Results of Proficiency Test
Metals content in Polymers
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Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

World-wide, many consumer products with plastic parts are produced and transported. These plastic parts are produced under strict regulations. For instance in the European Directive 2011/65/EC maximum concentrations are specified for metals in plastic: the content of Lead (Pb), Mercury (Hg), Cadmium (Cd) and hexavalent Chromium (CrVI) may not exceed 0.1%M/M, while the maximum concentration for Cadmium may not exceed 0.01%M/M.
The determination of metals in plastics is known to cause problems sometimes regarding the ability to compare laboratory results. However, still only a few plastic reference materials are available. As an alternative, participation in a proficiency test may enable the laboratories to check their performance. Therefore, a proficiency-testing scheme (laboratory-evaluating interlaboratory study) for the determination of metals in plastics is organised by the Institute for Interlaboratory Studies since 1998. Starting with only total Cadmium, over the years the scope was extended with total Antimony, total Chromium, Chromium (VI), total Cobalt, total Copper, total Mercury and total Lead content. In this year's proficiency test the scope was extended with total Nickel content.
In the interlaboratory study of September 2016, 146 laboratories from 39 different countries registered for participation (See appendix 2). In this report, the results of the 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 organiser of this proficiency test (PT). The analyses for fit-for-use and for homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send 2 different samples of approximately 6 grams each (3 grams for Hexavalent Chromium testing and 3 grams for the other metals), labelled #16600 and #16601, both positive (artificially fortified) on one or more metals. Participants were requested to report rounded and unrounded test results and some details of the test methods used. 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/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 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

Two different samples, both artificially fortified to be positive on one or more metals, were selected. The materials were divided over plastic bags, approx. 6 grams for each sample and labelled respectively #16600 and #16601.

The homogeneity of the subsamples #16600 was checked by determination of Total Cadmium, Nickel and Copper according to an in-house method on 8 stratified randomly selected subsamples.

	Total Cadmium in mg/kg	Total Copper in mg/kg	Total Nickel in mg/kg
sample #16600-1	313	227	285
sample #16600-2	305	225	283
sample #16600-3	305	222	281
sample #16600-4	316	231	287
sample #16600-5	318	229	288
sample #16600-6	310	222	282
sample #16600-7	316	231	290
sample #16600-8	320	226	283

Table 1: homogeneity test results of subsamples #16600

From the above test results, the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the reference test method for Cadmium and with 0.3 times the estimated reproducibility using the Horwitz equation for Nickel and Copper in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Total Cadmium in mg/kg	Total Copper in mg/kg	Total Nickel in mg/kg
r (observed)	16.0	10.0	8.9
reference test method	EN1122:01	Horwitz	Horwitz
0.3 x R (ref. test method)	23.5	13.5	16.4

Table 2: evaluation of repeatabilities of the subsamples #16600

The homogeneity of the subsamples #16601 was checked by determination of Total Lead and Cobalt according to an in-house method on 8 stratified randomly selected subsamples.

	Total Lead in mg/kg	Total Cobalt in mg/kg
sample #16601-1	145.4	116.9
sample #16601-2	144.4	113.8
sample #16601-3	140.6	114.9
sample #16601-4	148.0	115.4
sample #16601-5	146.2	115.8
sample #16601-6	150.9	113.6
sample #16601-7	143.2	113.9
sample #16601-8	142.2	114.7

Table 3: homogeneity test results of subsamples #16601

From the above test results, the repeatability was calculated and compared with 0.3 times the estimated reproducibility using the Horwitz equation for Lead and Copper in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Total Lead in mg/kg	Total Cobalt in mg/kg
r (observed)	9.2	3.2
reference test method	Horwitz	Horwitz
0.3 x R (ref. test method)	9.2	7.6

Table 4: evaluation of repeatabilities of the subsamples #16601

The calculated repeatabilities as listed in tables 2 and 4 were in agreement with 0.3 times the corresponding reproducibility of the reference test methods. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one set of samples; 1 * sample, labelled #16600 and 1 * sample, labelled #16601 was sent on August 10, 2016.

2.5 ANALYSES

The participants were requested to determine on both samples: total Antimony, total Cadmium, total Chromium, total Hexavalent Chromium, total Cobalt, total Copper, total Lead, total Mercury and total Nickel. It was explicitly requested to treat the samples as if it were routine samples and to report the test results using the indicated units on the report form and not to round the results, but report as much significant figures as possible.

It was also requested not to report ‘less than’ results, which are above the detection limit, because such results cannot be used for meaningful statistical calculations.
To get comparable results a detailed report form, on which the units were prescribed as well as the reference test methods and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The laboratories were also requested to confirm the sample receipt on the same data entry portal.

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-cts/. 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 reanalysis). Additional or corrected test results are used for data analysis and original test results are placed under 'Remarks' in the test result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ of April 2014 (iis-protocol, version 3.3).
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. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the test results should be used with due care.

According to ISO 5725 the original test results per determination were submitted to Dixon’s, Grubbs’ and/or Rosner’s outlier tests. Outliers are marked by D(0.01) for the Dixon’s test, by G(0.01) or DG(0.01) for the Grubbs’ test and by R(0.01) for the Rosner’s test. Stragglers are marked by D(0.05) for the Dixon’s test, by G(0.05) or DG(0.05) for the Grubbs’ test and by R(0.05) for the Rosner’s test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.
Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

In order to visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

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

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.

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, no problems were encountered with the dispatch of the samples. Three participants reported results after the final reporting date and five participants did not report any results at all due to several reasons. Not all laboratories were able to report all analyses requested.
Finally, the 141 reporting laboratories submitted 1041 numerical results. Observed were 24 outlying results, which is 2.3% of all reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

The participants were also requested to report whether or not they are accredited to perform these tests. Of all 141 reporting laboratories, 87% are ISO/IEC 17025 accredited. Six laboratories remarked that they are only accredited for Cadmium and Lead and/or Chromium and/or Mercury.

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,

For the determination of the metal Cadmium in polymers, the method EN1122 is considered the official test method.
For the determination of the metals Hexavalent Chromium, Lead and Mercury (and Cadmium) in polymers and electronics, the method IEC62321:2008 was considered the official test method. However, in 2013, for the latest version of part 5 of this test method, the scope was changed and only Lead and Chromium (and Cadmium) were listed in the scope of the method. In the 2013 version of this test method (part 5, again only for Cadmium, Lead and Chromium), precision data are mentioned. Regretfully it is not clear which precision data can be used as reference values, as there is no significant correlation between the concentration of the metal, the quantification method and type of sample. Therefore, it was decided not to use the precision data mentioned in IEC62321-5:2013, but to estimate the reproducibility from the Horwitz equation, except for Cadmium for which test method EN1122:01 is available.

For the determination of Antimony, Cobalt, Copper and Nickel, no test methods are available. Therefore, it was decided to estimate the reproducibility requirements from the Horwitz equation.

Sample #16601 was also used in the 2014 proficiency test (iis14P05 “Metals in Plastic”). A more detailed description and comparison is given in paragraph 4.4 of this report.

4.1 EVALUATION PER SAMPLE PER ELEMENT

In this section, the results are discussed per analyte per sample.

Sample #16600:

Total Cadmium: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of statistical outliers is in agreement with the reproducibility requirements of EN1122:01.

Total Copper: This determination may be problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the reproducibility requirement estimated from the Horwitz equation.

Total Mercury: This determination may be problematic for a number of laboratories. Nine statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the reproducibility requirement estimated from the Horwitz equation.

Total Nickel: This determination may be problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the reproducibility requirement estimated from the Horwitz equation.

Other metals: The majority of participants agreed on a content of < 20 mg/kg for Antimony, Chromium, Hexavalent Chromium, Cobalt and Lead.

Sample #16601:

Total Chromium: This determination may be problematic. Three statistical outliers and two false negative test results were observed. The calculated reproducibility after rejection of the suspect test results is not in agreement with the reproducibility requirement estimated from the Horwitz equation.

Chromium VI: This determination was very problematic as a wide range of test results was reported (from 2.70 to 29 mg/kg). No statistical outliers were observed, but three test results were excluded because the test result was below the detection limit of the test method ("<2 mg/kg", see IEC62321-5:2014) and eleven false negative test results were present. The calculated reproducibility after rejection of the suspect data is not in agreement with the reproducibility requirement estimated from the Horwitz equation.
Since Hexavalent Chromium was used to prepare the samples, the concentration of Hexavalent Chromium should be the same as the concentration of Total Chromium. This means the recovery of Chromium VI for the participants within this group ranges from 6% (2.70 mg/kg) to 60% (29 mg/kg).
Based on the above, it was decided not to calculate z-scores for this determination.

Total Cobalt: This determination may not be problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the reproducibility requirement estimated from the Horwitz equation.

Total Lead: This determination may be problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the reproducibility requirement estimated from the Horwitz equation.

Total Mercury: This determination may be (very) problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the reproducibility requirement estimated from the Horwitz equation.

Other metals: The majority of participants agreed on a content of < 20 mg/kg for Antimony, Cadmium, Copper and Nickel.

4.2 PERFORMANCE EVALUATION OF THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility as found for the group of participating laboratories. The average results per sample, the calculated reproducibilities and the reproducibilities derived from EN1122 or from the Horwitz equation are compared in the next tables.

Parameter	unit	n	Average	2.8 * sd	R (target)
Total Cadmium as Cd	mg/kg	133	285	72	71
Total Copper as Cu	mg/kg	77	309	67	58
Total Mercury as Hg	mg/kg	99	55.5	12.5	13.6
Total Nickel as Ni	mg/kg	82	222	56	44

Table 5: performance overview for sample #16600

Parameter	unit	n	Average	2.8 * sd	R (target)
Total Chromium as Cr	mg/kg	104	48.0	13.5	12.0
Hexavalent Chromium as Cr^{6+}	mg/kg	50	(13.5)	(19.5)	(4.1)
Total Cobalt as Co	mg/kg	80	128	30	28
Total Lead as Pb	mg/kg	132	161	46	34
Total Mercury as Hg	mg/kg	106	141	55	30

Table 6: performance overview for sample #16601

*) Between brackets: no z-scores were calculated because of the wide range of reported test results.

Without further statistical calculations, it can be concluded that for sample #16600, there is only good compliance for the elements Cadmium and Mercury of the group of participating laboratories with the relevant target reproducibility. And for #16601 there is only good compliance for the element Cobalt of the group of participating laboratories with the relevant target reproducibility.

4.3 COMPARISON OF THE PT OF SEPTEMBER 2016 WITH PREVIOUS PROFICIENCY TESTS

The number of participants increased from 66 in 2005 to 146 in this round. The percentage of outliers decreased over the years from 10.3% in 2005 to 2.3% of the numerical results in 2016.

The evolution of the reproducibilities for cadmium, lead, cobalt, chromium, chromium VI, copper and mercury content as observed in this proficiency scheme and the comparison with the findings in previous rounds are visualized in table 7.

	25-300 mg Cd/kg	50-500 mg Pb/kg	25-250 mg Co/kg	25-250 mg Cr/kg	50-250 mg CrVI/kg	25-300 mg Cu/kg	5-250 mg Hg/kg	25-250 mg Ni/kg
2002	18%	29%	--	--	--	--	--	--
2003	11%	36%	--	--	--	--	--	--
2004	12%	--	--	--	--	--	--	--
2005	8%	--	--	12%	--	--	--	--
2006	7%	9%	--	11%	--	--	--	--
2007	8%	8-11%	--	15%	--	--	--	--
2008	9%	9%	--	9%	57-76%	--	--	--
2009	10%	7-10%	--	10-11%	55-62%	--	37-46%	--
2010	8-10%	9%	--	10%	23%	--	32%	--
2011	9%	8-11%	--	19-23%	64%	--	20%	--
2012	7-8%	6-8%	--	7-16%	48-57%	--	23-43%	--
2013	8-9%	7-9%	--	9-22%	39%	--	14-32%	--
2014	7%	10%	11%	11%	42%	--	18%	--
2015	8-9%	11%	10%	11-24%	66%	7%	13-24%	--
2016	9%	10%	8%	10%	52%	8%	8-14%	9%
EN1122	9%	--	--	--	--	--	--	--
Horwitz	----	6-9%	7-10%	7-10%	7-9%	7-10%	7-13%	7-10%

Table 7: comparison of the uncertainties for Cd, Pb, Co, Cr, Cu and Hg (in %) in the previous PTs and in the present PT

In general, it can be concluded from the uncertainties of all tested metals, except Hexavalent Chromium that the quality of the testing is acceptable. The determination of Hexavalent Chromium content still requires significant improvements to reach the desired quality level.

