Institute for
Interlaboratory Studies

Results of Proficiency Test
Total Metals in Polymers
September 2022

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

World-wide many consumer products with plastic parts are produced and transported. These plastic parts are produced under strict regulations. For instance, in the European Directive 2011/65/EC maximum concentrations are specified for metals in plastic: the content of Lead (Pb), Mercury (Hg),) and Hexavalent Chromium (CrVI) may not exceed 1000 mg/kg, while the maximum concentration for Cadmium (Cd) may not exceed 100 mg/kg.

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 2022/2023 it was decided to continue the proficiency test for the determination of Total Metals in Polymers.

In this interlaboratory study 164 laboratories in 34 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 an ISO/IEC17025 accredited laboratory.
It was decided to send two different samples of polypropylene of approximately 6 grams each labelled #22700 and #22701 respectively.
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 beige Polypropylene pieces was selected which was artificially fortified with some metals. After homogenization 190 small plastic bags were filled with approximately 6 grams each and labelled #22700.
The batch for sample #22700 was used in a previous proficiency test on Total Metals in Polymers (as sample #0651 in iis06P03). Therefore, homogeneity of the subsamples was assumed.

For the second sample a batch of white Polypropylene granulates was selected which was artificially fortified with some metals. After homogenization 190 small plastic bags were filled with approximately 6 grams each and labelled #22701.
The homogeneity of the subsamples was checked by the determination of Total Lead and Total Cobalt using an in house method on 8 stratified randomly selected subsamples.

	Total Lead in mg/kg	Total Cobalt in mg/kg
sample #22701-1	105.9	100.1
sample #22701-2	107.6	102.5
sample #22701-3	112.8	106.2
sample #22701-4	111.2	108.7
sample #22701-5	105.1	104.7
sample #22701-6	104.9	108.5
sample #22701-7	106.4	108.1
sample #22701-8	106.6	107.8

Table 1: homogeneity test results of subsamples #22701

From the above test results the relative standard deviations (RSD) were calculated and compared with 0.3 times the average relative standard deviation obtained from previous iis PTs in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Total Lead	Total Cobalt
RSD% (observed)	2.7	3.0
reference method	iis PTs	iis PTs
0.3 x RSD% (reference method)	2.7	2.7

Table 2: evaluation of the relative standard deviations of subsamples #22701

The calculated relative standard deviations are in agreement with 0.3 times the average relative standard deviation obtained from the previous iis PTs. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one polymer sample labelled #22700 and one polymer sample labelled #22701 were sent on August 24, 2022.

2.5 ANALYZES

The participants were requested to determine on both samples #22700 and #22701 the Total content per element of: Antimony as Sb, Cadmium as Cd, Chromium as Cr, Hexavalent Chromium as Cr6+, Cobalt as Co, Copper as Cu, Lead as Pb, Manganese an Mn, Mercury as Hg, Nickel as Ni, Tin as Sn and 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 some problems were encountered with the dispatch of the samples. Six participants reported test results after the final reporting date and twelve other participants did not report any test results. Not all participants were able to report all tests requested.
In total 152 participants reported 622 numerical test results. Observed were 20 outlying test results, which is 3.2%. 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 #22700

Total Chromium as Cr: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Chromium as Cr6+: This determination was problematic. Ten statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the estimated reproducibility calculated with the Horwitz equation.

The majority of 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. The test results are given in appendix 2.

sample #22701

Total Antimony as Sb: Almost all reporting participants agreed on a value <50 mg/kg. Therefore, no z-scores are calculated.

Total Cadmium as Cd: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN1122:01.

Total Cobalt as Co: This determination was not problematic. Five 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: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the estimated reproducibility calculated with the Horwitz equation.

The majority of 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. The 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 Chromium as Cr	mg/kg	126	193.7	34.4	39.3
Chromium as Cr6+	mg/kg	51	160.0	44.1	33.4

Table 3: reproducibilities of tests on sample #22700

Element	unit	n	average	2.8 * sd	R(target)
Total Antimony as Sb	mg/kg	80	<50	n.e.	n.e.
Total Cadmium as Cd	mg/kg	147	89.8	17.8	22.4
Total Cobalt as Co	mg/kg	82	102.1	16.0	22.8
Total Lead as Pb	mg/kg	149	106.4	17.4	23.6

Table 4: reproducibilities of tests on sample #22701

Without further statistical calculations it can be concluded that for most 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 and 5.

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

	September 2022	September 2021	September 2020	August 2019	September 2018
Number of reporting laboratories	152	146	162	177	166
Number of test results	622	797	519	1253	1471
Number of statistical outliers	20	35	8	42	46
Percentage of statistical outliers	3.2%	4.4%	1.5%	3.4%	3.1%

Table 5: 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 2022	September 2021	September 2020	August 2019	September 2018	2017-2004	Target
Sb	--	15%	--	--	11-14%	9-10%	7-9%
Cd	7%	5-6%	7%	7-10%	8-12%	7-12%	9%
Cr	6%	5%	--	8-11%	7%	7-24%	7-10%
Cr6+	10%	10%	--	9-22%	6%	23-76%	7-9%
Co	6%	--	--	--	--	8-11%	7-10%
Cu	--	--	8%	--	6%	7-8%	7-10%
Pb	6%	6%	8%	7%	7%	6-11%	6-9%
Mn	--	--	--	10%	--	--	7-10%
Hg	--	9%	--	--	9-20%	8-46%	7-13%
Ni	--	--	8%	8%	--	9-10%	7-10%
Sn	--	--	--	13%	--	--	7-10%

Table 6: development of the uncertainties over the years

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

4.4 EVALUATION OF THE ANALYTICAL DETAILS

The participants were asked to provide several analytical details which are listed in appendix 3. Based on the reported answers the following can be summarized:

- A vast majority (about 90%) mentioned that they are ISO/IEC17025 accredited to determine the reported elements.
- About 75% further cut the sample prior to analysis, 20% used the sample as received and 15% further grinded the sample. Note that it adds up to more than 100% because some participants used different sample pre-treatments dependent on the sample.
- About 90% used 0.5 grams or less of sample intake, most participants mentioned between 0.1 and 0.2 grams. Only 5% used a sample intake of one or more grams and one participant scanned the sample as such using a XRF technique.

Regarding Chromium VI (Cr6+) determination only:

- About 55% used Toluene only to dissolve or swell the sample, 20% used a mix of different solvents, 10% used an alkaline (digestion) solution and 10% used NMP or TCB solvent.
- The composition of the digestion solution consisted for most participants (about 80%) of a $NaOH+Na_2CO_3$ solution or other alkaline solutions were mentioned.
- The extraction time used by most participants (about 80%) was 90 minutes, 15% used a longer period of time and 5% used less.
- The extraction temperature mentioned by most participants (about 85%) was between 150-160 °C and about 15% mentioned a lower temperature.

For all positive elements, except Chromium 6+, the calculated reproducibility is in agreement with the requirements of the target reproducibility, 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 #22701 for Total Cadmium (Cd). Most reporting laboratories would have accepted this sample, except ten laboratories. Based on the elements Lead (Pb), and Hexavalent Chromium (Cr6+) all participants would have accepted the sample.

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

Table 8: Restricted metals in plastic 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

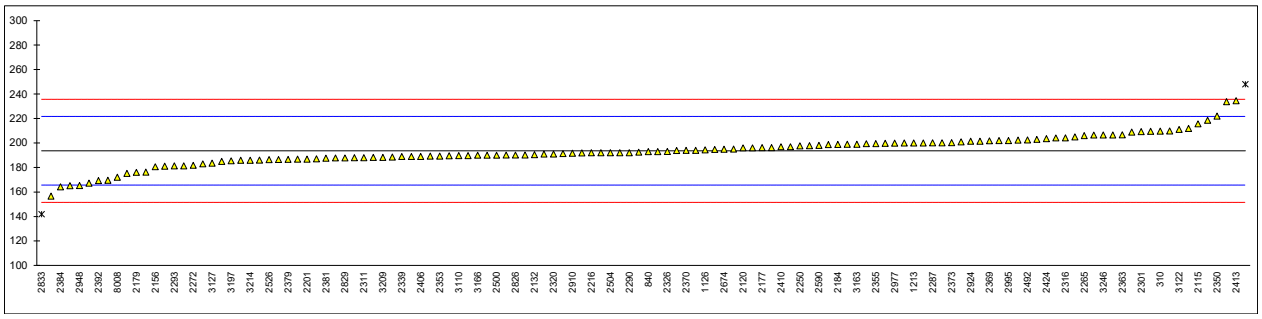
Determination of Total Chromium as Cr on sample #22700; results in mg/kg

