Institute for
Interlaboratory Studies

Results of Proficiency Test
Total Metals in Polymers
September 2023

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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Report: iis23P66

November 2023

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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 Lead, Mercury, Cadmium, and Hexavalent Chromium.

Since 1998 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the determination of Metals in Polymers every year. Over the years the scope was extended with more elements. During the annual proficiency testing program of 2023 it was decided to continue the proficiency test for the determination of Total Metals in Polymers.

In this interlaboratory study 141 laboratories in 35 countries registered for participation, see appendix 4 for the number of participants per country. In this report the results of the Total Metals in Polymers proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to a laboratory that has performed the tests in accordance with for ISO/IEC17043 relevant requirements of ISO/IEC17025.
It was decided to send two different polymer samples of approximately of 5 grams each: one PVC sample labelled #23700 and one Polypropylene sample labelled #23701.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

For the first sample a batch of orange PVC pieces was selected which was artificially fortified with some metals. After homogenization 175 small plastic bags were filled with approximately 5 grams each and labelled #23700.
The homogeneity of the subsamples was checked by the determination of Total Lead and Total Zinc using an in house method on 8 stratified randomly selected subsamples.

	Total Lead in mg/kg	Total Zinc in mg/kg
sample #23700-1	203	746
sample #23700-2	206	756
sample #23700-3	205	755
sample #23700-4	209	778
sample #23700-5	208	778
sample #23700-6	203	756
sample #23700-7	211	764
sample #23700-8	207	759

Table 1: homogeneity test results of subsamples #23700

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

	Total Lead in mg/kg	Total Zinc in mg/kg
r (observed)	8	32
reference method	Horwitz	Horwitz
0.3 x R (reference method)	12	38

Table 2: evaluation of the repeatabilities of subsamples #23700

The calculated repeatabilities are in agreement with 0.3 times the corresponding estimated reproducibility calculated with the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

For the second sample a batch of beige Polypropylene pieces was selected which was artificially fortified with some metals. After homogenization 175 small plastic bags were filled with approximately 5 grams each and labelled #23701.
The homogeneity of the subsamples was checked by the determination of Total Cadmium and Total Lead according to CPSC-CH-E1002-08.3 on 8 stratified randomly selected subsamples.

	Total Cadmium in mg/kg	Total Lead in mg/kg
sample #23701-1	98	103
sample #23701-2	94	99
sample #23701-3	92	99
sample #23701-4	95	101
sample #23701-5	94	100
sample #23701-6	96	104
sample #23701-7	98	102
sample #23701-8	98	106

Table 3: homogeneity test results of subsamples #23701

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

	Total Cadmium in mg/kg	Total Lead in mg/kg
r (observed)	6	7
reference method	EN1122:01	Horwitz
0.3 x R (reference method)	7	7

Table 2: evaluation of the repeatability of subsamples #23701

The calculated repeatabilities are in agreement with 0.3 times the corresponding estimated reproducibility calculated with the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one PVC sample labelled #23700 and one Polypropylene sample labelled #23701 were sent on August 16, 2023.

2.5 ANALYZES

The participants were requested to determine on samples #23700 and #23701: Total Antimony as Sb, Total Cadmium as Cd, Total Chromium as Cr, Chromium as Cr6+, Total Cobalt as Co, Total Copper as Cu, Total Lead as Pb, Total Manganese as Mn, Total Mercury as Hg, Total Nickel as Ni, Total Tin as Sn and Total Zinc as Zn.
It was also requested to report if the laboratory was accredited for the determined elements and to report some analytical details.

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

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

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The reported test results are tabulated per determination in appendices 1 and 2 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the result tables in appendices 1 and 2. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

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

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

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

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

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

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

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

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

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

The z-scores were calculated according to:

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

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

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

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

4 EVALUATION

In this proficiency test no problems were encountered with the dispatch of the samples. Six participants reported test results after the final reporting date and six other participants did not report any test results. Not all participants were able to report all tests requested. In total 135 participants reported 746 numerical test results. Observed were 22 outlying test results, which is 2.9%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER ELEMENT

In this section the reported test results are discussed per sample and per element. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 5.

Test method EN1122 is considered to be the official test method for the determination of Cadmium in polymers. The precision data mentioned in EN1122 were used to evaluate the Cadmium test results. Unfortunately, a suitable reference test method providing precision data for all other requested elements is not available. For these elements the calculated

reproducibility was compared against the estimated reproducibility calculated with the Horwitz equation.

sample #23700

Total Cadmium as Cd: The group of participants met the target requirements. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN1122:01.

Total Chromium as Cr: The group of participants met the target requirements. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Chromium as Cr6+: The group of participants met the target requirements. Eight statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Total Lead as Pb: The group of participants met the target requirements. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Total Zinc as Zn: The group of participants may have had difficulty to meet the target requirements. No statistical outliers were observed. The calculated reproducibility is not in agreement with the estimated reproducibility calculated with the Horwitz equation.

The participants agreed on a concentration near or below the limit of detection for all other elements mentioned in paragraph 2.5. Therefore, no z-scores are calculated for these elements. The reported test results are given in appendix 2.

sample #23701

Total Cadmium as Cd: The group of participants met the target requirements. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN1122:01.

Total Lead as Pb: The group of participants met the target requirements. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

The participants agreed on a concentration near or below the limit of detection for all other elements mentioned in paragraph 2.5. Therefore, no z-scores are calculated for these elements. The reported test results are given in appendix 2.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Element	unit	n	average	2.8 * sd	R(target)
Total Cadmium as Cd	mg/kg	125	513	112	128
Total Chromium as Cr	mg/kg	102	214	40	43
Chromium as Cr6+	mg/kg	47	194	32	39
Total Lead as Pb	mg/kg	125	201	43	41
Total Zinc as Zn	mg/kg	72	705	176	118

Table 5: reproducibilities of tests on sample #23700

Element	unit	n	average	2.8 * sd	R(target)
Total Cadmium as Cd	mg/kg	124	93.8	15.6	23.4
Total Lead as Pb	mg/kg	129	94.7	17.8	21.4

Table 6: reproducibilities of tests on sample #23701

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF SEPTEMBER 2023 WITH PREVIOUS PTS

	September 2023	September 2022	September 2021	September 2020	2018- 2019
Number of reporting laboratories	135	152	146	162	177
Number of test results	746	622	797	519	1253
Number of statistical outliers	22	20	35	8	42
Percentage of statistical outliers	2.9%	3.2%	4.4%	1.5%	3.4%

Table 7: comparison with previous proficiency tests

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

The performance of the determinations of the proficiency test was compared to uncertainties observed in PTs over the years, expressed as relative standard deviation (RSD) of the PTs, see next table.

Element	September 2023	September 2022	September 2021	September 2020	August 2019	2018-2004	Target *)
Sb	--	--	15%	--	--	9-14%	6-13%
Cd	6-8%	7%	5-6%	7%	7-10%	7-12%	9%
Cr	7%	6%	5%	--	8-11%	7-24%	6-13%
Cr6+	6%	10%	10%	--	9-22%	6-76%	6-13%
Co	--	6%	--	--	--	8-11%	6-13%
Cu	--	--	--	8%	--	6-8%	6-13%
Pb	7-8%	6%	6%	8%	7%	6-11%	6-13%
Mn	--	--	--	--	10%	--	6-13%
Hg	--	--	9%	--	--	8-46%	6-13%
Ni	--	--	--	8%	8%	9-10%	6-13%
Sn	--	--	--	--	13%	--	6-13%
Zn	9%	--	--	--	--	--	6-13%

Table 8: development of the uncertainties over the years

*) calculated at respectively 500 – 5 mg/kg

The uncertainties observed in this PT are comparable to the uncertainties observed in previous PTs.

4.4 EVALUATION OF THE ANALYTICAL DETAILS

For this PT some analytical details were requested which are listed in appendix 3. Based on the answers given by the participants the following can be summarized:

- 88% of the participants mentioned that they are ISO/IEC17025 accredited to determine the reported elements.
- 78% of the participants further cut or grinded the sample prior to analysis, 18% used the sample as received and for 4% of the participants the pretreatment depends on the sample.
- About 97% used 0.5 grams or less of sample intake, most participants mentioned between 0.1 and 0.2 grams. Only 3% used a sample intake of 1 gram or more. Some participants scanned the sample as such using a XRF technique. For some participants the sample intake depends on the element, the analyze technique or depends on the sample.
- About 83% of the participants used microwave to release the sample, about 8% used acid digestion about for about 9% the release technique used depends on the method used, the element, the analyze technique or the sample.
- About 93% of the participants used Nitric Acid (mixture) for the Acid Digestion.
- Depending on the element to analyze or the test method used different analyze techniques were used to quantify the elements: the majority of the participants used ICP-OES as analyze technique.

The calculated reproducibility is in agreement with the requirements of the target reproducibility for Cadmium, Chromium, Chromium 6+ and Lead in sample #23700 and for Cadmium and Lead in sample #23701, therefore no separate statistical analysis has been performed.

5 DISCUSSION

When the results of this interlaboratory study were compared to the metals mentioned in the European Directive 2011/65/EC, in which maximum concentrations are specified for metals in polymers, it was noticed that not all participants would have made identical decisions about the acceptability of sample #23700 and sample #23701 for Total Cadmium (Cd).
Almost all participants (except 1) would have rejected the sample #23700 for Total Cadmium and sample #23701 would have been accepted for Total Cadmium by most of the participants, twelve participants would have rejected the sample.
Based on the elements Lead (Pb), and Hexavalent Chromium (Cr6+) all participants would have accepted the sample #23700 and sample #23701.

Element	Maximum concentration values tolerated in mg/kg
Cadmium	100
Lead	1000
Hexavalent Chromium	1000

Table 9: Restricted metals in polymers according to the European Directive 2011/65/EC

6 CONCLUSION

Each participating laboratory will have to evaluate its performance in this study and decide about any corrective actions if necessary. Therefore, participation on a regular basis in this scheme could be helpful to improve the performance and thus increase of the quality of the analytical results.

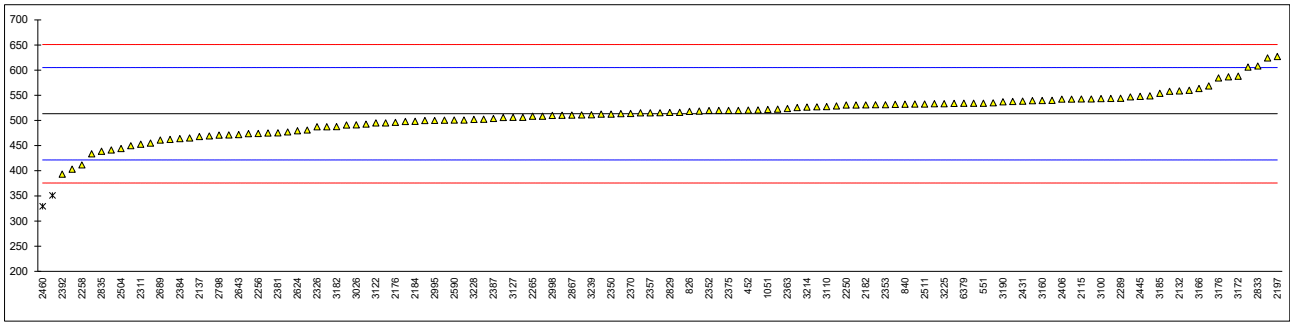
APPENDIX 1

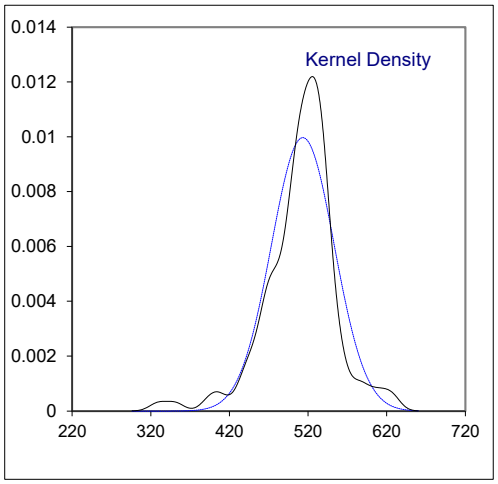
Determination of Total Cadmium as Cd on sample #23700; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475	EN1122	586.9		1.61
339	In house	532.1365		0.41	2476		-----		-----
452	CPSC-CH-E1002-08	520.71		0.16	2477		-----		-----
523	ISO8124-5	492.61		-0.45	2482	IEC62321-5	510.3		-0.07
551	EPA3052	534.31355		0.46	2488		-----		-----
623	EN1122	537.57		0.53	2492	IEC62321-5	513.6200		0.01
826	IEC62321-5	518.1		0.10	2504	EN1122	444.136		-1.51
840	In house	532.30		0.41	2511	EN16711-1	532.8		0.43
841	ISO8124-5	475		-0.84	2529	CPSC-CH-E1002-08	522.53		0.20
1051	EN1122	521.9		0.19	2561	CPSC-CH-E1002-08	505.89		-0.16
1126	In house	471.25		-0.92	2568		-----		-----
2115	EN16711-1	542.72		0.64	2590	EN1122	500.827	C	-0.27
2129	EN16711-1	530.67		0.38	2621	IEC62321-5	515.44		0.05
2132	EN1122	558.78		0.99	2624	In house	479.6		-0.74
2137	IEC62321-5	468.0		-0.99	2630	IEC62321-5	481.0		-0.71
2165	EN1122	512.78		-0.01	2637	EN16711-1	520		0.15
2176	In house	496.228		-0.37	2643	EN16711-1	472.0		-0.90
2182	EN1122	530.953		0.38	2649	EN1122	491		-0.49
2184	EN1122	498.3		-0.33	2665	In house	501.0		-0.27
2197	In house	627.0		2.48	2674	EN1122	516.26		0.06
2201	ISO8124-5	539.50		0.57	2678		-----		-----
2202	IEC62321-5	518.5		0.11	2689	EPA3052	461.1		-1.14
2218		-----		-----	2701	IEC62321-5	477.09		-0.79
2232	CPSC-CH-E1002-08	469.260		-0.96	2720	EN1122	546.8		0.73
2247	EN1122	533.17		0.43	2734		-----		-----
2250	EN1122	530.6		0.38	2736	In house	495.142		-0.40
2256	EN1122	474.30		-0.85	2794	IEC62321-3-1	543.91		0.67
2258	CDSD-N-00164	411.58		-2.22	2798	EN16711-1	471		-0.92
2264		-----		-----	2817		-----		-----
2265	EN1122	508.5		-0.11	2829	EN1122	516.06		0.06
2289	IEC62321-5	544.2		0.67	2833	IEC62321-3-1	608.2		2.07
2294		-----		-----	2835	IEC62321-5	438.91		-1.62
2310	CPSC-CH-E1002-08	455		-1.27	2864	IEC62321-5	508.74		-0.10
2311	EN1122	452.673		-1.32	2867	IEC62321-5	510.8		-0.05
2313	EN1122	441.2		-1.57	2885	IEC62321-5	Not detected	f-?	-----
2316	IEC62321-5	433.77		-1.74	2943	IEC62321-3-1	624.48		2.43
2320	EN16711-1	465.2		-1.05	2977	EN17072-2	606.209		2.03
2326		487.4		-0.57	2995	IEC62321-5	500		-0.29
2330	EN1122	462.36		-1.11	2998	In house	510	C	-0.07
2339	In house	351	R(0.05)	-3.54	3015	IEC62321-5	542.3		0.63
2347	EN1122	511		-0.05	3026	IEC62321-5	491.19		-0.48
2350	CPSC-CH-E1002-08	512.8		-0.01	3100	EN1122	543.520		0.66
2352	EN1122	519.82		0.14	3110	ASTM F963	527.657		0.31
2353	IEC62321-5	531.20		0.39	3111	EPA3052	540.0		0.58
2355	IEC62321-5	498		-0.33	3116	EN1122	535.008		0.47
2357	IEC62321-5	515		0.04	3118	EN1122	403.118		-2.40
2358	EN16711-1	568.49		1.20	3122	CPSC-CH-E1002-08	494.975		-0.40
2362	CPSC-CH-E1002-08	531.2		0.39	3127	ISO11885	506.1		-0.16
2363	EN16711-1	524		0.23	3146	ISO17294-2	534		0.45
2365	IEC62321-5	529		0.34	3153	IEC62321-5	559.9		1.02
2366	CPSC-CH-E1002-08	558		0.97	3160	CPSC-CH-E1002-08	539.82		0.58
2369	EPA3052	520.92		0.17	3163		-----		-----
2370	EN1122	514		0.01	3166	In house	563.5		1.09
2373	EN1122	500.69		-0.28	3172	EN16711-1	588		1.63
2375	EN16711-1	520		0.15	3176	EN16711-1	584.47		1.55
2378	EN1122	515		0.04	3182	IEC62321-5	487.65		-0.56
2379	IEC62321-5	487.470		-0.56	3185	EN1122	553.72		0.88
2380	EN16711-1	499.70		-0.30	3190	EN16711-1	537		0.52
2381	EN16711-1	475.50		-0.83	3197	EN1122	502.37		-0.24
2384	EPA3051	464		-1.08	3210	In house	506.35		-0.15
2385	IEC62321-5	549		0.78	3214	EN16711-1	526.4		0.29
2387	IEC62321-5	503.75		-0.21	3218	EN16711-1	542.75		0.64
2392	IEC62321-5	393.27		-2.62	3225	EN1122	533.25		0.43
2406	EN1122	542.3		0.63	3228	IEC62321-5	502		-0.25
2415	EN1122	520		0.15	3239	IEC62321-5	511.377		-0.04
2424	In house	474		-0.86	3246	EN1122	532.66		0.42
2431	CPSC-CH-E1002-08	538.15		0.54	3248	EN1122	527		0.30
2445	In house	548.0		0.76	6379	In house	534.053		0.45
2449	EN16711-1	449.807		-1.39	8005		-----		-----
2453	EN1122	534.18		0.46	8008	EN1122	525.713		0.27
2460	EN1122	329.210	C,R(0.01)	-4.02					