Sample #16601 was used in previous PT's as sample #14150 in iis14P05. When the assigned value of both PTs is compared, the resemblance is striking. See below table:

	unit	Average		2.8*sd	
		#16601	#14150	#16601	#14150
Total Chromium as Cr	mg/kg	48.0	48.1	13.5	14.5
Hexavalent Chromium as Cr^{6+}	mg/kg	13.5	15.9	19.5	18.5
Total Cobalt as Co	mg/kg	128	128	30	40
Total Lead as Pb	mg/kg	161	161	46	47
Total Mercury as Hg	mg/kg	142	142	55	67

Table 8: comparison of samples #14150 and #16601

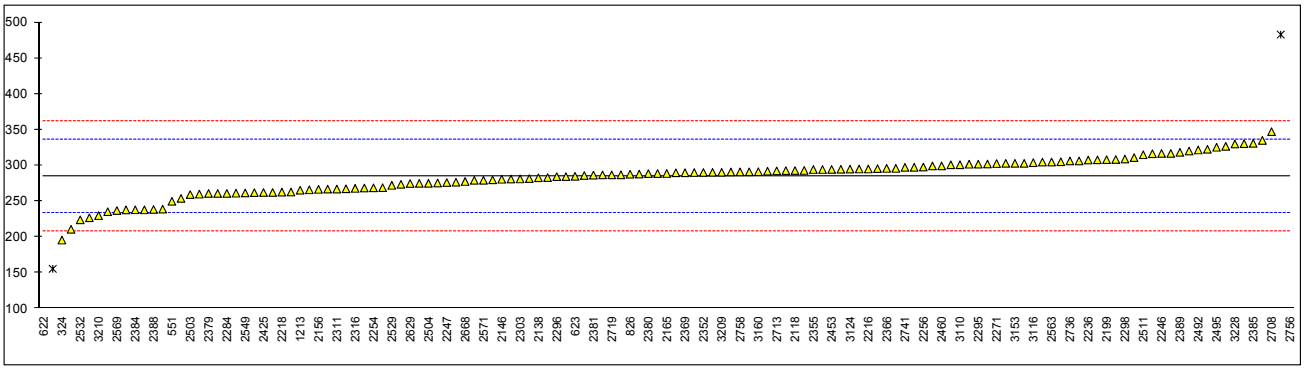
APPENDIX 1

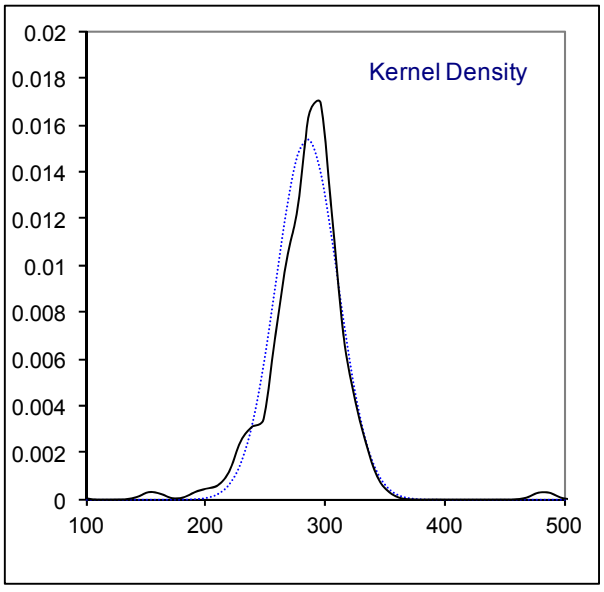
Determination of total Cadmium as Cd on sample #16600; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	238.54		-1.82
213	In house	283.12		-0.07	2389	CPSC-CH-E1002-08	318.48		1.32
324	EN1122	195.8		-3.50	2390	EN1122	295.07		0.40
339	In house	293.088		0.32	2415	EN1122	296		0.44
348	In house	292.819		0.31	2422		-----		-----
362	EN1122	260		-0.98	2425	EN1122	262.30		-0.89
551	IEC62321	250		-1.37	2431	CPSC-CH-E1002-08	299.43		0.57
622	IEC62321	83.078	C,R(0.01)	-7.93	2432	EN1122	268.6		-0.64
623	In house	284.86		0.00	2433	IEC62321	286.9		0.08
826	IEC62321	287.8		0.11	2444	IEC62321	266.95		-0.71
840	EN1122	238		-1.84	2453	EN1122	294.48		0.38
1051	EN1122	276.69		-0.32	2460	EN1122	299.5		0.57
1099	In house	326.8	C	1.65	2464	CPSC-CH-E1002-08	288		0.12
1126	In house	235.5		-1.94	2489	IEC62321	210.92		-2.91
1213	IEC62321	265.4		-0.77	2492	In house	321.7		1.45
2108	CPSC-CH-E1002-08	273.7		-0.44	2495	EN1122	325.5		1.60
2115	EN16711-1	320.2		1.39	2503	CPSC-CH-E1002-08	259.4		-1.00
2118	CPSC-CH-E1002-08	292.92		0.31	2504	EN1122	275.113		-0.39
2129	IEC62321	284.4		-0.02	2510		-----		-----
2132	EN1122	311.04		1.03	2511	EN1122	314.996		1.18
2135	In house	290.15		0.21	2529	CPSC-CH-E1002-08	272.3		-0.50
2138	In house	282.9		-0.08	2532	EN1122	224		-2.39
2146	EN1122	280.8		-0.16	2549	In house	261.59		-0.92
2156	IEC62321	266.7		-0.72	2557		-----		-----
2165	IEC62321	288.82		0.15	2563	IEC62321	304.9		0.79
2175	EPA3052	297.5		0.49	2564	CPSC-CH-E1002-08	305.2		0.80
2182	EN1122	292.1		0.28	2568		-----		-----
2184	EN1122	335.1		1.97	2569	CPSC-CH-E1002-08	237		-1.88
2190	In house	239		-1.80	2571	IEC62321	279.40		-0.22
2199	IEC62321	308.2		0.92	2572	EN1122	291.2		0.25
2212	In house	308.4		0.92	2590	CPSC-CH-E1002-08	254.068		-1.21
2216	CPSC-CH-E1002-08	295.1		0.40	2591	CPSC-CH-E1002-08	306.41		0.85
2217	EPA3052	281.7		-0.13	2612	EN1122	155.6	R(0.01)	-5.08
2218	CPSC-CH-E1002-08	262.84		-0.87	2620	IEC62321	291		0.24
2232	EN1122	267.4		-0.69	2624	EN1122	295.7		0.42
2236	EPA3050B	307.7		0.90	2629	EN1122	274.9		-0.39
2246	EN1122	316.86		1.26	2642	EN1122	301		0.63
2247	EN1122	276.12		-0.35	2668	In house	277.66		-0.29
2254	CPSC-CH-E1002-08	268.861		-0.63	2674	EN1122	330.53		1.79
2256	EN1122	297.9		0.51	2678		-----		-----
2258		-----		-----	2708	IEC62321	347.3		2.45
2271	IEC62321	302.7		0.70	2713	EN1122	292.51		0.30
2284	EN1122	261		-0.94	2719	EN1122	286.9		0.08
2290	EN1122	289.8		0.19	2736	In house	306.36		0.84
2293	EN1122	279.3		-0.22	2741	CPSC-CH-E1002-08	297.47		0.49
2294		-----		-----	2756	ISO17072-2	2470.0	R(0.01)	85.90
2295	CPSC-CH-E1002-08	301.9		0.67	2758	In house	291.05		0.24
2296	In house	284.386		-0.02	3110	EN1122	301.1		0.64
2298	CPSC-CH-E1002-08	309.00		0.95	3116	EN1122	304		0.75
2300	In house	307.91		0.90	3122	CPSC-CH-E1002-08	262.1		-0.90
2303	In house	281.21		-0.15	3124	EPA3052	295		0.40
2310	EN1122	275		-0.39	3146	In house	303		0.71
2311	EN1122	267.1		-0.70	3153	IEC62321	303.0		0.71
2316	IEC62321	268		-0.66	3154	IEC62321	262.33		-0.89
2320	In house	227		-2.28	3160	CPSC-CH-E1002-08	291.30		0.25
2347	IEC62321	266		-0.74	3163	IEC62321	483	R(0.01)	7.79
2350	EN1122	304.8		0.78	3166	In house	294.7		0.38
2352	IEC62321	290.3		0.21	3167	EN1122	260.9		-0.94
2355	IEC62321	294.4		0.37	3172	EN1122	294.4		0.37
2357	EN1122	290.5		0.22	3176	EN1122	316.87		1.26
2358	EPA3052	301.8		0.66	3182	EN1122	281.1		-0.15
2363	IEC62321	269		-0.63	3197	EN1122	316.5		1.24
2365	IEC62321	280		-0.19	3200		-----		-----
2366	EN1122	296		0.44	3209	EPA3052	290.52		0.22
2369	IEC62321	289.9		0.20	3210	EN1122	230		-2.16
2370	EPA3052	287		0.08	3213	IEC62321	261.319		-0.93
2375	In house	286.02		0.04	3214	EN1122	288.8		0.15
2379	EN1122	260.9		-0.94	3216	In house	275.6		-0.37
2380	CPSC-CH-E1002-08	288.637		0.15	3225	EN1122	302.10		0.68
2381	CPSC-CH-E1002-08	286.560		0.06	3228	EN1122	330.1		1.78
2384	IEC62321	238.04	C	-1.84	3237	IEC62321	262.93		-0.86
2385	EPA3052	331		1.81	3243	IEC62321	322.75		1.49
2387	IEC62321	238.05	C	-1.84	3248	EN1122	303		0.71

normality	OK
n	133
outliers	4
mean (n)	284.912
st.dev. (n)	25.8720
R(calc.)	72.442
R(EN1122:01)	71.228

Lab 622 first reported: 184.732
Lab 1099 first reported: 131
Lab 2384 first reported: 238.54
Lab 2387 first reported: 238.54



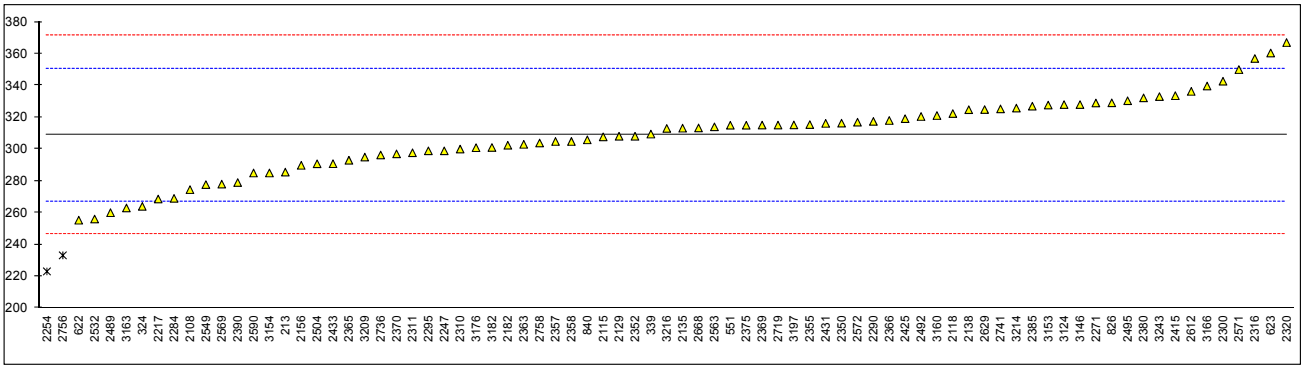


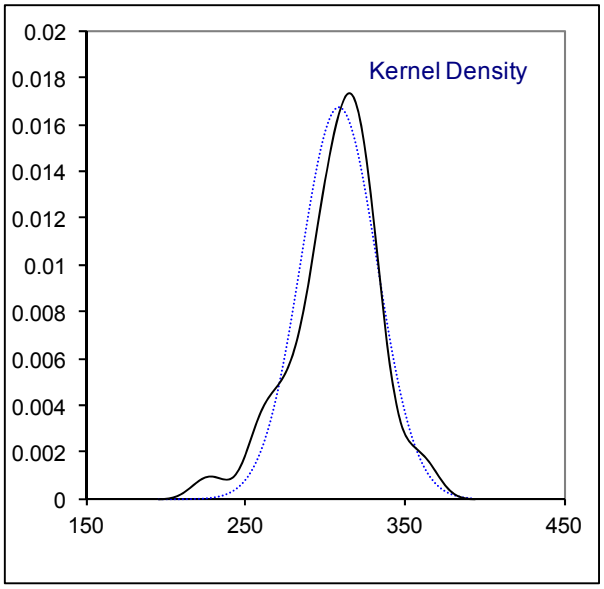
Determination of total Copper as Cu on sample #16600; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388		-----		-----
213	In house	285.55		-1.11	2389		-----		-----
324	IEC62321	264		-2.15	2390	CPSC-CH-E1002-08	278.96		-1.43
339	In house	309.441		0.03	2415	In house	333.6		1.19
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	319.15		0.50
551	IEC62321	315	C	0.30	2431	CPSC-CH-E1002-08	316.17		0.36
622	In house	255.281		-2.56	2432		-----		-----
623	In house	360.45		2.48	2433	IEC62321	290.8		-0.86
826	EPA3052	329.1		0.98	2444		-----		-----
840	EPA3052	305.8		-0.14	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099		-----		-----	2464		-----	W	-----
1126		-----		-----	2489	IEC62321	260	C	-2.34
1213		-----		-----	2492	In house	320.5		0.56
2108	CPSC-CH-E1002-08	274.5		-1.64	2495	CPSC-CH-E1002-08	330.4		1.04
2115	EN16711-1	307.7		-0.05	2503		-----		-----
2118	CPSC-CH-E1002-08	322.36		0.65	2504	IEC62321	290.781		-0.86
2129	IEC62321	308.1		-0.03	2510		-----		-----
2132		-----		-----	2511		-----		-----
2135	In house	313.15		0.21	2529		-----		-----
2138	In house	324.8		0.77	2532	EPA3051	256		-2.53
2146		-----		-----	2549	In house	277.64		-1.49
2156	EPA3052	289.8		-0.91	2557		-----		-----
2165	IEC62321	NA		-----	2563	IEC62321	314.02		0.25
2175		-----		-----	2564		-----		-----
2182	CPSC-CH-E1002-08	302.4		-0.30	2568		-----		-----
2184		-----		-----	2569	CPSC-CH-E1002-08	278		-1.47
2190		-----		-----	2571	IEC62321	350.00		1.98
2199		-----		-----	2572	IEC62321	316.9		0.39
2212		-----		-----	2590	CPSC-CH-E1002-08	284.969		-1.14
2216		-----		-----	2591		-----		-----
2217	EPA3052	268.6		-1.93	2612	In house	336.3		1.32
2218		-----		-----	2620		-----		-----
2232		-----		-----	2624		-----		-----
2236		-----		-----	2629	EPA3052	324.8698		0.77
2246		-----		-----	2642		-----		-----
2247	EPA3050B	298.9		-0.47	2668	In house	313.33		0.22
2254	CPSC-CH-E1002-08	223.066	DG(0.05)	-4.11	2674	CPSC-CH-E1002-08	N/A		-----
2256		-----		-----	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	329		0.97	2713		-----		-----
2284	CPSC-CH-E1002-08	269		-1.91	2719	CPSC-CH-E1002-08	315.1		0.31
2290	IEC62321	317.4		0.42	2736	In house	296.30		-0.60
2293		-----		-----	2741	CPSC-CH-E1002-08	325.31		0.80
2294		-----		-----	2756	ISO17072-2	233.17	C,DG(0.05)	-3.63
2295	CPSC-CH-E1002-08	298.9		-0.47	2758	In house	303.83		-0.24
2296		-----		-----	3110		-----		-----
2298		-----		-----	3116		-----		-----
2300	In house	342.69		1.63	3122		-----		-----
2303		-----		-----	3124	EPA3052	328		0.92
2310	EPA3052	300		-0.42	3146	In house	328		0.92
2311	EPA3052	297.7		-0.53	3153	IEC62321	327.7		0.91
2316	IEC62321	357		2.32	3154	IEC62321	284.98		-1.14
2320	In house	367	C	2.80	3160	CPSC-CH-E1002-08	321.10		0.59
2347		-----		-----	3163	IEC62321	263		-2.19
2350	EPA3052	316.3		0.36	3166	In house	339.7		1.49
2352	IEC62321	308.1		-0.03	3167		-----		-----
2355	EPA3052	315.4		0.32	3172	In house	---		-----
2357	IEC62321	304.8		-0.19	3176	In house	300.88		-0.38
2358	EPA3052	304.8		-0.19	3182	IEC62321	301.0		-0.37
2363	In house	303		-0.28	3197	IEC62321	315.2		0.31
2365	EPA3052	293		-0.75	3200		-----		-----
2366	CPSC-CH-E1002-08	318		0.44	3209	EPA3052	295.01		-0.66
2369	IEC62321	315.1		0.31	3210		-----		-----
2370	EPA3052	297		-0.56	3213		-----		-----
2375	In house	315.00		0.30	3214	EPA3052	325.8		0.82
2379		-----		-----	3216	In house	313.0		0.20
2380	CPSC-CH-E1002-08	332.207		1.13	3225		-----		-----
2381		-----		-----	3228		-----		-----
2384		-----		-----	3237		-----		-----
2385	EPA3052	327		0.88	3243	In house	333		1.16
2387		-----		-----	3248		-----		-----