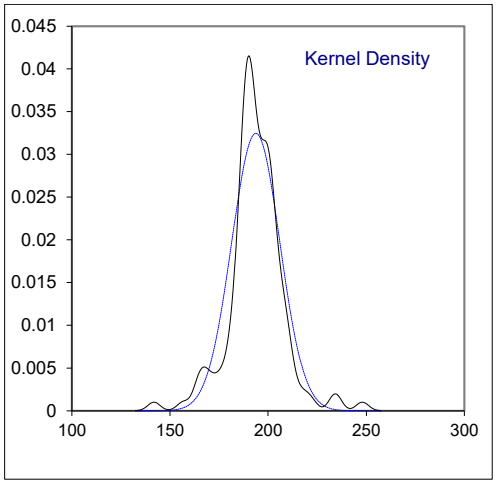
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	EN16711-1	202		0.59
310	In house	209.684		1.14	2378	EN16711-1	209.579		1.13
339		-----		-----	2379	IEC62321-5	186.650		-0.50
523		-----		-----	2380	EN16711-1	190.16		-0.25
551		-----		-----	2381	EN16711-1	187.60		-0.44
623	In house	175.28		-1.31	2382	EN16711-1	202.4		0.62
826	IEC62321-5	198.98		0.38	2384	IEC62321-5	164.13		-2.11
840	In house	193.0		-0.05	2385	IEC62321-5	200		0.45
1051		-----		-----	2387	IEC62321-5	167.25		-1.89
1126	In house	194.4		0.05	2392	IEC62321-5	169.37		-1.74
1213	IEC62321-5	200.06		0.45	2406	CPSC-CH-E1002-08	189.09		-0.33
2115	EN16711-1	215.7		1.57	2410	IEC62321-5	197		0.23
2120	EN16711-1	196		0.16	2413	CPSC-CH-E1002-08	234.638		2.92
2121		-----		-----	2424	IEC62321-5	203.6		0.70
2132	CPSC-CH-E1002-08	190.50		-0.23	2426	EN16711-1	193.9		0.01
2135	EN16711-1	203.00		0.66	2431	CPSC-CH-E1002-08	206.45		0.91
2137	IEC62321-5	183.0		-0.76	2444		-----		-----
2146		-----		-----	2453		-----		-----
2156	IEC62321-5	180.7		-0.93	2459	EN16711-1	169.64		-1.72
2165	IEC62321-5	191.9		-0.13	2460		-----		-----
2177	IEC62321-5	196.23		0.18	2475		-----		-----
2179	IEC62321-5	176.1		-1.26	2476		-----		-----
2182		not determnd.		-----	2492	EN16711-1	202.565		0.63
2184	CPSC-CH-E1002-08	198.9		0.37	2494	IEC62321-5	165.10		-2.04
2199		-----		-----	2500	EN16711-1	190.1		-0.26
2201	IEC62321-5	186.89		-0.49	2503	CPSC-CH-E1002-08	176.3		-1.24
2202	IEC62321-5	197		0.23	2504	EPA3052	192.08		-0.12
2213	EN16711-1	181.32		-0.88	2511	EN16711-1	191.0		-0.19
2216	IEC62321-5	192		-0.12	2526	IEC62321-5	186.42		-0.52
2218		-----		-----	2529	CPSC-CH-E1002-08.3	186.49		-0.52
2236	In house	205.0		0.80	2560	EN16711-1	185.90		-0.56
2250	EN16711-1	197.67		0.28	2561	CPSC-CH-E1002-08	188.555		-0.37
2256	IEC62321-5	194.08		0.03	2564		-----		-----
2258	CPSC-CH-E1002-08	233.795	C	2.86	2569	CPSC-CH-E1002-08.3	186		-0.55
2265	EN16711-1	206		0.88	2572	IEC62321-5	195.1		0.10
2272	EN16711-1	181.8		-0.85	2573	CPSC-CH-E1002-08	188.05		-0.40
2284	IEC62321-5	198.71		0.36	2590	EN16711-1	198.00		0.31
2287	EN16711-1	200.1		0.45	2591		-----		-----
2290	IEC62321-5	192.1		-0.12	2624	In house	189.01		-0.34
2293	EN16711-1	181.3		-0.89	2674	IEC62321-5	195		0.09
2295	IEC62321-3-1	191.3		-0.17	2678		-----		-----
2301	EN16711-1	209.31		1.11	2734		-----		-----
2310	CPSC-CH-E1002-08	201		0.52	2737	CPSC-CH-E1002-08	201.48		0.55
2311	EN16711-1	188.1		-0.40	2741	CPSC-CH-E1002-08	196.32		0.19
2313	CPSC-CH-E1002-08	Not Applicable		-----	2758	In house	200.084		0.45
2314		-----		-----	2794	IEC62321-3-1	211.97		1.30
2316	IEC62321-5	204.2857		0.75	2798	EN16711-1	209		1.09
2320	EN16711-1	191.01		-0.19	2817		-----		-----
2326	CPSC-CH-E1002-08	193.08		-0.05	2826	IEC62321-5	190.1710		-0.25
2330		Not Analyzed		-----	2829	CPSC-CH-E1002-08	187.819		-0.42
2339	In house	189		-0.34	2833	IEC62321-3-1	141.85	R(0.01)	-3.70
2347	IEC62321-5	192.5		-0.09	2835	IEC62321-5	156.70	C	-2.64
2350	EPA3052	222		2.02	2851		-----		-----
2352	GB/T39560-5	206.65		0.92	2853		-----		-----
2353	IEC62321-5	189.3		-0.31	2864		-----		-----
2355	IEC62321-5	199.6		0.42	2885		-----		-----
2357	IEC62321-5	204.2		0.75	2900	IEC62321-5	199.8		0.43
2358	EPA3051	189.3		-0.31	2910	IEC62321-5	191.74		-0.14
2362		-----		-----	2924	IEC62321-5	201.4		0.55
2363	EPA3052	206.8		0.93	2937	CPSC-CH-E1002-08	200.10		0.45
2365	IEC62321-5	199.4		0.40	2948	EN16711-1	165.23		-2.03
2366	IEC62321-5	197.81		0.29	2952		-----		-----
2369	EPA3052	201.84		0.58	2959	EN16711-1	187.8		-0.42
2370	EPA3052	194		0.02	2960	EN16711-1	188.29		-0.39
2373	EN16711-1	200.22		0.46	2977		199.96		0.44

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
2986		-----		-----	3185	In house	190.00		-0.27
2995	IEC62321-5	202		0.59	3197	IEC62321-5	185.5		-0.59
3011		-----		-----	3200	IEC62321-5	190.29		-0.24
3100	IEC62321-5	187.0700		-0.47	3209	ISO8124-5	188.3		-0.39
3110	ASTM Total screening	189.69		-0.29	3210	In house	218.6		1.77
3116		-----		-----	3214	EPA3052	185.915		-0.56
3118	EN16711-1	209.7800	C	1.14	3225		-----		-----
3122	CPSC-CH-E1002-08	211.078		1.24	3228	IEC62321-5	196		0.16
3127	DIN22022-3	183.6		-0.72	3230		-----		-----
3146	In house	189.6		-0.29	3233	In house	185.00		-0.62
3153	IEC62321-5	193.0		-0.05	3237	EN16711-1	192.08		-0.12
3154	EN16711-1	186.84		-0.49	3239	IEC62321-5	248.0	C,R(0.01)	3.87
3160	CPSC-CH-E1002-08	181.14		-0.90	3246	CPSC-CH-E1002-08	206.6		0.92
3163	IEC62321-5	199		0.38	3248		not analyze		-----
3166	In house	190		-0.27	6379	In house	189.732		-0.28
3172	EN16711-1	192.03		-0.12	8005	ASTM F963	194.799		0.08
3182		-----		-----	8008	ASTM Total screening	172.03		-1.55

normality	suspect
n	126
outliers	2
mean (n)	193.7188
st.dev. (n)	12.28425
RSD=6%	
R(calc.)	34.3959
st.dev.(Horwitz)	14.02937
R(Horwitz)	39.2822

Lab 2258 first reported 139.81
Lab 2835 first reported 239.03
Lab 3118 first reported 287.5367
Lab 3239 first reported 238.70





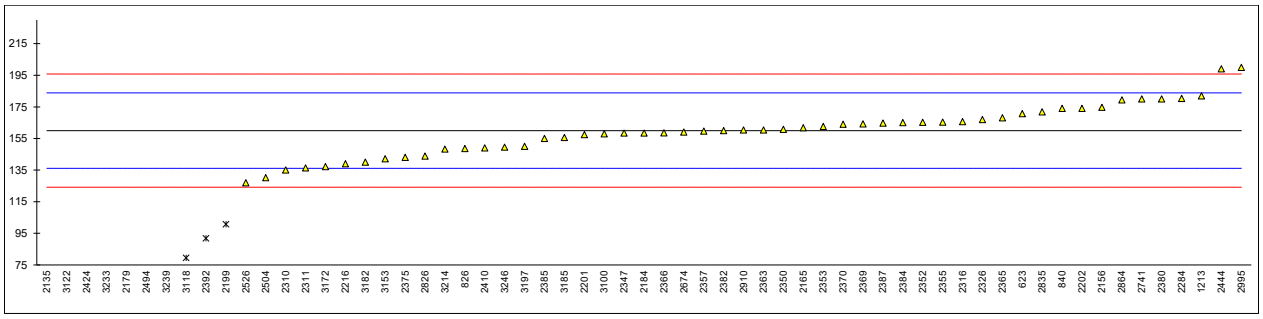
Determination of Chromium as Cr6+ on sample #22700; results in mg/kg

