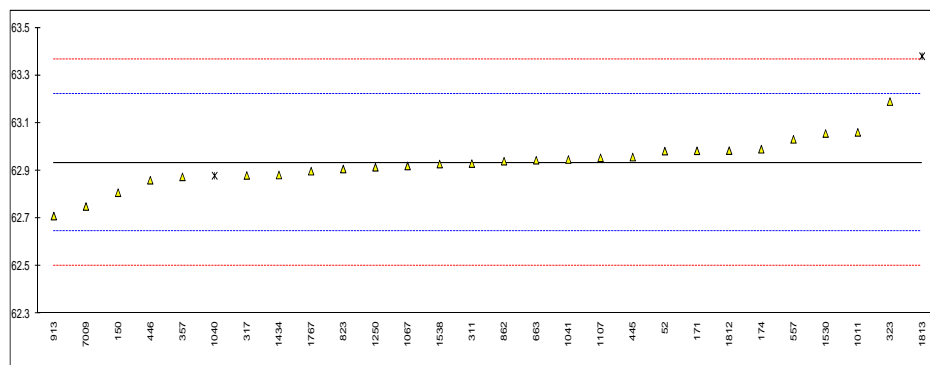
Determination of Cumene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0188		-0.34	
150	D2360	0.021		2.14	
158		-----		-----	
171	D6563	0.0188		-0.34	
174	D6563	0.019		-0.12	
311	D2360	0.020		1.01	
317	D6563	0.02		1.01	
323	D6563	0.03	R(0.01)	12.28	no unrounded test result was reported
357	D6563	0.019		-0.12	
445	D6563	0.016		-3.50	
446	D6563	0.02		1.01	
551		-----		-----	
555		-----		-----	
557	UOP798	0.002149	R(0.01)	-19.12	
621		-----		-----	
663	D6563	0.019		-0.12	
823	D6563	0.0187		-0.46	
862	D2360	0.0196		0.56	
913	D6563	0.0170		-2.37	
1011	D5917	0.021		2.14	
1040	D2360	0.032	R(0.01)	14.54	
1041		0.020		1.01	
1067	D6563	0.02		1.01	
1081	D6563	0.0279	R(0.01)	9.92	
1107		-----		-----	
1250	D2360	0.0183		-0.91	
1434	in house	0.01959		0.55	
1530	D2360	0.017		-2.37	
1538	D2360	0.019		-0.12	
1767	D2360	0.0206		1.69	
1812	D6563	0.0180		-1.24	
1813		-----		-----	
1866		-----		-----	
7009	D2306	0.019		-0.12	
	normality	OK			
	n	23			
	outliers	4			
	mean (n)	0.0191			
	st.dev. (n)	0.00126			
	R(calc.)	0.0035			
	R(D2360:11)	0.0025			



