Results of Proficiency Test
Metals in Paint
April 2015

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since the USA Consumer Product Safety Improvement Act (CPSIA) did pass in 2008, iis did receive a number of requests to start a PT scheme for the determination of lead in paint. Among other things, the CPSIA bans lead and phthalates in toys.
This USA legislation reduces the amount of total lead content in the substrates of children's products to 600 ppm by 10 February 2009, to 300 ppm by 14 August 2009 and to 100 ppm by 14 August 2011 and the total lead content in surface coatings or paint to 90 mg/kg by 14 August 2009.

Since 2008 the Institute for Interlaboratory Studies (iis) organizes every year a proficiency test on total Lead in dried Paint. In the 2015 PT, it was decided to extend the scope with other metals on request of a number of participants.
In the 2015 interlaboratory study 157 laboratories in 34 different countries participated. See appendix 2 for the number of participants per country.
In this report the results of the 2015 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 in Spijkenisse was the organiser of this proficiency test. It was decided to use in this proficiency test 2 different dried paint samples (labelled #15050 and #15051). Both samples #15050 and #15051 were spiked with Lead. For sample #15050 besides Lead also the elements Cobalt, Nickel and Selenium were requested to be determined. The fit-for-use and homogeneity testing was subcontracted. The participants were asked to report the analytical results with one extra figure using the indicated units on the report form. These results with an extra figure are 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 accreditation scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentially 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 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 can be downloaded via the FAQ page of the iis internet site www.iisnl.com.

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 dried paint samples were used in this proficiency test. Both samples #15050 and #15051 were made from water based paint.
After thorough mixing, both paint samples were applied to plastic sheets. After drying, the paint was scraped off the sheets. The dried paint was milled until the particles passed through a 0.5 mm sieve. The two dried and sieved paint samples, labelled #15050 and #15051 were respectively divided over 194 and 198 subsamples of 0.5 gram each. Homogeneity on samples #15050 and #15051 was performed by the determination of total Lead on 8 randomly selected samples each. The analytical testing was performed by a subcontracted laboratory. See the following tables for the homogeneity test results.

	Total Lead conc. in mg/kg
Sample #15050-1	82
Sample #15050-2	82
Sample #15050-3	79
Sample #15050-4	83
Sample #15050-5	81
Sample #15050-6	80
Sample #15050-7	81
Sample #15050-8	82

table 1: homogeneity test results of subsamples #15050

	Total Lead conc. in mg/kg
Sample #15051-1	88
Sample #15051-2	88
Sample #15051-3	89
Sample #15051-4	88
Sample #15051-5	88
Sample #15051-6	87
Sample #15051-7	88
Sample #15051-8	88

table 2: : homogeneity test results of subsamples #15051

From the homogeneity test results of table 1 and table 2, the repeatabilities were calculated and compared with 0.3 times the corresponding target reproducibility in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Total Lead (#15050) mg/kg	Total Lead (#15051) mg/kg
r (observed)	4	1
Reference method	Horwitz	Horwitz
0.3 * R (ref. method)	6	6

table 3: repeatabilities of subsamples #15050 and subsamples #15051

The calculated repeatabilities for samples #15050 and #15051 are both in agreement with 0.3 times the estimated target reproducibilities, calculated using the Horwitz equation. Therefore, homogeneity of the subsamples #15050 and #15051 was assumed.

Approx. 0.5 grams of each of the samples #15050 and #15051 were sent to the participating laboratories on April 8, 2015.

2.5 ANALYSES

The participants were asked, applying the analysis procedure that is routinely used in the laboratory, to determine on sample #15050 the concentration of total Cobalt, total Lead, total Nickel and total Selenium. And on sample #15051 participants were asked to determine total Lead only.
To get comparable results reported, a detailed report form, on which the requested metals and the units were pre-printed, was sent together with each set of samples. A letter of instructions was sent along.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original data are tabulated in the appendices of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder fax was sent to those laboratories that had not yet reported. 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 data are placed under 'Remarks' in the result tables in appendix 1. A list of abbreviations used in the tables can be found in appendix 5.

3.1 STATISTICS

Statistical calculations were performed as described in the report ’iis Interlaboratory Studies: Protocol for the Organization, 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 results. Results reported as '<…' or '>…" were in general 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.
In accordance to ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test and by R(0.01) for the Rosner General ESD test (see appendix 3, no.15). Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test and by R(0.05) for the Rosner. Both outliers and stragglers were not included in the calculations of the averages and the 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 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 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 (see appendix 3; nos.13 and 14). Also a normal Gauss curve was projected over the Kernel Density Graph.

3.3 Z-SCORES

To evaluate the performance of the individual participating laboratories the z-scores were calculated. In order to be able to have an objective evaluation of the performance of the individual participants, it was decided to evaluate this performance against the literature requirements. Therefore the z-scores were calculated using a target standard deviation. This target standard deviation was calculated from the literature reproducibility by division with 2.8.
The $z_{(target)}$-scores were calculated according to:

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

The $z_{(target)}$-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 whether the reported test results is fit-for-use.

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

During the execution of this proficiency test some reporting problems occurred. Of the 157 participants, 27 participants reported results after the final reporting date and one participant reported no results at all.
Finally, the 156 reporting laboratories did report in total 558 numerical results. Observed were 16 statistically outlying results, which is 2.9% of the numerical results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.
For laboratory 2452 statistical outliers were observed for total Cobalt (#15050) and total Lead (#15051). For this reason the test result for Nickel reported by this laboratory was excluded from the statistical evaluation. The determinations are not independent from each other.

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, see also paragraph 3.1.

Due to the lack of precision data in the relevant test methods for the determination of metals in paint, the z-scores and the calculated reproducibilities were compared with an estimated reproducibility calculated using the Horwitz equation.

4.1 EVALUATION PER SAMPLE

In this section, the results are discussed per sample. All statistical results reported on the textile samples are summarised in appendix 1.

Sample #15050

Total Cobalt: The total cobalt determination on this sample, at a concentration level of 523 mg/kg, may be problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the estimated reproducibility calculated using the Horwitz equation.

Total Lead: The total lead determination on this sample, at a concentration level of 82 mg/kg may be problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated using the Horwitz equation.

Total Nickel: The total nickel determination on this sample, at a concentration level of 29 mg/kg may be problematic. One statistical outlier was observed and one other test result was excluded. The calculated reproducibility, after rejection of the suspect data is not in agreement with the estimated reproducibility calculated using the Horwitz equation.

Total Selenium: All reported results, except one, were near or below the detection limit. Therefore no further conclusions were drawn.

Sample #15051

Total Lead: The total lead determination on this sample, at a concentration level of 88 mg/kg, may be problematic for a number of laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated using the Horwitz equation.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the target reproducibilities calculated from the Horwitz equation and the reproducibilities as found for the group of participating laboratories. The number of significant results, the average results, the calculated reproducibilities (standard deviation*2.8) and the target reproducibilities are compared in the next tables.

#sample 15050

Parameter	*unit*	*n*	*average*	*2.8 * sd*	*R (target)*
Total Cobalt	mg/kg	107	522.7	107.5	91.3
Total Lead	mg/kg	150	82.2	19.9	19.0
Total Nickel	mg/kg	108	29.4	10.5	7.9
Total Selenium	mg/kg	24	3.1	7.2	(1.2)

table 4: reproducibilities of cobalt, lead, nickel and selenium in dried paint sample #15050

#sample 15051

Parameter	*unit*	*n*	*average*	*2.8 * sd*	*R (target)*
Total Lead	mg/kg	152	88.2	21.8	20.1

table 5: reproducibility of lead in dried paint sample #15051

From the above table it can be concluded, without statistical calculations, that the participating laboratories have no difficulties with the analysis of total Lead in dried paint but that the analysis of total Cobalt and total Nickel is more difficult for the laboratories when compared with the strict target results calculated with the Horwitz equation. See also the discussions in paragraphs 4.1 and 5.