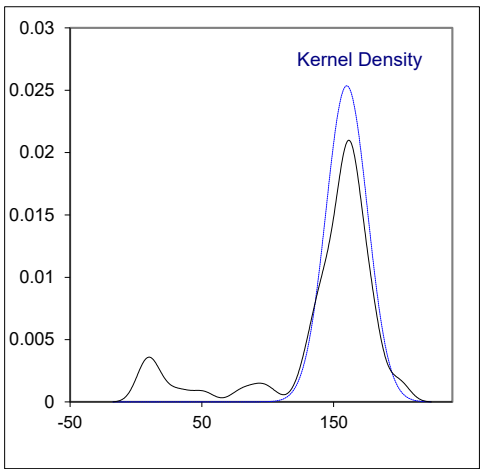
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	IEC62321-7-2	143		-1.42
310		-----		-----	2378		-----		-----
339		-----		-----	2379		Not Analyzed		-----
523		-----		-----	2380	IEC62321-7-2	180.02		1.68
551		-----		-----	2381		-----		-----
623	IEC62321-7-2	170.63		0.89	2382	IEC62321-7-2	160.0		0.00
826	IEC62321-7-2	148.6		-0.96	2384	IEC62321-7-2	165.00		0.42
840	In house	174.0		1.17	2385	IEC62321-7-2	155		-0.42
1051		-----		-----	2387	IEC62321-7-2	164.75		0.40
1126		-----		-----	2392	IEC62321-7-2	91.83	R(0.05)	-5.72
1213	IEC62321-7-2	181.89		1.84	2406		-----		-----
2115		-----		-----	2410	IEC62321-7-2	149		-0.92
2120		-----		-----	2413	CPSC-CH-E1002-08	Not Analyzed		-----
2121		-----		-----	2424	IEC62321-7-2	9.4	R(0.01)	-12.63
2132		-----		-----	2426	EN16711-1	Not Analyzed		-----
2135	64LFGB B82.02-11	6.82	R(0.01)	-12.84	2431		-----		-----
2137		-----		-----	2444	IEC62321-7-2	199.02		3.27
2146		-----		-----	2453		-----		-----
2156	IEC62321-7-2	174.64		1.23	2459		-----		-----
2165	IEC62321-7-2	161.7		0.14	2460		-----		-----
2177		-----		-----	2475		-----		-----
2179	IEC62321-7-2	19.1	R(0.01)	-11.81	2476		-----		-----
2182		not determnd.		-----	2492		-----		-----
2184	IEC62321-7-2	158.4		-0.13	2494	IEC62321-7-2	33.83	C,R(0.01)	-10.58
2199	IEC62321-7-2	100.79	C,R(0.05)	-4.96	2500		-----		-----
2201	IEC62321-7-2	157.48		-0.21	2503		-----		-----
2202	IEC62321-7-2	174		1.17	2504	IEC62321-7-2	130.15		-2.50
2213		-----		-----	2511		-----		-----
2216	IEC62321-7-2	139		-1.76	2526	IEC62321-7-2	127.00		-2.77
2218		-----		-----	2529		-----		-----
2236	In house	N/A		-----	2560	EN16711-1	not analyzed		-----
2250		not analyzed		-----	2561		-----		-----
2256		-----		-----	2564		-----		-----
2258		not analyzed		-----	2569		Not Determined		-----
2265		-----		-----	2572		-----		-----
2272		-----		-----	2573		-----		-----
2284	IEC62321-7-2	180.26		1.70	2590	EN16711-1	not performed		-----
2287		-----		-----	2591		-----		-----
2290		-----		-----	2624		-----		-----
2293		-----		-----	2674	IEC62321-7-2	159		-0.08
2295		-----		-----	2678		-----		-----
2301		-----		-----	2734		-----		-----
2310	IEC62321-7-2	135		-2.10	2737		-----		-----
2311	IEC62321-7-2	136.4		-1.98	2741	In house	180		1.68
2313	CPSC-CH-E1002-08	Not Applicable		-----	2758	In house	not determined		-----
2314		-----		-----	2794		not analyzed		-----
2316	IEC62321-7-2	165.5629		0.47	2798		-----		-----
2320		-----		-----	2817		-----		-----
2326	CPSC-CH-E1002-08	166.89		0.58	2826	IEC62321-7-2	143.8732		-1.35
2330		Not Analyzed		-----	2829		-----		-----
2339		-----		-----	2833		-----		-----
2347	IEC62321-7-2	158.4		-0.13	2835	IEC62321-7-2	171.76		0.99
2350	IEC62321-7-2	160.75		0.06	2851		-----		-----
2352	GB/T39560-702	165.22		0.44	2853		-----		-----
2353	IEC62321-7-2	162.56		0.22	2864	IEC62321-7-2	179.37		1.63
2355	IEC62321-7-2	165.3		0.45	2885		-----		-----
2357	IEC62321-7-2	159.7		-0.02	2900		-----		-----
2358		not determnd.		-----	2910	IEC62321-7-2	160.31		0.03
2362		-----		-----	2924		-----		-----
2363	IEC62321-7-2	160.34		0.03	2937		Not applicable		-----
2365	IEC62321-7-2	168.0		0.67	2948	EN16711-1	Not detected	f-?	-----
2366	IEC62321-7-2	158.6		-0.12	2952		-----		-----
2369	IEC62321-7-2	164.21		0.35	2959		-----		-----
2370	IEC62321-7-2	164		0.34	2960		-----		-----
2373	EN16711-1	not applicable		-----	2977		not analyzed		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
2986		-----		-----	3185	IEC62321-7-2	155.60		-0.37
2995	IEC62321-7-2	200		3.36	3197	IEC62321-7-2	150	C	-0.84
3011		-----		-----	3200		-----		-----
3100	IEC62321-7-2	157.9474		-0.17	3209		-----		-----
3110		-----		-----	3210		-----		-----
3116		-----		-----	3214	IEC62321-7-2	148.221		-0.99
3118	IEC62321-7-2	79.50	C,R(0.05)	-6.75	3225		-----		-----
3122	EPA3060a	8.179	R(0.01)	-12.73	3228		-----		-----
3127		-----		-----	3230		-----		-----
3146	EN62321-7-2Mod.	< 50	f-?	<-9.22	3233	In house	10.03	C,R(0.01)	-12.58
3153	IEC62321-7-2	142.2		-1.49	3237		-----		-----
3154		-----		-----	3239	IEC62321-7-2	51.0	C,R(0.01)	-9.14
3160		-----		-----	3246	IEC62321-7-2	149.5		-0.88
3163		-----		-----	3248		not analyze		-----
3166		-----		-----	6379		-----		-----
3172	IEC62321-7-2	137.2		-1.91	8005		-----		-----
3182	IEC62321-7-2	140.000		-1.68	8008		-----		-----

normality	OK
n	51
outliers	10
mean (n)	159.9893
st.dev. (n)	15.73967
R(calc.)	44.0711
st.dev.(Horwitz)	11.92511
R(Horwitz)	33.3903
	RSD=10%

Lab 2199 first reported 92.210
Lab 2494 first reported 25.42
Lab 2948 possibly a false negative test result?
Lab 3118 first reported not detected
Lab 3146 possibly a false negative test result?
Lab 3197 first reported 32.3
Lab 3233 first reported 10.92
Lab 3239 first reported <50.00





Determination of Total Antimony as Sb on sample #22701; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	EN16711-1	<10		-----
310	In house	21.8565		-----	2378	EN16711-1	33.322		-----
339		-----		-----	2379		Not Analyzed		-----
523		-----		-----	2380		-----		-----
551		-----		-----	2381	EN16711-1	not detected		-----
623	In house	24.53		-----	2382	ASTM F963	35.1		-----
826	EPA3052	32.59		-----	2384		-----		-----
840	In house	22.44		-----	2385	IEC62321-5	<10		-----
1051		-----		-----	2387		-----		-----
1126		-----		-----	2392	IEC62321	Not detected		-----
1213		21.49		-----	2406	CPSC-CH-E1002-08	not detected		-----
2115	EN16711-1	31.9		-----	2410	IEC62321-5	32		-----
2120	EN16711-1	< 33		-----	2413	CPSC-CH-E1002-08	Not Detected		-----
2121		-----		-----	2424	In house	12.9		-----
2132	CPSC-CH-E1002-08	<10		-----	2426	EN16711-1	Not Analyzed		-----
2135		-----		-----	2431	CPSC-CH-E1002-08	17.83		-----
2137		-----		-----	2444		-----		-----
2146		-----		-----	2453		-----		-----
2156	IEC62321-5	20.10		-----	2459	EN16711-1	BDL		-----
2165		-----		-----	2460		-----		-----
2177		-----		-----	2475		-----		-----
2179		not applicable		-----	2476		-----		-----
2182		not determnd.		-----	2492		-----		-----
2184		-----		-----	2494	IEC62321-5	Not Detected	C	-----
2199		-----		-----	2500	EN16711-1	30.1		-----
2201	IEC62321-5	19.22		-----	2503	CPSC-CH-E1002-08	1.05		-----
2202	EPA3052	36		-----	2504	EPA3052	6.12		-----
2213	EN16711-1	<10		-----	2511		-----		-----
2216		-----		-----	2526		-----		-----
2218		-----		-----	2529		-----		-----
2236	In house	19.87		-----	2560	EN16711-1	not analyzed		-----
2250	EN16711-1	12.45		-----	2561	CPSC-CH-E1002-08	16.547		-----
2256		-----		-----	2564		-----		-----
2258	CPSC-CH-E1002-08	Not detected		-----	2569	CPSC-CH-E1002-08.3	Not Detected		-----
2265		-----		-----	2572		-----		-----
2272		-----		-----	2573		-----		-----
2284	EN16711-1	32.21		-----	2590	EN16711-1	7.60		-----
2287		-----		-----	2591		-----		-----
2290	IEC62321-5	29.7		-----	2624	In house	26.10		-----
2293		-----		-----	2674		-----		-----
2295		28		-----	2678		-----		-----
2301	EN16711-1	<10		-----	2734		-----		-----
2310	CPSC-CH-E1002-08	not detected		-----	2737		-----		-----
2311	EN16711-1	Not Detected		-----	2741	CPSC-CH-E1002-08	<50		-----
2313	CPSC-CH-E1002-08	Not Applicable		-----	2758	In house	not detected		-----
2314		-----		-----	2794	IEC62321-3-1	not detected		-----
2316		not applicable		-----	2798	EN16711-1	not detected		-----
2320	EN16711-1	<5		-----	2817		-----		-----
2326	CPSC-CH-E1002-08	Not detected		-----	2826		-----		-----
2330		Not Analyzed		-----	2829		-----		-----
2339	In house	33		-----	2833		-----		-----
2347		-----		-----	2835	IEC62321-5	Not detected		-----
2350	EPA3052	29.95		-----	2851		-----		-----
2352	In house	32.66		-----	2853		-----		-----
2353		not determnd.		-----	2864		-----		-----
2355	EPA3052	33.7		-----	2885		-----		-----
2357	EPA3052	33.6		-----	2900	EPA3052	40.5		-----
2358	EPA3051	not detected		-----	2910		not analyzed		-----
2362		-----		-----	2924		-----		-----
2363	EPA3052	35.1		-----	2937	CPSC-CH-E1002-08	27.18		-----
2365	IEC62321-5	32.0		-----	2948	EN16711-1	Not detected		-----
2366	IEC62321-5	32.74		-----	2952		-----		-----
2369	EPA3052	31.95		-----	2959	EN16711-1	37.9		-----
2370	EPA3052	35.9		-----	2960		-----		-----
2373	EN16711-1	34.81		-----	2977	ISO17072-2	34.71		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
2986		-----		-----	3185	In house	29.66		-----
2995		-----		-----	3197	EPA3052	25.0		-----
3011		-----		-----	3200		-----		-----
3100		-----		-----	3209		-----		-----
3110		-----		-----	3210	In house	<25		-----
3116		-----		-----	3214	EPA3052	35.082		-----
3118	EN16711-1	Not Detected	C	-----	3225		-----		-----
3122	CPSC-CH-E1002-08	not detected		-----	3228		-----		-----
3127		-----		-----	3230		-----		-----
3146	In house	< 10		-----	3233	In house	4.61	C	-----
3153	IEC62321-5	30.3		-----	3237	EN16711-1	25.96		-----
3154	EN16711-1	17.443		-----	3239		not analyzed		-----
3160	CPSC-CH-E1002-08	not detected		-----	3246	CPSC-CH-E1002-08	not detected		-----
3163	IEC62321-5	59		-----	3248		not analyze		-----
3166	In house	35.05		-----	6379	In house	9.1115		-----
3172		-----		-----	8005	ASTM F963	<10		-----
3182		-----		-----	8008		-----		-----
	n	80							
	mean (n)	<50							