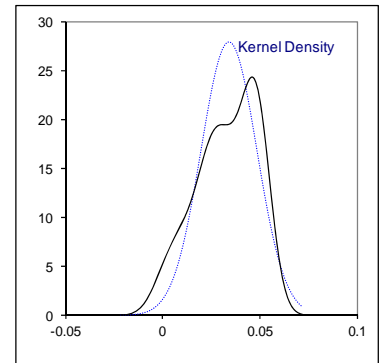
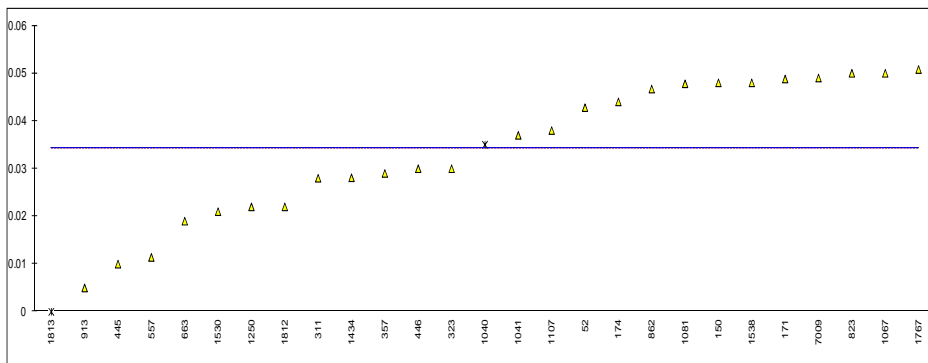
Determination of Sum m+p-Xylene on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	62.9824		0.34	
150	D6563	62.808		-0.87	
158		----		----	
171	D6563	62.9837		0.34	
174	D6563	62.990	C	0.39	first reported:64.263
311	D2306	62.93		-0.03	
317	D6563	62.88		-0.37	
323	D6563	63.19	C	1.77	first reported:85.37
357	D6563	62.874		-0.41	
445	D6563	62.957		0.16	
446	D6563	62.86		-0.51	
551		----		----	
555		----		----	
557	UOP798	63.03162		0.68	
621		----		----	
663	D6563	62.944		0.07	
823	D6563	62.9072	C	-0.19	first reported:69.9072
862	D6563	62.940		0.04	
913	D6563	62.71		-1.55	
1011	D5917	63.061		0.88	
1040	D2360	62.879	ex	-0.38	see § 4.1
1041		62.947		0.09	
1067	D6563	62.92		-0.10	
1081		----		----	
1107	D6563	62.954		0.14	
1250	D2360	62.9146		-0.13	
1434	in house	62.88197		-0.36	
1530	D6563	63.056		0.84	
1538	D6563	62.928		-0.04	
1767	D6563	62.8981		-0.25	
1812	D6563	62.984		0.35	
1813	D6563	63.38	R(0.01)	3.09	
1866		----		----	
7009	D2306	62.750		-1.27	
	normality	suspect			
	n	26			
	outliers	1 + 1 excl.			
	mean (n)	62.9339			
	st.dev. (n)	0.09695			
	R(calc.)	0.2715			
	R(D6563:12)	0.4047			



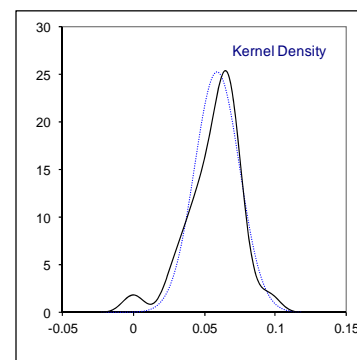
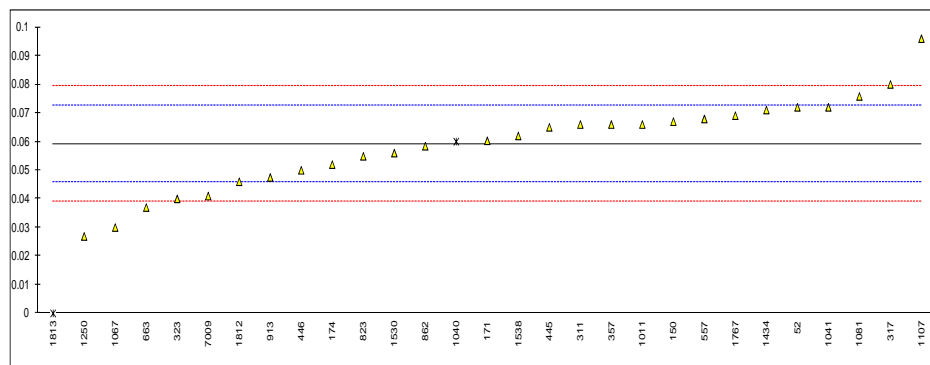
Determination of Sum of C9+ aromatics on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0428		----	
150	D2360	0.048		----	
158		----		----	
171	D6563	0.0488		----	
174	D6563	0.044		----	
311	D2360	0.028		----	
317	D6563	<0.05		----	
323	D6563	0.03		----	
357	D6563	0.029		----	
445	D6563	0.010		----	
446	D6563	0.03		----	
551		----		----	
555		----		----	
557	UOP798	0.0114059		----	
621		----		----	
663	D6563	0.019		----	
823	D6563	0.0500		----	
862	D6563	0.0467		----	
913	D6563	0.0050		----	
1011		----		----	
1040	D2360	0.035	ex	----	see § 4.1
1041		0.037		----	
1067	D6563	0.05		----	
1081	D6563	0.0478		----	
1107	D6563	0.038		----	
1250	D2360	0.0220	C	----	first reported:0
1434	in house	0.0281		----	
1530	D6563	0.021		----	
1538	D6563	0.048		----	
1767	D6563	0.0508		----	
1812	D6563	0.0220		----	
1813	D6563	0.00	ex	----	see § 4.1
1866		----		----	
7009	D2306	0.049		----	
	normality	OK			
	n	25			
	outliers	0 + 2 excl.			
	mean (n)	0.0343			
	st.dev. (n)	0.01432			
	R(calc.)	0.0401			
	R(D6563:12)	(0.0082)			