normality	OK
n	77
outliers	2
mean (n)	308.735
st.dev. (n)	23.8194
R(calc.)	66.694
R(Horwitz)	58.364

Lab 551 first reported: 429
Lab 2320 first reported: 236.5
Lab 2464 first reported: 389
Lab 2489 first reported: 228
Lab 2756 first reported: 106.0675



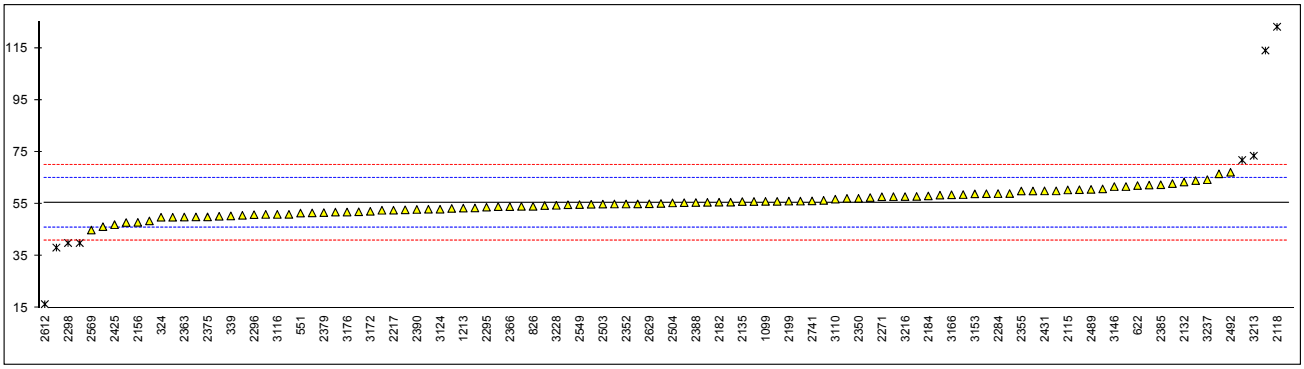


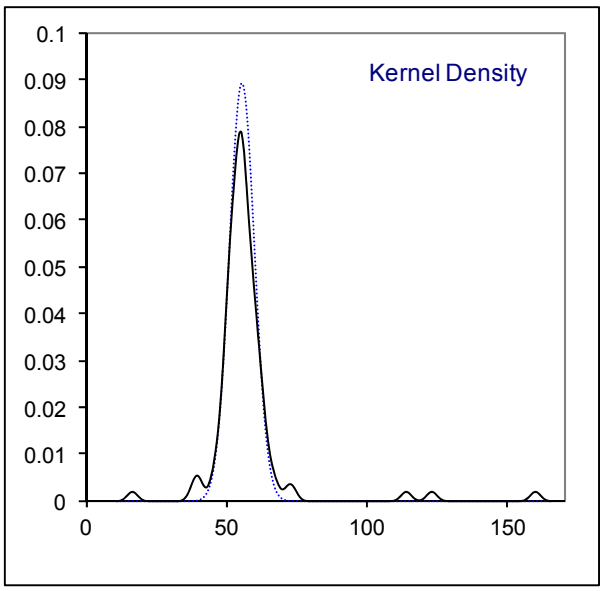
Determination of total Mercury as Hg on sample #16600; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	55.58		0.02
213	In house	51.57		-0.81	2389		-----		-----
324	IEC62321	49.9		-1.15	2390	CPSC-CH-E1002-08	52.9	C	-0.54
339	In house	50.431		-1.04	2415	In house	54.1		-0.29
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	47.06		-1.74
551	IEC62321	51.53		-0.82	2431	CPSC-CH-E1002-08	60.039		0.94
622	IEC62321	62.082		1.36	2432		-----		-----
623	In house	71.89	R(0.05)	3.38	2433	IEC62321	ND		-----
826	IEC62321	54.11		-0.29	2444	IEC62321	51.02		-0.92
840	EPA3052	46.3		-1.90	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099	In house	56		0.10	2464	CPSC-CH-E1002-08	64		1.75
1126		-----		-----	2489	IEC62321	60.60		1.05
1213	IEC62321	53.42		-0.43	2492	In house	67.2		2.41
2108	CPSC-CH-E1002-08	66.6		2.29	2495	CPSC-CH-E1002-08	57.9		0.50
2115	In house	60.4		1.01	2503	CPSC-CH-E1002-08	54.95		-0.11
2118	CPSC-CH-E1002-08	123.1019	R(0.01)	13.94	2504	IEC62321	55.431		-0.01
2129	IEC62321	53.5		-0.41	2510		-----		-----
2132	CPSC-CH-E1002-08	63.44		1.64	2511		-----		-----
2135	In house	55.94		0.09	2529		-----		-----
2138	In house	50.66		-1.00	2532	EPA3051	58.4		0.60
2146		-----		-----	2549	In house	54.77		-0.15
2156	IEC62321	47.95		-1.56	2557		-----		-----
2165	IEC62321	54.40		-0.23	2563		-----		-----
2175	EPA3052	54.7		-0.16	2564		-----		-----
2182	CPSC-CH-E1002-08	55.7		0.04	2568		-----		-----
2184	IEC62321	58.1		0.54	2569	CPSC-CH-E1002-08	45		-2.16
2190	In house	51		-0.93	2571	IEC62321	58.62		0.64
2199	IEC62321	56.1		0.12	2572	IEC62321	55.7		0.04
2212	In house	54.9		-0.12	2590	CPSC-CH-E1002-08	40.024	R(0.05)	-3.19
2216	CPSC-CH-E1002-08	58.95		0.71	2591		-----		-----
2217	EPA3052	52.63		-0.59	2612	In house	16.5	R(0.01)	-8.04
2218		-----		-----	2620	IEC62321	56		0.10
2232		-----		-----	2624		-----		-----
2236	EPA3050B	60.81		1.10	2629	EPA3052	55.07		-0.09
2246	CPSC-CH-E1002-08	62.86		1.52	2642		-----		-----
2247	EPA3050B	48.5		-1.44	2668	In house	55.62		0.03
2254	CPSC-CH-E1002-08	47.891		-1.57	2674	CPSC-CH-E1002-08	57.82		0.48
2256	IEC62321	60.0		0.93	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	57.8		0.47	2713		-----		-----
2284	CPSC-CH-E1002-08	59		0.72	2719	IEC62321	56.1		0.12
2290	IEC62321	55.0		-0.10	2736		-----		-----
2293		-----		-----	2741	CPSC-CH-E1002-08	56.2		0.15
2294		-----		-----	2756		-----		-----
2295	CPSC-CH-E1002-08	53.8		-0.35	2758	In house	50.02		-1.13
2296	In house	50.905		-0.95	3110	In house	56.85		0.28
2298	CPSC-CH-E1002-08	40.00	R(0.05)	-3.19	3116	CPSC-CH-E1002-08Mod.	51		-0.93
2300	In house	51.9		-0.74	3122		-----		-----
2303	In house	52.77		-0.56	3124	EPA3052	53.0		-0.51
2310	EPA3052	55.2		-0.06	3146	In house	61.7		1.28
2311	EPA3052	52.6		-0.60	3153	IEC62321	58.9		0.70
2316	IEC62321	54		-0.31	3154	IEC62321	62.28		1.40
2320	In house	114	C,R(0.01)	12.06	3160	CPSC-CH-E1002-08	60.49	C	1.03
2347	IEC62321	52		-0.72	3163	IEC62321	160	R(0.01)	21.54
2350	IEC62321	57.19		0.35	3166	In house	58.55		0.63
2352	IEC62321	55.0		-0.10	3167	IEC62321	57.49		0.41
2355	IEC62321	60.0		0.93	3172	In house	52.2		-0.68
2357		-----		-----	3176	In house	51.91	C	-0.74
2358	EPA3052	57.17		0.34	3182	IEC62321	60.04		0.94
2363	IEC62321	50		-1.13	3197	IEC62321	61.7		1.28
2365	IEC62321	53.0		-0.51	3200		-----		-----
2366		54		-0.31	3209	EPA3052	55.03		-0.10
2369	IEC62321	56.4		0.19	3210		-----		-----
2370	EPA3052	50.3		-1.07	3213	IEC62321	73.544	C,R(0.05)	3.72
2375	In house	50.04		-1.12	3214	IEC62321	49.9		-1.15
2379	IEC62321	51.7		-0.78	3216	In house	57.86		0.49
2380	CPSC-CH-E1002-08	38.246	R(0.05)	-3.56	3225	CPSC-CH-E1002-08	59.02		0.73
2381		-----		-----	3228	IEC62321	54.5		-0.21
2384	IEC62321	55.97	C	0.10	3237	IEC62321	64.34		1.82
2385	EPA3052	62.4		1.42	3243	IEC62321	55.5		0.00
2387	IEC62321	53.28	C	-0.46	3248		-----		-----

normality	OK
n	99
outliers	9
mean (n)	55.497
st.dev. (n)	4.4645
R(calc.)	12.501
R(Horwitz)	13.583

Lab 2320 first reported: 149
Lab 2384 first reported: 55.58
Lab 2387 first reported: 55.58
Lab 2390 first reported: 28.62
Lab 3160 first reported: 81.57
Lab 3176 first reported: 107.25
Lab 3213 first reported: 7.867