normality	suspect	
n	125	
outliers	2	
mean (n)	513.315	
st.dev. (n)	40.0190	RSD = 8%
R(calc.)	112.053	
st.dev.(EN1122:01)	45.8317	
R(EN1122:01)	128.329	

Lab 2460 first reported 164.605
Lab 2590 first reported 769.757
Lab 2998 first reported 0.0510 mg/kg



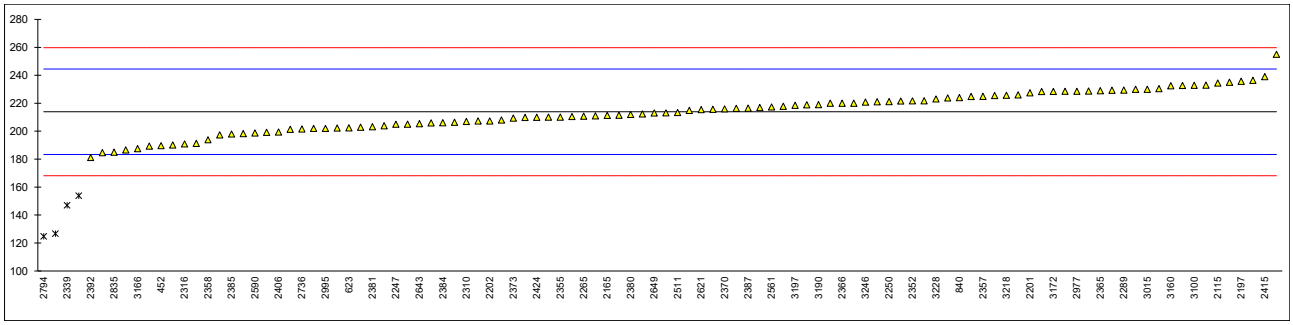


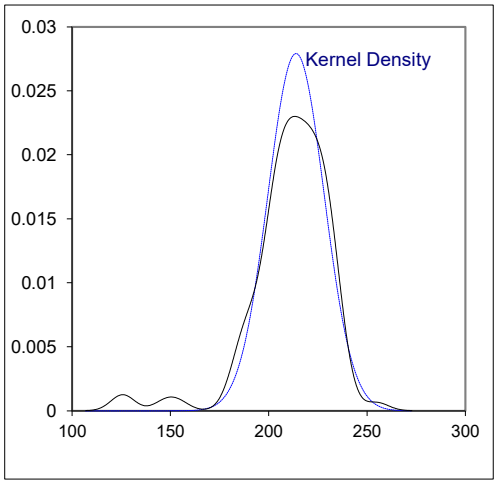
Determination of Total Chromium as Cr on sample #23700; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475		-----		-----
339	In house	126.669	R(0.01)	-5.72	2476		-----		-----
452	CPSC-CH-E1002-08	189.62		-1.59	2477		-----		-----
523	ISO8124-5	207.26		-0.44	2482	IEC62321-5	213.1		-0.05
551	EPA3052	216.40701		0.16	2488		-----		-----
623	EN16711-1	202.37		-0.76	2492	IEC62321-5	219.94		0.40
826	IEC62321-5	216.9		0.20	2504	IEC62321-5	189.330		-1.61
840	In house	223.97		0.66	2511	EN16711-1	213.3		-0.04
841	ISO8124-5	210		-0.26	2529	CPSC-CH-E1002-08	221.60		0.50
1051		-----		-----	2561	CPSC-CH-E1002-08	217.35		0.23
1126	In house	235		1.38	2568		-----		-----
2115	EN16711-1	234.48		1.35	2590	EN16711-1	198.703		-1.00
2129	EN16711-1	211.00		-0.19	2621	In house	215.45		0.10
2132	ASTM F963	232.72		1.23	2624	In house	215.6		0.11
2137	IEC62321-5	210.5		-0.22	2630		-----		-----
2165	IEC62321-5	211.3		-0.17	2637	EN16711-1	255		2.69
2176	In house	207.998		-0.39	2643	EN16711-1	205.4		-0.56
2182		-----		-----	2649	CPSC-CH-E1002-08	213		-0.06
2184	CPSC-CH-E1002-08	223.8		0.65	2665	In house	221.8		0.52
2197	In house	235.8		1.43	2674	IEC62321-5	209.82		-0.27
2201	IEC62321-5	227.50		0.89	2678		-----		-----
2202	IEC62321-5	207.3		-0.43	2689		-----		-----
2218		-----		-----	2701	IEC62321-5	186.54		-1.79
2232		Not analyzed		-----	2720	CPSC-CH-E1002-08	228.8		0.98
2247	EN16711-1	204.96		-0.59	2734		-----		-----
2250	EN16711-1	221.2		0.48	2736	In house	201.596		-0.81
2256	IEC62321-5	190.10		-1.56	2794	IEC62321-3-1	124.8	R(0.01)	-5.84
2258	CDSD-N-00164	153.88	R(0.01)	-3.93	2798		-----		-----
2264		-----		-----	2817		-----		-----
2265	EN16711-1	210.8		-0.20	2829	CPSC-CH-E1002-08	225.50		0.76
2289	IEC62321-5	229.4		1.02	2833	IEC62321-3-1	<LOD	C, f-?	-----
2294		-----		-----	2835	IEC62321-5	184.99		-1.89
2310	CPSC-CH-E1002-08	207		-0.45	2864		-----		-----
2311	EN16711-1	184.633		-1.92	2867	IEC62321-5	211.4		-0.16
2313	EN16711-1	197.3		-1.09	2885		-----		-----
2316	IEC62321-5	190.93		-1.51	2943	IEC62321-3-1	not detected	C, f-?	-----
2320	EN16711-1	191.3		-1.48	2977	EN17072-2	228.560		0.96
2326		198.3		-1.02	2995	IEC62321-5	202		-0.78
2330		not analyzed		-----	2998	In house	230	C	1.05
2339	In house	147	R(0.01)	-4.38	3015	IEC62321-5	230.0		1.05
2347		-----		-----	3026		-----		-----
2350	EPA3052	201.4		-0.82	3100	IEC62321-5	232.900		1.24
2352	IEC62321-5	221.70		0.51	3110	ASTM F963	205.945		-0.52
2353	IEC62321-5	228.30		0.94	3111	EPA3052	224.9		0.72
2355	EPA3052	210		-0.26	3116		-----		-----
2357	IEC62321-5	225		0.73	3118	EN16711-1	203.884		-0.66
2358	EN16711-1	193.87		-1.31	3122	CPSC-CH-E1002-08	221.069		0.47
2362		not applicable		-----	3127	ISO11885	214.9		0.07
2363	EN16711-1	226		0.79	3146	ISO17294-2	233		1.25
2365	IEC62321-5	229		0.99	3153	IEC62321-5	230.5		1.09
2366	CPSC-CH-E1002-08	220		0.40	3160	CPSC-CH-E1002-08	232.45		1.22
2369	EPA3052	228.51		0.96	3163		-----		-----
2370	EPA3052	216		0.14	3166	In house	187.5		-1.73
2373	EN16711-1	209.36		-0.30	3172	EN16711-1	228.5		0.96
2375	EN16711-1	202		-0.78	3176	EN16711-1	212.41		-0.10
2378	EPA3052	220		0.40	3182		not analyzed		-----
2379	IEC62321-5	199.158		-0.97	3185	In house	229.33		1.01
2380	EN16711-1	211.92		-0.13	3190	EN16711-1	219		0.33
2381	EN16711-1	203.20		-0.70	3197	IEC62321-5	218.55		0.30
2384	EPA3051	206		-0.52	3210	In house	218.96		0.33
2385	IEC62321-5	198		-1.04	3214	EN16711-1	217.9		0.26
2387	IEC62321-5	216.46		0.17	3218	EN16711-1	225.71		0.77
2392	IEC62321-5	181.14	C	-2.15	3225		-----		-----
2406	CPSC-CH-E1002-08	199.5		-0.94	3228	IEC62321-5	223		0.60
2415	CPSC-CH-E1002-08	239		1.64	3239	IEC62321-5	205.025		-0.58
2424	In house	209.9		-0.26	3246	IEC62321-5	220.88		0.46
2431	CPSC-CH-E1002-08	236.34		1.47	3248		-----		-----
2445	In house	202.3		-0.76	6379	In house	202.856		-0.72
2449	EN16711-1	206.455		-0.49	8005		-----		-----
2453		-----		-----	8008		-----		-----
2460		-----		-----					

normality	OK	
n	102	
outliers	4	
mean (n)	213.905	
st.dev. (n)	14.2912	RSD = 7%
R(calc.)	40.015	
st.dev.(Horwitz)	15.2619	
R(Horwitz)	42.733	

Lab 2392 first reported 162.07
Lab 2833 first reported 1039.7
Lab 2943 first reported 366.48
Lab 2998 first reported 0.023 mg/kg