4.3 EVALUATION OF THE PROFICIENCY TEST OF APRIL 2015 WITH PREVIOUS PTS

	April 2015	*April 2014*	*April 2013*	*February 2012*
Number of reporting labs	156	132	139	110
Number of results reported	558	264	276	215
Number of statistical outliers	16	10	6	9
Percentage outliers	2.9%	3.8%	2.2%	4.2%

table 6: comparison with previous proficiency tests

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

The evolution of the reproducibility as observed in this proficiency scheme and the comparison with the findings in previous rounds is summarized in table 6.

Parameter	*April 2015*	*April 2014*	*April 2013*	*February 2012*	*February 2011*	*February 2010*	*February 2009*
Total Cobalt	7%	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
Total Lead	9%	6 - 8%	10%	10%	8-9%	7-8%	7-8%
Total Nickel	13%	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.

table 7: comparison of the uncertainties (in %) in the previous and present PT

5 DISCUSSION

It was the first time that the metals cobalt and nickel were determined in dried paint in an iis PT. Therefore it is not surprisingly that the performance on those two metals is less than the performance on the determination of lead. It is to be expected that the performance will improve in future PTs due to the corrective actions taken by a number of participating laboratories.

A large number of different test methods were used. The American CPSC-CH-E1003-09 method (“For determining Lead (Pb) in Paint and Other Similar Surface Coatings) was used by 96 laboratories and other versions of CPSC were used two times. Twenty-eight laboratories reported to have used ‘in house’ methods and EPA 3052 was reported 9 times. Other laboratories reported to have used ASTM E1645, CRF1303, DIN 54233, EN 14602, EN 1671, EPA 3050, EPA 3051, and ISO 17294. Some of these methods are applicable, for example ASTM E1645 for the determination of lead in dried paint, while others may be less applicable. DIN 54233 is a test method for the determination of metals in textile by extraction with artificial sweat solution and ISO 17294 is a test method for the determination of metals in water. Neither of the methods used contains a precision statement that may be used as target reference.

APPENDIX 1

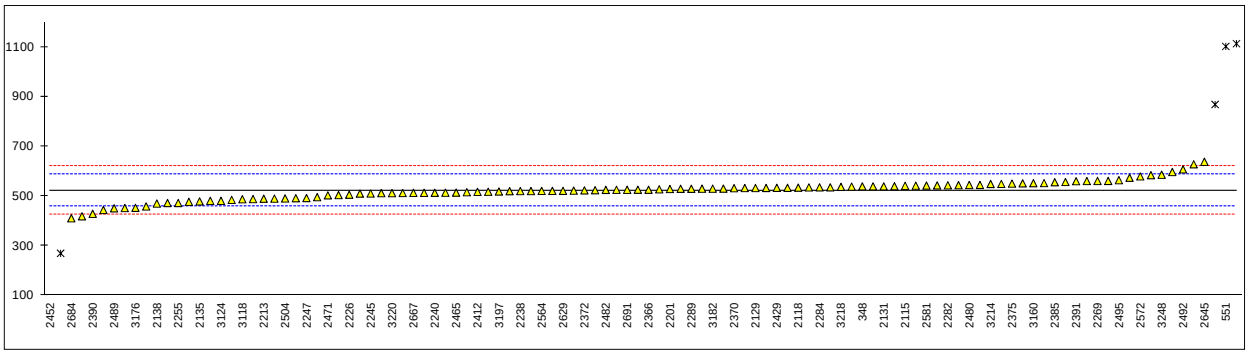
Determination of Total Cobalt as Co on sample #15050; results in mg/kg

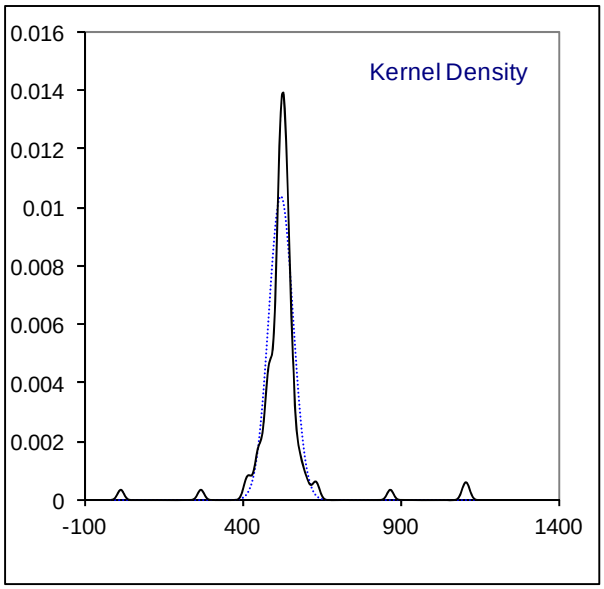
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
330		-----		-----	2449		-----		-----
348	in house	539.12		0.50	2452	CPSC-CH-E1003-09	16.7	R(0.01)	-15.52
452	in house	574.0		1.57	2453		-----		-----
551	CPSC-CH-E1003-09	1102	C,R(0.01)	17.77	2459	US EPA 3052B (mod)	418.862		-3.18
622	in house	628.01		3.23	2460		-----		-----
632	EPA3052	535.0		0.38	2464	CPSC-CH-E1003-09	481.0		-1.28
1051		-----		-----	2465	CPSC-CH-E1003-09	514.0		-0.27
2115	DIN54233	541.467		0.58	2471	in house	503.33		-0.59
2118	in house	534.03		0.35	2476		-----		-----
2129	CPSC-CH-E1003-09	532.64		0.31	2477		-----		-----
2131	CPSC-CH-E1003-09	539.2		0.51	2480	in house	544.68		0.67
2132		-----		-----	2482	in house	525.174		0.08
2135	EN16711	478.8	C	-1.35	2488		-----		-----
2137	CPSC-CH-E1003-09	504.2		-0.57	2489	EPA3050	451.0		-2.20
2138	EPA3052	470.2	C	-1.61	2492	in house	607.6		2.60
2139	CPSC-CH-E1003-09	452		-2.17	2495	CPSC-CH-E1003-09	564.0		1.27
2156	CPSC-CH-E1003-09	512.0		-0.33	2500		-----		-----
2165	CPSC-CH-E1003-09	538.26		0.48	2503	in house	513.3		-0.29
2170		-----		-----	2504	CPSC-CH-E1002-08.3	490.68		-0.98
2172	CPSC-CH-E1003-09	535.4		0.39	2511		-----		-----
2184	CPSC-CH-E1003-09	522.2		-0.01	2514		-----		-----
2190	in house	540		0.53	2529		-----		-----
2201	CPSC-CH-E1003-09	528.6		0.18	2532	EPA3050	477		-1.40
2213	in house	489.8		-1.01	2564	EPA3052	520.88		-0.06
2215	CPSC-CH-E1003-09	539.175		0.51	2566	CPSC-CH-E1003-09	520.4		-0.07
2225	CPSC-CH-E1003-09	517.6		-0.16	2567	CPSC-CH-E1003-09	484.83		-1.16
2226	EPA3051/EPA6010	505.8		-0.52	2572	CPSC-CH-E1003-09	579.3		1.74
2228		-----		-----	2581	CPSC-CH-E1003-09	542.302		0.60
2229		-----		-----	2589	CPSC-CH-E1003-09	551.6		0.89
2230	EPA3051	513.792		-0.27	2590	EN14602	1112.89	R(0.01)	18.10
2234	CPSC-CH-E1003-09	525.46		0.09	2613	in house	561.0		1.18
2238	CPSC-CH-E1003-09	520.4		-0.07	2614		-----		-----
2240	CPSC-CH-E1003-09	513.4		-0.28	2629	CPSC-CH-E1003-09	521.10		-0.05
2245	in house	510.5		-0.37	2643		458.43		-1.97
2246		-----		-----	2645	in house	638.17		3.54
2247	EPA3050	492.26		-0.93	2649		-----		-----
2253	CPSC-CH-E1003-09	512.39		-0.32	2667	CPSC-CH-E1002-08.3	513.19		-0.29
2254	in house	868.5	R(0.01)	10.61	2669		-----		-----
2255	in house	472.28		-1.55	2671		-----		-----
2256		-----		-----	2672	ISO17294	491.6		-0.95
2258		-----		-----	2674	CPSC-CH-E1003-09	523.70		0.03
2268	CPSC-CH-E1003-09	530.12		0.23	2680	CPSC-CH-E1003-09	510.2		-0.38
2269	in house	560.8726		1.17	2683		-----		-----
2277	EPA3051A	488.146		-1.06	2684	EPA3052	410.9		-3.43
2279	CPSC-CH-E1003-09	515.7		-0.21	2691	CPSC-CH-E1003-09	525.5		0.09
2280	CPSC-CH-E1003-09	533.5		0.33	2692	CPSC-CH-E1003-09	495.75		-0.83
2282	EPA3050	543.5		0.64	2693	CFR1303	530		0.22
2284	CPSC-CH-E1003-09	535.23		0.38	2694		-----		-----
2286		-----		-----	2696		-----		-----
2287		-----		-----	2697	CPSC-CH-E1003-09	549.076		0.81
2289	CPSC-CH-E1003-09	529.7		0.22	2699	in house	597		2.28
2290	CPSC-CH-E1003-09	584.4		1.89	3110		-----		-----
2293		-----		-----	3116		-----		-----
2295		-----		-----	3117		-----		-----
2296	in house	556.782		1.05	3118	CPSC-CH-E1003-09	487.4		-1.08
2301	CPSC-CH-E1003-09	490.08		-1.00	3124	EPA3052	481		-1.28
2320		-----		-----	3146	CPSC-CH-E1003-09	545		0.68
2349	EPA3052	527.4		0.14	3160	CPSC-CH-E1003-09	551.99		0.90
2353	EPA3051	532.5		0.30	3163	in house	270	R(0.01)	-7.75
2358	CPSC-CH-E1003-09	542.0		0.59	3167	CPSC-CH-E1003-09	560.7		1.17
2366	IEC62321	525.85		0.10	3172	in house	472.23		-1.55
2367		-----		-----	3176	in house	452.851		-2.14
2370	EPA3052	532		0.29	3182	CPSC-CH-E1003-09	530.0		0.22
2372	EPA3052	523.1		0.01	3190	CPSC-CH-E1003	520		-0.08
2374		-----		-----	3197	CPSC-CH-E1003	518.7		-0.12
2375	in house	550.4		0.85	3199		-----		-----
2385	in house	556		1.02	3210	in house	521		-0.05
2389		-----		-----	3214	EPA3052	548.9		0.80
2390	CPSC-CH-E1003-09	429.01		-2.87	3218	CPSC-CH-E1003-09	537.2		0.45
2391	CPSC-CH-E1003-09	560.00		1.14	3220	EPA3050	512.0		-0.33
2401		-----		-----	3222	DIN54233	532.91		0.31
2410	CPSC-CH-E1003-09	544		0.65	3225		-----		-----
2412	CPSC-CH-E1003-09	517.0		-0.17	3228	IEC62321	529.6		0.21
2413	CPSC-CH-E1003-09	444.26		-2.41	3233	in house	543		0.62
2415	in house	552.3		0.91	3237		-----		-----
2426		-----		-----	3248	CFR1303	586		1.94