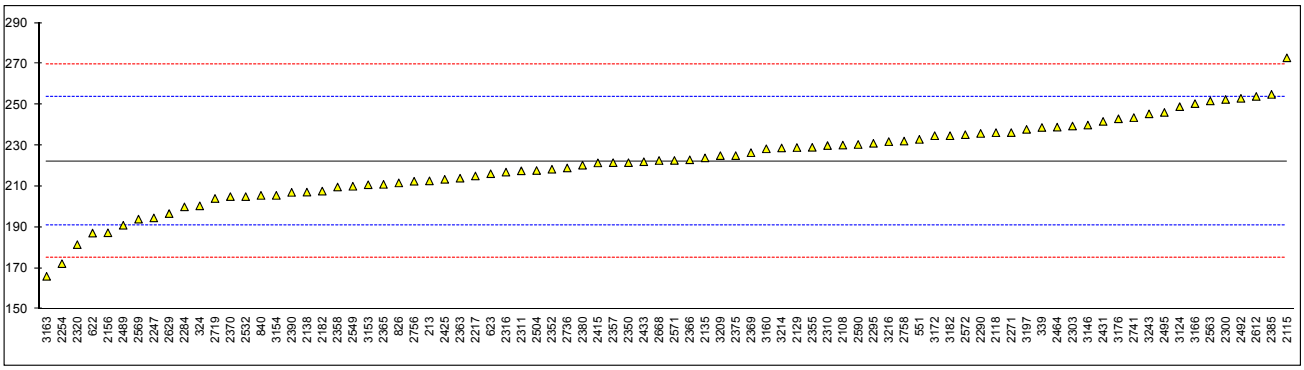


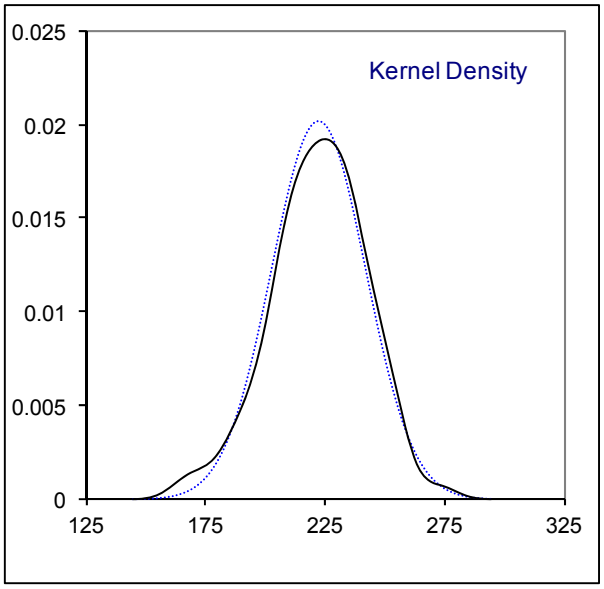


Determination of total Nickel as Ni on sample #16600; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388		-----		-----
213	In house	212.71		-0.60	2389		-----		-----
324	IEC62321	200.5		-1.38	2390	CPSC-CH-E1002-08	207.08		-0.96
339	In house	238.831		1.05	2415	In house	221.5		-0.05
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	213.46		-0.56
551	IEC62321	233		0.68	2431	CPSC-CH-E1002-08	241.786		1.24
622	In house	187.182		-2.22	2432		-----		-----
623	In house	216.21		-0.38	2433	IEC62321	222.05		-0.01
826	EPA3052	211.7		-0.67	2444		-----		-----
840	EPA3052	205.6		-1.06	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099		-----		-----	2464	CPSC-CH-E1002-08	239		1.06
1126		-----		-----	2489	IEC62321	191		-1.98
1213		-----		-----	2492	In house	253.1		1.96
2108	CPSC-CH-E1002-08	230.2		0.51	2495	CPSC-CH-E1002-08	246.2		1.52
2115	In house	272.9		3.21	2503		-----		-----
2118	CPSC-CH-E1002-08	236.28		0.89	2504	IEC62321	217.783		-0.28
2129	IEC62321	229		0.43	2510		-----		-----
2132		-----		-----	2511		-----		-----
2135	In house	223.95		0.11	2529		-----		-----
2138	In house	207.2		-0.95	2532	EPA3051	205		-1.09
2146		-----		-----	2549	In house	210.07		-0.77
2156	EPA3052	187.3		-2.22	2557		-----		-----
2165	IEC62321	NA		-----	2563	IEC62321	251.8		1.88
2175		-----		-----	2564		-----		-----
2182	CPSC-CH-E1002-08	207.7		-0.92	2568		-----		-----
2184		-----		-----	2569	CPSC-CH-E1002-08	194		-1.79
2190		-----		-----	2571	IEC62321	222.70		0.03
2199		-----		-----	2572	IEC62321	235.3		0.83
2212		-----		-----	2590	CPSC-CH-E1002-08	230.503		0.52
2216		-----		-----	2591		-----		-----
2217	EPA3052	215.1		-0.45	2612	In house	254		2.01
2218		-----		-----	2620		-----		-----
2232		-----		-----	2624		-----		-----
2236		-----		-----	2629	EPA3052	196.7		-1.62
2246		-----		-----	2642		-----		-----
2247	EPA3050B	194.6		-1.75	2668	In house	222.66		0.03
2254	CPSC-CH-E1002-08	172.214		-3.17	2674	CPSC-CH-E1002-08	N/A		-----
2256		-----		-----	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	236.3		0.89	2713		-----		-----
2284	CPSC-CH-E1002-08	200		-1.41	2719	CPSC-CH-E1002-08	204.1		-1.15
2290	IEC62321	235.9		0.87	2736	In house	219.00		-0.21
2293		-----		-----	2741	CPSC-CH-E1002-08	243.65		1.36
2294		-----		-----	2756	ISO17072-2	212.5		-0.62
2295	CPSC-CH-E1002-08	231.1		0.56	2758	In house	232.19		0.63
2296		-----		-----	3110		-----		-----
2298		-----		-----	3116		-----		-----
2300	In house	252.51		1.92	3122		-----		-----
2303	In house	239.51		1.10	3124	EPA3052	249		1.70
2310	EPA3052	230		0.49	3146	In house	240		1.13
2311	EPA3052	217.6		-0.29	3153	IEC62321	210.8		-0.73
2316	IEC62321	217		-0.33	3154	IEC62321	205.6		-1.06
2320	In house	181.5		-2.58	3160	CPSC-CH-E1002-08	228.39		0.39
2347		-----		-----	3163	IEC62321	166		-3.57
2350	EPA3052	221.6		-0.04	3166	In house	250.5		1.79
2352	IEC62321	218.4		-0.24	3167		-----		-----
2355	EPA3052	229.1		0.44	3172	In house	234.8		0.80
2357	IEC62321	221.6		-0.04	3176	In house	243.08		1.32
2358	EPA3052	209.7		-0.80	3182	IEC62321	234.8		0.80
2363	In house	214		-0.52	3197	IEC62321	237.9		0.99
2365	EPA3052	211		-0.71	3200		-----		-----
2366	CPSC-CH-E1002-08	223		0.05	3209	EPA3052	225.04		0.18
2369	IEC62321	226.5		0.27	3210		-----		-----
2370	EPA3052	205		-1.09	3213		-----		-----
2375	In house	225.07		0.18	3214	EPA3052	228.8		0.42
2379		-----		-----	3216	In house	231.9		0.61
2380	CPSC-CH-E1002-08	220.383		-0.12	3225		-----		-----
2381		-----		-----	3228		-----		-----
2384		-----		-----	3237		-----		-----
2385	EPA3052	255		2.08	3243	In house	245.5		1.48
2387		-----		-----	3248		-----		-----

normality	OK
n	82
outliers	0
mean (n)	222.234
st.dev. (n)	19.8249
R(calc.)	55.510
R(Horwitz)	44.143





Determination of total Antimony, Chromium, Hexavalent Chromium, Cobalt and Lead on sample #16600; results is mg/kg

lab	method	Sb	Cr	Cr VI	Co	Pb
110		-----	-----	-----	-----	-----
213		-----	-----	-----	-----	-----
324	IEC	< 2	< 2	< 2	6.82	< 2
339	IH/IECMod.	<15	1.923	<1	10.592	<3
348	IH/CPSC	-----	n.d.	-----	-----	n.d.
362		-----	-----	-----	-----	-----
551	IEC	ND	ND	ND	ND	<12.5 C
622	IEC/IH	0.084	7.279 C	<1	5.918	4.327
623	IH/IEC	n.d.	n.d.	n.d.	n.d.	n.d.
826	3052/IEC	n.d	1.600	0.441	n.d	n.d
840	3052	ND	ND	-----	ND	ND
1051	CPSC	-----	-----	-----	-----	<10
1099	IH	-----	< 20	< 20	-----	< 20
1126		-----	-----	-----	-----	-----
1213	IEC	-----	-----	<5.0	-----	<5.0
2108	CPSC	-----	7.4	-----	-----	-----
2115		-----	-----	-----	-----	-----
2118	CPSC	0	0	0	0.1396	0.1496
2129	IEC	<10	<5	-----	<5	<5
2132	CPSC	<10	<10	-----	-----	<10
2135	IH	<1	1.513	-----	<1	<1
2138	IH	ND	ND	ND	ND	ND
2146		-----	-----	-----	-----	-----
2156	IEC/3052/3060a	0.5	0.98	0.337	0.5	0.5
2165	IEC	NA	ND	ND	NA	ND
2175	3052	-----	<2	-----	10.1	<1
2182		-----	-----	-----	-----	-----
2184	IEC	-----	<10	<10	-----	<10
2190	IH	18	<4	<20	-----	<4
2199	IEC	-----	4.64	<2	-----	<2
2212	IH/CPSC	<30	<10	<2	-----	<10
2216	CPSC	<30	<10	-----	-----	<10
2217	3052	0.13	1.31	-----	0.17	0.35
2218		-----	-----	-----	-----	-----
2232	CPSC	-----	-----	-----	-----	<10
2236	3050B	<25	<10	-----	-----	<10
2246	CPSC	<10	<10	-----	-----	<10
2247	3050B	nd	nd	nd	nd	nd
2254	CPSC	<2	<6	-----	<2	<4
2256	IEC	-----	<10	-----	-----	<10
2258		-----	-----	-----	-----	-----
2271	IEC	<5.0	<5.0	<5.0	<5.0	<5.0
2284	CPSC	nd	nd	-----	nd	nd
2290	IEC	<20	<20	<1	<20	<20
2293	CPSC	-----	-----	-----	-----	<10
2294	CPSC	-----	-----	-----	-----	<8
2295		-----	-----	-----	-----	-----
2296	IH	-----	0	-----	-----	0
2298	CPSC	<10	<10	-----	-----	<10
2300	IH	nd	nd	no capability	nd	5.3
2303	IH	<10	<10	-----	<10	<10
2310	3052	NOT DET.	NOT DET.	-----	NOT DET.	NOT DET.
2311	3052	Not Det.	Not Det.	-----	Not Det.	Not Det.
2316	IEC	ND	ND	ND	ND	ND
2320	IH	-----	0.685	-----	-----	-----
2347	IH	-----	-----	0	-----	0
2350	IEC/3052	<10.0	<0.5	<1.0	<2.0	<5.0
2352	IEC	ND	ND	ND	ND	ND
2355	IEC/3052	<10	-----	-----	-----	<2
2357	IEC	<10	<5	-----	<5	<5
2358	3052/3060a	N.D.	N.D.	N.D.	N.D.	N.D.
2363	IEC/IH	<10	<2	<2	<5	<2
2365	IEC/3052	<10	<2	<2	<5	<2
2366	CPSC/IEC	<10	<5	<2	<20	<10
2369	IEC	<10	-----	-----	<5	<2
2370	3052/IEC	<2	<2	<2	<2	<2
2375		-----	-----	-----	-----	-----
2379	IEC	-----	-----	0.1177	-----	Not detected
2380	CPSC/IH	-----	ND	ND	-----	ND
2381	CPSC	-----	-----	-----	-----	ND
2384	IEC	-----	<2	<2	-----	<2
2385	3052/3060a	<5	<5	<1	<1	<1
2387	IEC	-----	<2	<2	-----	<2

2388	IEC	-----		<2		<2	-----	<2
2389	CPSC	-----		-----		-----	-----	n.d
2390	CPSC/IEC	ND		ND		ND	ND	ND
2415	IEC/IH/CPSC	ND		ND		ND	ND	ND
2422	IEC	-----		-----		-----	-----	Not Det.
2425	IH	not detected		not detected		not detected	not detected	not detected
2431		-----		-----		-----	-----	-----
2432		-----		-----		-----	-----	-----
2433	IEC	ND		ND		ND	ND	ND
2444	IEC	-----		-----		0.00	-----	2.28
2453		-----		-----		-----	-----	-----
2460	CPSC	-----		-----		-----	-----	0
2464		-----		-----		-----	-----	-----
2489	IEC	ND		ND		ND	ND	ND
2492		-----		-----		-----	-----	-----
2495	CPSC	-----		<5		-----	<5	<20
2503	CPSC	-----		1.245		-----	-----	3.418
2504	IEC	<10		<5		<2	<5	<2
2510		-----		-----		-----	-----	-----
2511		-----		-----		-----	-----	-----
2529		-----		-----		-----	-----	-----
2532	3051/IEC	Not Det.		Not Det.		Not Det.	Not Det.	Not Det.
2549	IH	ND		ND		ND	ND	ND
2557	IEC	-----		-----		<2	-----	-----
2563		-----		-----		-----	-----	-----
2564	CPSC	-----		-----		-----	-----	ND
2568	IEC	-----		-----		N.D	-----	-----
2569	CPSC	<10		<10		-----	<10	<10
2571	IEC	N.D.		3.76		0.77	N.D.	5.36
2572	IEC	<20		<20		<1	<20	<20
2590	CPSC	< 0.5		1.160		-----	< 0.5	< 0.5
2591	CPSC	-----		-----		-----	-----	0.0
2612	IH/IEC	-----		1.56		0.44	9.19	0.79
2620	IEC	-----		<100		-----	-----	<500
2624	IH	-----		-----		-----	-----	not det.
2629	3052/IEC	ND		ND		ND	ND	ND
2642	CPSC	-----		-----		-----	-----	<25
2668	IH	Not Det.		Not Det.		Not Det.	Not Det.	Not Det
2674	CPSC/3060a	N/A		n.d.		n.d.	N/A	n.d.
2678		-----		-----		-----	-----	-----
2708	IEC	-----		ND		-----	-----	-----
2713	IH	-----		-----		-----	-----	< 10
2719	CPSC/IEC	<10		<10		-----	<10	<10
2736	IH	<5		<5		-----	<5	<5
2741	CPSC/IEC	<5		<5		<3	<5	<10
2756	ISO17072-2	-----		58.37	C, f+?	-----	ND	ND
2758	IH	< 10		< 10		-----	< 10	< 10
3110	IH	<15		<15		-----	-----	<15
3116		-----		-----		-----	-----	-----
3122	CPSC	-----		-----		-----	-----	2.519
3124	3052	1.34		<1		-----	0.17	0.28
3146	IH/IEC	n.d.		n.d.		n.d.	n.d.	n.d.
3153	IEC	ND		ND		ND	ND	ND
3154		-----		-----		-----	-----	-----
3160	CPSC	-----		0		-----	9.45	1.40
3163	IEC	55	f+?	20		-----	3	0
3166	IH/3060a	1.25		1.25		< 0.05	0.169	0.282
3167		-----		-----		-----	-----	-----
3172	IH	< 10		< 10		< 0.5	< 10	< 10
3176		-----		-----		-----	-----	-----
3182	IEC	<13		<5		nd	<5	nd
3197	IEC/CPSC	ND		ND		ND	6.5	ND
3200		-----		-----		-----	-----	-----
3209	3052	<10.0		<10.0		-----	<10.0	<10.0
3210		-----		-----		-----	-----	-----
3213	IEC	-----		1.605		-----	-----	0.259
3214	IEC/3052	<10		<10		<1	<10	<10
3216	IH	0.496		1.306		-----	0.199	0.301
3225	CPSC	-----		<15.0		-----	-----	<15.0
3228	IEC	-----		<10		<10	-----	<10
3237	IEC	-----		1.31		-----	-----	0.46
3243	IEC/IH	n.d.		< 1		n.d.	< 1	< 5
3248	CPSC	-----		-----		-----	-----	<10

normality	n.a.	n.a.	n.a.	n.a.	n.a.
n	69	94	61	68	113
outliers	n.a.	n.a.	n.a.	n.a.	n.a.
mean (n)	<20	<20	<20	<20	<20
st.dev. (n)	n.a.	n.a.	n.a.	n.a.	n.a.
R(calc.)	n.a.	n.a.	n.a.	n.a.	n.a.
R(Horwitz)	n.a.	n.a.	n.a.	n.a.	n.a.