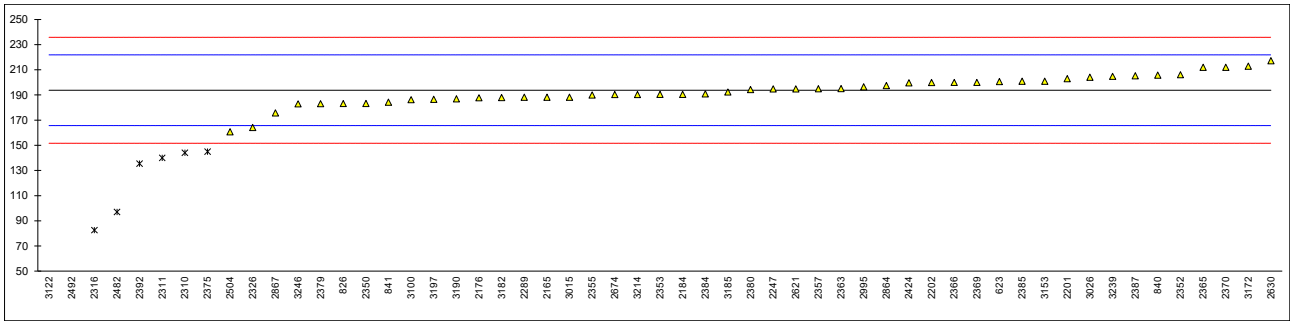


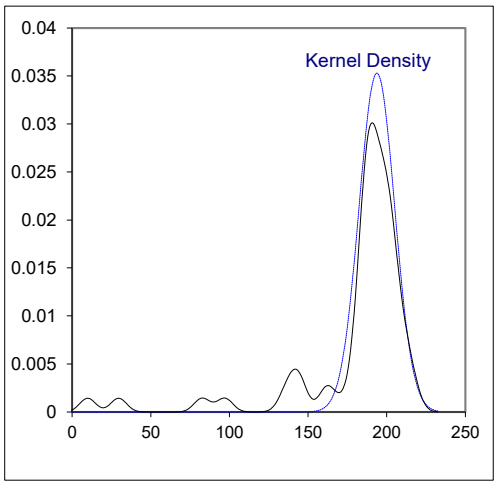
Determination of Chromium as Cr6+ on sample #23700; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475		-----		-----
339		-----		-----	2476		-----		-----
452		-----		-----	2477		-----		-----
523		not analyzed		-----	2482	IEC62321-7-2	97.03	C,R(0.01)	-6.89
551		-----		-----	2488		-----		-----
623	IEC62321-7-2	200.7		0.49	2492	IEC62321-7-2	29.5331	R(0.01)	-11.70
826	IEC62321-7-2	183.2		-0.75	2504	IEC62321-7-2	160.729		-2.35
840	IEC62321-7-2	205.8		0.86	2511		-----		-----
841	IEC62321-7-2	184.2		-0.68	2529		-----		-----
1051		-----		-----	2561		-----		-----
1126		-----		-----	2568		-----		-----
2115		-----		-----	2590		-----		-----
2129		not analyzed		-----	2621	IEC62321-7-2	194.86		0.08
2132		-----		-----	2624		not analyzed		-----
2137		-----		-----	2630	IEC62321	217.3		1.68
2165	IEC62321-7-2	188.2		-0.40	2637		not analyzed		-----
2176	IEC62321-7-2	187.826		-0.42	2643		-----		-----
2182		-----		-----	2649	CPSC-CH-E1002-08	Not Detected	f-?	-----
2184	IEC62321-7-2	190.5		-0.23	2665		-----		-----
2197		-----		-----	2674	IEC62321-7-2	190.35		-0.24
2201	IEC62321-7-2	202.95		0.65	2678		-----		-----
2202	IEC62321-7-2	199.9		0.44	2689		-----		-----
2218		-----		-----	2701		-----		-----
2232		Not analyzed		-----	2720		-----		-----
2247	IEC62321-7-2	194.79	C	0.07	2734		-----		-----
2250		-----		-----	2736		-----		-----
2256		-----		-----	2794		not tested		-----
2258		not applicable		-----	2798		-----		-----
2264		-----		-----	2817		-----		-----
2265		-----		-----	2829		-----		-----
2289	IEC62321-7-2	188.2		-0.40	2833		-----		-----
2294		-----		-----	2835	IEC62321-7-2	not detected	f-?	-----
2310	IEC62321-7-2	144	C,R(0.01)	-3.55	2864	IEC62321-7-2	197.5	C	0.27
2311	IEC62321-7-2	140	C,R(0.01)	-3.83	2867	IEC62321-7-2	175.8		-1.28
2313		Not tested		-----	2885		-----		-----
2316	IEC62321-7-2	82.59	R(0.01)	-7.92	2943		-----		-----
2320		not applicable		-----	2977		not determined		-----
2326		164.2		-2.11	2995	IEC62321-7-2	196.5		0.20
2330		not analyzed		-----	2998		-----		-----
2339		-----		-----	3015	IEC62321-7-2	188.2		-0.40
2347		-----		-----	3026	IEC62321-7-2	204.16		0.74
2350	IEC62321-7-2	183.3		-0.75	3100	IEC62321-7-2	186.2608		-0.53
2352	IEC62321-7-2	206.13		0.88	3110		-----		-----
2353	IEC62321-7-2	190.44		-0.24	3111		-----		-----
2355	IEC62321-7-2	190		-0.27	3116		-----		-----
2357	IEC62321-7-2	195		0.09	3118		-----		-----
2358		not applicable		-----	3122	EPA3060a	9.853	R(0.01)	-13.11
2362		not applicable		-----	3127		-----		-----
2363	IEC62321-7-2	195.09		0.09	3146		-----		-----
2365	IEC62321-7-2	212		1.30	3153	IEC62321-7-2	201.0		0.52
2366	IEC62321-7-2	200		0.44	3160		-----		-----
2369	IEC62321-7-2	200.06		0.45	3163		-----		-----
2370	IEC62321-7-2	212		1.30	3166		not determined		-----
2373		not applicable		-----	3172	EN16711-1	212.98		1.37
2375	IEC62321-7-2	145	C,R(0.01)	-3.47	3176		-----		-----
2378	In house	Out of Capability		-----	3182	IEC62321-7-2	187.96		-0.41
2379	IEC62321-7-2	183.10		-0.76	3185	IEC62321-7-2	192.38		-0.10
2380	IEC62321-7	194.42		0.05	3190	IEC62321-7-2	187		-0.48
2381		-----		-----	3197	IEC62321-7-2	186.57		-0.51
2384	IEC62321-7-2	191	C	-0.20	3210		-----		-----
2385	IEC62321-7-2	201		0.52	3214	EN16711-1	190.4		-0.24
2387	IEC62321-7-2	205.32		0.82	3218		-----		-----
2392	IEC62321-7-2	135.41	C,R(0.01)	-4.16	3225		-----		-----
2406		Not analyzed		-----	3228		-----		-----
2415		-----		-----	3239	IEC62321-7-2	204.79		0.79
2424	IEC62321-7-2	199.7		0.42	3246	IEC62321-7-2	183		-0.77
2431		-----		-----	3248		-----		-----
2445		Not analyzed		-----	6379		-----		-----
2449		-----		-----	8005		-----		-----
2453		-----		-----	8008		-----		-----
2460		-----		-----					

normality	suspect	
n	47	
outliers	8	
mean (n)	193.761	
st.dev. (n)	11.3056	RSD = 6%
R(calc.)	31.656	
st.dev.(Horwitz)	14.0320	
R(Horwitz)	39.289	

Lab 2247 first reported Not detected, test method EN16711-1
Lab 2310 first reported 72.4
Lab 2311 first reported 76.01
Lab 2375 first reported 66
Lab 2384 first reported 382
Lab 2392 first reported 126.45
Lab 2482 first reported 87.60
Lab 2864 first reported 98.16



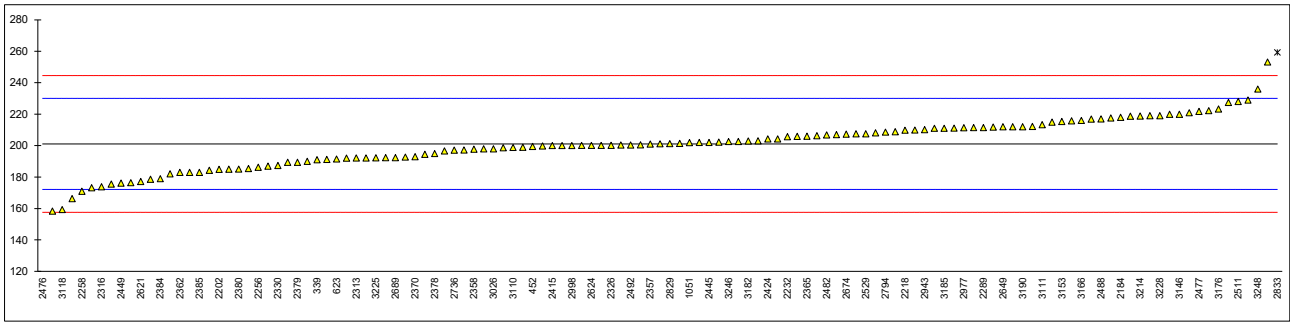


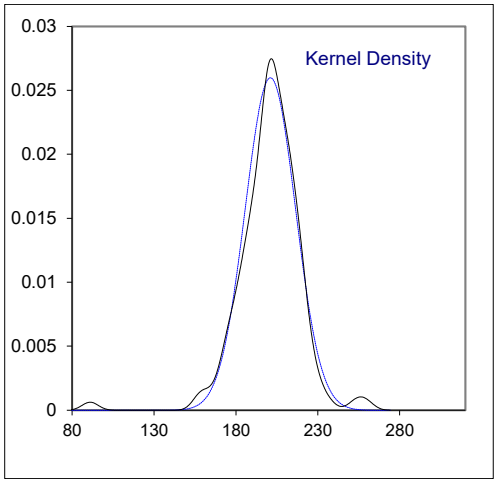
Determination of Total Lead as Pb on sample #23700; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475	In house	229		1.93
339	In house	191.049		-0.69	2476	CPSC-CH-E1002-8	91.02	R(0.01)	-7.60
452	CPSC-CH-E1002-08.1	199.43		-0.11	2477	CPSC-CH-E1002-08.3	221.767		1.43
523	ISO8124-5	207.56		0.45	2482	IEC62321-5	206.8		0.40
551	EPA3052	253.18341		3.60	2488	CPSC-CH-E1002-08.3	216.94		1.10
623	EN16711-1	191.45		-0.66	2492	IEC62321-5	200.4260		-0.04
826	IEC62321-5	200.1		-0.07	2504	IEC62321-5	176.399		-1.70
840	In house	205.91		0.33	2511	CPSC-CH-E1002-08.3	228.1		1.87
841	ISO8124-5	198		-0.21	2529	CPSC-CH-E1002-08.3	207.58		0.45
1051	CPSC-CH-E1002-08.3	201.9		0.06	2561	CPSC-CH-E1002-08.3	208.86		0.54
1126		-----		-----	2568		-----		-----
2115	EN16711-1	202.62		0.11	2590	CPSC-CH-E1002-08.3	178.609		-1.55
2129	EN16711-1	202.00		0.06	2621	IEC62321-5	177.22		-1.65
2132	CPSC-CH-E1002-08	209.94		0.61	2624	In house	200.1		-0.07
2137	IEC62321-5	199.0		-0.14	2630	IEC62321-5	189.4		-0.81
2165	IEC62321-5	200.4		-0.05	2637	EN16711-1	220		1.31
2176	In house	201.418		0.02	2643	CPSC-CH-E1002-08.3	192.3		-0.61
2182	CPSC-CH-E1002-08.3	204.3		0.22	2649	CPSC-CH-E1002-08	212		0.76
2184	CPSC-CH-E1002-08.3	218.0		1.17	2665	In house	212.2		0.77
2197	In house	219.0		1.24	2674	IEC62321-5	207.31		0.43
2201	IEC62321-5	215.00		0.96	2678		-----		-----
2202	IEC62321-5	184.9		-1.12	2689	EPA3052	192.3		-0.61
2218	CPSC-CH-E1002-08	209.776		0.60	2701	IEC62321-5	184.30		-1.16
2232	CPSC-CH-E1002-08.3	205.631		0.32	2720	CPSC-CH-E1002-08.2	212.0		0.76
2247	EN16711-1	216.87		1.09	2734		-----		-----
2250	EN16711-1	222.2		1.46	2736	In house	197.085		-0.27
2256	IEC62321-5	186.20		-1.03	2794	IEC62321-3-1	208.6		0.52
2258	CDSD-N-00164	170.98		-2.08	2798	EN16711-1	200		-0.07
2264		-----		-----	2817		-----		-----
2265	EN16711-1	192.0		-0.63	2829	CPSC-CH-E1002-08.3	201.21		0.01
2289	IEC62321-5	211.5		0.72	2833	IEC62321-3-1	259.3	C,R(0.05)	4.02
2294	CPSC-CH-E1002-08.3	211.48		0.72	2835	IEC62321-5	175.61		-1.76
2310	CPSC-CH-E1002-08	187		-0.97	2864	IEC62321-5	198.6		-0.17
2311	CPSC-CH-E1002-08.3	182.101		-1.31	2867	IEC62321-5	206.3		0.36
2313	EN16711-1	192.1		-0.62	2885	IEC62321-5	Not detected	f-?	-----
2316	IEC62321-5	173.83		-1.88	2943	IEC62321-3-1	210.21		0.63
2320	EN16711-1	166.3		-2.40	2977	EN17072-2	211.410		0.71
2326		200.25		-0.06	2995	IEC62321-5	173.25		-1.92
2330	CPSC-CH-E1002	187.37		-0.95	2998	In house	200	C	-0.07
2339		-----		-----	3015	IEC62321-5	211.8		0.74
2347		-----		-----	3026	IEC62321-5	198.01		-0.21
2350	CPSC-CH-E1002-08.3	197.2		-0.27	3100	IEC62321-5	217.590		1.14
2352	IEC62321-5	201.16		0.01	3110	ASTM F963	198.801		-0.16
2353	IEC62321-5	183		-1.25	3111	EPA3052	213.3		0.85
2355	IEC62321-5	185		-1.11	3116		-----		-----
2357	IEC62321-5	201		0.00	3118	EN16711-1	159.287		-2.88
2358	EN16711-1	197.82		-0.22	3122	CPSC-CH-E1002-08.1	200.132		-0.06
2362	CPSC-CH-E1002-08	183.00		-1.25	3127	ISO11885	200.5		-0.04
2363	EN16711-1	203		0.13	3146	ISO17294-2	220		1.31
2365	IEC62321-5	206		0.34	3153	IEC62321-5	215.4		0.99
2366	CPSC-CH-E1002-08.3	211		0.69	3160	CPSC-CH-E1002-08.3	215.78		1.02
2369	EPA3052	202.19		0.08	3163		-----		-----
2370	CPSC-CH-E1002-08.3	193		-0.56	3166	In house	216.0		1.03
2373	CPSC-CH-E1002-08.3	185.45		-1.08	3172	CPSC-CH-E1002-08.3	227.5		1.83
2375	EN16711-1	190		-0.76	3176	EN16711-1	223.29		1.54
2378	EPA3052	195		-0.42	3182	IEC62321-5	202.92		0.13
2379	IEC62321-5	189.408		-0.80	3185	CPSC-CH-E1002-08.3	211.01		0.69
2380	EN16711-1	185.12		-1.10	3190	EN16711-1	212		0.76
2381	EN16711-1	191.20		-0.68	3197	CPSC-CH-E1002-08	199.76		-0.09
2384	EPA3051	179		-1.52	3210	In house	196.68		-0.30
2385	IEC62321-5	183		-1.25	3214	EN16711-1	218.8		1.23
2387	IEC62321-5	218.74		1.22	3218	EN16711-1	211.17		0.70
2392	IEC62321-5	158.36	C	-2.95	3225	CPSC-CH-E1002-08.3	192.24		-0.61
2406	CPSC-CH-E1002-08	208.1		0.49	3228	IEC62321-5	219		1.24
2415	CPSC-CH-E1002-08	200		-0.07	3239	IEC62321-5	192.150		-0.62
2424	In house	204.3		0.22	3246	IEC62321-5	202.55		0.10
2431	CPSC-CH-E1002-08	220.90		1.37	3248	CPSC-CH-E1002-08	236		2.41
2445	In house	202.0		0.06	6379	In house	194.441		-0.46
2449	EN16711-1	176.147		-1.72	8005	C-02.3	192.731		-0.58
2453		-----		-----	8008		-----		-----
2460	CPSC-CH-E1002-08.3	206.98		0.41					

normality	OK	
n	125	
outliers	2	
mean (n)	201.060	
st.dev. (n)	15.3607	RSD = 8%
R(calc.)	43.010	
st.dev.(Horwitz)	14.4798	
R(Horwitz)	40.543	

Lab 2392 first reported 145.18
Lab 2833 first reported 425.4
Lab 2998 first reported 0.02 mg/kg