2429	CPSC-CH-E1003-09	533.3	0.33	8005	-----	-----
2431		-----	-----	8010	-----	-----
2433	ASTM E1645	525.59	0.09			

normality	suspect
n	107
outliers	5
mean (n)	522.680
st.dev. (n)	38.4066
R(calc.)	107.538
R(Horwitz)	91.281

Lab 551 first reported: 1015
Lab 2135 first reported: 89.9
Lab 2138 first reported: 71.52





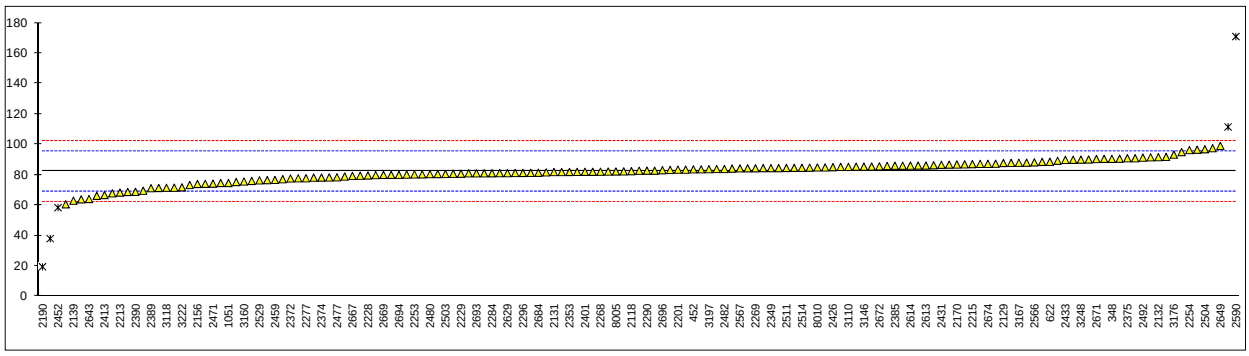
Determination of Total Lead as Pb on sample #15050; results in mg/kg