Lab 551 first reported for Lead: 12.72
Lab 622 first reported for Chromium: 13.942
Lab 2756 first reported for Chromium: 17.5

Abbreviations of the method names in this table:

3050B	=	EPA 3050B
3052	=	EPA 3052
3060a	=	EPA 3060a
CPSC	=	CPSC-CH-E1002-08
IEC	=	IEC62321
IECMod.	=	IEC62321Mod.
IH	=	In house

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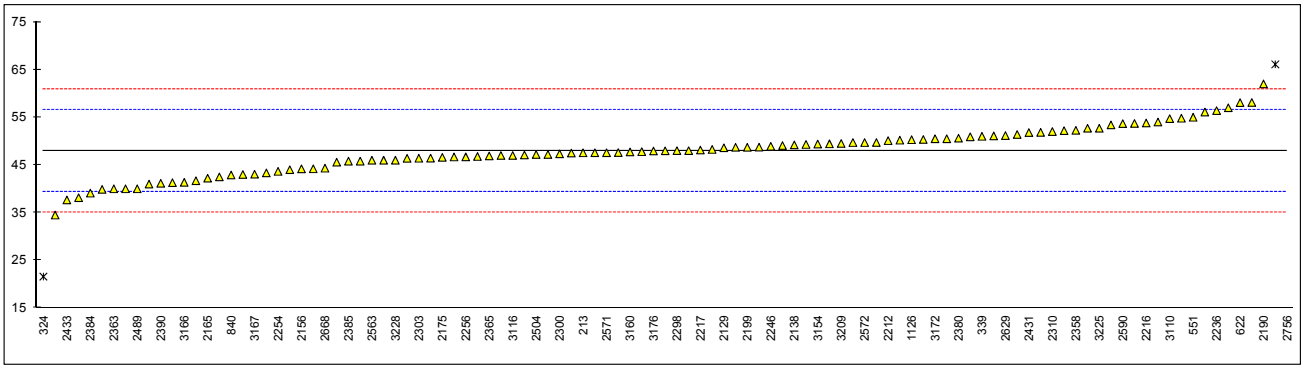
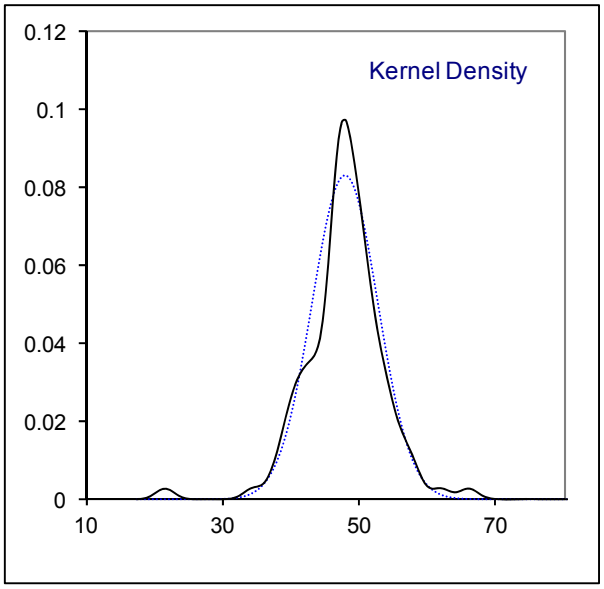
Determination of total Chromium as Cr on sample #16601; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	38.14	C	-2.29
213	In house	47.55		-0.10	2389		-----		-----
324	IEC62321	21.6	R(0.01)	-6.15	2390	CPSC-CH-E1002-08	41.15		-1.59
339	In house	51.008		0.71	2415	IEC62321	44.2		-0.88
348	In house	50.354		0.56	2422		-----		-----
362		-----		-----	2425	In house	49.71		0.41
551	IEC62321	55		1.64	2431	CPSC-CH-E1002-08	51.80		0.89
622	IEC62321	58.067		2.36	2432		-----		-----
623	In house	46.78		-0.28	2433	IEC62321	37.66		-2.41
826	EPA3052	47.97		0.00	2444		-----		-----
840	EPA3052	42.9		-1.18	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099	In house	< 20	false -?	<-6.53	2464		-----		-----
1126	In house	50.3		0.54	2489	IEC62321	40		-1.86
1213		-----		-----	2492	In house	56.1		1.90
2108	CPSC-CH-E1002-08	58.1		2.36	2495	CPSC-CH-E1002-08	54.8		1.59
2115	In house	53.7		1.34	2503	CPSC-CH-E1002-08	51.39		0.80
2118	CPSC-CH-E1002-08	46.68		-0.30	2504	IEC62321	47.187		-0.18
2129	IEC62321	48.6		0.15	2510		-----		-----
2132	CPSC-CH-E1002-08	48.74		0.18	2511		-----		-----
2135	In house	49.43		0.34	2529		-----		-----
2138	In house	49.22		0.29	2532	EPA3051	45.8		-0.51
2146		-----		-----	2549	In house	41.7		-1.46
2156	IEC62321	44.19		-0.88	2557		-----		-----
2165	IEC62321	42.23		-1.34	2563	IEC62321	46		-0.46
2175	EPA3052	46.6		-0.32	2564		-----		-----
2182	CPSC-CH-E1002-08	47.1		-0.20	2568		-----		-----
2184	IEC62321	52.2		0.99	2569	CPSC-CH-E1002-08	46		-0.46
2190	In house	62		3.27	2571	IEC62321	47.57		-0.09
2199	IEC62321	48.7		0.17	2572	IEC62321	49.7		0.40
2212	In house	50.1		0.50	2590	CPSC-CH-E1002-08	53.668		1.33
2216	CPSC-CH-E1002-08	53.8		1.36	2591		-----		-----
2217	EPA3052	48.14		0.04	2612	In house	51.1		0.73
2218		-----		-----	2620	IEC62321	66.1	R(0.05)	4.23
2232		-----		-----	2624		-----		-----
2236	EPA3050B	56.40		1.97	2629	EPA3052	51.17		0.75
2246	CPSC-CH-E1002-08	48.91		0.22	2642		-----		-----
2247	EPA3051	46.4		-0.37	2668	In house	44.33		-0.85
2254	CPSC-CH-E1002-08	43.656		-1.01	2674	CPSC-CH-E1002-08	46.44		-0.36
2256	IEC62321	46.7		-0.30	2678		-----		-----
2258		-----		-----	2708	IEC62321	53.4		1.27
2271	IEC62321	47.6		-0.09	2713		-----		-----
2284	CPSC-CH-E1002-08	41		-1.63	2719	IEC62321	43.0		-1.16
2290	IEC62321	49.3		0.31	2736	In house	51.84		0.90
2293		-----		-----	2741	CPSC-CH-E1002-08	50.9		0.68
2294		-----		-----	2756	ISO17072-2	155.23	C,R(0.01)	25.02
2295	CPSC-CH-E1002-08	52.7		1.10	2758	In house	47.79		-0.04
2296	In house	47.565		-0.09	3110	In house	54.71		1.57
2298	CPSC-CH-E1002-08	48.00		0.01	3116	CPSC-CH-E1002-08Mod.	47		-0.23
2300	In house	47.34		-0.15	3122		-----		-----
2303	In house	46.41		-0.36	3124	EPA3052	<5	false -?	<-10.03
2310	EPA3052	52.01		0.94	3146	In house	50.2		0.52
2311	EPA3052	49.7		0.40	3153	IEC62321	47.5		-0.11
2316	IEC62321	54		1.41	3154	IEC62321	49.39		0.33
2320	In house	39.89		-1.89	3160	CPSC-CH-E1002-08	47.73		-0.06
2347		-----		-----	3163	IEC62321	57		2.11
2350	IEC62321	48.7	C	0.17	3166	In house	41.37		-1.54
2352	IEC62321	40.0		-1.86	3167	IEC62321	43.07		-1.14
2355		-----		-----	3172	In house	50.5		0.59
2357	IEC62321	42.5		-1.28	3176	In house	47.94		-0.01
2358	EPA3052	52.27		1.00	3182	IEC62321	50.5		0.59
2363	IEC62321	40		-1.86	3197	IEC62321	48.0		0.01
2365	IEC62321	46.9		-0.25	3200		-----		-----
2366	CPSC-CH-E1002-08	47		-0.23	3209	EPA3052	49.51		0.36
2369		-----		-----	3210		-----		-----
2370	EPA3052	47.2		-0.18	3213	IEC62321	49.067	C	0.26
2375	In house	44.01		-0.92	3214	IEC62321	34.5		-3.14
2379		-----		-----	3216	In house	45.58		-0.56
2380	CPSC-CH-E1002-08	50.614		0.62	3225	CPSC-CH-E1002-08	52.71		1.11
2381		-----		-----	3228	IEC62321	46.0		-0.46
2384	IEC62321	39.10	C	-2.07	3237	IEC62321	48.26		0.07
2385	EPA3052	45.8		-0.51	3243	IEC62321	43.333		-1.08
2387	IEC62321	41.30	C	-1.56	3248		-----		-----

normality	OK
n	104
outliers	3
mean (n)	47.970
st.dev. (n)	4.8172
R(calc.)	13.488
R(Horwitz)	12.001

Lab 2350 first reported: 27.35
Lab 2384 first reported: 29.36
Lab 2387 first reported: 29.36
Lab 2388 first reported: 29.36
Lab 2620 reported a mean of duplicated results
Lab 2756 first reported: 68.5
Lab 3213 first reported: 75.446