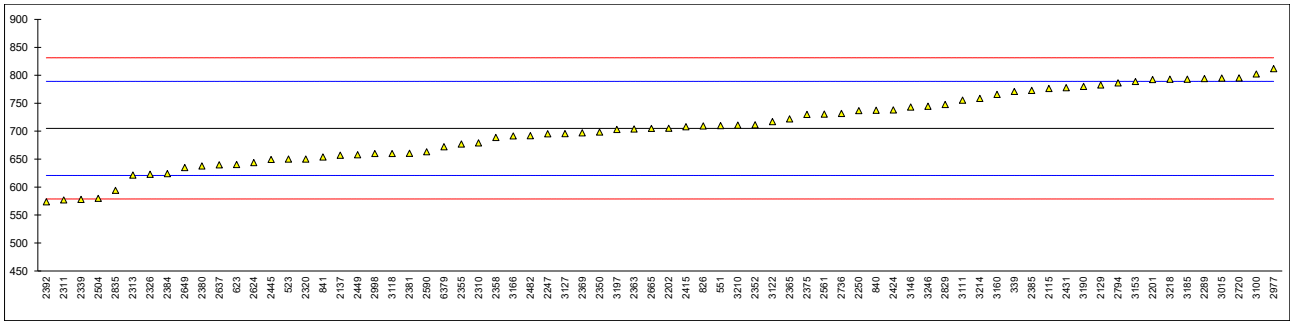


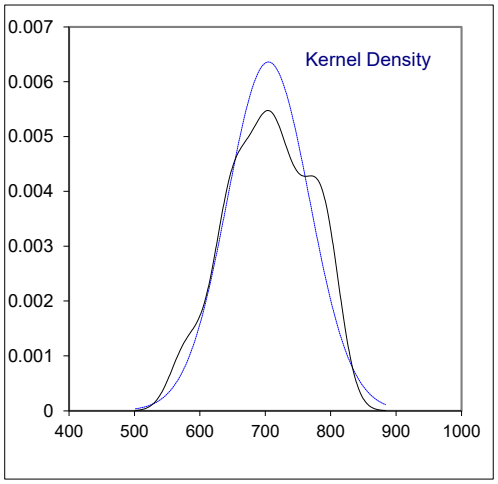
Determination of Total Zinc as Zn on sample #23700; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475		-----		-----
339	In house	771.0045		1.57	2476		-----		-----
452		-----		-----	2477		-----		-----
523	ISO8124-5	650.1		-1.31	2482	EN16711-1	692.0		-0.31
551	EPA3052	710.08144		0.12	2488		-----		-----
623	EN16711-1	640.54		-1.53	2492		-----		-----
826	EPA3052	709.4		0.11	2504	IEC62321-5	579.929		-2.97
840	In house	737.42		0.77	2511		-----		-----
841	ISO8124-5	654		-1.21	2529		-----		-----
1051		-----		-----	2561	CPSC-CH-E1002-08	730.77		0.61
1126		-----		-----	2568		-----		-----
2115	EN16711-1	776.5	C	1.70	2590	EN16711-1	663.251		-0.99
2129	EN16711-1	782.67		1.85	2621		-----		-----
2132		-----		-----	2624	In house	643.9		-1.45
2137	IEC62321-5	657.0		-1.14	2630		-----		-----
2165		-----		-----	2637	EN16711-1	640		-1.55
2176		not analyzed		-----	2643		-----		-----
2182		-----		-----	2649	CPSC-CH-E1002-08	635		-1.66
2184		-----		-----	2665	In house	705.0		0.00
2197		-----		-----	2674		-----		-----
2201	IEC62321-5	792.64		2.09	2678		-----		-----
2202	In house	705.3		0.01	2689		-----		-----
2218		-----		-----	2701		-----		-----
2232		Not analyzed		-----	2720	CPSC-CH-E1002-08	795.1		2.14
2247	EN16711-1	695.44		-0.23	2734		-----		-----
2250	EN16711-1	736.6		0.75	2736	In house	731.783		0.64
2256		-----		-----	2794	IEC62321-3-1	786.42	C	1.94
2258		not applicable		-----	2798		-----		-----
2264		-----		-----	2817		-----		-----
2265		-----		-----	2829	CPSC-CH-E1002-08	747.75		1.02
2289	IEC62321-5	794.2		2.12	2833		-----		-----
2294		-----		-----	2835	IEC62321-5	594.27		-2.63
2310	CPSC-CH-E1002-08	679		-0.62	2864		-----		-----
2311	EN16711-1	577		-3.04	2867		-----		-----
2313	EN16711-1	621.3		-1.99	2885		-----		-----
2316		Not Applicable		-----	2943		-----		-----
2320	EN16711-1	650.3		-1.30	2977	EN17072-2	811.870		2.54
2326		622.9		-1.95	2995		-----		-----
2330		not analyzed		-----	2998	In house	660	C	-1.07
2339	In house	578		-3.02	3015	IEC62321-5	795.0		2.14
2347		-----		-----	3026		-----		-----
2350	EPA3052	698.5		-0.15	3100	IEC62321-5	802.335		2.32
2352	In house	711.38		0.15	3110		-----		-----
2353		not applicable		-----	3111	EPA3052	755.6		1.20
2355	EPA3052	677		-0.67	3116		-----		-----
2357		not analyzed		-----	3118	EN16711-1	660.129		-1.07
2358	EN16711-1	688.83		-0.38	3122	CPSC-CH-E1002-08	717.250		0.29
2362		not applicable		-----	3127	ISO11885	695.6		-0.22
2363	EN16711-1	704		-0.02	3146	ISO17294-2	743		0.90
2365	EPA3052	722		0.41	3153	IEC62321-5	788.9		2.00
2366	CPSC-CH-E1002-08	out of capability		-----	3160	CPSC-CH-E1002-08	765.74		1.45
2369	EPA3052	697.00		-0.19	3163		-----		-----
2370		-----		-----	3166	In house	691.5		-0.32
2373	EN16711-1	not applicable		-----	3172		-----		-----
2375	EN16711-1	730		0.60	3176		-----		-----
2378	In house	Out of Capability		-----	3182	IEC62321-5	not analyzed		-----
2379	IEC62321-5	Not analyzed		-----	3185	In house	793.13		2.10
2380	EN16711-1	637.70		-1.60	3190	EN16711-1	780		1.78
2381	EN16711-1	660.50		-1.06	3197	In house	703.20		-0.04
2384	EPA3051	624		-1.93	3210	In house	710.75		0.14
2385	IEC62321-5	773		1.62	3214	EN16711-1	758.8		1.28
2387		-----		-----	3218	EN16711-1	792.95		2.09
2392	IEC62321-5	573.83	C	-3.12	3225		-----		-----
2406		Not analyzed		-----	3228		-----		-----
2415	CPSC-CH-E1002-08	708		0.07	3239		-----		-----
2424	In house	738		0.79	3246	ISO8124-5	744.71		0.95
2431	CPSC-CH-E1002-08	777.70		1.73	3248		-----		-----
2445	In house	649.3		-1.32	6379	In house	672.247		-0.78
2449	EN16711-1	657.922		-1.12	8005		-----		-----
2453		-----		-----	8008		-----		-----
2460		-----		-----					

normality	OK	
n	72	
outliers	0	
mean (n)	704.971	
st.dev. (n)	62.7493	RSD = 9%
R(calc.)	175.698	
st.dev.(Horwitz)	42.0338	
R(Horwitz)	117.695	

Lab 2115 first reported 368.67
Lab 2392 first reported 513.43
Lab 2794 first reported 1040.3
Lab 2998 first reported 0.066 mg/kg



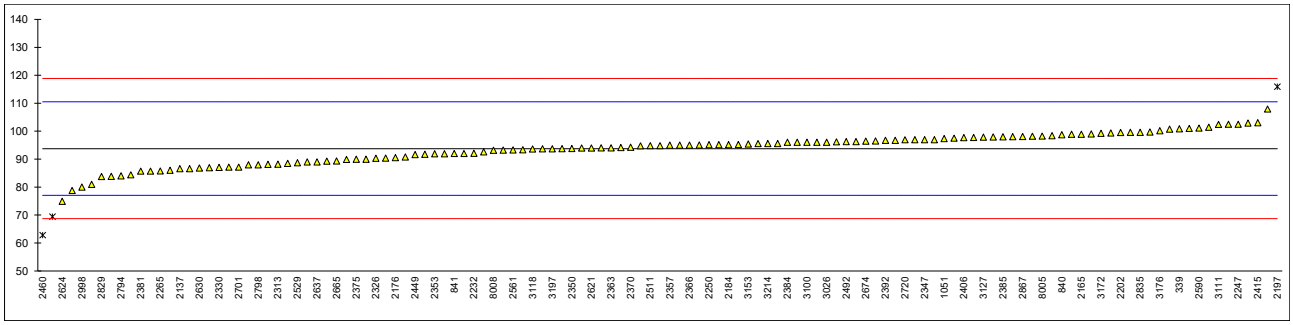


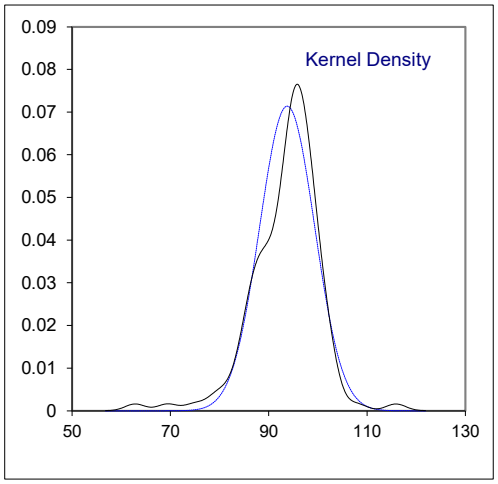
Determination of Total Cadmium as Cd on sample #23701; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475	EN1122	101		0.86
339	In house	100.8295		0.84	2476		-----		-----
452	CPSC-CH-E1002-08	81.02		-1.52	2477		-----		-----
523	ISO8124-5	96.5		0.33	2482	IEC62321-5	86.60		-0.86
551	EPA3052	92.56260		-0.14	2488	IEC62321-5	95.53		0.21
623	EN1122	96.99		0.39	2492	IEC62321-5	96.2874		0.30
826	IEC62321-5	93.96		0.02	2504	EN1122	98.877		0.61
840	In house	98.70		0.59	2511	EN16711-1	94.8		0.12
841	ISO8124-5	92		-0.21	2529	CPSC-CH-E1002-08	88.71		-0.60
1051	EN1122	97.35		0.43	2561	CPSC-CH-E1002-08	93.28		-0.06
1126	In house	99.57		0.69	2568		-----		-----
2115	EN16711-1	89.0	C	-0.57	2590	EN1122	101.123		0.88
2129	EN16711-1	88.00		-0.69	2621	IEC62321-5	93.970		0.02
2132	EN1122	93.35		-0.05	2624	In house	74.9		-2.25
2137	IEC62321-5	86.6		-0.86	2630	IEC62321-5	86.8		-0.83
2165	EN1122	98.9		0.61	2637	EN16711-1	89		-0.57
2176	In house	90.526		-0.39	2643	EN16711-1	92.0		-0.21
2182	CPSC-CH-E1002-08	95.170		0.17	2649	EN1122	94.8		0.12
2184	EN1122	95.2		0.17	2665	In house	89.36		-0.53
2197	In house	115.9	R(0.05)	2.64	2674	EN1122	96.43		0.32
2201	ISO8124-5	97.75		0.48	2678		-----		-----
2202	IEC62321-5	99.5		0.69	2689	EPA3052	84.40		-1.12
2218		-----		-----	2701	IEC62321-5	87.16		-0.79
2232	CPSC-CH-E1002-08	92.135		-0.19	2720	CPSC-CH-E1002-08	96.93		0.38
2247	CPSC-CH-E1002-08	102.49		1.04	2734		-----		-----
2250	EN1122	95.16		0.17	2736	In house	93.246		-0.06
2256	EN1122	102.90		1.09	2794	IEC62321-3-1	83.99		-1.17
2258	CPSCD-N-00164	99.35		0.67	2798	EN16711-1	88		-0.69
2264		-----		-----	2817		-----		-----
2265	EN1122	85.74		-0.96	2829	EN1122	83.82		-1.19
2289	IEC62321-5	96.7		0.35	2833	IEC62321-3-1	99.72		0.71
2294		-----		-----	2835	IEC62321-5	99.59		0.70
2310	CPSC-CH-E1002-08	89.3		-0.53	2864	IEC62321-5	95.62		0.22
2311	EN1122	85.7		-0.96	2867	IEC62321-5	98.1		0.52
2313	EN1122	88.21		-0.66	2885	IEC62321-5	88.16		-0.67
2316	IEC62321-5	83.84		-1.19	2943	IEC62321-3-1	100.75		0.83
2320	EN16711-1	96.2		0.29	2977	EN17072-2	101.401		0.91
2326		90.30		-0.41	2995	IEC62321-5	93.75		0.00
2330	EN16711	87.01		-0.81	2998	In house	80	C	-1.64
2339		-----		-----	3015	IEC62321-5	96.3		0.30
2347	IEC62321-5	97		0.39	3026	IEC62321-5	96.04		0.27
2350	CPSC-CH-E1002-08	93.79		0.00	3100	EN1122	96.032		0.27
2352	EN1122	95.23		0.18	3110	ASTM F963	94.755		0.12
2353	IEC62321-5	91.89		-0.22	3111	EPA3052	102.4		1.03
2355	IEC62321-5	95		0.15	3116		-----		-----
2357	IEC62321-5	95		0.15	3118	EN1122	93.642		-0.01
2358	EN16711-1	97.92		0.50	3122	CPSC-CH-E1002-08	69.402	R(0.01)	-2.91
2362	CPSC-CH-E1002-08	91.89		-0.22	3127	ISO11885	97.89		0.49
2363	EN16711-1	94		0.03	3146	ISO17294-2	98.2		0.53
2365	IEC62321-5	97		0.39	3153	IEC62321-5	95.4		0.20
2366	C02.3.1	95		0.15	3160	CPSC-CH-E1002-08	88.47		-0.63
2369	EPA3052	96.04		0.27	3163		-----		-----
2370	EN1122	94.3		0.06	3166	In house	97.5		0.45
2373	EN1122	93.68		-0.01	3172	EN16711-1	99.25		0.66
2375	EN16711-1	90		-0.45	3176	EN16711-1	100.14		0.76
2378	EN1122	94		0.03	3182	IEC62321-5	98.03		0.51
2379	IEC62321-5	89.862		-0.47	3185	EN1122	99.04		0.63
2380	EN16711-1	87.15		-0.79	3190	EN16711-1	96		0.27
2381	EN16711-1	85.70		-0.96	3197	EN1122	93.69		-0.01
2384	EPA3051	96		0.27	3210	In house	78.75		-1.79
2385	IEC62321-5	98		0.51	3214	EN16711-1	95.6		0.22
2387	IEC62321-5	95.09		0.16	3218	EN16711-1	98.41		0.56
2392	IEC62321-5	96.70	C	0.35	3225	EN1122	102.47		1.04
2406	EN1122	97.7		0.47	3228	IEC62321-5	90		-0.45
2415	EN1122	103		1.10	3239	IEC62321-5	107.908		1.69
2424	In house	86.9		-0.82	3246	EN1122	90.77		-0.36
2431		-----		-----	3248		86		-0.93
2445	In house	91.73		-0.24	6379	In house	94.1815		0.05
2449	CPSC-CH-E1002-08	91.617		-0.26	8005	ASTM F963	98.250		0.54
2453	EN1122	90.35		-0.41	8008	EN1122	93.151		-0.07
2460	EN1122	62.809	C,R(0.01)	-3.70					

normality	OK	
n	124	
outliers	3	
mean (n)	93.762	
st.dev. (n)	5.5869	RSD = 6%
R(calc.)	15.643	
st.dev.(EN1122:01)	8.3716	
R(EN1122:01)	23.440	

Lab 2115 first reported 72.11
Lab 2392 first reported 73.38
Lab 2460 first reported 34.026
Lab 2998 first reported 0.008 mg/kg