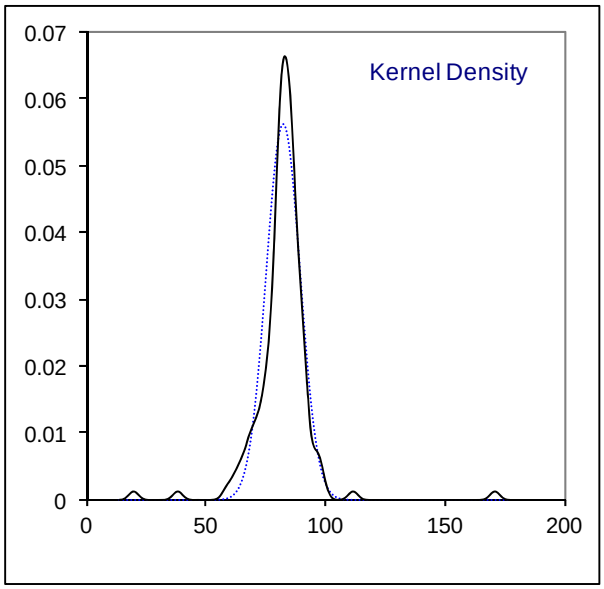
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
330	in house	111.50	R(0.05)	4.33	2449	CPSC-CH-E1003-09	96.5378		2.12
348	CPSC-CH-E1003-09	90.52		1.23	2452	CPSC-CH-E1003-09	58.39	R(0.05)	-3.51
452	in house	83.6		0.21	2453	CPSC-CH-E1003-09	90.9		1.29
551	CPSC-CH-E1003-09	86.71		0.67	2459	US EPA 3052B (mod)	76.637		-0.82
622	in house	88.58		0.94	2460	CPSC-CH-E1003-09	87.847		0.84
632	EPA3052	85.44		0.48	2464	CPSC-CH-E1003-09	97.5		2.26
1051	CPSC-CH-E1003-09	74.61		-1.12	2465	CPSC-CH-E1003-09	78.27		-0.58
2115	CPSC-CH-E1003-09	84.420		0.33	2471	in house	74.17		-1.18
2118	in house	82.39		0.03	2476	CPSC-CH-E1003-09	94.92		1.88
2129	CPSC-CH-E1003-09	87.76		0.82	2477	CPSC-CH-E1003-09	78.3705		-0.56
2131	CPSC-CH-E1003-09	81.82		-0.05	2480	in house	80.43		-0.26
2132	CPSC-CH-E1003-09	91.60		1.39	2482	CPSC-CH-E1003-09	83.824		0.24
2135	EN16711	89.9	C	1.14	2488	CPSC-CH-E1003-09	84.7		0.37
2137	CPSC-CH-E1003-09	74.1		-1.19	2489	EPA3050	86.0		0.56
2138	EPA3052	71.52	C	-1.58	2492	in house	91.3		1.35
2139	CPSC-CH-E1003-09	63		-2.83	2495	CPSC-CH-E1003-09	83.8		0.24
2156	CPSC-CH-E1003-09	74.0		-1.21	2500	CPSC-CH-E1003-09	84.6		0.36
2165	CPSC-CH-E1003-09	90.50		1.23	2503	ASTM F963	80.55		-0.24
2170	E1645	86.8		0.68	2504	CPSC-CH-E1003-09	96.82		2.16
2172	CPSC-CH-E1003-09	81.92		-0.04	2511	CPSC-CH-E1003-09	84.5		0.34
2184	CPSC-CH-E1003-09	88.5		0.93	2514	CPSC-CH-E1003-09	84.64		0.36
2190	in house	19.5	R(0.01)	-9.26	2529	CPSC-CH-E1003-09	76.375		-0.86
2201	CPSC-CH-E1003-09	83.4		0.18	2532	EPA3050	69.5		-1.87
2213	CPSC-CH-E1002-08	68.3		-2.05	2564	CPSC-CH-E1003-09	86.30		0.61
2215	CPSC-CH-E1003-09	87.0255		0.71	2566	CPSC-CH-E1003-09	88.2		0.89
2225	CPSC-CH-E1003-09	81.2		-0.15	2567	CPSC-CH-E1003-09	84.22		0.30
2226	EPA3051/EPA6010	77.7		-0.66	2572	CPSC-CH-E1003-09	80.0		-0.32
2228	in house	79.5413		-0.39	2581	CPSC-CH-E1003-09	84.863		0.39
2229	CPSC-CH-E1003-09	80.74		-0.21	2589	CPSC-CH-E1003-09	80.51		-0.25
2230	EPA3051	75.227		-1.03	2590	CPSC-CH-E1003-09	170.96	R(0.01)	13.11
2234	CPSC-CH-E1003-09	80.69		-0.22	2613	in house	86.08		0.57
2238	CPSC-CH-E1003-09	79.4		-0.41	2614	CPSC-CH-E1003-09	86.05		0.57
2240	CPSC-CH-E1003-09	76.52		-0.84	2629	CPSC-CH-E1003-09	81.11		-0.16
2245	in house	74.6		-1.12	2643	CPSC-CH-E1003-09	64.08		-2.67
2246	CPSC-CH-E1003-09	82.24		0.01	2645	CPSC-CH-E1003-09	85.82		0.54
2247	EPA3050	66.21		-2.36	2649	CPSC-CH-E1003-09	99.00		2.48
2253	CPSC-CH-E1003-09	80.25		-0.29	2667	CPSC-CH-E1002-08.3	79.28		-0.43
2254	in house	96.25		2.08	2669	CPSC-CH-E1003-09	79.96		-0.33
2255	in house	85.34		0.47	2671	CPSC-CH-E1003-09	90.37		1.21
2256	CPSC-CH-E1003-09	85.2		0.44	2672	ISO17294	85.56		0.50
2258	in house	78.154		-0.60	2674	CPSC-CH-E1003-09	87.21		0.74
2268	CPSC-CH-E1003-09	82.037		-0.02	2680	CPSC-CH-E1003-09	79.84		-0.35
2269	in house	84.3157		0.31	2683		-----		-----
2277	EPA3051A	77.715		-0.66	2684	EPA3052	81.34		-0.13
2279	CPSC-CH-E1003-09	81.6		-0.09	2691	CPSC-CH-E1003-09	82.68		0.07
2280	CPSC-CH-E1003-09	84.4		0.33	2692	CPSC-CH-E1003-09	81.83		-0.05
2282	EPA3050	87.2		0.74	2693	CFR1303	81		-0.18
2284	CPSC-CH-E1003-09	81.04		-0.17	2694	CPSC-CH-E1003-09	80.010		-0.32
2286	CPSC-CH-E1003-09	86.89		0.69	2696	CPSC-CH-E1003-09	83.047		0.13
2287	E1645	67.8		-2.12	2697	CPSC-CH-E1003-09	80.2902		-0.28
2289	CPSC-CH-E1003-09	84.1		0.28	2699	in house	88		0.86
2290	CPSC-CH-E1003-09	82.7		0.08	3110	CPSC-CH-E1003-09	85.21		0.45
2293	CPSC-CH-E1003-09	86.070		0.57	3116	CCPSAC02	82.14		-0.01
2295	CPSC-CH-E1003-09	83.6		0.21	3117	CPSC-CH-E1003-09	81.00		-0.18
2296	in house	81.240		-0.14	3118	CPSC-CH-E1003-09	71.48		-1.58
2301	CPSC-CH-E1003-09	63.87		-2.71	3124	EPA3052	77.1		-0.75
2320	CPSC-CH-E1003-09	89.228		1.04	3146	CPSC-CH-E1003-09	85.4		0.47
2349	EPA3052	84.4		0.33	3160	CPSC-CH-E1003-09	75.60		-0.97
2353	EPA3051	81.9		-0.04	3163	in house	>56		-----
2358	CPSC-CH-E1003-09	81.1		-0.16	3167	CPSC-CH-E1003-09	87.92		0.85
2366	IEC62321	83.20		0.15	3172	CPSC-CH-E1003-09	71.37		-1.60
2367	in house	91.8037	C	1.42	3176	in house	93.280		1.64
2370	CPSC-CH-E1003-09	87.3		0.75	3182	CPSC-CH-E1003-09	80.135		-0.30
2372	EPA3052	77.60		-0.68	3190	CPSC-CH-E1003	76		-0.91
2374	CPSC-CH-E1003-09	78.2		-0.59	3197	CPSC-CH-E1003	83.7		0.22
2375	in house	90.9		1.29	3199	in house	81.29		-0.13
2385	in house	86		0.56	3210	CPSC-CH-E1003-09	60.6		-3.19
2389	CPSC-CH-E1003-09	71.17		-1.63	3214	EPA3052	73.3		-1.31
2390	CPSC-CH-E1003-09	68.81		-1.98	3218	CPSC-CH-E1003-09	83.4		0.18
2391	CPSC-CH-E1003-09	84.28		0.31	3220	EPA3050	38.0	R(0.01)	-6.53
2401	in house	82		-0.03	3222	DIN54233	71.78		-1.54
2410	CPSC-CH-E1003-09	68.7		-1.99	3225	CPSC-CH-E1003-09	90.6		1.24
2412	CPSC-CH-E1003-09	81.0		-0.18	3228	IEC62321	90.1		1.17
2413	CPSC-CH-E1003-09	66.72		-2.28	3233	in house	82.7		0.08
2415	CPSC-CH-E1003-09	78.87		-0.49	3237	CPSC-CH-E1003-09	91.51		1.38
2426	CPSC-CH-E1003-09	85.06		0.42	3248	CPSC-CRF1303	90		1.15

2429	CPSC-CH-E1003-09	82.0	-0.03	8005	CPSC-CH-E1003-09	82.21	0.00
2431	CPSC-CH-E1003-09	86.6215	0.65	8010	in house	84.8530	0.39
2433	E1645	89.85	1.13				

normality	OK
n	150
outliers	5
mean (n)	82.190
st.dev. (n)	7.1072
R(calc.)	19.900
R(Horwitz)	18.962

Lab 2135 first reported: 478.8
Lab 2138 first reported: 28.46
Lab 2367 first reported: 137.0260





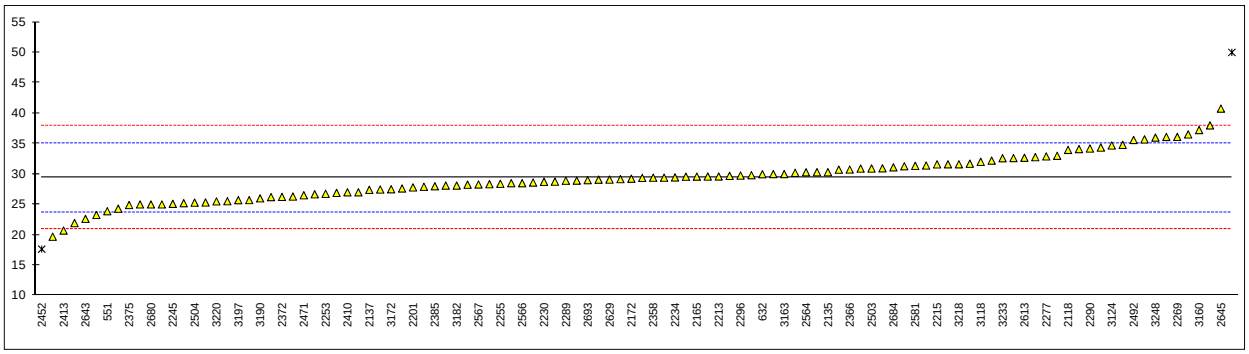
Determination of Total Nickel as Ni on sample #15050; results in mg/kg