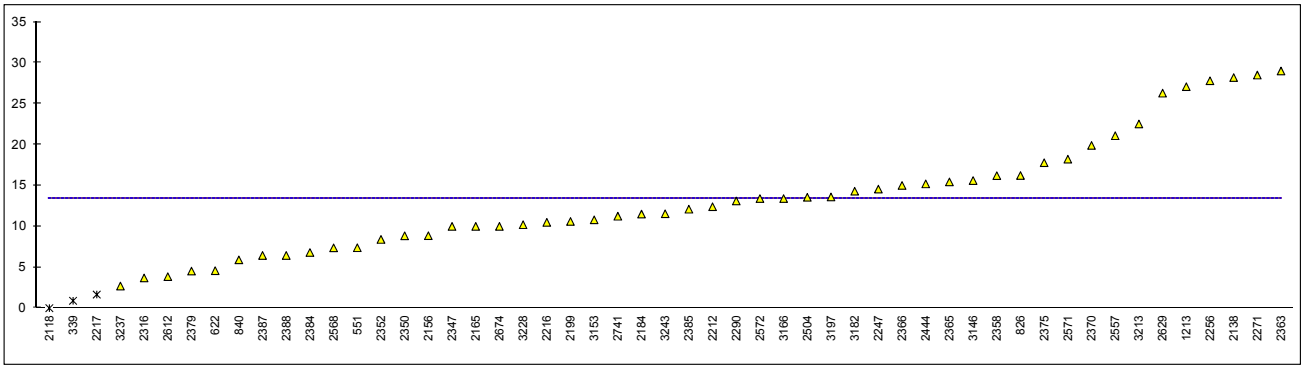


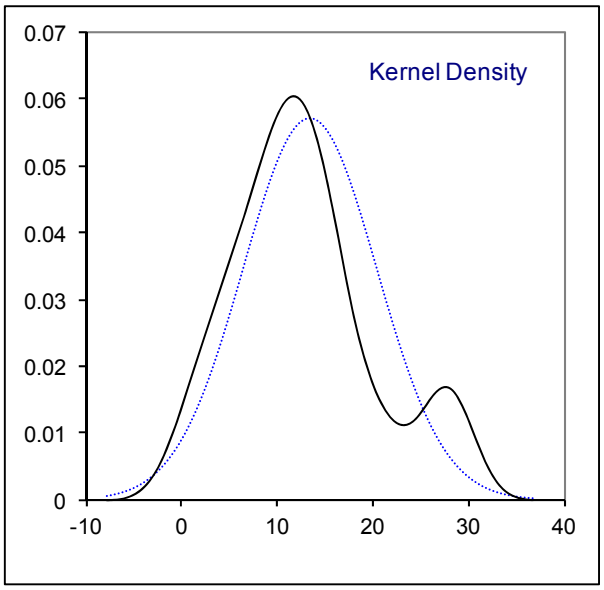
Determination of Hexavalent Chromium as Cr^{6+} on sample #16601; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	6.44		-----
213		-----		-----	2389		-----		-----
324	IEC62321	< 2	false - ?	-----	2390	EPA3060a	ND	false - ?	-----
339	IEC62321Mod.	0.9	ex	-----	2415		-----		-----
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	not det.	false - ?	-----
551	IEC62321	7.38		-----	2431		-----		-----
622	IEC62321	4.579		-----	2432		-----		-----
623	IEC62321	n.d.	false - ?	-----	2433	IEC62321	ND	false - ?	-----
826	IEC62321	16.223		-----	2444	IEC62321	15.19		-----
840	IEC62321	5.9		-----	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099		< 20		-----	2464		-----		-----
1126		-----		-----	2489	IEC62321	<3	false - ?	-----
1213	IEC62321	27.08		-----	2492		-----		-----
2108		-----		-----	2495		-----		-----
2115		-----		-----	2503		-----		-----
2118		0	ex	-----	2504	IEC62321	13.55		-----
2129		-----		-----	2510		-----		-----
2132		-----		-----	2511		-----		-----
2135		-----		-----	2529		-----		-----
2138	IEC62321	28.2		-----	2532	IEC62321	<3		-----
2146		-----		-----	2549	In house	ND	false - ?	-----
2156	EPA3060a	8.858	C	-----	2557	IEC62321	21.081		-----
2165	IEC62321	10.00		-----	2563		-----		-----
2175		-----		-----	2564		-----		-----
2182		-----		-----	2568	IEC62321	7.375		-----
2184	IEC62321	11.5		-----	2569		-----		-----
2190	In house	<20		-----	2571	IEC62321	18.22		-----
2199	EPA3060a	10.6		-----	2572	IEC62321	13.4		-----
2212	In house	12.4		-----	2590		-----		-----
2216	In house	10.49		-----	2591		-----		-----
2217	In house	1.66	ex	-----	2612	IEC62321	3.85		-----
2218		-----		-----	2620		-----		-----
2232		-----		-----	2624		-----		-----
2236		-----		-----	2629	IEC62321	26.29		-----
2246		-----		-----	2642		-----		-----
2247	IEC62321	14.56		-----	2668	In house	< 3 ppm	false - ?	-----
2254		-----		-----	2674	EPA3060a	10.00		-----
2256	IEC62321	27.8		-----	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	28.5		-----	2713		-----		-----
2284		-----		-----	2719		-----		-----
2290	IEC62321	13.1		-----	2736		-----		-----
2293		-----		-----	2741	IEC62321	11.24		-----
2294		-----		-----	2756		-----		-----
2295		-----		-----	2758		-----		-----
2296		-----		-----	3110		-----		-----
2298		-----		-----	3116		-----		-----
2300	In house	no capability		-----	3122		-----		-----
2303		-----		-----	3124		-----		-----
2310		-----		-----	3146	IEC62321	15.6		-----
2311		-----		-----	3153	IEC62321	10.8		-----
2316	IEC62321	3.69		-----	3154		-----		-----
2320		-----		-----	3160		-----		-----
2347	IEC62321	10		-----	3163		-----		-----
2350	IEC62321	8.8468		-----	3166	EPA3060a	13.4		-----
2352	IEC62321	8.4		-----	3167		-----		-----
2355		-----		-----	3172	In house	< 0.5	false - ?	-----
2357		-----		-----	3176		-----		-----
2358	EPA3060a	16.2		-----	3182	IEC62321	14.3		-----
2363	IEC62321	29		-----	3197	IEC62321	13.6		-----
2365	IEC62321	15.44		-----	3200		-----		-----
2366	IEC62321	15		-----	3209		-----		-----
2369		-----		-----	3210		-----		-----
2370	IEC62321	19.9		-----	3213	IEC62321	22.523		-----
2375	IEC62321	17.78		-----	3214	In house	<1	false - ?	-----
2379	IEC62321	4.5295		-----	3216		-----		-----
2380	In house	ND	false - ?	-----	3225		-----		-----
2381		-----		-----	3228	IEC62321	10.2		-----
2384	IEC62321	6.80	C	-----	3237	IEC62321	2.70		-----
2385	EPA3060a	12.1		-----	3243	IEC62321	11.538		-----
2387	IEC62321	6.44		-----	3248		-----		-----

normality	OK
n	50
outliers	0+ (3ex)
mean (n)	13.452
st.dev. (n)	6.9769
R(calc.)	19.535
R(Horwitz)	(4.075)

Lab 2156 first reported: 43.48
Lab 2384 first reported: 6.44
Lab 339, 2118 and 2217 were excluded for they reported a test result below the detection limit of IEC62321, see §4.1

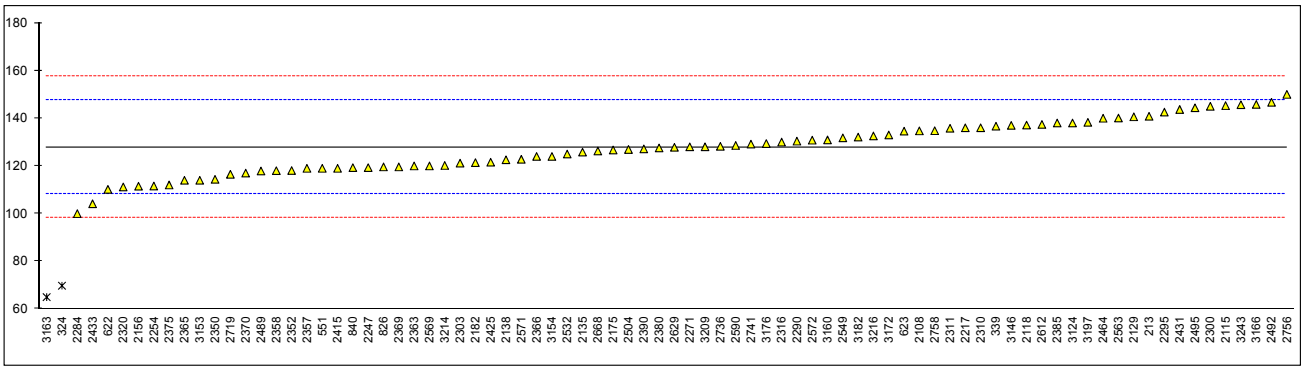


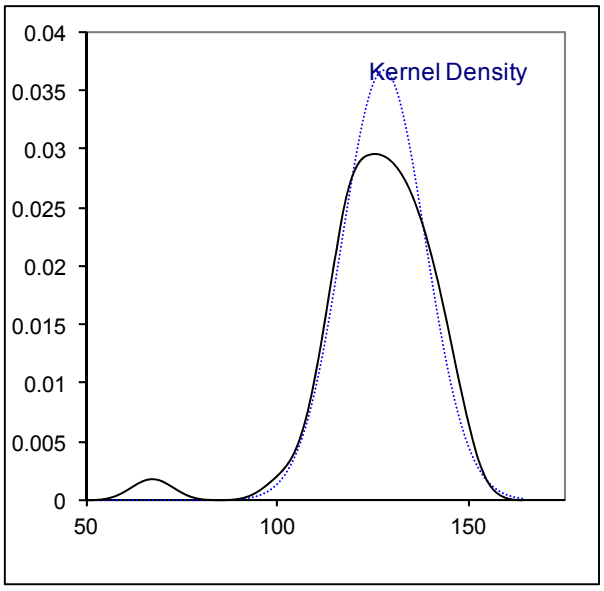


Determination of total Cobalt as Co on sample #16601; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388		-----		-----
213	In house	140.82		1.32	2389		-----		-----
324	IEC62321	69.8	R(0.01)	-5.89	2390	CPSC-CH-E1002-08	127.16		-0.07
339	In house	136.675		0.90	2415	In house	119.0		-0.89
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	121.58		-0.63
551	IEC62321	119		-0.89	2431	CPSC-CH-E1002-08	143.68		1.61
622	In house	110.190		-1.79	2432		-----		-----
623	In house	134.59		0.69	2433	IEC62321	104.15		-2.40
826	EPA3052	119.6		-0.83	2444		-----		-----
840	EPA3052	119.3		-0.86	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099		-----		-----	2464	CPSC-CH-E1002-08	140		1.24
1126		-----		-----	2489	IEC62321	117.9		-1.01
1213		-----		-----	2492	In house	146.7		1.92
2108	CPSC-CH-E1002-08	134.7		0.70	2495	CPSC-CH-E1002-08	144.4		1.68
2115	In house	145.3		1.78	2503		-----		-----
2118	CPSC-CH-E1002-08	137.15		0.95	2504	IEC62321	126.902		-0.09
2129	IEC62321	140.6		1.30	2510		-----		-----
2132		-----		-----	2511		-----		-----
2135	In house	125.82		-0.20	2529		-----		-----
2138	In house	122.6		-0.53	2532	EPA3051	125		-0.28
2146		-----		-----	2549	In house	131.79		0.40
2156	EPA3052	111.5		-1.65	2557		-----		-----
2165	IEC62321	NA		-----	2563	IEC62321	140.1		1.25
2175	EPA3052	126.7		-0.11	2564		-----		-----
2182	CPSC-CH-E1002-08	121.4		-0.65	2568		-----		-----
2184		-----		-----	2569	CPSC-CH-E1002-08	120		-0.79
2190		-----		-----	2571	IEC62321	122.80		-0.51
2199		-----		-----	2572	IEC62321	130.8		0.30
2212		-----		-----	2590	CPSC-CH-E1002-08	128.585		0.08
2216		-----		-----	2591		-----		-----
2217	EPA3052	136		0.83	2612	In house	137.4		0.97
2218		-----		-----	2620		-----		-----
2232		-----		-----	2624		-----		-----
2236		-----		-----	2629	EPA3052	127.8		0.00
2246		-----		-----	2642		-----		-----
2247	EPA3050B	119.3		-0.86	2668	In house	126.26		-0.16
2254	CPSC-CH-E1002-08	111.601		-1.64	2674	CPSC-CH-E1002-08	N/A		-----
2256		-----		-----	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	128.0		0.02	2713		-----		-----
2284	CPSC-CH-E1002-08	100		-2.82	2719	CPSC-CH-E1002-08	116.5		-1.15
2290	IEC62321	130.4		0.26	2736	In house	128.24		0.04
2293		-----		-----	2741	CPSC-CH-E1002-08	129.17		0.14
2294		-----		-----	2756	ISO17072-2	150.0		2.25
2295	CPSC-CH-E1002-08	142.6		1.50	2758	In house	134.76		0.71
2296		-----		-----	3110		-----		-----
2298		-----		-----	3116		-----		-----
2300	In house	145.02		1.75	3122		-----		-----
2303	In house	121.19		-0.67	3124	EPA3052	138		1.03
2310	EPA3052	136.02		0.83	3146	In house	137		0.93
2311	EPA3052	135.8		0.81	3153	IEC62321	114.0		-1.40
2316	IEC62321	130		0.22	3154	IEC62321	124.0		-0.39
2320	In house	111.2		-1.69	3160	CPSC-CH-E1002-08	130.92		0.32
2347		-----		-----	3163	IEC62321	65	R(0.01)	-6.37
2350	EPA3052	114.4		-1.36	3166	In house	145.8		1.83
2352	IEC62321	118.1		-0.98	3167		-----		-----
2355		-----		-----	3172	In house	133.0		0.53
2357	IEC62321	119.0		-0.89	3176	In house	129.39		0.16
2358	EPA3052	118.0		-1.00	3182	IEC62321	132.1		0.44
2363	In house	120		-0.79	3197	IEC62321	138.3		1.07
2365	EPA3052	114		-1.40	3200		-----		-----
2366	CPSC-CH-E1002-08	124		-0.39	3209	EPA3052	128.04		0.02
2369	IEC62321	119.6		-0.83	3210		-----		-----
2370	EPA3052	117		-1.10	3213		-----		-----
2375	In house	112.01		-1.60	3214	EPA3052	120.2		-0.77
2379		-----		-----	3216	In house	132.6		0.49
2380	CPSC-CH-E1002-08	127.555		-0.03	3225		-----		-----
2381		-----		-----	3228		-----		-----
2384		-----		-----	3237		-----		-----
2385	EPA3052	138		1.03	3243	In house	145.667		1.81
2387		-----		-----	3248		-----		-----

normality	OK
n	80
outliers	2
mean (n)	127.805
st.dev. (n)	10.8491
R(calc.)	30.377
R(Horwitz)	27.591