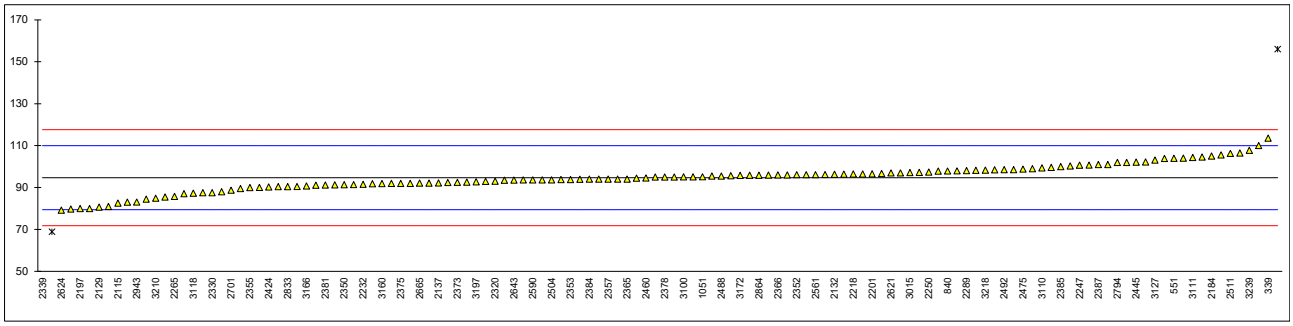


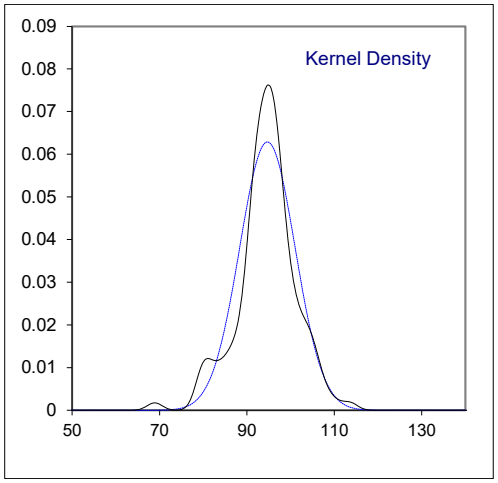
Determination of Total Lead as Pb on sample #23701; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2475	In house	98.8		0.54
339	In house	113.5775		2.48	2476	CPSC-CH-E1002-08	156.01	R(0.01)	8.03
452	CPSC-CH-E1002-08.1	79.79		-1.95	2477	CPSC-CH-E1002-08.3	95.606		0.12
523	ISO8124-5	100.69		0.79	2482	IEC62321-5	80.94		-1.80
551	EPA3052	103.99165		1.22	2488	IEC62321-5	95.51		0.11
623	EN16711-1	95.85		0.15	2492	IEC62321-5	98.4953		0.50
826	IEC62321-5	93.65		-0.13	2504	IEC62321-5	93.651		-0.13
840	In house	97.88		0.42	2511	CPSC-CH-E1002-08.3	106.3		1.52
841	ISO8124-5	94		-0.09	2529	CPSC-CH-E1002-08.3	91.23		-0.45
1051	CPSC-CH-E1002-08.3	95.12		0.06	2561	CPSC-CH-E1002-08.3	96.14		0.19
1126	In house	105.60		1.43	2568		-----		-----
2115	EN16711-1	82.6	C	-1.58	2590	CPSC-CH-E1002-08.3	93.635		-0.14
2129	EN16711-1	80.67		-1.83	2621	IEC62321-5	96.987		0.30
2132	CPSC-CH-E1002-08	96.34		0.22	2624	In house	79.2		-2.03
2137	IEC62321-5	92.2		-0.32	2630	IEC62321-5	90.4		-0.56
2165	IEC62321-5	93.8		-0.11	2637	EN16711-1	97		0.30
2176	In house	92.986		-0.22	2643	CPSC-CH-E1002-08.3	93.6		-0.14
2182	CPSC-CH-E1002-08.3	96.130		0.19	2649	CPSC-CH-E1002-08	110		2.01
2184	CPSC-CH-E1002-08.3	105.0		1.35	2665	In house	92.10		-0.34
2197	In house	80.0		-1.92	2674	IEC62321-5	96.17		0.20
2201	ISO8124-5	96.55		0.25	2678		-----		-----
2202	IEC62321-5	102.2		0.99	2689	EPA3052	91.12		-0.47
2218	CPSC-CH-E1002-08	96.463		0.23	2701	IEC62321-5	88.70		-0.78
2232	CPSC-CH-E1002-08.3	91.522		-0.41	2720	CPSC-CH-E1002-08.3	98.44		0.49
2247	CPSC-CH-E1002-08.3	100.64		0.78	2734		-----		-----
2250	EN16711-1	97.40		0.36	2736	In house	93.630		-0.14
2256	IEC62321-5	104.60		1.30	2794	IEC62321-3-1	102		0.96
2258	CPSCD-N-00164	84.50		-1.33	2798	EN16711-1	83		-1.53
2264		-----		-----	2817		-----		-----
2265	EN16711-1	85.74		-1.17	2829	CPSC-CH-E1002-08.3	91.43		-0.42
2289	IEC62321-5	98.1		0.45	2833	IEC62321-3-1	90.41		-0.56
2294	CPSC-CH-E1002-08.3	90.50		-0.55	2835	IEC62321-5	98.55		0.51
2310	CPSC-CH-E1002-08	88		-0.87	2864	IEC62321-5	95.87		0.16
2311	CPSC-CH-E1002-08.3	87.1		-0.99	2867	IEC62321-5	96.7		0.27
2313	EN16711-1	92.62		-0.27	2885	IEC62321-5	106.5		1.55
2316	IEC62321-5	85.47		-1.21	2943	IEC62321-3-1	83.08		-1.52
2320	EN16711-1	93.0		-0.22	2977	EN17072-2	93.910		-0.10
2326		100.32		0.74	2995	IEC62321-5	87.5		-0.94
2330	EN16711	87.55		-0.93	2998	In house	80	C	-1.92
2339	In house	8	R(0.01)	-11.35	3015	IEC62321-5	97.2		0.33
2347	IEC62321-5	94		-0.09	3026	IEC62321-5	94.54		-0.02
2350	CPSC-CH-E1002-08.3	91.3		-0.44	3100	IEC62321-5	95.051		0.05
2352	IEC62321-5	96.12		0.19	3110	ASTM F963	99.374		0.62
2353	IEC62321-5	93.82		-0.11	3111	EPA3052	104.3		1.26
2355	IEC62321-5	90		-0.61	3116	CPSC-CH-E1002-08.3	95.083		0.05
2357	IEC62321-5	94		-0.09	3118	EN16711-1	87.285		-0.97
2358	EN16711-1	103.88		1.21	3122	CPSC-CH-E1002-08.1	68.866	R(0.05)	-3.38
2362	CPSC-CH-E1002-08	97.82		0.41	3127	ISO118855	103.1		1.10
2363	EN16711-1	95		0.04	3146	ISO17294-2	102		0.96
2365	IEC62321-5	94		-0.09	3153	IEC62321-5	96.0		0.17
2366	C02.3.1	96		0.17	3160	CPSC-CH-E1002-08.3	91.89		-0.36
2369	EPA3052	97.27		0.34	3163		-----		-----
2370	CPSC-CH-E1002-08.3	92.4		-0.30	3166	In house	90.75		-0.51
2373	CPSC-CH-E1002-08.3	92.47		-0.29	3172	CPSC-CH-E1002-08.3	95.75		0.14
2375	EN16711-1	92		-0.35	3176	EN16711-1	97.99		0.43
2378	EPA3052	95		0.04	3182	IEC62321-5	95.93		0.16
2379	IEC62321-5	93.506		-0.15	3185	CPSC-CH-E1002-08.3	99.57		0.64
2380	EN16711-1	91.97		-0.35	3190	EN16711-1	99		0.57
2381	EN16711-1	91.20		-0.46	3197	CPSC-CH-E1002-08	92.72		-0.26
2384	EPA3051	94		-0.09	3210	In house	84.91		-1.28
2385	IEC62321-5	100		0.70	3214	EN16711-1	95.5		0.11
2387	IEC62321-5	100.98		0.83	3218	EN16711-1	98.30		0.47
2392	IEC62321-5	89.48	C	-0.68	3225	CPSC-CH-E1002-08.3	94.97		0.04
2406	CPSC-CH-E1002-08	96.4		0.23	3228	IEC62321-5	101		0.83
2415	CPSC-CH-E1002-08.3	104		1.22	3239	IEC62321-5	107.752		1.71
2424	In house	90.3		-0.57	3246	IEC62321-5	92.10		-0.34
2431	CPSC-CH-E1002-08	98.26		0.47	3248		92		-0.35
2445	In house	102.1		0.97	6379	In house	90.0615		-0.60
2449	CPSC-CH-E1002-08.3	91.837		-0.37	8005	ASTM F963	96.500		0.24
2453		-----		-----	8008		-----		-----
2460	CPSC-CH-E1002-08.3	94.56		-0.02					

normality	OK	
n	129	
outliers	3	
mean (n)	94.675	
st.dev. (n)	6.3441	RSD = 7%
R(calc.)	17.763	
st.dev.(Horwitz)	7.6366	
R(Horwitz)	21.383	

Lab 2115 first reported 56.3
Lab 2392 first reported 70.94
Lab 2998 first reported 0.008 mg/kg





APPENDIX 2
Other reported Metals in sample #23700; results in mg/kg

lab	Sb	Co	Cu	Mn	Hg
210	-----	-----	-----	-----	-----
339	not detected	9.9475	not detected	3.6085	not detected
452	<10	-----	-----	-----	<10
523	not detected	not detected	not detected	not detected	not detected
551	ND	0.0399	0.96707	4.54052	0.256117
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
826	N.D.	N.D.	N.D.	N.D.	N.D.
840	<10	<10	<10	<10	<5
841	<10	<10	<10	<10	<10
1051	-----	-----	-----	-----	-----
1126	-----	-----	----- W	-----	-----
2115	-----	-----	-----	5.25	0.58
2129	not detectable	not detectable	not detectable	not detectable	not detectable
2132	<10	-----	-----	-----	<10
2137	-----	-----	-----	-----	-----
2165	-----	-----	-----	-----	Not Detected
2176	not analyzed	not analyzed	not analyzed	not analyzed	not detected
2182	-----	-----	-----	-----	-----
2184	-----	-----	-----	-----	<10
2197	-----	-----	below detection limit	-----	-----
2201	<10	<10	<10	<10	<10
2202	12.6	8.2	N.D	N.D	N.D
2218	-----	-----	-----	-----	-----
2232	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
2247	Not detected	Not detected	Not detected	Not detected	Not detected
2250	<1	<1	<10	5.037	0.5590
2256	-----	-----	-----	-----	<5
2258	not detected	not applicable	not applicable	not applicable	not detected
2264	-----	-----	-----	-----	-----
2265	-----	-----	-----	-----	0.527
2289	<10	<10	<10	<10	<10
2294	-----	-----	-----	-----	-----
2310	not detected	not detected	<10	<10	not detected
2311	Not Detected	Not Detected	Not Detected	<5	Not Detected
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2316	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not detected
2320	<5	<5	<5	<5	<1
2326	-----	-----	-----	-----	-----
2330	not analyzed	not analyzed	not analyzed	not analyzed	not analyzed
2339	1 C	<1	<1	3	<1
2347	-----	-----	-----	-----	-----
2350	<10	<10	<10	<10	<2
2352	-----	-----	-----	-----	-----
2353	not applicable	not applicable	not applicable	not applicable	not detected
2355	<10	<5	<5	<5	<2
2357	<10	<10	<10	<10	<2
2358	not detected	not detected	not detected	not applicable	not detected
2362	not applicable	not applicable	not applicable	not applicable	not applicable
2363	<10	<5	<10	<5	<5
2365	<10	<10	<10	<10	<2
2366	out of capability	out of capability	out of capability	out of capability	<10
2369	<10	<5	<5	<5	<2
2370	<2	-----	-----	-----	<2
2373	not detected	not detected	not detected	not applicable	not detected
2375	<10	<10	<10	<10	<10
2378	<5	<5	<5	Out of Capability	<10
2379	ǒNot detected	Not analyzed	Not analyzed	Not analyzed	ǒNot detected
2380	-----	-----	-----	-----	-----
2381	-----	-----	-----	-----	-----
2384	not detected	not detected	not detected	not detected	not detected
2385	<5	<1	<5	4.5	0.60
2387	-----	-----	-----	-----	Not Detected
2392	not detected	not detected	not detected	not detected	not detected
2406	< 20	Not analyzed	Not analyzed	Not analyzed	< 20
2415	-----	-----	-----	-----	-----
2424	6.3	0	15.9	5.5	505
2431	-----	-----	-----	-----	-----
2445	1.230	0.0488	0.7643	4.430	0.5037
2449	-----	-----	-----	5.624	-----
2453	-----	-----	-----	-----	-----
2460	-----	-----	-----	-----	-----
2475	-----	-----	-----	-----	-----
2476	-----	-----	-----	-----	-----
2477	-----	-----	-----	-----	-----
2482	< 10	< 10	< 10	< 10	< 1

lab	Sb	Co	Cu	Mn	Hg	
2488	-----	-----	-----	-----	-----	
2492	-----	-----	-----	-----	Not detected	
2504	<10	<10	<10	<10	<2	
2511	-----	-----	-----	-----	-----	
2529	-----	-----	-----	-----	-----	
2561	-----	-----	1.60	4.24	0.65	
2568	-----	-----	-----	-----	<5	
2590	< LOQ	< LOQ	< LOQ	-----	-----	
2621	-----	-----	-----	-----	Not Detected [<2]	
2624	not analyzed	not detected	11.1	7.8	not analyzed	
2630	-----	-----	-----	-----	not detected	
2637	1.3	not detected	1.3	5.5	0.55	
2643	-----	-----	-----	-----	-----	
2649	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
2665	1.21	not determined	1.37	4.79	0.580	
2674	-----	< 10	-----	-----	< 10	
2678	-----	-----	-----	-----	-----	
2689	-----	-----	-----	-----	-----	
2701	-----	-----	-----	-----	-----	
2720	<10	<10	<10	<10	<10	
2734	-----	-----	-----	-----	-----	
2736	-----	-----	<3.470	4.511	<3.470	
2794	not detected	not detected	not detected	not detected	not detected	
2798	-----	-----	-----	-----	-----	
2817	-----	-----	-----	-----	-----	
2829	-----	-----	-----	-----	-----	
2833	-----	-----	-----	-----	below det. limit	C
2835	not detected	not detected	not detected	2.93	not detected	
2864	-----	-----	-----	-----	not determined	
2867	-----	-----	-----	-----	<10	
2885	-----	-----	-----	-----	Not detected	
2943	-----	-----	-----	-----	not detected	
2977	not detected	not detected	not detected	not detected	not detected	
2995	-----	-----	-----	-----	not detected	
2998	not detected	not detected	not detected	not detected	not detected	
3015	<10	<10	<10	<10	<10	
3026	-----	-----	-----	-----	-----	
3100	＜10	＜10	＜10	＜10	＜10	
3110	-----	-----	-----	-----	-----	
3111	4.8	12.2	not detected	5.08	not detected	
3116	-----	-----	-----	-----	-----	
3118	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
3122	not detected	not detected	not detected	5.160	not detected	
3127	-----	-----	-----	-----	-----	
3146	< 10	< 10	< 10	< 10	< 1.0	
3153	Not detected	Not detected	Not detected	Not detected	Not detected	
3160	not detected	not detected	<5	5.24	0.69	
3163	-----	-----	-----	-----	-----	
3166	1.19	0.0745	1.545	5.215	0.56	
3172	< 10	< 10	-----	-----	< 10	
3176	ND	ND	ND	-----	ND	
3182	not analyzed	not analyzed	not analyzed	not analyzed	<13	
3185	<10	<10	<10	<10	<10	
3190	<10	<10	<10	<10	<10	
3197	<10	<10	<10	<10	<10	
3210	<25	<10	<10	<10	0.553109	
3214	<5	<5	<5	<5	<0.1	
3218	<10	<10	<10	<10	<10	
3225	-----	-----	-----	-----	-----	
3228	-----	-----	-----	-----	<10	
3239	-----	-----	-----	-----	not detected	
3246	not detected	not detected	not detected	not detected	not detected	
3248	-----	-----	-----	-----	-----	
6379	0.543	0.0445	0.815	4.679	-----	
8005	-----	-----	-----	-----	-----	
8008	-----	-----	-----	-----	-----	

Lab 1126 test result withdrawn, reported 26
Lab 2339 first reported 578
Lab 2833 first reported 178.3