Lab 2494 first reported 83.40
Lab 3118 first reported 89.8759
Lab 3233 first reported 1.53

Determination of Total Cadmium as Cd on sample #22701; results in mg/kg

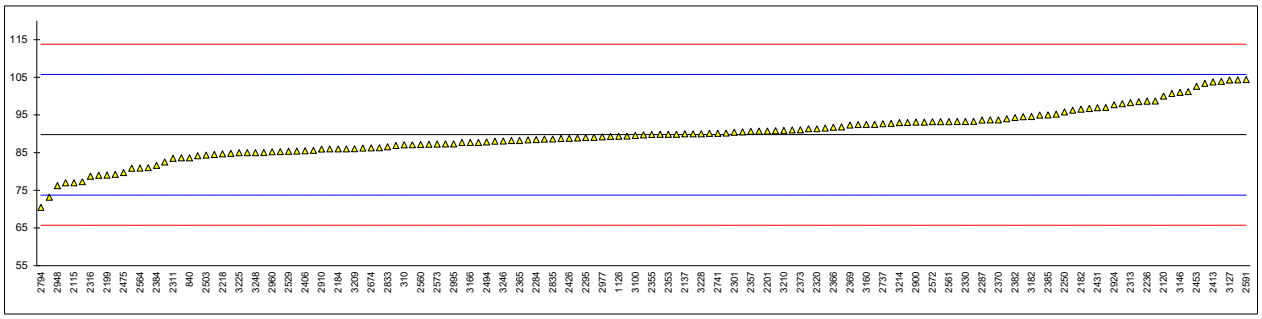
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	EN16711-1	94		0.53
310	In house	87.0735		-0.34	2378	EN16711-1	93.234		0.43
339		-----		-----	2379	IEC62321-5	87.319		-0.30
523		-----		-----	2380	EN16711-1	91.84		0.26
551		-----		-----	2381	EN16711-1	90.10		0.04
623	In house	87.24		-0.31	2382	ASTM F963	94.3		0.57
826	IEC62321-5	98.53		1.09	2384	IEC62321-5	81.64		-1.01
840	In house	83.61		-0.77	2385	IEC62321-5	95		0.65
1051	EN1122	85.03		-0.59	2387	IEC62321-5	90.71		0.12
1126	In house	89.360		-0.05	2392	IEC62321-5	79.25		-1.31
1213	IEC62321-5	93.11		0.42	2406	CPSC-CH-E1002-08	85.50		-0.53
2115	EN16711-1	77.0		-1.59	2410	EN1122	90		0.03
2120	EN1122	100		1.28	2413	CPSC-CH-E1002-08	103.737		1.74
2121		-----		-----	2424	IEC62321-5	98.7		1.12
2132	EN1122	80.85		-1.11	2426	EN16711-1	88.8		-0.12
2135	EN16711-1	96.72		0.87	2431	CPSC-CH-E1002-08	96.92		0.89
2137	IEC62321-5	90.0		0.03	2444	IEC62321-5	93.3249		0.44
2146	In house	93.7		0.49	2453	EN1122	102.61		1.60
2156	IEC62321-5	87.69		-0.26	2459	EN1122	84.20		-0.69
2165	IEC62321-5	85.6		-0.52	2460	EN1122	100.688		1.36
2177	IEC62321-5	86.888		-0.36	2475	EN1122	79.7		-1.26
2179	IEC62321-5	92.8		0.38	2476		-----		-----
2182	EN1122	96.54		0.85	2492	EN16711-1	95.248		0.68
2184	EN1122	86.0		-0.47	2494	IEC62321-5	87.80		-0.24
2199	IEC62321-5	79.02		-1.34	2500	EN16711-1	84.8		-0.62
2201	IEC62321-5	90.73		0.12	2503	CPSC-CH-E1002-08	84.34		-0.68
2202	IEC62321-5	98		1.03	2504	EN1122	85.26		-0.56
2213	EN16711-1	84.52		-0.65	2511	CPSC-CH-E1002-08	85.0		-0.59
2216	IEC62321-5	97		0.90	2526	IEC62321-5	91.04		0.16
2218	CPSC-CH-E1002-08	84.693		-0.63	2529	CPSC-CH-E1002-08.3	85.38		-0.55
2236	In house	98.67		1.11	2560	EN16711-1	87.17		-0.32
2250	EN1122	95.82		0.76	2561	CPSC-CH-E1002-08	93.258		0.44
2256	EN1122	92.43		0.33	2564	CPSC-CH-E1002-08	80.901		-1.11
2258	CPSC-CH-E1002-08	73.17	C	-2.07	2569	CPSC-CH-E1002-08.3	86		-0.47
2265	EN16711-1	79.0		-1.34	2572	EN1122	93.2		0.43
2272	EN16711-1	89.7		-0.01	2573	CPSC-CH-E1002-08	87.28		-0.31
2284	EN1122	88.48		-0.16	2590	EN1122	103.40		1.70
2287	EN16711-1	93.68		0.49	2591	CPSC-CH-E1002-08	104.422		1.83
2290	IEC62321-5	90.5		0.09	2624	EN1122	77.28		-1.56
2293	EN1122	87.71		-0.26	2674	EN1122	86.27		-0.44
2295		89		-0.09	2678		-----		-----
2301	EN16711-1	90.4	C	0.08	2734		-----		-----
2310	CPSC-CH-E1002-08	88.2		-0.19	2737	CPSC-CH-E1002-08	92.66		0.36
2311	EN1122	83.5		-0.78	2741	EN1122	90.114		0.04
2313	EN1122	98.3		1.07	2758	In house	94.979		0.65
2314	EN16711-1	86.21		-0.44	2794	IEC62321-3-1	70.49	C	-2.40
2316	IEC62321-5	78.7394		-1.38	2798	EN16711-1	81		-1.09
2320	EN16711-1	91.34		0.20	2817		-----		-----
2326	CPSC-CH-E1002-08	86.00		-0.47	2826	IEC62321-5	85.4245		-0.54
2330	EN16711-1	93.30		0.44	2829	EN1122	86.306		-0.43
2339	In house	77		-1.59	2833	IEC62321-3-1	86.5475		-0.40
2347	EN1122	88.4		-0.17	2835	IEC62321-5	88.63		-0.14
2350	EN1122	101.2		1.43	2851		-----		-----
2352	EN1122	96.25		0.81	2853		-----		-----
2353	IEC62321-5	89.89		0.02	2864	IEC62321-5	93.27		0.44
2355	IEC62321-5	89.8		0.00	2885	IEC62321-5	89.32		-0.05
2357	EN1122	90.7		0.12	2900	IEC62321-5	93.1		0.42
2358	EPA3051	89.89		0.02	2910	EN1122	85.93		-0.48
2362	In house	89.89		0.02	2924	IEC62321-5	97.7		0.99
2363	EPA3052	93		0.40	2937	CPSC-CH-E1002-08	82.51		-0.90
2365	IEC62321-5	88.2		-0.19	2948	EN16711-1	76.25		-1.69
2366	IEC62321-5	91.77		0.25	2952		-----		-----
2369	EPA3052	92.34		0.32	2959	EN1122	87.1		-0.33
2370	EN1122	93.7		0.49	2960	EN1122	85.23		-0.57
2373	EN16711-1	91.06		0.16	2977	EN1122	89.18		-0.07