Determination of Nonaromatics on sample #15192; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D7504	0.0720		1.92	
150	D2360	0.067		1.17	
158		-----		-----	
171	D6563	0.0603		0.18	
174	D6563	0.052		-1.06	
311	D2360	0.066		1.03	
317	D6563	0.08		3.11	
323	D6563	0.04		-2.84	
357	D6563	0.066		1.03	
445	D6563	0.065	C	0.88	first reported:0.0065
446	D6563	0.05		-1.35	
551		-----		-----	
555		-----		-----	
557	UOP798	0.06794		1.31	
621		-----		-----	
663	D6563	0.037		-3.29	
823	D6563	0.0549		-0.63	
862	D2360	0.0584		-0.11	
913	D6563	0.0475		-1.73	
1011	D5917	0.066		1.03	
1040	D2360	0.060	ex	0.13	see § 4.1
1041		0.072		1.92	
1067	D6563	0.03		-4.33	
1081	D6563	0.0758		2.48	
1107	D6563	0.096		5.49	
1250	D2360	0.0269	C	-4.79	first reported:0
1434	in house	0.07105		1.78	
1530	D2360	0.056		-0.46	
1538	D2360	0.062		0.43	
1767	D2360	0.0691		1.49	
1812	D6563	0.0460		-1.95	
1813	D6563	0.00	R(0.05)	-8.79	
1866		-----		-----	
7009	D2306	0.041		-2.69	
normality		OK			
n		27			
outliers		1 + 1 excl.			
mean (n)		0.0591			
st.dev. (n)		0.01583			
R(calc.)		0.0443			
R(D2360:11)		0.0188			



APPENDIX 2

Number of participants per country

1 lab in AUSTRALIA

2 labs in BELGIUM

3 labs in BRAZIL

1 lab in CANADA

2 labs in CHINA, People's Republic

1 lab in FINLAND

4 labs in GERMANY

1 lab in INDIA

1 lab in INDONESIA

1 lab in IRAN, Islamic Republic of

1 lab in ISRAEL

4 labs in NETHERLANDS

1 lab in PAKISTAN

1 lab in POLAND

1 lab in PORTUGAL

1 lab in SAUDI ARABIA

1 lab in SOUTH KOREA

1 lab in THAILAND

2 labs in UNITED KINGDOM

4 labs in UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations:

C	= final result after checking of first reported suspect result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner outlier test
R(0.05)	= straggler in Rosner outlier test
E	= error in calculations
ex	= excluded from calculations
n.a.	= not applicable

Literature:

- 1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014
- 2 ASTM E178-89
- 3 ASTM E1301-89
- 4 ISO 5725-86
- 5 ISO 5725, parts 1-6, 1994
- 6 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
- 7 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
- 8 IP 367/84
- 9 DIN 38402 T41/42
- 10 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
- 11 J.N. Miller, Analyst, 118, 455, (1993)
- 12 Analytical Methods Committee Technical brief, No4 January 2001.
- 13 The Royal Society of Chemistry 2002, Analyst 2002, 127 page 1359-1364, P.J. Lowthian and M. Thompson (see <http://www.rsc.org/suppdata/an/b2/b205600n/>).
- 14 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), pp. 165-172, (1983)