Other reported Metals in sample #23700; results in mg/kg - continued -

lab	Ni		Sn	
210	-----		-----	
339	8.1175		not detected	
452	-----		-----	
523	8.25		not detected	
551	-----		ND	
623	Not Detected		Not Detected	
826	N.D.		-----	
840	<20		<10	
841	<10		<10	
1051	-----		-----	
1126	-----		-----	
2115	8.05		0.13	
2129	not detectable		not detectable	
2132	-----		-----	
2137	-----		-----	
2165	-----		-----	
2176	not analyzed		not analyzed	
2182	-----		-----	
2184	-----		-----	
2197	-----		-----	
2201	<10		<10	
2202	7.3		N.D	
2218	-----		-----	
2232	Not analyzed		Not analyzed	
2247	Not detected		Not detected	
2250	7.137		<1	
2256	-----		-----	
2258	not applicable		not applicable	
2264	-----		-----	
2265	-----		-----	
2289	<10		<10	
2294	-----		-----	
2310	<10		not detected	
2311	<5		Not Detected	
2313	Not Detected		Not Detected	
2316	Not Applicable		Not Applicable	
2320	8.23		<5	
2326	-----		-----	
2330	not analyzed		not analyzed	
2339	4.5		<1	
2347	-----		-----	
2350	<10		<10	
2352	8.29		-----	
2353	not applicable		not applicable	
2355	<10		<10	
2357	<10		<10	
2358	6.39		not detected	
2362	not applicable		not applicable	
2363	9		<5	
2365	<10		<10	
2366	out of capability		out of capability	
2369	8.72		<5	
2370	-----		<10	
2373	not detected		not applicable	
2375	<10		<10	
2378	<10		Out of Capability	
2379	Not analyzed		Not analyzed	
2380	-----		-----	
2381	-----		-----	
2384	not detected		not detected	
2385	6.2		<5	
2387	-----		-----	
2392	not detected		20.57	C
2406	Not analyzed		Not analyzed	
2415	-----		-----	
2424	3.8		2.4	
2431	-----		-----	
2445	6.493		0.1540	
2449	10.789		-----	
2453	-----		-----	
2460	-----		-----	
2475	-----		-----	
2476	-----		-----	
2477	-----		-----	
2482	12.15	C	< 10	

lab	Ni		Sn
2488	-----		-----
2492	-----		-----
2504	<10		<10
2511	-----		-----
2529	-----		-----
2561	6.19		-----
2568	-----		-----
2590	< LOQ		< LOQ
2621	-----		-----
2624	7.2		not analyzed
2630	-----		-----
2637	8.1		not detected
2643	-----		-----
2649	Not Detected		Not Detected
2665	6.97		not determined
2674	-----		-----
2678	-----		-----
2689	-----		-----
2701	-----		-----
2720	<10		<10
2734	-----		-----
2736	6.593		6.246
2794	not detected		not detected
2798	-----		-----
2817	-----		-----
2829	-----		-----
2833	-----		-----
2835	3.97		2.58
2864	-----		-----
2867	-----		-----
2885	-----		-----
2943	-----		-----
2977	not detected		not detected
2995	-----		-----
2998	10	C	not detected
3015	<10		<10
3026	-----		-----
3100	＜10		＜10
3110	-----		-----
3111	7.23		-----
3116	-----		-----
3118	Not Detected		Not Detected
3122	7.440		not detected
3127	-----		0.189
3146	< 10		< 10
3153	Not detected		Not detected
3160	7.44		not detected
3163	-----		-----
3166	9.005		0.106
3172	< 10		< 5
3176	ND		-----
3182	not analyzed		not analyzed
3185	<10		<10
3190	<10		<10
3197	<10		<10
3210	<10		<10
3214	<5		<5
3218	<10		<10
3225	-----		-----
3228	-----		-----
3239	-----		-----
3246	not detected		not detected
3248	-----		-----
6379	6.960		0
8005	-----		-----
8008	-----		-----

Lab 2392 first reported 32.01
Lab 2482 first reported 206.8
Lab 2998 first reported 0.001 mg/kg

Other reported Metals in sample #23701; results in mg/kg

lab	Sb	Cr	Cr6+	Co	Cu	
210	-----	-----	-----	-----	-----	
339	not detected	not detected	-----	2.9635	not detected	
452	<10	<10	-----	-----	-----	
523	1.04	not detected	not analyzed	not detected	not detected	
551	ND	ND	-----	ND	ND	
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
826	N.D.	N.D.	not detected	N.D.	N.D.	
840	<10	<10	<8	<10	<10	
841	<10	<10	<8	<10	<10	
1051	-----	-----	-----	-----	-----	
1126	-----	6.56	-----	-----	-----	W
2115	0.71	1.17	-----	-----	-----	
2129	not detectable	not detectable	not analyzed	not detectable	not detectable	
2132	<10	<10	-----	-----	-----	
2137	-----	-----	-----	-----	-----	
2165	-----	Not Detected	Not Detected	-----	-----	
2176	not analyzed	not detected	not detected	not analyzed	not analyzed	
2182	-----	-----	-----	-----	-----	
2184	-----	<10	<10	-----	-----	
2197	-----	2.8	-----	-----	below detection limit	
2201	<10	<10	<10	<10	<10	
2202	N.D	N.D	N.D	N.D	N.D	
2218	-----	-----	-----	-----	-----	
2232	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
2247	Not detected	Not detected	Not detected	Not detected	Not detected	
2250	<1	<1	-----	<1	<10	
2256	-----	<5	-----	-----	-----	
2258	not detected	not detected	not applicable	not applicable	not applicable	
2264	-----	-----	-----	-----	-----	
2265	-----	not detected	-----	-----	-----	
2289	<10	<10	<10	<10	<10	
2294	-----	-----	-----	-----	-----	
2310	not detected	not detected	not detected	not detected	<10	
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
2313	Not Detected	Not Detected	NOT TESTED	Not Detected	Not Detected	
2316	Not Applicable	Not detected	Not detected	Not Applicable	Not Applicable	
2320	<5	<5	not applicable	<5	<5	
2326	-----	-----	-----	-----	-----	
2330	not analyzed	not detected	not analyzed	not analyzed	not analyzed	
2339	-----	<2	-----	<2	<2	
2347	-----	<8	<8	-----	-----	
2350	<10	<10	<8	<10	<10	
2352	-----	-----	-----	-----	-----	
2353	not applicable	not detected	not detected	not applicable	not applicable	
2355	<10	<8	<8	<5	<5	
2357	<10	<8	<8	<10	<10	
2358	not detected	not detected	not applicable	not detected	not detected	
2362	not applicable	not applicable	not applicable	not applicable	not applicable	
2363	<10	<5	<8	<5	<10	
2365	<10	<10	<10	<10	<10	
2366	-----	-----	<8	-----	-----	
2369	<10	<2	<8	<5	<5	
2370	<2	<2	<8	-----	-----	
2373	not detected	not detected	not applicable	not detected	not detected	
2375	<10	<10	<10	<10	<10	
2378	<5	<5	Out of Capability	<5	<5	
2379	ǒNot detected	ǒNot detected	ǒNot detected	Not analyzed	Not analyzed	
2380	-----	-----	-----	-----	-----	
2381	-----	-----	-----	-----	-----	
2384	not detected	not detected	not detected	not detected	not detected	
2385	<5	<5	< 1	<1	<5	
2387	-----	Not Detected	Not Detected	-----	-----	
2392	not detected	not detected	not detected	not detected	not detected	
2406	< 20	< 20	Not analyzed	Not analyzed	Not analyzed	
2415	-----	-----	-----	-----	-----	
2424	22.8	2.6	-----	0	7.6	
2431	-----	-----	-----	-----	-----	
2445	1.0320	0.7163	Not analyzed	0.02805	Below LOR	
2449	-----	-----	-----	-----	-----	
2453	-----	-----	-----	-----	-----	
2460	-----	-----	-----	-----	-----	
2475	-----	-----	-----	-----	-----	
2476	-----	-----	-----	-----	-----	
2477	-----	-----	-----	-----	-----	
2482	< 10	< 10	< 10	< 10	< 10	

lab	Sb	Cr	Cr6+	Co	Cu
2488	-----	-----	-----	-----	-----
2492	-----	Not detected	Not detected	-----	-----
2504	<10	<2	<5	<10	<10
2511	-----	-----	-----	-----	-----
2529	-----	-----	-----	-----	-----
2561	-----	0.75	-----	-----	1.58
2568	-----	-----	-----	-----	-----
2590	< LOQ	-----	-----	< LOQ	-----
2621	-----	Not Detected [<10]	Not Detected [<2]	-----	-----
2624	not analyzed	1.9	not analyzed	not detected	5.6
2630	-----	-----	not detected	-----	-----
2637	1.8	0.6	not analyzed	not detected	not detected
2643	-----	-----	-----	-----	-----
2649	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2665	1.10	0.550	-----	not detected	0.286
2674	-----	< 10	< 10	< 10	-----
2678	-----	-----	-----	-----	-----
2689	-----	-----	-----	-----	-----
2701	-----	-----	-----	-----	-----
2720	<10	<10	-----	<10	<10
2734	-----	-----	-----	-----	-----
2736	-----	<3.837	-----	-----	13.047
2794	not detected	not detected	not analyzed	not detected	not detected
2798	-----	-----	-----	-----	-----
2817	-----	-----	-----	-----	-----
2829	-----	-----	-----	-----	-----
2833	-----	-----	-----	-----	-----
2835	not detected	not detected	not detected	not detected	not detected
2864	-----	-----	not determined	-----	-----
2867	-----	<10	<10	-----	-----
2885	-----	-----	-----	-----	-----
2943	-----	not detected	-----	-----	-----
2977	not detected	not detected	not determined	not detected	not detected
2995	-----	not detected	not detected	-----	-----
2998	not detected	10 C	-----	not detected	not detected
3015	<10	<10	<10	<10	<10
3026	-----	-----	-----	-----	-----
3100	＜10	＜10	＜10	＜10	＜10
3110	-----	-----	-----	-----	-----
3111	1.2	0.94	-----	0.05	1.03
3116	-----	-----	-----	-----	-----
3118	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
3122	10.980	not detected	not detected	not detected	not detected
3127	-----	0.899	-----	-----	-----
3146	< 10	< 10	-----	< 10	< 10
3153	Not detected	Not detected	Not detected	Not detected	Not detected
3160	<2	not detected	-----	not detected	<10
3163	-----	-----	-----	-----	-----
3166	0.62	2.19	not determined	0.0205	0.5355
3172	< 10	< 10	< 10	< 10	-----
3176	ND	ND	-----	ND	ND
3182	not analyzed	not analyzed	<10	not analyzed	not analyzed
3185	<10	<10	<10	<10	<10
3190	<10	<10	<10	<10	<10
3197	<10	<10	<10	<10	<10
3210	<25	<10	-----	<10	<10
3214	<5	<5	<8	<5	<5
3218	<10	<10	-----	<10	<10
3225	-----	-----	-----	-----	-----
3228	-----	<10	-----	-----	-----
3239	-----	not detected	not detected	-----	-----
3246	not detected	not detected	not detected	not detected	not detected
3248	-----	-----	-----	-----	-----
6379	0.4255	0.7325	-----	0.010	0.911
8005	-----	-----	-----	-----	-----
8008	-----	-----	-----	-----	-----

Lab 1126 test result withdrawn, reported 60
Lab 2998 first reported 0.001 mg/kg

Other reported Metals in sample #23701; results in mg/kg - continued -

lab	Mn	Hg	Ni	Sn	Zn
210	-----	-----	-----	-----	-----
339	not detected	not detected	not detected	not detected	5.116
452	-----	<10	-----	-----	-----
523	not detected	not detected	1.55	not detected	not detected
551	ND	ND	-----	ND	ND
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
826	N.D.	N.D.	N.D.	-----	N.D.
840	<10	<5	<20	<10	<10
841	<10	<10	<10	<10	<10
1051	-----	-----	-----	-----	-----
1126	-----	-----	-----	-----	-----
2115	-----	-----	-----	-----	5.28
2129	not detectable	not detectable	not detectable	not detectable	not detectable
2132	-----	<10	-----	-----	-----
2137	-----	-----	-----	-----	-----
2165	-----	Not Detected	-----	-----	-----
2176	not analyzed	not detected	not analyzed	not analyzed	not analyzed
2182	-----	-----	-----	-----	-----
2184	-----	<10	-----	-----	-----
2197	-----	-----	-----	-----	-----
2201	<10	<10	<10	<10	<10
2202	N.D	N.D	N.D	N.D	N.D
2218	-----	-----	-----	-----	-----
2232	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
2247	Not detected	Not detected	Not detected	Not detected	Not detected
2250	<1	<0,1	1.013	<1	<10
2256	-----	<5	-----	-----	-----
2258	not applicable	not detected	not applicable	not applicable	not applicable
2264	-----	-----	-----	-----	-----
2265	-----	not detected	-----	-----	-----
2289	<10	<10	<10	<10	<10
2294	-----	-----	-----	-----	-----
2310	not detected	not detected	not detected	not detected	<10
2311	Not Detected	Not Detected	Not Detected	Not Detected	<5
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2316	Not Applicable	Not detected	Not Applicable	Not Applicable	Not Applicable
2320	<5	<1	<5	<5	<5
2326	-----	-----	-----	-----	-----
2330	not analyzed	not detected	not analyzed	not analyzed	not analyzed
2339	<2	<2	<2	-----	-----
2347	-----	<2	-----	-----	-----
2350	<10	<2	<10	<10	<10
2352	-----	-----	-----	-----	-----
2353	not applicable	not detected	not applicable	not applicable	not applicable
2355	<5	<2	<10	<10	<20
2357	<10	<2	<10	<10	not analyzed
2358	not applicable	not detected	not detected	not detected	not detected
2362	not applicable	not applicable	not applicable	not applicable	not applicable
2363	<5	<5	<5	<5	<10
2365	<10	<2	<10	<10	<10
2366	-----	-----	-----	-----	-----
2369	<5	<2	<5	<5	<5
2370	-----	<2	-----	<2	-----
2373	not applicable	not detected	not detected	not applicable	not applicable
2375	<10	<10	<10	<10	<10
2378	Out of Capability	<10	<10	Out of Capability	Out of Capability
2379	Not analyzed	Not detected	Not analyzed	Not analyzed	Not analyzed
2380	-----	-----	-----	-----	-----
2381	-----	-----	-----	-----	-----
2384	not detected	not detected	not detected	not detected	13
2385	<1	<0,1	<5	<5	<5
2387	-----	Not Detected	-----	-----	-----
2392	not detected	not detected	not detected	not detected	not detected
2406	Not analyzed	< 20	Not analyzed	Not analyzed	Not analyzed
2415	-----	-----	-----	-----	-----
2424	0.9	30.2	0	1.7	26.2
2431	-----	-----	-----	-----	-----
2445	0.2553	Below LOR	0.2585	0.1190	Below LOR
2449	-----	-----	-----	-----	-----
2453	-----	-----	-----	-----	-----
2460	-----	-----	-----	-----	-----
2475	-----	-----	-----	-----	-----
2476	-----	-----	-----	-----	-----
2477	-----	-----	-----	-----	-----
2482	< 10	< 1	< 10	< 10	< 10