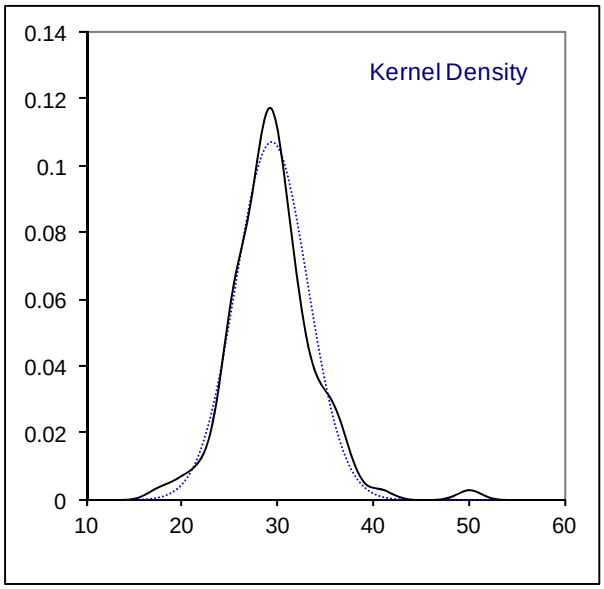
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
330		-----		-----	2449		-----		-----
348	in house	31.28		0.66	2452	CPSC-CH-E1003-09	17.65	ex	-4.16
452	in house	31.6		0.78	2453		-----		-----
551	CPSC-CH-E1003-09	23.89		-1.95	2459	US EPA 3052B (mod)	25.711		-1.31
622	in house	29.37		-0.01	2460		-----		-----
632	EPA3052	29.97	C	0.20	2464	CPSC-CH-E1003-09	30.0		0.21
1051		-----		-----	2465	CPSC-CH-E1003-09	28.25		-0.41
2115	DIN54233	28.916		-0.17	2471	in house	26.51		-1.02
2118	in house	33.97		1.61	2476		-----		-----
2129	CPSC-CH-E1003-09	32.21		0.99	2477		-----		-----
2131	CPSC-CH-E1003-09	26.67		-0.97	2480	in house	25.53		-1.37
2132		-----		-----	2482	in house	36.518		2.51
2135	EN16711	30.3		0.32	2488		-----		-----
2137	CPSC-CH-E1003-09	27.4		-0.71	2489	EPA3050	25.2		-1.49
2138	EPA3052	27.46	C	-0.69	2492	in house	35.6		2.19
2139	CPSC-CH-E1003-09	25		-1.56	2495	CPSC-CH-E1003-09	36.1		2.37
2156	CPSC-CH-E1003-09	33.0	C	1.27	2500		-----		-----
2165	CPSC-CH-E1003-09	29.57		0.06	2503	ASTM F963	30.91		0.53
2170		-----		-----	2504	CPSC-CH-E1002-08.3	25.294		-1.45
2172	CPSC-CH-E1003-09	29.23		-0.06	2511		-----		-----
2184	CPSC-CH-E1003-09	30.3		0.32	2514		-----		-----
2190	in house	26.9		-0.89	2529		-----		-----
2201	CPSC-CH-E1003-09	27.8		-0.57	2532	EPA3050	27		-0.85
2213	in house	29.6		0.07	2564	EPA3052	30.28		0.31
2215	CPSC-CH-E1003-09	31.5890		0.77	2566	CPSC-CH-E1003-09	28.5		-0.32
2225	CPSC-CH-E1003-09	30.2		0.28	2567	CPSC-CH-E1003-09	28.29	C	-0.39
2226	EPA3051/EPA6010	n.d.	false -?	-----	2572	CPSC-CH-E1003-09	35.7		2.23
2228		-----		-----	2581	CPSC-CH-E1003-09	31.353		0.69
2229		-----		-----	2589	CPSC-CH-E1003-09	29.56		0.05
2230	EPA3051	28.725		-0.24	2590	EN14602	50.01	R(0.01)	7.28
2234	CPSC-CH-E1003-09	29.44		0.01	2613	in house	32.68		1.16
2238	CPSC-CH-E1003-09	26.3		-1.10	2614		-----		-----
2240	CPSC-CH-E1003-09	29.81		0.14	2629	CPSC-CH-E1003-09	29.09		-0.11
2245	in house	25.1		-1.52	2643		22.63		-2.40
2246		-----		-----	2645	in house	40.76		4.01
2247	EPA3050	30.94		0.54	2649		-----		-----
2253	CPSC-CH-E1003-09	26.75		-0.94	2667	CPSC-CH-E1002-08.3	25.32		-1.44
2254	in house	29.59		0.06	2669		-----		-----
2255	in house	28.4		-0.36	2671		-----		-----
2256		-----		-----	2672	ISO17294	32.63		1.14
2258		-----		-----	2674	CPSC-CH-E1003-09	29.40		0.00
2268	CPSC-CH-E1003-09	28.752		-0.23	2680	CPSC-CH-E1003-09	25.00		-1.56
2269	in house	36.1102		2.37	2683		-----		-----
2277	EPA3051A	32.9		1.24	2684	EPA3052	31.10		0.60
2279	CPSC-CH-E1003-09	29.7		0.10	2691	CPSC-CH-E1003-09	26.2		-1.13
2280	CPSC-CH-E1003-09	31.7		0.81	2692	CPSC-CH-E1003-09	30.72		0.46
2282	EPA3050	29.08		-0.12	2693	CFR1303	29		-0.14
2284	CPSC-CH-E1003-09	28.33		-0.38	2694		-----		-----
2286		-----		-----	2696		-----		-----
2287		-----		-----	2697	CPSC-CH-E1003-09	27.6268		-0.63
2289	CPSC-CH-E1003-09	28.9		-0.18	2699	in house	38		3.04
2290	CPSC-CH-E1003-09	34.2		1.69	3110		-----		-----
2293		-----		-----	3116		-----		-----
2295		-----		-----	3117		-----		-----
2296	in house	29.750		0.12	3118	CPSC-CH-E1003-09	32.01		0.92
2301	CPSC-CH-E1003-09	21.928		-2.64	3124	EPA3052	34.7		1.87
2320		-----		-----	3146	CPSC-CH-E1003-09	34.1		1.66
2349	EPA3052	30.9		0.53	3160	CPSC-CH-E1003-09	37.24		2.77
2353	EPA3051	28.1		-0.46	3163	in house	30		0.21
2358	CPSC-CH-E1003-09	29.4		0.00	3167	CPSC-CH-E1003-09	34.80		1.91
2366	IEC62321	30.74		0.47	3172	in house	27.5		-0.67
2367		-----		-----	3176	in house	32.772		1.19
2370	EPA3052	28.6		-0.29	3182	CPSC-CH-E1003-09	28.102		-0.46
2372	EPA3052	26.24		-1.12	3190	CPSC-CH-E1003	26		-1.20
2374		-----		-----	3197	CPSC-CH-E1003	25.7		-1.31
2375	in house	24.9		-1.59	3199		-----		-----
2385	in house	28		-0.50	3210	in house	25.0		-1.56
2389		-----		-----	3214	EPA3052	24.3		-1.81
2390	CPSC-CH-E1003-09	n.d.	false -?	-----	3218	CPSC-CH-E1003-09	31.6		0.78
2391	CPSC-CH-E1003-09	23.27		-2.17	3220	EPA3050	25.5		-1.38
2401		-----		-----	3222	DIN54233	19.69		-3.44
2410	CPSC-CH-E1003-09	27		-0.85	3225		-----		-----
2412	CPSC-CH-E1003-09	28.5		-0.32	3228	IEC62321	31.4		0.70
2413	CPSC-CH-E1003-09	20.70		-3.08	3233	in house	32.6		1.13
2415	in house	34.36		1.75	3237		-----		-----
2426		-----		-----	3248	CPSC-CRF1303	36		2.33