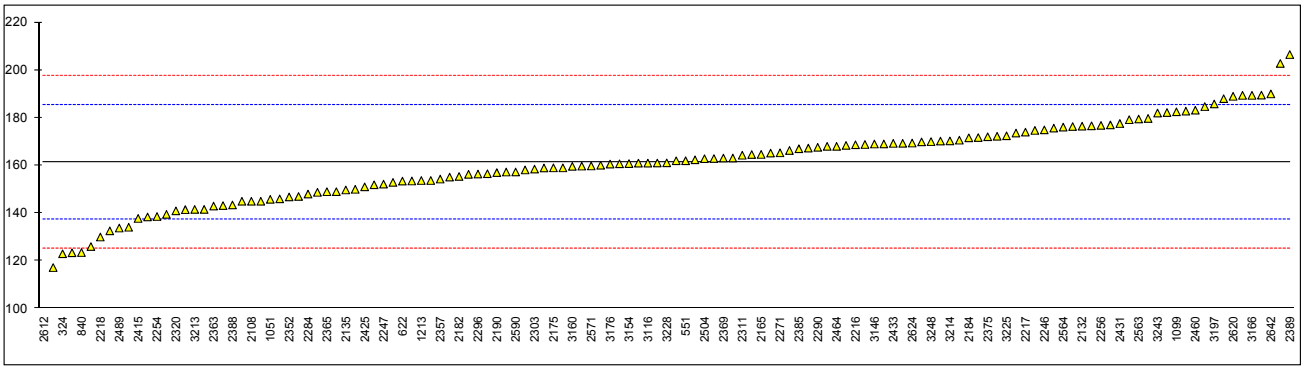


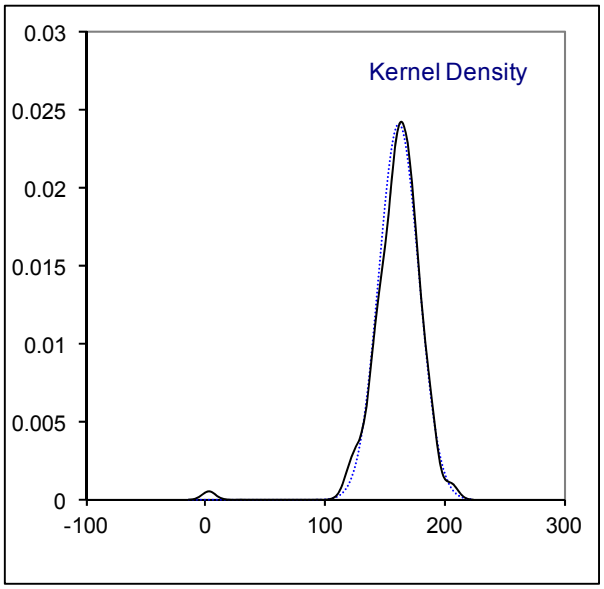
Determination of total Lead as Pb on sample #16601; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	143.44		-1.49
213	In house	170.6		0.77	2389	CPSC-CH-E1002-08	206.5		3.76
324	IEC62321	123		-3.19	2390	CPSC-CH-E1002-08	202.76		3.45
339	In house	167.3		0.49	2415	CPSC-CH-E1002-08	137.8		-1.96
348	CPSC-CH-E1002-08	176.342		1.25	2422	IEC62321	149.024		-1.03
362		-----		-----	2425	In house	151.03		-0.86
551	IEC62321	162		0.05	2431	CPSC-CH-E1002-08	177.579		1.35
622	IEC62321	153.436		-0.66	2432		-----		-----
623	In house	170.22		0.74	2433	IEC62321	169.27		0.66
826	IEC62321	152.9		-0.71	2444	IEC62321	163.14		0.15
840	EPA3052	123.5		-3.15	2453		-----		-----
1051	CPSC-CH-E1002-08	145.79		-1.30	2460	CPSC-CH-E1002-08	183.2		1.82
1099	In house	182.5	C	1.76	2464	CPSC-CH-E1002-08	168	C	0.55
1126	In house	173.6		1.02	2489	IEC62321	133.77		-2.30
1213	IEC62321	153.7		-0.64	2492	In house	168.4		0.59
2108	CPSC-CH-E1002-08	145.0		-1.36	2495	CPSC-CH-E1002-08	184.7		1.94
2115	In house	189.4		2.33	2503	CPSC-CH-E1002-08	189.5		2.34
2118	CPSC-CH-E1002-08	176.63		1.27	2504	IEC62321	162.871		0.12
2129	IEC62321	169.9		0.71	2510		-----		-----
2132	CPSC-CH-E1002-08	176.48		1.26	2511	CPSC-CH-E1002-08	156.56		-0.40
2135	In house	149.73		-0.97	2529	CPSC-CH-E1002-08	168.8		0.62
2138	In house	162.9		0.13	2532	EPA3051	145		-1.36
2146		-----		-----	2549	In house	143.17		-1.52
2156	IEC62321	134.1		-2.27	2557		-----		-----
2165	IEC62321	164.64		0.27	2563	IEC62321	179.5		1.51
2175	EPA3052	159		-0.20	2564	CPSC-CH-E1002-08	176.1		1.23
2182	CPSC-CH-E1002-08	155.4		-0.50	2568		-----		-----
2184	IEC62321	171.6		0.85	2569	CPSC-CH-E1002-08	147		-1.20
2190	In house	157		-0.36	2571	IEC62321	159.80		-0.13
2199	IEC62321	153.5		-0.66	2572	IEC62321	166.3		0.41
2212	CPSC-CH-E1002-08	171.7		0.86	2590	CPSC-CH-E1002-08	157.278		-0.34
2216	CPSC-CH-E1002-08	168.7		0.61	2591	CPSC-CH-E1002-08	179.72		1.53
2217	EPA3052	174		1.05	2612	In house	2.96	R(0.01)	-13.19
2218	CPSC-CH-E1002-08	130.0		-2.61	2620	IEC62321	189		2.30
2232	CPSC-CH-E1002-08	141.6		-1.65	2624	In house	169.4		0.67
2236	EPA3050B	179.2	C	1.48	2629	EPA3052	123.4		-3.16
2246	CPSC-CH-E1002-08	174.92		1.13	2642	CPSC-CH-E1002-08	190		2.38
2247	EPA3050B	152.2		-0.76	2668	In house	148.73		-1.05
2254	CPSC-CH-E1002-08	138.593		-1.90	2674	CPSC-CH-E1002-08	158.95		-0.20
2256	IEC62321	176.8		1.28	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	165.3		0.33	2713	In house	177.02		1.30
2284	CPSC-CH-E1002-08	148		-1.11	2719	CPSC-CH-E1002-08	132.6		-2.40
2290	IEC62321	167.6		0.52	2736	In house	157.25		-0.34
2293	CPSC-CH-E1002-08	182.2		1.73	2741	CPSC-CH-E1002-08	169.3		0.66
2294	CPSC-CH-E1002-08	138.42		-1.91	2756	ISO17072-2	117.19	C	-3.68
2295	CPSC-CH-E1002-08	162.4		0.09	2758	In house	161.98		0.05
2296	In house	156.428		-0.41	3110	In house	175.67		1.19
2298	CPSC-CH-E1002-08	161.00		-0.03	3116	CPSC-CH-E1002-08	161		-0.03
2300	In house	172.23		0.90	3122	CPSC-CH-E1002-08	174.7		1.11
2303	In house	158.47		-0.24	3124	EPA3052	188		2.22
2310	EPA3052	169.04		0.64	3146	In house	169		0.64
2311	EPA3052	164.3		0.24	3153	IEC62321	164.6		0.27
2316	IEC62321	168		0.55	3154	IEC62321	160.8		-0.05
2320	In house	140.96		-1.70	3160	CPSC-CH-E1002-08	159.65		-0.14
2347	IEC62321	145		-1.36	3163	IEC62321	126		-2.94
2350	IEC62321	151.9		-0.79	3166	In house	189.4		2.33
2352	IEC62321	146.8		-1.21	3167	IEC62321	146.0		-1.28
2355	EPA3052	165.2		0.32	3172	In house	160.7		-0.06
2357	IEC62321	154.3		-0.59	3176	In house	160.59		-0.06
2358	EPA3052	160.1		-0.11	3182	IEC62321	182.8		1.78
2363	IEC62321	143		-1.53	3197	CPSC-CH-E1002-08	185.8		2.03
2365	IEC62321	149		-1.03	3200		-----		-----
2366	CPSC-CH-E1002-08	159		-0.20	3209	EPA3052	161.03		-0.03
2369	IEC62321	163.1		0.14	3210		-----		-----
2370	EPA3052	150		-0.95	3213	IEC62321	141.576		-1.65
2375	In house	172.03		0.89	3214	IEC62321	170.3		0.74
2379	IEC62321	153.7		-0.64	3216	In house	156.3		-0.42
2380	CPSC-CH-E1002-08	159.734		-0.14	3225	CPSC-CH-E1002-08	172.44		0.92
2381	CPSC-CH-E1002-08	158.125		-0.27	3228	IEC62321	161.1		-0.02
2384	IEC62321	139.51	C	-1.82	3237	IEC62321	155.14		-0.52
2385	EPA3052	167		0.47	3243	IEC62321	182.0		1.72
2387	IEC62321	141.48	C	-1.66	3248	CPSC-CH-E1002-08	170		0.72

normality	OK
n	132
outliers	1
mean (n)	161.370
st.dev. (n)	16.5868
R(calc.)	46.443
R(Horwitz)	33.635

Lab 1099 first reported: 92
Lab 2236 first reported: 269.0
Lab 2384 first reported: 143.44
Lab 2387 first reported: 143.44
Lab 2464 first reported: 330
Lab 2756 first reported: 24.06075



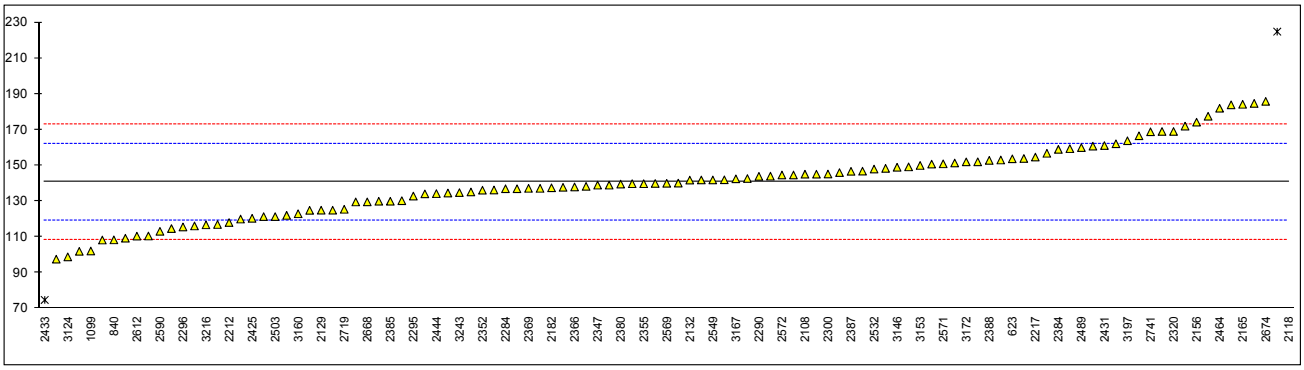


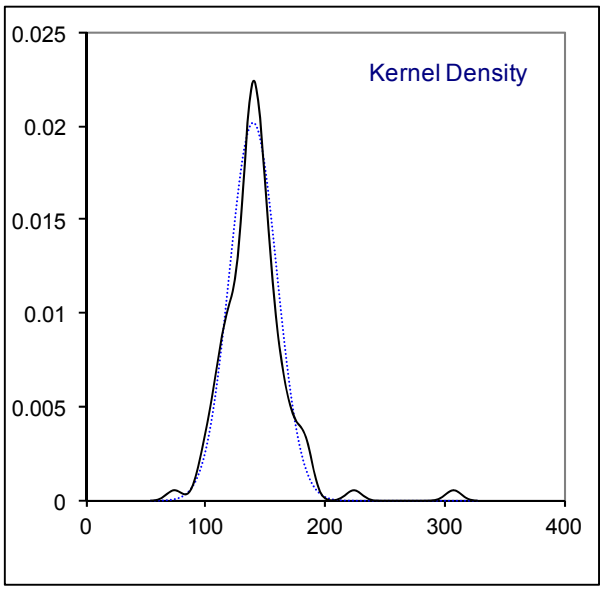
Determination of total Mercury as Hg on sample #16601; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110		-----		-----	2388	IEC62321	152.85		1.14
213	In house	134.13		-0.61	2389		-----		-----
324	IEC62321	97.6		-4.03	2390	CPSC-CH-E1002-08	124.94		-1.47
339	In house	109.313		-2.93	2415	In house	137.2		-0.32
348		-----		-----	2422		-----		-----
362		-----		-----	2425	In house	120.46		-1.89
551	IEC62321	110.55		-2.82	2431	CPSC-CH-E1002-08	161.127		1.92
622	IEC62321	152.05		1.07	2432		-----		-----
623	In house	153.70	C	1.22	2433	IEC62321	74.83	R(0.05)	-6.16
826	IEC62321	159.4		1.75	2444	IEC62321	134.25		-0.60
840	EPA3052	108.4		-3.02	2453		-----		-----
1051		-----		-----	2460		-----		-----
1099	In house	102.2	C	-3.60	2464	CPSC-CH-E1002-08	182		3.87
1126	In house	134.6		-0.57	2489	IEC62321	160		1.81
1213	IEC62321	121.4		-1.80	2492	In house	149.2		0.80
2108	CPSC-CH-E1002-08	145.1		0.42	2495	CPSC-CH-E1002-08	151.4		1.01
2115	In house	162.1		2.01	2503	CPSC-CH-E1002-08	121.4		-1.80
2118	CPSC-CH-E1002-08	307.99	R(0.01)	15.66	2504	IEC62321	129.604		-1.03
2129	IEC62321	125		-1.46	2510		-----		-----
2132	CPSC-CH-E1002-08	141.83		0.11	2511		-----		-----
2135	In house	116.18		-2.29	2529		-----		-----
2138	In house	137.8		-0.27	2532	EPA3051	148		0.69
2146		-----		-----	2549	In house	141.92		0.12
2156	IEC62321	174.2		3.14	2557		-----		-----
2165	IEC62321	184.19		4.07	2563		-----		-----
2175	EPA3052	135.2		-0.51	2564		-----		-----
2182	CPSC-CH-E1002-08	137.5		-0.29	2568		-----		-----
2184	IEC62321	183.9		4.05	2569	CPSC-CH-E1002-08	140		-0.06
2190	In house	102		-3.62	2571	IEC62321	150.90		0.96
2199	IEC62321	136.3		-0.41	2572	IEC62321	144.7		0.38
2212	In house	118.1		-2.11	2590	CPSC-CH-E1002-08	113.16	C	-2.57
2216	CPSC-CH-E1002-08	122.1		-1.74	2591		-----		-----
2217	EPA3052	154.7		1.31	2612	In house	110.5		-2.82
2218		-----		-----	2620	IEC62321	146		0.50
2232		-----		-----	2624		-----		-----
2236	EPA3050B	108.3		-3.03	2629	EPA3052	114.73		-2.43
2246	CPSC-CH-E1002-08	139.93		-0.07	2642		-----		-----
2247	EPA3050B	130.3		-0.97	2668	In house	129.63		-1.03
2254	CPSC-CH-E1002-08	166.571		2.42	2674	CPSC-CH-E1002-08	185.83		4.23
2256	IEC62321	169.0		2.65	2678		-----		-----
2258		-----		-----	2708		-----		-----
2271	IEC62321	139.8		-0.08	2713		-----		-----
2284	CPSC-CH-E1002-08	137		-0.34	2719	IEC62321	125.5		-1.42
2290	IEC62321	143.9		0.30	2736		-----		-----
2293		-----		-----	2741	CPSC-CH-E1002-08	168.85		2.64
2294		-----		-----	2756		-----		-----
2295	CPSC-CH-E1002-08	132.9		-0.73	2758	In house	140.14		-0.05
2296	In house	115.628		-2.34	3110	In house	150.77		0.95
2298	CPSC-CH-E1002-08	139.00		-0.15	3116	CPSC-CH-E1002-08Mod.	137		-0.34
2300	In house	145.21		0.43	3122		-----		-----
2303	In house	153.92		1.24	3124	EPA3052	98.9		-3.91
2310	EPA3052	148.38		0.72	3146	In house	149		0.78
2311	EPA3052	146.8		0.58	3153	IEC62321	150.0		0.87
2316	IEC62321	142		0.13	3154	IEC62321	224.8	R(0.01)	7.87
2320	In house	169	C	2.65	3160	CPSC-CH-E1002-08	122.99	C	-1.65
2347	IEC62321	139		-0.15	3163	IEC62321	172		2.93
2350	IEC62321	156.8		1.51	3166		-----		-----
2352	IEC62321	136.2		-0.42	3167	IEC62321	142.5		0.17
2355	EPA3052	139.8		-0.08	3172	In house	152.0		1.06
2357		-----		-----	3176	In house	141.88		0.11
2358	EPA3052	138.3		-0.22	3182	IEC62321	144.7		0.38
2363	IEC62321	130		-1.00	3197	IEC62321	163.8		2.17
2365	IEC62321	125		-1.46	3200		-----		-----
2366	CPSC-CH-E1002-08	138		-0.25	3209	EPA3052	153.04		1.16
2369	IEC62321	137.2		-0.32	3210		-----		-----
2370	EPA3052	117		-2.21	3213	IEC62321	177.496	C	3.45
2375	In house	120.03		-1.93	3214	IEC62321	144.0		0.31
2379	IEC62321	160.8		1.88	3216	In house	116.8		-2.23
2380	CPSC-CH-E1002-08	139.591		-0.10	3225	CPSC-CH-E1002-08	145.12		0.42
2381		-----		-----	3228	IEC62321	184.7		4.12
2384	IEC62321	158.97	C	1.71	3237	IEC62321	142.72		0.19
2385	EPA3052	130		-1.00	3243	IEC62321	134.833		-0.54
2387	IEC62321	146.72	C	0.57	3248		-----		-----