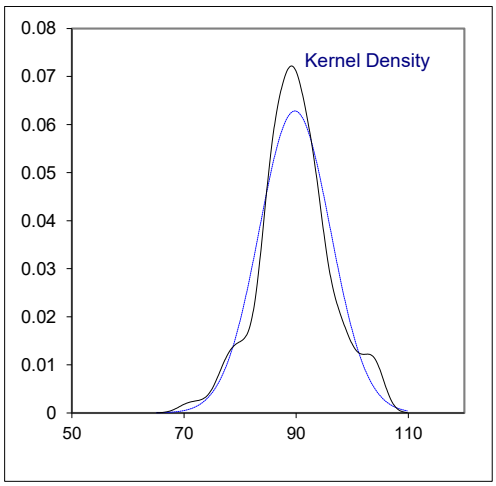
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
2986		-----		-----	3185	EN1122	90.18		0.05
2995	IEC62321-5	87.33		-0.30	3197	IEC62321-5	89.4		-0.05
3011		-----		-----	3200	IEC62321-5	88.59		-0.15
3100	EN1122	89.5820		-0.02	3209	ISO8124-5	86.04		-0.46
3110	EN1122	92.51		0.34	3210	In house	90.9		0.14
3116		-----		-----	3214	EPA3052	92.968		0.40
3118	EN1122	104.3185	C	1.82	3225	EN1122	84.98		-0.60
3122	CPSC-CH-E1002-08	88.771		-0.12	3228	IEC62321-5	90		0.03
3127	DIN22022-3	104.3		1.81	3230		-----		-----
3146	In house	101		1.40	3233	In house	88.90		-0.11
3153	IEC62321-5	90.8		0.13	3237	EN16711-1	91.52		0.22
3154	EN1122	88.043		-0.21	3239	IEC62321-5	103.96		1.77
3160	CPSC-CH-E1002-08	92.48		0.34	3246	EN1122	88.1		-0.21
3163		-----		-----	3248		85		-0.59
3166	In house	87.7		-0.26	6379	In house	83.6045		-0.77
3172	EN16711-1	91.33		0.20	8005	ASTM F963	89.083		-0.08
3182	EN1122	94.580		0.60	8008	EN1122	94.55		0.60

normality	OK
n	147
outliers	0
mean (n)	89.7607
st.dev. (n)	6.34920
R(calc.)	17.7778
st.dev.(EN1122:01)	8.01435
R(EN1122:01)	22.4402

RSD=7%

Lab 2258 first reported 116.218
Lab 2301 first reported 63.4
Lab 2794 first reported 57.17
Lab 3118 first reported 121.3196





Determination of Total Cobalt as Co on sample #22701; results in mg/kg

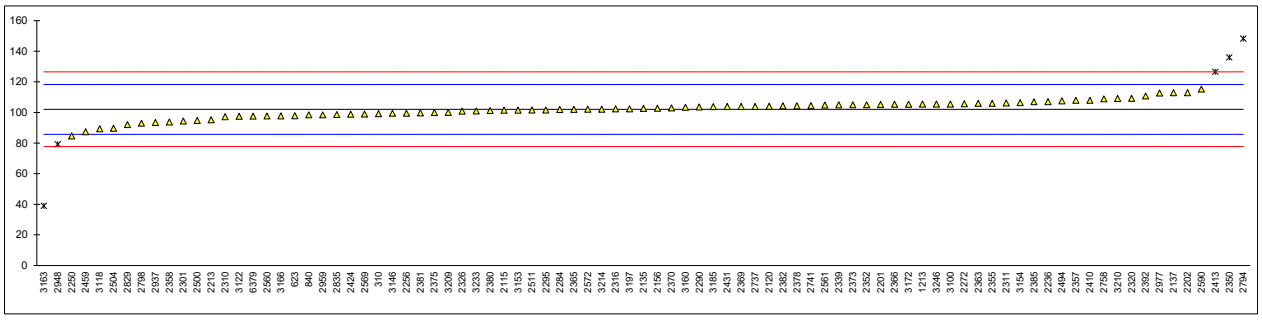
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	EN16711-1	100		-0.25
310	In house	99.243		-0.35	2378	EN16711-1	104.433		0.29
339		-----		-----	2379		Not Analyzed		-----
523		-----		-----	2380	EN16711-1	101.32		-0.09
551		-----		-----	2381	EN16711-1	99.80		-0.28
623	In house	97.86		-0.52	2382	ASTM F963	104.4		0.29
826		-----		-----	2384		-----		-----
840	In house	98.46		-0.44	2385	IEC62321-5	107		0.61
1051		-----		-----	2387		-----		-----
1126		-----		-----	2392	IEC62321	110.77		1.07
1213	IEC62321-5	105.50		0.42	2406		-----		-----
2115	EN16711-1	101.55		-0.06	2410	IEC62321-5	108		0.73
2120	EN16711-1	104		0.24	2413	CPSC-CH-E1002-08	126.616	R(0.05)	3.01
2121		-----		-----	2424	In house	98.9		-0.39
2132		-----		-----	2426	EN16711-1	Not Analyzed		-----
2135	EN16711-1	102.70		0.08	2431		103.93		0.23
2137	IEC62321-5	113.0		1.34	2444		-----		-----
2146		-----		-----	2453		-----		-----
2156	IEC62321-5	102.83		0.09	2459	EN16711-1	87.43		-1.80
2165		-----		-----	2460		-----		-----
2177		-----		-----	2475		-----		-----
2179		not applicable		-----	2476		-----		-----
2182		not determnd.		-----	2492		-----		-----
2184		-----		-----	2494	IEC62321-5	107.6	C	0.68
2199		-----		-----	2500	EN16711-1	94.8		-0.89
2201	IEC62321-5	105.26		0.39	2503		-----		-----
2202	EPA3052	113		1.34	2504	EPA3052	89.70		-1.52
2213	EN16711-1	95.27		-0.84	2511	CPSC-CH-E1002-08	101.66		-0.05
2216		-----		-----	2526		-----		-----
2218		-----		-----	2529		-----		-----
2236	In house	107.1		0.62	2560	EN16711-1	97.70		-0.54
2250	EN16711-1	84.73	C	-2.13	2561	CPSC-CH-E1002-08	104.872		0.34
2256	IEC62321-5	99.54		-0.31	2564		-----		-----
2258		not analyzed		-----	2569	CPSC-CH-E1002-08.3	99		-0.38
2265		-----		-----	2572	IEC62321-5	102.1		0.00
2272	EN16711-1	105.7		0.45	2573		-----		-----
2284	EN16711-1	101.95		-0.02	2590	EN16711-1	115.30		1.62
2287		-----		-----	2591		-----		-----
2290	IEC62321-5	103.6		0.19	2624		-----		-----
2293		-----		-----	2674		-----		-----
2295		101.7		-0.05	2678		-----		-----
2301	EN16711-1	94.42		-0.94	2734		-----		-----
2310	CPSC-CH-E1002-08	97.2		-0.60	2737	CPSC-CH-E1002-08	103.96		0.23
2311	EN16711-1	106.3		0.52	2741	CPSC-CH-E1002-08	104.456		0.29
2313	CPSC-CH-E1002-08	Not Applicable		-----	2758	In house	108.883		0.84
2314		-----		-----	2794	IEC62321-3-1	148.31	C,R(0.01)	5.68
2316	In house	102.3841		0.04	2798	EN16711-1	93		-1.11
2320	EN16711-1	109.313		0.89	2817		-----		-----
2326	CPSC-CH-E1002-08	100.89		-0.15	2826		-----		-----
2330		Not Analyzed		-----	2829	CPSC-CH-E1002-08	92.066		-1.23
2339	In house	105		0.36	2833		-----		-----
2347		-----		-----	2835	IEC62321-5	98.68		-0.42
2350	EPA3052	136	R(0.01)	4.17	2851		-----		-----
2352	In house	105.09		0.37	2853		-----		-----
2353		not determnd.		-----	2864		-----		-----
2355	EPA3052	106.0		0.48	2885		-----		-----
2357	EPA3052	108.0		0.73	2900		-----		-----
2358	EPA3051	93.76		-1.02	2910		not analyzed		-----
2362		-----		-----	2924		-----		-----
2363	EPA3052	106		0.48	2937	CPSC-CH-E1002-08	93.53		-1.05
2365	IEC62321-5	102.0		-0.01	2948	EN16711-1	79.25	C,R(0.05)	-2.80
2366	IEC62321-5	105.44		0.41	2952		-----		-----
2369	EPA3052	103.94		0.23	2959	EN16711-1	98.5		-0.44
2370	EPA3052	103		0.11	2960		-----		-----
2373	EN16711-1	105.09		0.37	2977	ISO17072-2	112.8		1.32

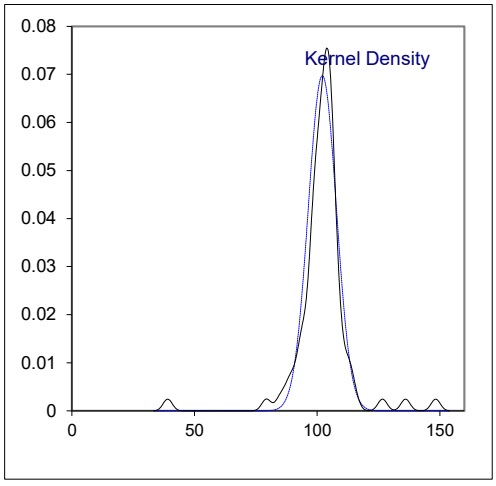
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
2986		-----		-----	3185	In house	103.86		0.22
2995		-----		-----	3197	EPA3052	102.4		0.04
3011		-----		-----	3200		-----		-----
3100	IEC62321-5	105.5200		0.42	3209	ISO8124-5	100.1		-0.24
3110		-----		-----	3210	In house	109.2		0.88
3116		-----		-----	3214	EPA3052	102.176		0.01
3118	EN16711-1	89.41	C	-1.56	3225		-----		-----
3122	CPSC-CH-E1002-08	97.56		-0.55	3228		-----		-----
3127		-----		-----	3230		-----		-----
3146	In house	99.5		-0.32	3233	In house	101.00		-0.13
3153	IEC62321-5	101.6		-0.06	3237		-----		-----
3154	EN16711-1	106.43	C	0.54	3239		not analyze		-----
3160	CPSC-CH-E1002-08	103.44		0.17	3246	CPSC-CH-E1002-08	105.5		0.42
3163	IEC62321-5	39	R(0.01)	-7.75	3248		not analyze		-----
3166	In house	97.85		-0.52	6379	In house	97.6615		-0.54
3172	EN16711-1	105.44		0.41	8005		-----		-----
3182		-----		-----	8008		-----		-----

normality	OK
n	82
outliers	5
mean (n)	102.0739
st.dev. (n)	5.72278
R(calc.)	16.0238
st.dev.(Horwitz)	8.14072
R(Horwitz)	22.7940