2429	CPSC-CH-E1003-09	27.9	-0.53	8005	-----	-----
2431		-----	-----	8010	-----	-----
2433	E1645	29.16	-0.09			

normality	OK
n	108
outliers	1 + 1 excl.
mean (n)	29.406
st.dev. (n)	3.7352
R(calc.)	10.459
R(Horwitz)	7.919

Lab 632 first reported: 50.82
Lab 2138 first reported: 470.2
Lab 2156 first reported: 53.0
Lab 2567 first reported: 45.31
Lab 2452 test result excluded, see §4





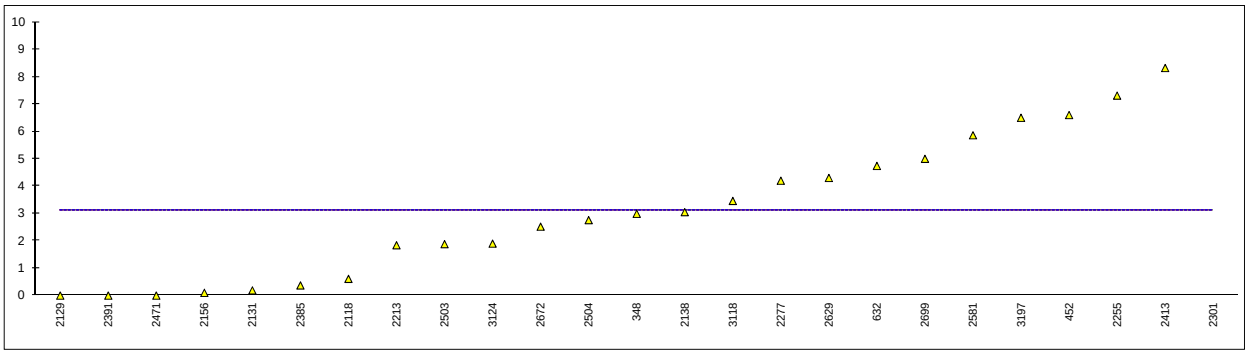
Determination of Total Selenium as Se on sample #15050; results in mg/kg

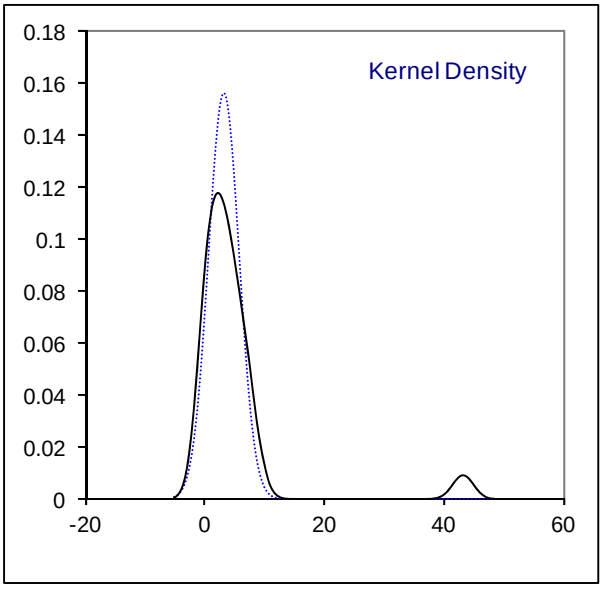
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
330		-----		-----	2449		-----		-----
348	in house	2.99		-----	2452		-----		-----
452	in house	6.6		-----	2453		-----		-----
551	CPSC-CH-E1003-09	n.d.		-----	2459	US EPA 3052B (mod)	n.d.	C	-----
622	in house	<1		-----	2460		-----		-----
632	EPA3052	4.74		-----	2464		-----		-----
1051		-----		-----	2465	CPSC-CH-E1003-09	<25		-----
2115	DIN54233	n.d.		-----	2471	in house	0.00		-----
2118	in house	0.61		-----	2476		-----		-----
2129	CPSC-CH-E1003-09	0.00		-----	2477		-----		-----
2131	CPSC-CH-E1003-09	0.19		-----	2480		-----		-----
2132		-----		-----	2482	in house	<20		-----
2135		-----		-----	2488		-----		-----
2137	CPSC-CH-E1003-09	<5.0		-----	2489	EPA3050	n.d.		-----
2138	EPA3052	3.05		-----	2492		-----		-----
2139	CPSC-CH-E1003-09	<5		-----	2495	CPSC-CH-E1003-09	<5		-----
2156	CPSC-CH-E1003-09	0.1		-----	2500		-----		-----
2165	CPSC-CH-E1003-09	n.d.		-----	2503	ASTM F963	1.882		-----
2170		-----		-----	2504	CPSC-CH-E1002-08.3	2.759		-----
2172	CPSC-CH-E1003-09	<10		-----	2511		-----		-----
2184	CPSC-CH-E1003-09	<10		-----	2514		-----		-----
2190	in house	<10		-----	2529		-----		-----
2201	CPSC-CH-E1003-09	<10		-----	2532	EPA3050	n.d.		-----
2213	in house	1.84		-----	2564		-----		-----
2215	CPSC-CH-E1003-09	<10		-----	2566	CPSC-CH-E1003-09	n.d.		-----
2225	CPSC-CH-E1003-09	<25.0		-----	2567	CPSC-CH-E1003-09	n.d.		-----
2226	EPA3051/EPA6010	n.d.		-----	2572	CPSC-CH-E1003-09	<20		-----
2228		-----		-----	2581	CPSC-CH-E1003-09	5.861		-----
2229		-----		-----	2589	CPSC-CH-E1003-09	<10		-----
2230		-----		-----	2590		-----		-----
2234	CPSC-CH-E1003-09	<25		-----	2613	in house	n.d.		-----
2238	CPSC-CH-E1003-09	<10		-----	2614		-----		-----
2240	CPSC-CH-E1003-09	<10		-----	2629	CPSC-CH-E1003-09	4.30		-----
2245	in house	<5		-----	2643		-----		-----
2246		-----		-----	2645	in house	n.d.		-----
2247	EPA3050	n.d.		-----	2649		-----		-----
2253	CPSC-CH-E1003-09	<5		-----	2667	CPSC-CH-E1002-08.3	<5		-----
2254	in house	n.d.		-----	2669		-----		-----
2255	in house	7.31		-----	2671		-----		-----
2256		-----		-----	2672	ISO17294	2.520		-----
2258		-----		-----	2674	CPSC-CH-E1003-09	n.d.		-----
2268	CPSC-CH-E1003-09	<10		-----	2680		-----		-----
2269	in house	n.d.		-----	2683		-----		-----
2277	EPA3051A	4.2		-----	2684	EPA3052	n.d.		-----
2279	CPSC-CH-E1003-09	<10		-----	2691	CPSC-CH-E1003-09	<10		-----
2280	CPSC-CH-E1003-09	<10		-----	2692	CPSC-CH-E1003-09	n.d.		-----
2282	EPA3050	<10		-----	2693		-----		-----
2284	CPSC-CH-E1003-09	<5		-----	2694		-----		-----
2286		-----		-----	2696		-----		-----
2287		-----		-----	2697	CPSC-CH-E1003-09	n.d.		-----
2289	CPSC-CH-E1003-09	<10		-----	2699	in house	5		-----
2290	CPSC-CH-E1003-09	<20		-----	3110		-----		-----
2293		-----		-----	3116		-----		-----
2295		-----		-----	3117		-----		-----
2296	in house	n.d.		-----	3118	CPSC-CH-E1003-09	3.46		-----
2301	CPSC-CH-E1003-09	43.237	C,R(0.01)	-----	3124	EPA3052	1.90		-----
2320		-----		-----	3146	CPSC-CH-E1003-09	n.d.		-----
2349	EPA3052	n.d.		-----	3160		-----		-----
2353		-----		-----	3163		-----		-----
2358		-----		-----	3167	CPSC-CH-E1003-09	<10		-----
2366	IEC62321	<10		-----	3172		-----		-----
2367		-----		-----	3176	in house	n.d.		-----
2370	EPA3052	n.d.		-----	3182	CPSC-CH-E1003-09	<13		-----
2372	EPA3052	n.d.		-----	3190	CPSC-CH-E1003	<10		-----
2374		-----		-----	3197	CPSC-CH-E1003	6.5		-----
2375		-----		-----	3199		-----		-----
2385	in house	0.37		-----	3210	in house	<10		-----
2389		-----		-----	3214	EPA3052	<10		-----
2390	CPSC-CH-E1003-09	n.d.		-----	3218	CPSC-CH-E1003-09	<10		-----
2391	CPSC-CH-E1003-09	0.00		-----	3220	EPA3050	n.d.		-----
2401		-----		-----	3222		-----		-----
2410	CPSC-CH-E1003-09	<2		-----	3225		-----		-----
2412	CPSC-CH-E1003-09	n.d.		-----	3228	IEC62321	<10		-----
2413	CPSC-CH-E1003-09	8.32		-----	3233	in house	n.d.		-----
2415	in house	n.d.		-----	3237		-----		-----
2426		-----		-----	3248	CPSC-CRF1303	<10		-----