normality	OK
n	106
outliers	3
mean (n)	140.652
st.dev. (n)	19.7687
R(calc.)	55.352
R(Horwitz)	29.929

Lab 623 first reported: 199.31
Lab 1099 first reported: 86
Lab 2320 first reported: 243
Lab 2384 first reported: 152.85
Lab 2387 first reported: 152.85
Lab 2590 first reported: 82.075
Lab 3160 first reported: 90.39
Lab 3213 first reported: 21.681





Determination of total Antimony, Cadmium, Copper and Nickel on sample #16600; results is mg/kg

lab	method	Sb	Cd	Cu	Ni
110		-----	-----	-----	-----
213		-----	-----	-----	-----
324	IEC/EN	< 2	< 2	2.82	2.11
339	IH	<15	<1.5	7.544	2.969
348	IH	-----	n.d.	-----	-----
362		-----	-----	-----	-----
551	IEC	ND	ND	ND	ND
622	IH/IEC	0.790	<1	10.564	4.128
623	IH	n.d.	n.d.	n.d.	n.d.
826	3052/IEC	n.d	n.d	3.740	2.470
840	3052	ND	ND	ND	ND
1051	EN	-----	<10	-----	-----
1099	IH	-----	< 20	-----	-----
1126		-----	-----	-----	-----
1213	IEC	-----	<5.0	-----	-----
2108	CPSC	-----	-----	4.4	11.3
2115		-----	-----	-----	-----
2118	CPSC	0.9710	0.0840	6.865	0.792
2129	IEC	<10	<5	<10	<10
2132	CPSC/EN	<10	<10	-----	-----
2135	IH	<1	<1	2.280	3.683
2138	IH	ND	ND	ND	ND
2146		-----	0	-----	-----
2156	3052/IEC	0.5	0.5	2.403	1.615
2165	IEC	NA	ND	NA	NA
2175	3052	-----	<1	-----	-----
2182		-----	-----	-----	-----
2184	EN	-----	<10	-----	-----
2190	IH	<5	<5	-----	-----
2199	IEC	-----	<2	-----	-----
2212	IH	<30	<5	-----	-----
2216	CPSC	<30	<10	-----	-----
2217	3052	0.88	0.2	3.49	3.01
2218		-----	-----	-----	-----
2232	EN	-----	<10	-----	-----
2236	3050B	<25	<10	-----	-----
2246	CPSC/EN	<10	<10	-----	-----
2247	3050B/EN	nd	nd	nd	nd
2254	CPSC	<2	<2	2.705	2.501
2256	EN	-----	<10	-----	-----
2258		-----	-----	-----	-----
2271	IEC	<5.0	<5.0	<5.0	<5.0
2284	CPSC/EN	nd	nd	12	nd
2290	IEC/EN	<20	<20	<20	<20
2293	EN	-----	<10	-----	-----
2294		-----	-----	-----	-----
2295		-----	-----	-----	-----
2296	IH	-----	0	-----	-----
2298	CPSC	<10	<10	-----	-----
2300	IH	nd	nd	6.95	4.3
2303	IH	<10	<10	-----	<10
2310	3052/EN	NOT DET.	NOT DET.	NOT DET.	NOT DET.
2311	3052/EN	Not Det.	Not Det.	Not Det.	Not Det.
2316	IEC	ND	ND	ND	ND
2320	IH	-----	-----	2.77	1.80
2347	IEC	-----	0	-----	-----
2350	3052	<10.0	<0.5	3.285	2.417
2352	IEC	ND	ND	ND	ND
2355	3052/IEC	<10	<2	<5	<5
2357	IEC	<10	<5	<5	<5
2358	3052	N.D.	N.D.	N.D.	N.D.
2363	IH/IEC	<10	<2	<5	<5
2365	3052/IEC	<10	<2	<5	<5
2366	CPSC	<10	<5	<10	<20
2369	IEC	<10	<2	<5	<5
2370	3052	<2	<2	3.70	2.58
2375		-----	-----	-----	-----
2379	EN	-----	Not det.	-----	-----
2380	CPSC	-----	ND	-----	-----
2381	CPSC	-----	ND	-----	-----
2384	IEC	-----	<2	-----	-----
2385	3052	<5	<1	5.9	<5
2387	IEC	-----	<2	-----	-----
2388	IEC	-----	<2	-----	-----

2389	CPSC	-----	n,d	-----		-----
2390	CPSC/EN	ND	ND	ND		ND
2415	IH/EN	ND	ND	ND		ND
2422		-----	-----	-----		-----
2425	IH/EN	not detected	not detected	not detected		not detected
2431		-----	-----	-----		-----
2432	EN	-----	ND	-----		-----
2433	IEC	ND	ND	ND		ND
2444	IEC	-----	0.00	-----		-----
2453	EN	-----	< 20 mg/kg	-----		-----
2460	EN	-----	0	-----		-----
2464		-----	-----	-----		-----
2489	IEC	ND	ND	ND		ND
2492		-----	-----	-----		-----
2495	CPSC/EN	-----	<5	<5		<5
2503	CPSC	2.430	1.240	-----		-----
2504	IEC/EN	<10	<2	<5		<5
2510		-----	-----	-----		-----
2511		-----	-----	-----		-----
2529		-----	-----	-----		-----
2532	3051	Not Det.	Not Det	Not Det.		Not Det.
2549	IH	ND	ND	ND		ND
2557		-----	-----	-----		-----
2563		-----	-----	-----		-----
2564	CPSC	-----	ND	-----		-----
2568		-----	-----	-----		-----
2569	CPSC	<10	<10	<10		<10
2571	IEC	N.D.	N.D.	4.42		3.00
2572	IEC/EN	<20	<20	<20		<20
2590	CPSC	< 0.5	< 0.5	4.056		2.436
2591	CPSC	-----	0.15	-----		-----
2612	IH/EN	-----	0.155	4.50		3.32
2620	IEC	-----	<10	-----		-----
2624	EN	-----	not det.	-----		-----
2629	3052	ND	ND	ND		ND
2642	EN	-----	<10	-----		-----
2668	IH	Not Det.	Not Det.	Not Det.		Not Det.
2674	CPSC/EN	N/A	n.d.	N/A		N/A
2678		-----	-----	-----		-----
2708	IEC	-----	nd	-----		-----
2713	EN	-----	<10	-----		-----
2719	CPSC/EN	<10	<10	<10		<10
2736	IH	<5	<5	<5		<5
2741	CPSC	<5	<5	6.9		<5
2756	ISO 17072-2	-----	0.75	1.252		11.0
2758	IH	< 10	< 10	< 10		< 10
3110	IH/EN	<15	<15	-----		-----
3116		-----	-----	-----		-----
3122	CPSC	-----	1.26	-----		-----
3124	3052	1.13	0.114	4.27		3.04
3146	IH	n.d.	n.d.	n.d.		n.d.
3153	IEC	ND	ND	ND		ND
3154		-----	-----	-----		-----
3160	CPSC	-----	0	4.31		0.37
3163	IEC	0	0	8		10
3166	IH	0.850	-----	4.50		3.123
3167		-----	-----	-----		-----
3172	IH/EN	< 10	< 10	---		< 10
3176		-----	-----	-----		-----
3182	IEC/EN	<13	nd	<5		<5
3197	IEC/EN	ND	ND	7.8		ND
3200		-----	-----	-----		-----
3209	3052	<10.0	<10.0	<10.0		<10.0
3210	EN	-----	<40	-----		-----
3213		-----	-----	-----		-----
3214	3052/EN	<10	<10	<10		<10
3216	IH	0.572	0.122	4.05	C	3.589
3225	EN	-----	<10.0	-----		-----
3228	EN	-----	<10	-----		-----
3237	IEC	-----	0.11	-----		-----
3243	IH/IEC	n.d.	< 1	< 1		< 1
3248	EN	-----	<10	-----		-----

normality	n.a.	n.a.	n.a.	n.a.
n	70	114	68	70
outliers	n.a.	n.a.	n.a.	n.a.
mean (n)	<20	<20	<20	<20
st.dev. (n)	n.a.	n.a.	n.a.	n.a.
R(calc.)	n.a.	n.a.	n.a.	n.a.
R(Horwitz)	n.a.	n.a.	n.a.	n.a.

Lab 3216 first reported for Copper: 23.7

Abbreviations of the method names in this table:

3050B	=	EPA 3050B
3052	=	EPA 3052
3051	=	EPA 3051
CPSC	=	CPSC-CH-E1002-08
EN	=	EN1122
IEC	=	IEC62321
IECMod.	=	IEC62321Mod.
IH	=	In house

APPENDIX 2

Number of participating laboratories per country

4 labs in BANGLADESH
2 labs in BELGIUM
1 lab in BRAZIL
1 lab in BULGARIA
1 lab in CANADA
1 lab in DENMARK
1 lab in ETHIOPIA
1 lab in FINLAND
3 labs in FRANCE
10 labs in GERMANY
2 labs in GUATEMALA
17 labs in HONG KONG
1 lab in HUNGARY
10 labs in INDIA
2 labs in INDONESIA
1 lab in IRELAND
5 labs in ITALY
2 labs in JAPAN
6 labs in KOREA
4 labs in MALAYSIA
2 labs in MEXICO
1 lab in MOROCCO
18 labs in P.R. of CHINA
2 labs in PAKISTAN
1 lab in PHILIPPINES
1 lab in POLAND
1 lab in PORTUGAL
3 labs in SINGAPORE
5 labs in SPAIN
1 lab in SRI LANKA
1 lab in SWITZERLAND
3 labs in TAIWAN R.O.C.
4 labs in THAILAND
2 labs in THE NETHERLANDS
2 labs in TUNISIA
6 labs in TURKEY
8 labs in U.S.A.
2 labs in UNITED KINGDOM
8 labs in VIETNAM

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' outlier test
R(0.05) = straggler in Rosner' outlier test
W = test result withdrawn on request of participant
ex = test result excluded from calculations
n.a. = not applicable
n.e. = not evaluated
n.d. = not detected
fr. = first reported

Literature:

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2 EN 1122:2001, "Determination of Cadmium in plastics with the method of the wet decomposition".
3 ASTM D4004:98, "Determination of Metal Content by Flame Atomic Absorption (AAS) analysis"
4 ASTM E178:02
5 ASTM E1301:03
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8 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
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10 Horwitz. Journal of AOAC International Vol. 79 No.3. 1996
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18 The Royal Society of Chemistry 2002, Analyst 2002, 127, p1359-1364, P.J. Lowthian and M. Thompson.
19 R.G. Visser, Reliability of proficiency test results for metals and phthalates in plastics, Accred Qual Assur, 14, p29-34 (2009)
20 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier procedure, T*echnometrics*, 25(2), p165-172, (1983)