RSD=6%

Lab 2250 first reported 87.50
Lab 2494 first reported 84.90
Lab 2794 first reported not detected
Lab 2948 first reported Not detected
Lab 3118 first reported 132.3513
Lab 3154 first reported 85,321





Determination of Total Lead as Pb on sample #22701; results in mg/kg

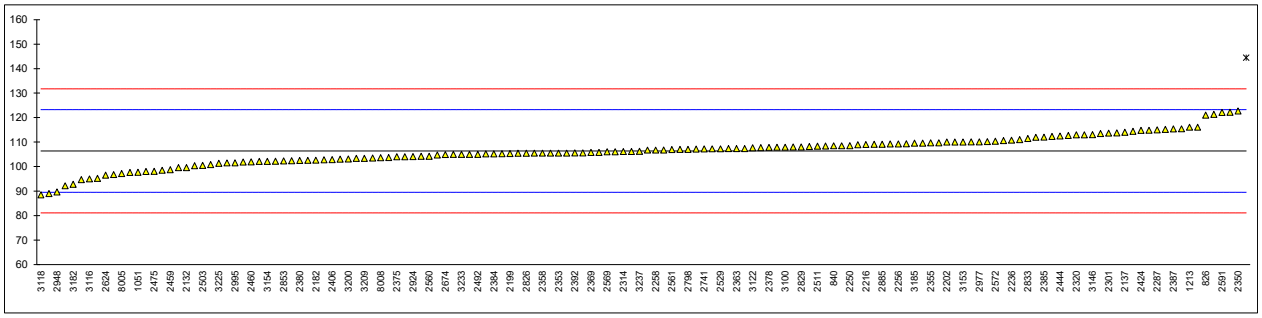
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
210		-----		-----	2375	EN16711-1	104		-0.28
310	In house	105.4095		-0.12	2378	EN16711-1	107.864		0.17
339		-----		-----	2379	IEC62321-5	105.206		-0.14
523		-----		-----	2380	EN16711-1	102.51		-0.46
551		-----		-----	2381	EN16711-1	101.50		-0.58
623	In house	100.78		-0.67	2382	ASTM F963	110.2		0.45
826	IEC62321-5	120.99		1.73	2384	IEC62321-5	105.21		-0.14
840	In house	108.48		0.25	2385	IEC62321-5	112		0.66
1051	CPSC-CH-E1002-08.3	97.67		-1.03	2387	IEC62321-5	115.365		1.06
1126		-----		-----	2392	IEC62321-5	105.60		-0.09
1213	IEC62321-5	116.08		1.15	2406	CPSC-CH-E1002-08.3	102.83		-0.42
2115	EN16711-1	96.74		-1.15	2410	CPSC-CH-E1002-08.3	110		0.43
2120	CPSC-CH-E1002-08.3	107		0.07	2413	CPSC-CH-E1002-08	144.474	R(0.01)	4.52
2121	CPSC-CH-E1002-08.3	116.1	C	1.15	2424	IEC62321-5	114.8		1.00
2132	CPSC-CH-E1002-08.3	99.57		-0.81	2426	EN16711-1	103.7		-0.32
2135	EN16711-1	108.4		0.24	2431	CPSC-CH-E1002-08	109.54		0.37
2137	IEC62321-5	114.0		0.90	2444	IEC62321-5	112.5010		0.72
2146	In house	113.8		0.88	2453		-----		-----
2156	IEC62321-5	109.30		0.34	2459	CPSC-CH-E1002-08.3	98.72		-0.91
2165	IEC62321-5	108.5		0.25	2460	CPSC-CH-E1002-08.3	101.898		-0.53
2177	IEC62321-5	105.507		-0.11	2475	In house	98.1		-0.98
2179	IEC62321-5	110.1		0.44	2476		-----		-----
2182	CPSC-CH-E1002-08.3	102.6		-0.45	2492	EN16711-1	105.046		-0.16
2184	CPSC-CH-E1002-08.3	104.2		-0.26	2494	CPSC-CH-E1002-08.3	98.50		-0.94
2199	IEC62321-5	105.31		-0.13	2500	EN16711-1	94.7		-1.39
2201	IEC62321-5	108.00		0.19	2503	CPSC-CH-E1002-08.3	100.5		-0.70
2202	IEC62321-5	110		0.43	2504	EPA3052	97.59		-1.04
2213	EN16711-1	103		-0.40	2511	CPSC-CH-E1002-08	108.3		0.23
2216	IEC62321-5	109		0.31	2526	IEC62321-7-2	114.85		1.00
2218	CPSC-CH-E1002-08.3	100.36		-0.72	2529	CPSC-CH-E1002-08.3	107.28		0.10
2236	In house	110.8		0.52	2560	EN16711-1	104.21		-0.26
2250	EN16711-1	108.55		0.26	2561	CPSC-CH-E1002-08.3	106.990		0.07
2256	IEC62321-5	109.27		0.34	2564	CPSC-CH-E1002-08	114.427		0.95
2258	CPSC-CH-E1002-08.2	106.751		0.04	2569	CPSC-CH-E1002-08.3	106		-0.05
2265	EN16711-1	95.2		-1.33	2572	IEC62321-5	110.4		0.47
2272	EN16711-1	107.4		0.12	2573	CPSC-CH-E1002-08.3	104.75		-0.20
2284	IEC62321-5	103.48		-0.35	2590	CPSC-CH-E1002-08.2	101.820	C	-0.54
2287	EN16711-1	115.0		1.02	2591	CPSC-CH-E1002-08.3	122.133		1.87
2290	IEC62321-5	108.9		0.30	2624	In house	96.52		-1.17
2293	EN16711-1	109.13		0.32	2674	CPSC-CH-E1002-08.2	104.93		-0.17
2295		105.5		-0.11	2678		-----		-----
2301	EN16711-1	113.67		0.86	2734		-----		-----
2310	CPSC-CH-E1002-08	104		-0.28	2737	CPSC-CH-E1002-08.3	108.20		0.21
2311	EN16711-1	99.55		-0.81	2741	CPSC-CH-E1002-08	107.217		0.10
2313	CPSC-CH-E1002-08.3	102.4		-0.47	2758	In house	115.452		1.07
2314	EN16711-1	106.12		-0.03	2794	IEC62321-3-1	115.2	C	1.04
2316	IEC62321-5	107.2502		0.10	2798	EN16711-1	107		0.07
2320	EN16711-1	112.94		0.78	2817		-----		-----
2326	CPSC-CH-E1002-08	102.23		-0.49	2826	IEC62321-5	105.4130		-0.12
2330	EN16711-1	112.73		0.75	2829	CPSC-CH-E1002-08.3	108.047		0.20
2339	In house	98		-1.00	2833	IEC62321-3-1	111.475		0.60
2347	IEC62321-5	105.8		-0.07	2835	IEC62321-5	92.17		-1.69
2350	IEC62321-5	122.7		1.93	2851		-----		-----
2352	GB/T39560	106.71		0.04	2853	CPSC-CH-E1002-08.2	102.3		-0.49
2353	IEC62321-5	105.5		-0.11	2864	IEC62321-5	110.61		0.50
2355	IEC62321-5	109.7		0.39	2885	IEC62321-5	109.13		0.32
2357	ISO8124-5	105.6		-0.09	2900	IEC62321-5	113.5		0.84
2358	EPA3051	105.5		-0.11	2910	CPSC-CH-E1002-08.3	103.40		-0.36
2362	CPSC-CH-E1002-08.3	105.5		-0.11	2924	IEC62321-5	104.1		-0.27
2363	EPA3052	107.4		0.12	2937	CPSC-CH-E1002-08.3	102.12		-0.51
2365	IEC62321-5	102.8		-0.43	2948	CPSC-CH-E1002-08.3	89.65		-1.99
2366	In house	107.74		0.16	2952	CPSC-CH-E1002-08.3	107.37		0.12
2369	EPA3052	105.79		-0.07	2959	EN16711-1	106.8		0.05
2370	CPSC-CH-E1002-08.3	105		-0.17	2960	EN16711-1	105.26		-0.13
2373	EN16711-1	106.18		-0.03	2977	CPSC-CH-E1002-08.3	110.1		0.44

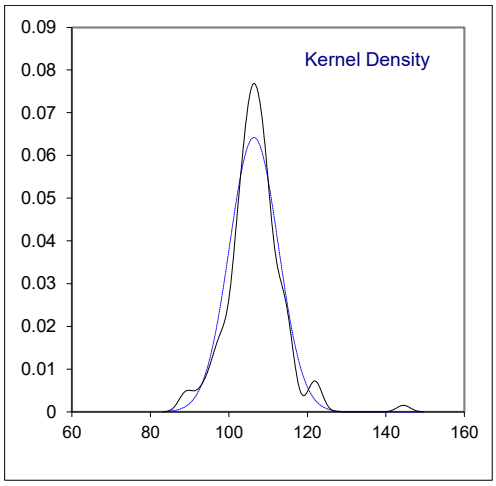
lab	method	value	mark	z(targ)
2986		-----		-----
2995	IEC62321-5	101.58		-0.57
3011		-----		-----
3100	IEC62321-5	107.9300		0.18
3110	CPSC-CH-E1002-08.3	102.56		-0.45
3116	CPSC-CH-E1002-08.3	94.950		-1.36
3118	EN16711-1	88.45	C	-2.13
3122	CPSC-CH-E1002-08.3	107.671		0.15
3127	DIN22022-3	122.2		1.87
3146	In house	113		0.78
3153	IEC62321-5	110.0		0.43
3154	EN16711-1	102.12		-0.51
3160	CPSC-CH-E1002-08.3	107.15		0.09
3163	IEC62321-5	89		-2.06
3166	In house	111		0.55
3172	CPSC-CH-E1002-08.3	112.98		0.78
3182	IEC62321-5	92.815		-1.61
3185	CPSC-CH-E1002-08.3	109.53		0.37
3197	IEC62321-5	107.9		0.18
3200	IEC62321-5	103.06		-0.40
3209	CPSC-CH-E1002-08.3	103.4		-0.36
3210	In house	112.3		0.70
3214	EPA3052	111.973		0.66
3225	CPSC-CH-E1002-08.3	101.315		-0.60
3228	IEC62321-5	106		-0.05
3230		-----		-----
3233	In house	105.00		-0.17
3237	EN16711-1	106.28		-0.01
3239	IEC62321-5	121.38		1.78
3246	CPSC-CH-E1002-08.3	109.7		0.39
3248	CPSC-CH-E1002-08	105		-0.17
6379	In house	109.2375		0.34
8005	ASTM F963	97.117		-1.10
8008	CPSC-CH-E1002-08.3	103.64		-0.33

normality	OK
n	149
outliers	1
mean (n)	106.3955
st.dev. (n)	6.21238
R(calc.)	17.3947
st.dev.(Horwitz)	8.43259
R(Horwitz)	23.6113