2429	CPSC-CH-E1003-09	<10	-----	8005	-----	-----
2431		-----	-----	8010	-----	-----
2433	ASTM E1645	n.d.	-----			

normality	OK
n	24
outliers	1
mean (n)	3.104
st.dev. (n)	2.5573
R(calc.)	7.160
R(Horwitz)	(1.173)

Lab 2301 first reported: 35.544
Lab 2459 first reported: 13.731





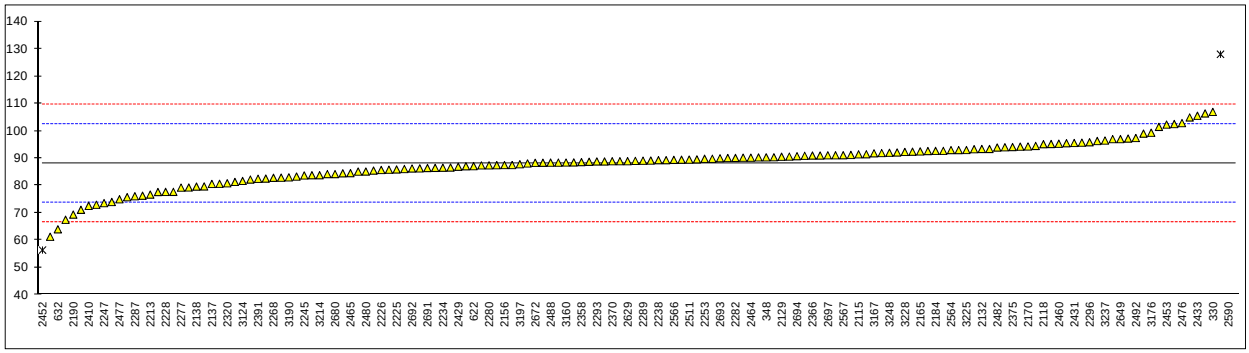
Determination of Total Lead as Pb on sample #15051; results in mg/kg