lab	Mn	Hg	Ni	Sn	Zn
2488	-----	-----	-----	-----	-----
2492	-----	Not detected	-----	-----	-----
2504	<10	<2	<10	<10	<10
2511	-----	-----	-----	-----	-----
2529	-----	-----	-----	-----	-----
2561	0.1125	0.1325	0.2725	-----	5.97
2568	-----	<5	-----	-----	-----
2590	< LOQ	< LOQ	< LOQ	< LOQ	-----
2621	-----	Not Detected [<2]	-----	-----	-----
2624	3.1	not analyzed	1.0	not analyzed	10.3
2630	-----	not detected	-----	-----	-----
2637	not detected	not detected	not detected	not detected	1.4
2643	-----	-----	-----	-----	-----
2649	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2665	0.325	not detected	not determined	not determined	0.878
2674	-----	< 10	-----	-----	-----
2678	-----	-----	-----	-----	-----
2689	-----	-----	-----	-----	-----
2701	-----	-----	-----	-----	-----
2720	<10	<10	<10	<10	<10
2734	-----	-----	-----	-----	-----
2736	<3.837	<3.837	<3.837	<3.837	35.303
2794	not detected	not detected	not detected	not detected	not detected
2798	-----	-----	-----	-----	-----
2817	-----	-----	-----	-----	-----
2829	-----	-----	-----	-----	-----
2833	-----	-----	-----	-----	-----
2835	not detected	not detected	not detected	3.41 C	not detected
2864	-----	not determined	-----	-----	-----
2867	-----	<10	-----	-----	-----
2885	-----	Not detected	-----	-----	-----
2943	-----	not detected	-----	-----	-----
2977	not detected	not detected	not detected	not detected	not detected
2995	-----	not detected	-----	-----	-----
2998	not detected	not detected	10 C	not detected	not detected
3015	<10	<10	<10	<10	<10
3026	-----	-----	-----	-----	-----
3100	＜10	＜10	＜10	＜10	＜20
3110	-----	-----	-----	-----	-----
3111	0.78	not detected	0.34	-----	2.45
3116	-----	-----	-----	-----	-----
3118	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
3122	not detected	not detected	not detected	not detected	6.510
3127	-----	-----	-----	0.119	3.833
3146	< 10	< 1.0	< 10	< 10	< 10
3153	Not detected	Not detected	Not detected	Not detected	Not detected
3160	not detected	not detected	not detected	1.13	-----
3163	-----	-----	-----	-----	-----
3166	0.3495	Not detected	0.533	0.0565	1.225
3172	-----	< 10	< 10	< 5	-----
3176	-----	ND	ND	-----	-----
3182	not analyzed	<13	not analyzed	not analyzed	not analyzed
3185	<10	<10	<10	<10	<10
3190	<10	<10	<10	<10	<10
3197	<10	<10	<10	<10	<10
3210	<10	<0.02	<10	<10	<10
3214	<5	<0.1	<5	<5	<5
3218	<10	<10	<10	<10	<10
3225	-----	-----	-----	-----	-----
3228	-----	<10	-----	-----	-----
3239	-----	not detected	-----	-----	-----
3246	not detected	not detected	not detected	not detected	not detected
3248	-----	-----	-----	-----	-----
6379	0.6415	-----	0.271	0.0475	1.3235
8005	-----	-----	-----	-----	-----
8008	-----	-----	-----	-----	-----

Lab 2835 first reported 42.77
Lab 2998 first reported 0.001 mg/kg

APPENDIX 3 Analytical Details

lab	ISO/SEC 17025 accr	sample preparation	sample intake (g)	metals release method
210	---	---		---
339	---	---		---
452	Yes	Further cut	0.2g	Microwave
523	Yes	Further cut	0.2 g	Microwave
551	Yes	Further cut	0,1g	Microwave
623	Yes	Further cut	0.2	Microwave
826	---	---		---
840	Yes	Further cut	0.25g	Microwave
841	Yes	Further cut	0.1 gams	Microwave
1051	Yes	Further cut		---
1126	Yes: Cd with XRF	Further cut	ICP-OES: 0,1gr XRF: layer thickness > 8mm	Microwave
2115	Yes	Further cut	0.11 g	Microwave
2129	Yes	Further cut	approx. 0.1g	Microwave
2132	Yes	Further cut		Acid Digestion and Microwave
2137	Yes	Further cut	0.1	Microwave
2165	Yes	Further cut	IEC 62321-5 0.1g, nearest 0.1mg EN1122 , 0.15/0.25g, nearest 0.1mg IEC 62321-7-2 0.1g, nearest 0.1mg	Microwave
2176	Yes	Further cut	0.1 gram per data	Microwave
2182	Yes	Used as received	0.1g for Lead, 0.5g for Cadmium	Microwave
2184	Yes	Further cut	Cd: 0.5g, Others: 0.15g	Acid Digestion and Microwave
2197	Yes	#23700: Used as received, #23701: Further cut	0.2 g	Microwave
2201	Yes	Further cut	0.2g for total, 0.15g for Cr6+.	Microwave
2202	Yes	Used as received	0.2 ~ 0.3 g	Microwave
2218	Yes	Further cut	0.15g-0.2g per trial	Microwave
2232	Yes	Used as received	0.2	Microwave
2247	Yes	Further cut	0.5gm	Microwave
2250	Yes	Further cut	0,1	Microwave
2256	Yes	Further cut	23700:0.2323g 23701:0.1975g	Microwave
2258	Yes	Used as received	23700 0.2047 Gm 23701 0.2071 Gm	Microwave
2264	---	---		---
2265	Yes	Further cut	0,1	Microwave
2289	Yes	Further cut	0.1g	Microwave
2294	Yes	Further cut	0.1 g for both samples	Microwave
2310	Yes	Further cut	0.25	Microwave
2311	Yes	Further cut	0.1	Microwave
2313	No	Further cut	0.25g	Microwave
2316	Yes	Further grinded	0.1 gram	Microwave
2320	Yes	Used as received	0.25	Microwave
2326	---	---		---
2330	Yes	Further cut	EN 1122: 0.5g, EN 16711 & CPSC-CH-E1002: 0.25g	Acid Digestion - Microwave
2339	No	Further cut	0.2 g	Microwave
2347	Yes	Further cut	EN 1122:0.5g, IEC 62321:0.2g	Microwave
2350	Yes	Further grinded	approximately 0.2g	Microwave
2352	Yes	Further grinded	0.25g	Microwave
2353	Yes	Used as received	0.25	Microwave
2355	Yes	Further cut	Cr6+:0.15g, other:0.1g	Microwave
2357	---	---		---
2358	Yes	Used as received	0.5	Microwave
2362	Yes	Used as received	0.15	Microwave
2363	Yes	Further grinded	23700:0.2g 23701:0.1g	Microwave
2365	Yes	Further cut	0.1g	Microwave
2366	Yes	Further cut		---
2369	Yes	---		---
2370	Yes	Further cut	0.1g	---
2373	Yes	Further cut	0.5g for EN1122 150mg for CPSC-CH-E1002-08.3 and EN16711-1	Acid Digestion + Microware was used for CPSC-CH-E1002-08.3 and EN16711-1
2375	Yes	Further cut	0,10g	Microwave
2378	Yes	Further cut	0.5g	Microwave
2379	Yes	Further cut , Cr6+: Further grinded	0.25 g, Cr6+: 01.1-0.15 g	Microwave, Cr6+: microwave and ultrasonic water bath
2380	Yes	Further cut	0.100 g	Microwave
2381	Yes	Further cut	0.25	Microwave
2384	Yes	Further grinded	0.2 gram	Microwave

lab	ISO/SEC 17025 accr	sample preparation	sample intake (g)	metals release method
2385	Yes	Used as received	HM: 0,1 - 0,15, Cr-VI: 0,2	Microwave
2387	No	Further grinded	0.20 grams	Acid Digestion
2392	Yes	Further grinded	1.5 grams	Microwave
2406	Yes	Further cut	0.1g	Microwave
2415	No	Further cut	0.1 gram	Microwave
2424	Yes	Further cut	0.1 g	Acid Digestion
2431	Yes	Further cut	0.1g	Microwave
2445	No	Further cut		---
2449	Yes	Further cut	0.2 grams	Microwave
2453	No	Further cut	±0.1	Acid Digestion
2460	Yes	Further cut	0.2 g for Pb, 0.5 g for Cd	Cd: Adic Digestion, Cd, Pb: Microwave
2475	Yes	Used as received	0.1	Microwave
2476	---	---	0.1	---
2477	Yes	Further cut	0.15	Microwave
2482	Yes	Used as received	0,1	Microwave
2488	Yes	Further grinded	0.05	Microwave
2492	Yes	Further cut	Cr(VI): 0.15g, Others: 0.2g	Acid Digestion
2504	Yes	Further cut	0.1 gram	Microwave
2511	---	---		---
2529	No	#23700: Used as received, #23701: Cryomilled	0.1500 g per trial, 3 trials per sample	Microwave
2561	Yes	Used as received	0.1	Microwave
2568	Yes	Further grinded		---
2590	No	Further cut	0.2 g	Microwave
2621	Yes	Further cut	0.15~0.2(g)	Microwave
2624	No	Further cut	0.5	Microwave
2630	Yes	Further cut	0.05	Microwave
2637	No	Used as received	250 mg	Microwave
2643	Yes	Further cut	0.2 g	Microwave
2649	Yes	Further cut	0.1	Microwave
2665	Yes	#23700: used as received, #23701: further cut	0.2 g	Microwave-assisted acid digestion
2674	Yes	Further cut	about 0.1g	Microwave
2678	---	---		---
2689	Yes	Further cut	#23700: 0.1312g, #23701: 0.1118g	Microwave
2701	Yes	Further cut	0.1g	Microwave
2720	Yes	Further cut	CPSC-CH-E1002-08 method used 0.1g. EN1122 method used 0.5g	Microwave
2734	---	---		---
2736	---	#23700: Used as received, #23701: Further cut	23700: 0.1441g 23701: 0.1303g	Microwave
2794	Yes	Used as received		---
2798	No	Further cut	0.1g	Acid Digestion
2817	---	---		---
2829	Yes	Further cut	0.150	Microwave
2833	Yes	Used as received		---
2835	Yes	Further cut	0.2g	Microwave
2864	Yes	Further cut	0.2g	Microwave
2867	Yes	Further cut	0.2g	Microwave
2885	No	Further cut	0.20g	Microwave
2943	Yes	Used as received	-	---
2977	Yes	Used as received	0,1g	Microwave
2995	No	Further cut	#23700: for Cd, Cr, Pb, Hg : 200 mg for Cr6 : 100 mg #23701: for Cd, Cr, Pb, Hg : 200 mg for Cr6 : 100 mg	Microwave, Cr6: ultrasound
2998	Yes	Used as received	1 g	Acid Digestion
3015	Yes	Further cut	0.1g	Microwave
3026	Yes	Further grinded	5 grams	Microwave
3100	Yes	Further cut	EN1122:0.5g IEC62321-5 & IEC62321-4:0.2g IEC62321-7-2:0.15g	EN1122:wet decomposition, IEC62321-5&IEC62321-4: microwave IEC62321-7-2:microwave
3110	---	---		---
3111	Yes: Cd, Hg, Pb	Used as received	0.2 grams	Microwave
3116	Yes	Used as received	0.5 (EN 1122), 0.1 (CPSC-CH-E1002.08.3)	Acid Digestion
3118	Yes	Further cut	0.15 gram, Cr (VI) = 2 gram	Microwave
3122	Yes	Further grinded	0.2 grams	Microwave
3127	No	Further cut	0,25 g	Acid Digestion
3146	Yes	Further cut	0.25 g	Acid Digestion
3153	Yes	Further grinded	100 mg	Microwave

lab	ISO/SEC 17025 accr	sample preparation	sample intake (g)	metals release method
3160	Yes: Pb, Cd, Cr	Used as received, #23701: further cut	0.15 g	Microwave
3163	---	---		---
3166	Yes	Further grinded	0.1	Microwave
3172	Yes	---		---
3176	Yes	Further cut	0.1	Microwave
3182	Yes	Further grinded	0.2 g	Microwave
3185	Yes	Further cut	0.1g	Microwave
3190	Yes	Further cut	0.2000	Microwave
3197	Yes	Further cut	0.1 g	Microwave
3210	Yes	Further cut	0.1	Microwave
3214	Yes	Further grinded	0.2	Microwave
3218	Yes	Further cut	0.2g	Microwave
3225	Yes	Further cut	0.5 for EN1122, 0.1 for CPSC pb	Microwave
3228	Yes	Further cut	0.1-0.2g	Microwave
3239	Yes	Further cut	Cd,Pb,Hg,Cr; 0.2 g, Cr6+: 0.1 g	Microwave
3246	Yes	Used as received	0.1-0.2g	Microwave
3248	Yes	Used as received	0.15 g (CPSC), 0.5 g (EN 1122)	Dry Ashing, #23700 --> CPSC: Microwave, EN1122: Acid Digestion
6379	No	Further cut	0,1g (orange), 0,4g(beige)	Microwave
8005	Yes	Used as received	0.1 (Canada Method C-02.3), 0.1 (ASTM F963 total screening)	Acid Digestion
8008	---	---		---

Analytical Details - continued

lab	acid digestion: acid mixture used	Temperature Program used	technique used to quantify
210			---
339			---
452	HNO3/HCl	Stage1: Ramp time: 10min Tempe 125°C hold time: 5min Stage2: Ramp time: 10min Tempe 170°C hold time: 5min Stage3: Ramp time: 10min Tempe 180°C hold time: 30min	ICP-OES
523	HNO3/HCl	24 °C to 140 °C - 20 minutes 140 °C - 20 minutes 140 °C to 210 °C - 15 minutes 210 °C -30 minutes	ICP-MS
551	8mL HNO3 + 2mL H202	140 - 210°C	ICP-MS
623	HNO3	210 C	ICP-OES
826			---
840	HNO3+HCl	10-15mins:150 15-20mins:210	ICP-OES
841	HNO3, HCl	Steps 1: ramp 150C, Steps 2: ramp 190C, Steps 3: ramp 210C	ICP-OES
1051			---
1126	10 ml HNO3.	Plastic program 1 step: in 5min to 220°C, hold for 12min	ICP-OES (Cd #23700: XRF)
2115			ICP-MS
2129			ICP-MS
2132	HNO3 + H2O2		ICP-OES
2137	Nitric Acid	Ramping 200℃ 25 min Holding 200℃ 15 min	ICP-OES
2165	IEC 62321-4&5 conc. HNO3 EN122:conc.H2SO4, conc .HNO3	IEC 62321-4&5 0-30min: Room temperature to 230℃ 30min-40min:230℃ 40min-60min:230℃ to 80℃ EN1122.120min:240℃	ICP-OES
2176		Digestion by Microwave Step 1: Temperature 180 degree C Hold 5 Mins Step 2: Temperature 230 degree C Hold 15 Mins	ICP-OES
2182	Nitric acid for Total Lead Sulfuric acid for Total Cadmium	ICP-OES	
2184	Cd: H2SO4	Pb, Cr, Hg: temperature increased to 200oC in 20mins, then hold at 200oc for 10mins Cr(VI): temperature increased to 120oC in 5mins, then increase temperature to 150oC in 5mins, then hold at 150oC for 1.5hrs	Cd: AAS, Pb, Cd, Hg: ICP-OES Cr(VI): UV-VIS
2197	10ml Nitric Acid, 65% plus 1ml Hydrogen Peroxide, 30%	Time Watt Temp.[°C] 1. 00:04:00 1000 110 2. 00:12:00 1200 215 3. 00:18:00 1400 215	XRF
2201	HNO3:HCL=3:1	room temperature to 230 degrees Celsius at 16 min; 230 degrees Celsius for 10 min; Cool to room temperature.	ICP-OES
2202	Nitric acid + Hydrogen peroxide	Microwave program / 1.5 hours / 240 ℃	ICP-OES
2218		stage 1 - ramp time 20 minutes, 200 degree Celsius, hold time 0 minute stage 2 - ramp time 0 minutes, 200 degree Celsius, hold time 10 minutes	ICP-OES
2232		Stage Ramp Time (min) Temperature (oC) Hold time (min) 1 10 150 0 2 5 190 0 3 5 210 30	ICP-OES
2247	HNO3 & H2O2	220 Degree celcious, hold 10min.	ICP-MS
2250	EN 1122: Sulphuric Acid and nitric acid, EN 16711-1: Nitric acid only and Mixture of nitric acid and hydrochloric acod	[Minuten][Watt] [°C] 1 10 1000 110 2 10 1000 180 3 30 1000 180	ICP-MS
2256	Concentrated nitric acid (HNO3)	ICP-OES	
2258	10 ml HNO3 65%	150 190 210 C 15 Min	ICP-OES
2264			---
2265			ICP-OES
2289		It took 25 minutes to go from room temperature to 200 degree, and it holded for 30 minutes.	ICP-OES
2294	nitric acid	200 °C	ICP-OES
2310		45minutes, 210 degrees	ICP-MS
2311	Nitric acid		ICP-OES
2313		Temperature (oC) Hold time (min) 100 2 210 20	ICP-OES
2316	Not Applicable	Time : 150 minutes Temperature : 180 to 220 °C.	ICP-OES (Cr6+: UV-VIS)
2320	Nitric acid	Duration(min) Temperature(°C) 1. 3 140 2. 2 140 3. 5 190 4. 5 190 5. 5 210 6. 20 210	ICP-OES
2326			---
2330	EN 1122: H2SO4 and H2O2 EN 16711 & CPSC-CH-E1002: HNO3	at 165 C for 15 minutes at 210 C for 35 minutes	ICP-OES
2339	HF/HNO3		ICP-AES
2347	6.5HNO3+1mLH2O2+1mLHBF4	/	ICP-OES
2350	Nitric acid/ hydrochloric acid/hydrofluoric acid	1 step: 5min 80 ℃ 2 step: 5min 50 ℃ 3 step: 15min 240 ℃ 4 step: 15min 240 ℃	ICP-OES
2352	HNO3+HCl+HF	Heat up to 110 ℃ for 5 minutes, regenerate to 210 ℃ for 15 minutes, and maintain for 15 minutes	ICP-OES