RSD=6%

Lab 2121 first reported 141.205
Lab 2590 first reported 130.10
Lab 2794 first reported 66
Lab 3118 first reported 161.9291





APPENDIX 2
Other reported Metals in sample #22700; results in mg/kg

lab	Sb	Cd	Co	Cu	Pb
210	-----	-----	-----	-----	-----
310	0.153	0.0785	0.013	0.553	2.185
339	-----	-----	-----	-----	-----
523	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----
623	Not detected	Not detected	Not detected	Not detected	Not detected
826	N.D.	N.D.	-----	N.D.	N.D.
840	<2	<2	<2	<10	<2
1051	-----	<5	-----	-----	<10
1126	-----	-----	-----	-----	-----
1213	not detected	not detected	not detected	not detected	not detected
2115	-----	-----	-----	-----	-----
2120	< 33	< 10	< 33	< 33	< 8,3
2121	-----	-----	-----	-----	1.441
2132	<10	<10	-----	-----	<10
2135	-----	-----	-----	-----	-----
2137	-----	-----	-----	-----	-----
2146	-----	0	-----	-----	0
2156	<10	<5	<5	<5	<10
2165	-----	not detected	-----	-----	not detected
2177	-----	-----	-----	-----	-----
2179	not applicable	not detected	not applicable	not applicable	not detected
2182	not determined	not detected	not determined	not determined	not detected
2184	-----	<10	-----	-----	<10
2199	-----	<5	-----	-----	<5
2201	<10	<10	<10	<10	<10
2202	Not detected	Not detected	Not detected	-----	Not detected
2213	<10	<10	<10	<10	<10
2216	-----	None Detected	-----	-----	None Detected
2218	-----	not detected	-----	-----	not detected
2236	<10.0	<10.0	<10.0	<50.0	<10.0
2250	<1	<1	<1	<1	<1
2256	-----	not determined	not determined	-----	not determined
2258	not detected	not detected	not analyzed	not analyzed	not detected
2265	-----	< 20	-----	-----	< 30
2272	-----	-----	-----	-----	-----
2284	<10	<10	<10	<10	<10
2287	-----	<5	-----	-----	<5
2290	<20	<20	<20	<20	<20
2293	-----	not detected	-----	-----	-----
2295	<10	<10	<10	<10	<10
2301	<10	<10	<10	<10	<10
2310	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Applicable	Not Detected	Not Applicable	Not Applicable	Not Detected
2314	-----	Not detected	-----	-----	Not detected
2316	not applicable	not detected	not detected	not detected	not detected
2320	<5	<5	<5	<5	<5
2326	Not detected	Not detected	Not detected	Not detected	Not detected
2330	Not Analyzed	Not Detected	Not Analyzed	Not Analyzed	Not Detected
2339	<1	<1	<1	<1	<1
2347	-----	<5	-----	-----	<2
2350	<10	<0.5	<5	<5	<5
2352	-----	-----	-----	-----	-----
2353	not determined	not detected	not determined	not determined	not detected
2355	＜10	＜5	＜5	＜5	＜2
2357	<10	<5	<10	<5	<5
2358	not detected	not detected	not detected	not detected	not detected
2362	-----	not detected	-----	-----	not detected
2363	<10	<2	<5	<5	<2
2365	＜10	＜2	＜10	-----	＜2
2366	<10	<2	<10	<50	<30
2369	<10	<2	<5	<5	<2
2370	<2	<2	<2	<2	<2
2373	not detected	not detected	not detected	not detected	not detected
2375	<10	<10	<10	<10	<10
2378	-----	-----	-----	-----	-----
2379	Not Analyzed	Not detected	Not Analyzed	Not Analyzed	Not detected
2380	-----	-----	-----	-----	-----
2381	not detected	not detected	not detected	not detected	not detected
2382	＜10	＜10	＜10	＜10	＜10
2384	-----	Not Detected	-----	-----	Not Detected
2385	<10	<0.2	<1	<5	<1
2387	-----	Not Detected	-----	-----	Not Detected
2392	Not detected	Not detected	Not detected	Not detected	Not detected

lab	Sb	Cd	Co	Cu	Pb
2406	not detected	not detected	-----	-----	not detected
2410	-----	-----	-----	-----	-----
2413	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2424	12.6	not detected	not detected	not detected	not detected
2426	Not Analyzed	Not Detected	Not Analyzed	Not Analyzed	Not Detected
2431	-----	-----	-----	-----	-----
2444	-----	0.120667	-----	-----	0.00
2453	-----	-----	-----	-----	-----
2459	-----	ND	ND	ND	ND
2460	-----	0.0	-----	-----	0.0
2475	-----	not detected	-----	-----	not detected
2476	-----	-----	-----	-----	-----
2492	-----	-----	-----	-----	-----
2494	not detected	not detected	not detected	not detected	not detected
2500	<10	<10	<10	<10	<10
2503	1.765	below detectable limit	-----	-----	below detectable limit
2504	<2	<2	<2	<2	<2
2511	-----	-----	-----	-----	-----
2526	-----	Not Detected	-----	-----	Not detected
2529	-----	-----	-----	-----	-----
2560	<10	<10	<10	<10	<10
2561	1.978	0.030	0.023	1.511	0.201
2564	-----	not detected	-----	-----	not detected
2569	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2572	<20	<20	<20	<20	<20
2573	-----	-----	-----	-----	-----
2590	< L.O.Q.	< L.O.Q.	< L.O.Q.	1.60	< L.O.Q.
2591	-----	not detected	-----	-----	not detected
2624	-----	-----	-----	-----	-----
2674	-----	<10	-----	-----	<10
2678	-----	-----	-----	-----	-----
2734	-----	-----	-----	-----	-----
2737	-----	-----	-----	-----	-----
2741	<50	<10	<10	<100	<10
2758	not detected	not detected	not detected	not detected	not detected
2794	not detected	not detected	not detected	not detected	not detected
2798	not detected	not detected	not detected	not detected	not detected
2817	-----	-----	-----	-----	-----
2826	-----	Not detected	-----	-----	Not detected
2829	-----	-----	-----	-----	-----
2833	-----	13.47	-----	-----	-----
2835	Not detected	Not detected	Not detected	Not detected	Not detected
2851	-----	-----	-----	-----	-----
2853	-----	-----	-----	-----	Not detected
2864	-----	not determined	-----	-----	not determined
2885	-----	Not detected	-----	-----	Not detected
2900	ND	ND	-----	-----	ND
2910	not analyzed	not detected	not analyzed	not analyzed	not detected
2924	-----	not detected	-----	-----	not detected
2937	Not detected	Not detected	Not detected	Not detected	Not detected
2948	Not detected	Not detected	Not detected	Not detected	Not detected
2952	-----	-----	-----	-----	0.00
2959	<10	<10	<10	<10	<10
2960	-----	-----	-----	-----	-----
2977	not detected	not detected	not detected	not detected	not detected
2986	-----	-----	-----	-----	-----
2995	-----	not detected	-----	-----	not detected
3011	-----	-----	-----	-----	-----
3100	-----	<5	<10	<10	<10
3110	-----	-----	-----	-----	-----
3116	-----	<10	-----	-----	-----
3118	Not Detected	Not Detected	7.7499	10.6286	Not Detected
3122	not detected	not detected	not detected	not detected	not detected
3127	-----	below detection limit	-----	-----	below detection limit
3146	< 10	< 5.0	< 10	< 10	< 5.0
3153	Not detected	Not detected	Not detected	Not detected	Not detected
3154	-----	-----	-----	7.864	-----
3160	not detected	not detected	not detected	not detected	not detected
3163	-----	-----	-----	-----	-----
3166	0.045	0.068	0.0125	0.20	0.15
3172	< 10	< 5	< 10	-----	< 5
3182	-----	<5	-----	-----	<13
3185	<10	<5	<10	<10	<10
3197	<10	<10	<10	<10	<10
3200	-----	<10.00	-----	-----	<10.00
3209	-----	<10.0	<10.0	-----	<10.0
3210	<25	<10	<10	<10	<25
3214	<10	<10	<10	<10	<10

lab	Sb	Cd	Co	Cu	Pb
3225	-----	<10	-----	-----	<15
3228	-----	<10	-----	-----	<10
3230	-----	-----	-----	-----	-----
3233	3.18	< 1	< 1	< 1	< 1
3237	-----	-----	-----	-----	-----
3239	not analyzed	not detected	not analyzed	not analyzed	not detected
3246	not detected	not detected	not detected	not detected	not detected
3248	not analyze	<10	not analyze	not analyze	<10
6379	0.0605	0.0605	0.0075	0.170	0.087
8005	<10	<10	-----	-----	<10
8008	-----	-----	-----	-----	-----