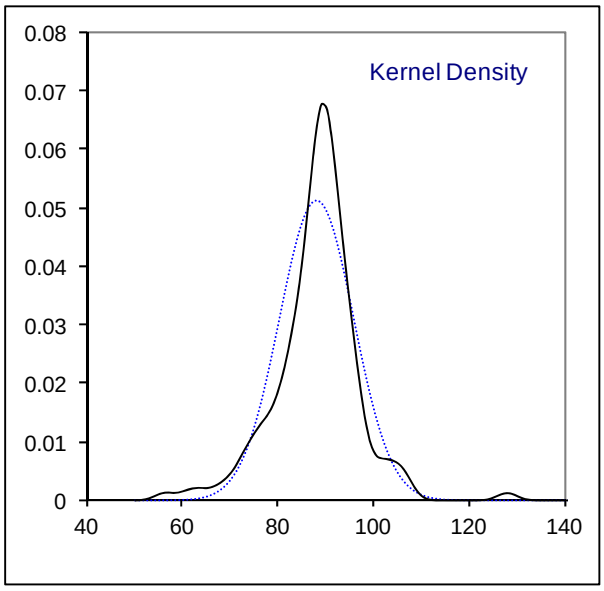
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
330	in house	106.93		2.61	2449	CPSC-CH-E1003-09	101.4681		1.85
348	CPSC-CH-E1003-09	90.32		0.30	2452	CPSC-CH-E1003-09	56.42	R(0.05)	-4.42
452	in house	94.5		0.88	2453	CPSC-CH-E1003-09	102.3		1.97
551	CPSC-CH-E1003-09	84.49		-0.51	2459	CPSC-CH-E1003-09	79.301		-1.23
622	CPSC-CH-E1003-09	87.11		-0.15	2460	CPSC-CH-E1003-09	95.297		0.99
632	EPA3052	64.01	C	-3.36	2464	CPSC-CH-E1003-09	90.2		0.28
1051	CPSC-CH-E1003-09	77.71		-1.45	2465	CPSC-CH-E1003-09	84.56		-0.50
2115	CPSC-CH-E1003-09	91.415		0.45	2471	CPSC-CH-E1003-09	82.20		-0.83
2118	in house	95.14		0.97	2476	CPSC-CH-E1003-09	102.85		2.04
2129	CPSC-CH-E1003-09	90.55		0.33	2477	CPSC-CH-E1003-09	75.0000		-1.83
2131	CPSC-CH-E1003-09	85.12		-0.42	2480	in house	85.14		-0.42
2132	CPSC-CH-E1003-09	93.38		0.73	2482	CPSC-CH-E1003-09	93.905		0.80
2135	EN16711	85.8		-0.33	2488	CPSC-CH-E1003-09	88.4		0.03
2137	CPSC-CH-E1003-09	80.6		-1.05	2489	EPA3050	89.3		0.16
2138	EPA3052	79.65		-1.18	2492	in house	97.4		1.29
2139	CPSC-CH-E1003-09	74		-1.97	2495	CPSC-CH-E1003-09	128.0	R(0.01)	5.54
2156	CPSC-CH-E1003-09	87.5	C	-0.09	2500	CPSC-CH-E1003-09	89.8		0.23
2165	CPSC-CH-E1003-09	92.49		0.60	2503	ASTM F963	97.18		1.26
2170	E1645	94.3		0.86	2504	CPSC-CH-E1003-09	106.37		2.53
2172	CPSC-CH-E1003-09	88.82		0.09	2511	CPSC-CH-E1003-09	89.5		0.19
2184	CPSC-CH-E1003-09	92.7		0.63	2514	CPSC-CH-E1003-09	88.09		-0.01
2190	in house	69.4		-2.61	2529	CPSC-CH-E1003-09	86.052		-0.29
2201	CPSC-CH-E1003-09	88.7		0.08	2532	EPA3050	73		-2.11
2213	CPSC-CH-E1002-08	76.7		-1.59	2564	CPSC-CH-E1003-09	92.97		0.67
2215	CPSC-CH-E1003-09	91.4669		0.46	2566	CPSC-CH-E1003-09	89.4		0.17
2225	CPSC-CH-E1003-09	85.9		-0.31	2567	CPSC-CH-E1003-09	91.10		0.41
2226	EPA3051/EPA6010	85.7		-0.34	2572	CPSC-CH-E1003-09	86.6		-0.22
2228	CPSD-AN-00001	77.6923		-1.46	2581	CPSC-CH-E1003-09	92.401		0.59
2229	CPSC-CH-E1003-09	93.40		0.73	2589	CPSC-CH-E1003-09	87.38		-0.11
2230	EPA3051	82.559		-0.78	2590	CPSC-CH-E1003-09	185.59	R(0.01)	13.56
2234	CPSC-CH-E1003-09	86.54		-0.22	2613	in house	92.7		0.63
2238	CPSC-CH-E1003-09	89.3		0.16	2614	CPSC-CH-E1003-09	90.08		0.27
2240	CPSC-CH-E1003-09	83.78		-0.61	2629	CPSC-CH-E1003-09	88.92		0.11
2245	CPSC-CH-E1003-09	83.7		-0.62	2643	CPSC-CH-E1003-09	71.15		-2.37
2246	CPSC-CH-E1003-09	90.36		0.31	2645	CPSC-CH-E1003-09	96.98		1.23
2247	EPA3050	73.59		-2.03	2649	CPSC-CH-E1003-09	97.00		1.23
2253	CPSC-CH-E1003-09	89.80		0.23	2667	CPSC-CH-E1002-08.3	86.29		-0.26
2254	in house	102.5		2.00	2669	CPSC-CH-E1003-09	88.47		0.04
2255	ASTM E1645	89.15		0.14	2671	CPSC-CH-E1003-09	94.23		0.85
2256	CPSC-CH-E1003-09	90.6		0.34	2672	ISO17294	88.32		0.02
2258	in house	89.467		0.18	2674	CPSC-CH-E1003-09	92.11		0.55
2268	CPSC-CH-E1003-09	82.855		-0.74	2680	CPSC-CH-E1003-09	84.20		-0.55
2269	in house	91.8841		0.52	2683	CPSC-CH-E1003-09	87.46		-0.10
2277	EPA3051A	79.26		-1.24	2684	EPA3052	88.36		0.03
2279	CPSC-CH-E1003-09	84.2		-0.55	2691	CPSC-CH-E1003-09	86.42		-0.24
2280	CPSC-CH-E1003-09	87.4		-0.10	2692	CPSC-CH-E1003-09	86.25		-0.26
2282	CPSC-CH-E1003-09	90.1		0.27	2693	CFR1303	90		0.26
2284	CPSC-CH-E1003-09	87.51		-0.09	2694	CPSC-CH-E1003-09	90.750		0.36
2286	CPSC-CH-E1003-09	95.69		1.05	2696	CPSC-CH-E1003-09	92.618		0.62
2287	E1645	76.1		-1.68	2697	CPSC-CH-E1003-09	91.0641		0.40
2289	CPSC-CH-E1003-09	89.1		0.13	2699	in house	99		1.51
2290	CPSC-CH-E1003-09	93.3		0.72	3110	CPSC-CH-E1003-09	92.99		0.67
2293	CPSC-CH-E1003-09	88.810		0.09	3116	CCPSAC02	89.59		0.20
2295	CPSC-CH-E1003-09	85.5		-0.37	3117	CPSC-CH-E1003-09	90.89		0.38
2296	in house	95.831		1.07	3118	CPSC-CH-E1003-09	81.35		-0.95
2301	CPSC-CH-E1003-09	67.509	C	-2.87	3124	EPA3052	81.7		-0.90
2320	CPSC-CH-E1003-09	80.84125		-1.02	3146	CPSC-CH-E1003-09	95.2		0.98
2349	CPSC-CH-E1003-09	90.3		0.30	3160	CPSC-CH-E1003-09	88.43		0.04
2353	EPA3051	91.2		0.42	3163	in house	>65		-----
2358	CPSC-CH-E1003-09	88.6		0.06	3167	CPSC-CH-E1003-09	91.81		0.51
2366	CPSC-CH-E1003-09	90.98		0.39	3172	CPSC-CH-E1003-09	80.65		-1.04
2367	in house	336.0354	C,R(0.01)	34.49	3176	CPSC-CH-E1003-09	99.320		1.55
2370	CPSC-CH-E1003-09	88.9		0.10	3182	CPSC-CH-E1003-09	86.48		-0.23
2372	EPA3052	79.69		-1.18	3190	CPSC-CH-E1003	83		-0.72
2374	CPSC-CH-E1003-09	90.2		0.28	3197	CPSC-CH-E1003	87.8		-0.05
2375	INH-102	94.1		0.83	3199	in house	91.07		0.41
2385	in house	94		0.81	3210	CPSC-CH-E1003-09	61.3		-3.74
2389	CPSC-CH-E1003-09	76.31		-1.65	3214	CPSC-1003	83.8		-0.61
2390	CPSC-CH-E1003-09	75.76		-1.72	3218	CPSC-CH-E1003-09	88.9		0.10
2391	CPSC-CH-E1003-09	82.49		-0.79	3220	EPA3050	83.3		-0.68
2401	INH-C02.2	91		0.40	3222	CPSC-CH-E1003-09	87.08		-0.15
2410	CPSC-CH-E1003-09	72.6		-2.16	3225	CPSC-CH-E1003-09	93.0		0.67
2412	CPSC-CH-E1003-09	82.9		-0.73	3228	IEC62321	92.3		0.58
2413	CPSC-CH-E1003-09	77.65		-1.46	3233	in house	88.4		0.03
2415	CPSC-CH-E1003-09	104.9		2.33	3237	CPSC-CH-E1003-09	96.47		1.16
2426	CPSC-CH-E1003-09	95.50		1.02	3248	CPSC-CRF1303	92		0.54

2429	CPSC-CH-E1003-09	86.9	-0.17	8005	CPSC-CH-E1003-09	89.03	0.12
2431	CPSC-CH-E1003-09	95.5714	1.03	8010	in house	96.2984	1.13
2433	ASTM E1645	105.53	2.42				

normality	suspect
n	152
outliers	4
mean (n)	88.155
st.dev. (n)	7.7677
R(calc.)	21.749
R(Horwitz)	20.125

Lab 632 first reported: 59.35
Lab 2156 first reported: 67.5
Lab 2301 firts reported: 64.803
Lab 2367 first reported: 197.5099





APPENDIX 2

Number of participants per country

4 labs in	BANGLADESH
1 lab in	BELGIUM
1 lab in	BRAZIL
1 lab in	CAMBODIA, Kingdom of
1 lab in	CANADA
1 lab in	DENMARK
1 lab in	EGYPT
5 labs in	FRANCE
6 labs in	GERMANY
2 labs in	GUATEMALA
16 labs in	HONG KONG
8 labs in	INDIA
5 labs in	INDONESIA
5 labs in	ITALY
2 labs in	JAPAN
5 labs in	KOREA
3 labs in	MALAYSIA
5 labs in	MEXICO
45 labs in	P.R. of CHINA
5 labs in	PAKISTAN
2 labs in	PHILIPPINES
1 lab in	PORTUGAL
1 lab in	SINGAPORE
2 labs in	SPAIN
1 lab in	SRI LANKA
1 lab in	SWITZERLAND
4 labs in	TAIWAN R.O.C.
3 labs in	THAILAND
1 lab in	THE NETHERLANDS
2 labs in	TUNISIA
6 labs in	TURKEY
5 labs in	U.S.A.
2 labs in	UNITED KINGDOM
4 labs in	VIETNAM

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
n.a.	= not applicable
n.d.	= not detected
n.r.	= not reported

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014

2 16 CFR § 1303.1

3 16 CFR § 1303.2

4 ASTM F963-07 Standard Consumer Safety Specification for Toy Safety

5 Horwitz. Journal of AOAC International Vol. 79 No.3 1996

6 P.L. Davies. Fr Z. Anal. Chem. 351 513 (1988)

7 W.J. Conover. Practical; Nonparametric Statistics. J. Wiley&Sons NY, p.302 (1971)

8 ISO 5725 (1986)

9 ISO 5725 parts 1-6 (1994)

10 CPSC-CH-E1002-08

11 CPSC-CH-E1003-09

12 M. Thompson and R. Wood. J. AOAC Int. 76 926 (1993)

13 Analytical Methods Committee Technical brief, No.4 January 2001

14 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/)

15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, T*echnometrics*, 25(2), pp. 165-172, (1983)