lab	acid digestion: acid mixture used	Temperature Program used	technique used to quantify
2353			ICP-OES
2355	22% HNO3	Cr6+:60 ℃, 3 h other:200 ℃, 30 min	ICP-OES
2357			---
2358			ICP-MS
2362			ICP-OES
2363	HNO3+HCl	step 1:7min to 150℃ keep 3mins step 2:5min to 180℃ keep 3mins step 3:5min to 210℃ keep 25mins	ICP-OES
2365	6.5mL HNO3+1mL H2O2+1mL HBF4	Raise the temperature from room temperature to 165℃ for 10 minutes and hold for 4 minutes, and them rise to 205℃ for 7 minutes, and hold for 30 minutes.	ICP-OES
2366			---
2369			---
2370	10mL HNO3 and 4mL HF	1.Power 1800(W), increase 10(min), keep 10(min), 175℃ 2.Power 1800(W), increase 5(min), keep 25(min), 190℃	ICP-OES
2373	for EN1122:H2SO4,H2O2 were used for cpsc-c-e1002-08:HNO3 was used for EN16711-1:HNO3 H2O2 were used	The process follows EN1122, CPSC-CH-E1002-08.3, EN16711-1 standards	ICP-OES
2375	HNO3+H2O2	-	ICP-OES (CrVI: UV-VIS)
2378		Temperature rising program: 5 minutes to 150°C and held for 2 minutes; 7 minutes to 210°C and held for 20 minutes.	ICP-OES
2379	HNO3 (Cr6+: NaOH+Na2CO3)	210 C (Cr6+ #23700: 60°C/3hr, Cr6+ #23701: 155°C/1.5hr)	AAS (Cr6+: UV-VIS)
2380	NHO3:H2O2 = 10:2	20 Minute-200 degree 15 Minute-200 degree	ICP-OES
2381	Nitric acid & Hydrogen peroxide	Step 1: Time - 3 min & Temperature 140°C Step 2: Time - 2 min & Temperature 140°C Step 3: Time - 5 min & Temperature 190°C Step 4: Time - 5 min & Temperature 190°C Step 5: Time - 5 min & Temperature 210°C Step 6: Time - 20 min & Temperature 210°C	ICP-OES
2384		Step 1: 200 degree celcius 25 min Step 2: 200 degree celcius, 10 min	ICP-OES
2385	HNO3 (Cr6+: alkaline digestion)	12 min, 260 °C	ICP-MS (Hg: CV-AAS, Cr6+ #23700: ICP-HPLC. Cr6+ #23701: IC-UV (PCR with DPC))
2387	Nitric Acid	90°C 5minutes 220°C 25minutes 220°C 10minutes 240°C 5minutes 240°C 15minutes	ICP-OES
2392	HNO3 : HCL 4 ml : 4 ml	Temperature at 180 ± 5 degree Celsius, Pressure 400 PSI, Ramping 20 min, Holding 20 min.	ICP-OES and ICP-VIS
2406	10mL 69% HNO3	increase the temperature to at least 200oC within 20 minutes, and then hold for 30 minutes, 60 minutes cool down is then programmed	ICP-OES
2415			ICP-OES
2424	5mL nitric acid	Microwave ramp to 120 C for 10 min hold for 15 min	ICP-MS
2431	HNO3, HCL	heating 10min to 200c hold 20min for 200c	ICP-MS
2445			ICP-MS
2449	HNO3:H2O2 10:1	210	ICP-OES
2453	H2SO4		ICP-OES
2460	H2SO4 whit H2O2	Rise to 200 °C in 20 min, hold 10 min in microwave	AAS
2475	HNO3	increase to 175°C during 20 min. stay at 175°C during 60min.	ICP-AES
2476		210	---
2477	HNO3	20 min, T= 200 °C, 10 min	ICP-AES
2482	8 ml HNO3 / 2 ml H202	160 °C 5 min, 250 °C 15 min, 230 °C 15 min, 50 °C 20 min	ICP-MS
2488	-	-	ICP-OES
2492	HNO3 + H2O2	Increase temperature to 200oC within 20 mins. Hold for 10 mins and 30 mins cool down.	ICP-OES
2504	HNO3	Step 1 Time 20 min Temp 220C Step 2 time 20 min Temp 220C	ICP-OES
2511			---
2529	5 mL of conc. nitric acid	ramp from 25C to 240C at 20 min. Hold at 240C for 10 min	ICP-OES
2561	Nitric and Hydrochloric	20 minutes @ 180°C, 8 minutes @ 200°C	ICP-MS
2568			---
2590		11min 120°C 2min 120°C 9min 220°C 10min 220°C	ICP-AES
2621	HNO3+H2O2+H2SO4	temperature :180~205	ICP-OES
2624	HCl 6 ml + HNO3 2 ml + H2O2 2 ml + H2O 5 ml	ICP-OES	
2630	HNO3 H2SO4	Step Heating(min) Target temp(℃) Lasting(min) 1. 14 120±5 1 2. 7 150±5 10 3. 10 180±5 10 4. Cool to room temp	ICP-OES
2637	HNO3 / HF		ICP-MS
2643	Nitric acid		ICP-OES
2649	Not Applicable	Digestion: Temparature to 200oC at 20 mins, stay for 15 mins. Cooling: 10 mins	ICP-MS
2665	nitric acid (6 mL) + hydrofluoric acid (50 µL)	35 min until 220°C 10 min at 220°C	ICP-MS
2674	HNO3	follow standard	ICP-OES

lab	acid digestion: acid mixture used	Temperature Program used	technique used to quantify
2678			---
2689	9mL concentrated nitric acid and 3mL concentrated hydrofluoric acid	180℃ 15min	ICP-OES
2701	nitric acid hydrogen peroxide hydrofluoric acid	210°C holding time: 35 mins	ICP-OES
2720	CPSC-CH-E1002-08 method used HNO3+Hcl. EN1122 method used H2SO4+H2O2	CPSC:It took 25 minutes to go from room temperature to 200 degree, and it holded for 10 minutes.	ICP-OES
2734			---
2736	Nitric and hydrochloric acids were used with a microwave digestion.	ICP-OES	
2794			XRF
2798	HCl/HNO3	180℃,4h	ICP-OES
2817			---
2829			ICP-OES
2833			XRF
2835	5ml nitric acid 200ml h202	ICP-OES	
2864	HNO_3+HCL	180 ±5 ℃ HOLD 5min -> 190 ±5℃ HOLD 10min	ICP-OES
2867	HNO3,HCL,H2O2	5min,0-120℃ 10min, 120-200℃ 20min, 200℃	ICP-OES
2885			ICP-OES
2943	-	-	XRF
2977	5 ml HNO3	290°C in 15' then 290°C for 20'	ICP-OES
2995	--	for Cd, Cr, Pb, Hg : 210°C/1h for Cr6 : 65°C / 3h	Cd, Cr, Pb, Hg : ICP-OES, Cr6: UV-VIS
2998	6 ml HCl + 2 ml HNO3	180°C x 1 h	ICP-OES
3015		It took 20 minutes to go from room temperature to 240 degree, and it holded for 20 minutes.	ICP-OES
3026	HNO3, HCl	23	ICP-OES
3100	EN1122:Sulfuric acid IEC62321-5&IEC62321-4:Nitric acid IEC62321-7-2:digestion solution,Toluene,magnesium chloride,phosphate buffer	IEC62321-5&IEC62321-4:Increasing the temperature of each sample to 205℃ in 20min,hold on 12min. IEC62321-7-2:Increasing the temperature of each sample to 155℃ in 20min,hold on 1.5h.	EN1122 & IEC62321-5 & IEC62321-4: ICP-OES, IEC62321-7-2: UV-VIS
3110			---
3111	200 °C		ICP-OES
3116	Sulphuric acid with further addition of hydrogen peroxide (EN 1122) Nitric acid (CPSC-CH-E1002.08.3)	Boiling by hotplate (EN 1122) Up to 210 deg.C by microwave (CPSC-CH-E1002.08.3)	ICP-OES
3118	Nitric Acid		ICP-MS
3122	For metals, a Nitric Acid solution 69% For Cr6+, an alkaline digestion solucion 0.28 M Na2CO3/NaOH	For metals, 20 min-210°C For Cr6+, 60 min-95°C	ICP-OES, Cr6+:UV-VIS
3127	HNO3 with additional microwave process.	20 min ramp from room temperature to 180°C --> holding at 180°C for 10min --> 10 min ramp from 180°C to 210°C --> holding for 20 min at 210°C --> cooling to room temperature.	ICP-OES
3146	Sn, Sb: 4.5 ml HNO3 (65%) + 1.5 ml HCl (25%) Other Elements: 5 ml HNO3 (65%)	Step 1: 02:30 min -> 70 °C Step 2: 12:00 min -> 200 °C Step 3: 18:00 min -> 250 °C	ICP-MS, Mercury: Hg-AFS
3153	HNO3:HCl = 3:1	Stage 1: Ramp the temperature from room temperature to 140°C, and hold for 5 minutes. Stage 2: Ramp from 140°C to 200°C in 5 minutes, and hold for 20 minutes.	ICP-OES
3160		Step 1: 210ºC in 20 minutes Step 2: Hold at 210ºC for 15 minutes.	ICP-MS
3163			---
3166	0.75 mL nitric acid, 0.25 mL hydrochloric acid, 0.25 mL hydrofluoric acid	10 minutes of ramp time to 90C 5 minutes of ramp time to 130C 15 minutes of ramp time to 200C 10 minutes of ramp time to 240C 10 minutes of hold time at 240C	ICP-MS
3172			---
3176	Nitric acid + hydrogen peroxide	Time (min) Temp1(C) Temp2 (C) 10 110 60 10 180 60 10 230 60 10 230 60	ICP-MS
3182	HNO3 10 ml + H2O2 1 ml	Step 1 Room temp to 200 C use time 15 min and hold time 10 min Step 2 200 C to 180 C use time 10 min	ICP-OES
3185	Nitric acid : Hydrochloric acid=3:1	1)increase to 210℃ in 20minutes 2)hold at 210℃ for 10minutes	ICP-OES
3190	HNO3:HCL(3:1)	Take 5mins to 180℃。and then take 10mins to 250℃, hold 30mins.	ICP-OES
3197		Ramping- 210°C for 20 minutes Waiting- 210°C for 10 minutes Cooling- until reaching room temperature	ICP-OES
3210	1ml HCl + 5ml HNO3	20min à 240°C	ICP-AES

lab	acid digestion: acid mixture used	Temperature Program used	technique used to quantify
3214	HNO3+HCl+HF	Ramp to 110°C in 25 min , Hold in 110°C 5min, next step,Ramp to 180°C in 10min , Hold in 180°C 5min, final step,Ramp to 220°C in 10min , Hold in 220°C 40min.	ICP-MS
3218	Nitric acid and Hydrochloric acid	0℃-85℃, 4min; 85℃-145℃, 5min; 145℃-200℃, 5min; 200℃, 24min.	AAS
3225	HNO3	120oC for 5min ramp time 160oC for 6min ramp time, hold 3min 190Oc for 10min ramp time, hold 30min	ICP-OES
3228		Power Time (mins) Temp (oC) Step 1 1000W 3:30 120 Step 2 1000W 15:00 180 Step 3 1000W 15:00 200	ICP-OES
3239	5ml Nitric Acid and 100ul hydrogen Peroxide	Sample (Cd, Pb, Hg, Cr) was digested for 40 minutes at a temperature from 120-200 degree celcius. Sample (Cr6+) was sonicated for 3 rounds (60 degree celcius, 1 hr/round).	ICP-OES, Cd,Pb,Hg,Cr using the ICP-OES. Cr6+ using the UV-Vis.
3246	Acid nitric 65%		ICP-MS and ICP-OES
3248	sulfuric acid, nitric acid and hydrogen peroxide	Stage 1 Ramp time: 10 mins, 150oC, hold time: 3 mins; Stage 2 Ramp time: 5 mins, 185oC, hold time: 3 mins; Stage 3 Ramp time: 5 mins, 200oC, hold time: 25 mins.	AAS
6379	1.digestion HNO3+H2O 2.digestion HNO3	up to 240C	ICP-MS
8005	Nitric acid (Canada Method C-02.3) Nitric acid/hydrogen peroxide (ASTM F963 total screening)	Up to 210 deg.C by microwave	ICP-OES
8008			---

APPENDIX 4

Number of participants per country

3 labs in	BANGLADESH
1 lab in	BRAZIL
1 lab in	CAMBODIA
1 lab in	CANADA
1 lab in	DENMARK
1 lab in	EGYPT
1 lab in	FINLAND
5 labs in	FRANCE
10 labs in	GERMANY
1 lab in	GUATEMALA
18 labs in	HONG KONG
5 labs in	INDIA
2 labs in	INDONESIA
9 labs in	ITALY
1 lab in	JAPAN
8 labs in	KOREA, Republic of
2 labs in	MALAYSIA
5 labs in	MEXICO
1 lab in	MOROCCO
25 labs in	P.R. of CHINA
2 labs in	PAKISTAN
1 lab in	PERU
1 lab in	PORTUGAL
3 labs in	SINGAPORE
2 labs in	SPAIN
1 lab in	SRI LANKA
1 lab in	SWEDEN
5 labs in	TAIWAN
5 labs in	THAILAND
2 labs in	THE NETHERLANDS
3 labs in	TUNISIA
4 labs in	TURKEY
4 labs in	U.S.A.
2 labs in	UNITED KINGDOM
4 labs in	VIETNAM

APPENDIX 5

Abbreviations

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

Literature

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