Other reported Metals in sample #22700; results in mg/kg - continued -

lab	Mn	Hg	Ni	Sn	Zn
210	-----	-----	-----	-----	-----
310	0.935	0.01	2.8075	0.0895	1.3155
339	-----	-----	-----	-----	-----
523	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----
623	Not detected	Not detected	Not detected	Not detected	Not detected
826	N.D.	N.D.	N.D.	-----	-----
840	<10	<2	<2	<2	<10
1051	-----	-----	-----	-----	-----
1126	-----	-----	-----	-----	-----
1213	not detected	not detected	not detected	not detected	not detected
2115	-----	-----	-----	-----	9.99
2120	-----	< 0,83	< 33	-----	-----
2121	-----	-----	-----	-----	-----
2132	-----	<10	-----	-----	-----
2135	-----	-----	-----	-----	-----
2137	-----	-----	-----	-----	-----
2146	-----	-----	-----	-----	-----
2156	<5	<5	<5	<5	9.309
2165	-----	not detected	-----	-----	-----
2177	-----	-----	-----	-----	-----
2179	not applicable	not detected	not applicable	not applicable	not applicable
2182	not determined	not determined	not determined	not determined	not determined
2184	-----	<10	-----	-----	-----
2199	-----	<2.5	-----	-----	-----
2201	<10	<10	<10	<10	<10
2202	-----	Not detected	Not detected	-----	-----
2213	<10	<10	<10	<10	<10
2216	-----	None Detected	-----	-----	-----
2218	-----	-----	-----	-----	-----
2236	<10.0	<5.0	<10.0	<10.0	<50.0
2250	<1	<0,1	1.191	<1	<10
2256	-----	not determined	-----	-----	-----
2258	not analyzed	not detected	not analyzed	not analyzed	not analyzed
2265	-----	< 0,4	-----	-----	-----
2272	-----	-----	-----	-----	-----
2284	<10	<10	<10	<10	<10
2287	-----	<5	-----	-----	-----
2290	<20	<20	<20	<20	<20
2293	-----	-----	-----	-----	-----
2295	<10	<1	<10	<10	<10
2301	<10	<10	<10	-----	<10
2310	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2314	-----	-----	-----	-----	-----
2316	not detected	not detected	26.5260	not applicable	not detected
2320	<5	<5	<5	<5	<5
2326	Not detected	Not detected	Not detected	Not detected	Not detected
2330	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
2339	<1	<1	<5	<1	<5
2347	-----	<2	-----	-----	-----
2350	<5	<2	<5	<10	13.1
2352	-----	-----	-----	-----	-----
2353	not determined	not detected	not determined	not determined	not determined
2355	＜5	＜2	＜5	＜10	＜20
2357	<10	<2	<5	<10	<20
2358	not detected	not detected	not detected	not detected	not detected
2362	-----	-----	-----	-----	-----
2363	<5	<2	<5	<5	<5
2365	-----	＜2	＜10	-----	-----
2366	<50	<2	<10	<12	<50
2369	<5	<2	<5	<5	<5
2370	<2	<2	<2	<2	<2
2373	not applicable	not detected	not detected	not applicable	not applicable
2375	<10	<10	<10	<10	<10
2378	-----	-----	-----	-----	-----
2379	Not Analyzed	Not detected	Not Analyzed	Not Analyzed	Not Analyzed
2380	-----	-----	-----	-----	-----
2381	not detected	not detected	not detected	not detected	not detected
2382	＜10	＜5	＜10	＜20	＜20
2384	-----	Not Detected	-----	-----	-----
2385	<5	<0.1	<5	<5	<10
2387	-----	Not Detected	-----	-----	-----

lab	Mn	Hg	Ni	Sn	Zn	
2392	Not detected	Not detected	Not detected	Not detected	Not analyzed	
2406	-----	not detected	-----	-----	-----	
2410	-----	-----	-----	-----	-----	
2413	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
2424	not detected	0.0395	not detected	19.2	-----	
2426	Not Detected	Not Detected	Not Detected	Not Analyzed	Not Analyzed	
2431	-----	-----	-----	-----	58.69	
2444	-----	0.00	-----	-----	-----	
2453	-----	-----	-----	-----	-----	
2459	-----	-----	BDL	-----	BDL	
2460	-----	-----	-----	-----	-----	
2475	-----	-----	-----	-----	-----	
2476	-----	-----	-----	-----	-----	
2492	-----	-----	-----	-----	-----	
2494	not detected	not detected	not detected	not detected	not detected	
2500	<10	<10	<10	<10	<10	
2503	-----	5.688	-----	-----	-----	
2504	<2	<2	<2	<2	<2	
2511	-----	-----	-----	-----	-----	
2526	-----	Not detected	-----	-----	-----	
2529	-----	-----	-----	-----	-----	
2560	<10	<10	<10	<10	<10	
2561	not detected	not detected	not detected	0.166	1.154	
2564	-----	-----	-----	-----	-----	
2569	Not Determined	Not Detected	Not Detected	Not Detected	Not Detected	
2572	<20	<20	<20	<20	<20	
2573	-----	-----	-----	-----	-----	
2590	< L.O.Q.	< L.O.Q.	< L.O.Q.	< L.O.Q.	4.80	
2591	-----	-----	-----	-----	-----	
2624	-----	-----	-----	-----	-----	
2674	-----	<10	-----	-----	-----	
2678	-----	-----	-----	-----	-----	
2734	-----	-----	-----	-----	-----	
2737	-----	-----	-----	-----	-----	
2741	<10	<10	<10	<10	<50	
2758	not detected	not detected	not detected	not detected	not detected	
2794	not detected	not detected	not detected	not detected	not detected	
2798	-----	not detected	not detected	-----	-----	
2817	-----	-----	-----	-----	-----	
2826	-----	Not detected	-----	-----	-----	
2829	-----	-----	-----	-----	-----	
2833	-----	-----	-----	-----	-----	
2835	Not detected	Not detected	Not detected	Not detected	Not detected	
2851	-----	-----	-----	-----	-----	
2853	-----	-----	-----	-----	-----	
2864	-----	not determined	-----	-----	-----	
2885	-----	Not detected	-----	-----	-----	
2900	-----	ND	-----	-----	-----	
2910	not analyzed	not detected	not analyzed	not analyzed	not analyzed	
2924	-----	not detected	-----	-----	-----	
2937	Not detected	Not detected	Not detected	Not detected	Not applicable	
2948	Not detected	Not detected	Not detected	Not detected	Not detected	
2952	-----	-----	-----	-----	-----	
2959	<10	<10	<10	<10	<10	
2960	-----	-----	-----	-----	-----	
2977	not detected	not detected	not detected	not detected	not detected	
2986	-----	-----	-----	-----	-----	
2995	-----	6.16	-----	-----	-----	
3011	-----	-----	-----	-----	-----	
3100	<10	<10	<10	<10	<10	
3110	-----	-----	-----	-----	-----	
3116	-----	-----	-----	-----	-----	
3118	Not Detected	Not Detected	Not Detected	Not Detected	49.0596	C
3122	not detected	not detected	not detected	not detected	not detected	
3127	-----	-----	-----	0.46	0.95	
3146	< 10	< 1.0	< 10	< 10	< 10	
3153	Not detected	Not detected	Not detected	Not detected	Not detected	
3154	-----	-----	-----	-----	-----	
3160	not detected	-----	not detected	not detected	<5	
3163	-----	-----	-----	-----	-----	
3166	0.015	not detected	0.365	0.030	0.85	
3172	-----	< 10	< 10	< 5	-----	
3182	-----	<13	-----	-----	-----	
3185	<10	<10	<10	<10	<10	
3197	<10	<10	<10	<10	<10	
3200	-----	<10.00	-----	-----	-----	
3209	-----	<10.0	-----	<10.0	-----	
3210	<10	<0,02	<10	<10	<10	

lab	Mn	Hg	Ni	Sn	Zn
3214	<10	<10	<10	<10	<10
3225	-----	-----	-----	-----	-----
3228	-----	<10	-----	-----	-----
3230	-----	-----	-----	-----	-----
3233	< 1	< 1	< 1	13.60	24.30
3237	-----	-----	-----	-----	-----
3239	not analyzed	not detected	not analyzed	not analyzed	not analyzed
3246	not detected	not detected	not detected	not detected	not detected
3248	not analyze	not analyze	not analyze	not analyze	not analyze
6379	0.246	-----	0.046	0.0185	0.423
8005	-----	<5	-----	-----	-----
8008	-----	-----	-----	-----	-----

Lab 3118 first reported 196.4001 for Total Zinc as Zn

Other reported Metals in sample #22701; results in mg/kg

lab	Cr	Cr6+	Cu	Mn	Hg
210	-----	-----	-----	-----	-----
310	0.1435	-----	0.389	0.257	0.001
339	-----	-----	-----	-----	-----
523	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----
623	not detected	not detected	not detected	not detected	not detected
826	N.D.	not detected	N.D.	N.D.	N.D.
840	<2	-----	<10	<10	<2
1051	-----	-----	-----	-----	-----
1126	-----	-----	-----	-----	-----
1213	not detected	not detected	not detected	not detected	not detected
2115	-----	-----	-----	-----	-----
2120	< 8,3	-----	< 33	-----	< 0,83
2121	-----	-----	-----	-----	-----
2132	<10	-----	-----	-----	<10
2135	-----	-----	-----	-----	-----
2137	-----	-----	-----	-----	-----
2146	-----	-----	-----	-----	-----
2156	<5	<20	<5	<5	<5
2165	not detected	not detected	-----	-----	not detected
2177	-----	-----	-----	-----	-----
2179	not detected	not detected	not applicable	not applicable	not detected
2182	not determined	not determined	not determined	not determined	not determined
2184	<10	<10	-----	-----	<10
2199	-----	<8	-----	-----	<2.5
2201	<10	<10	<10	<10	<10
2202	Not detected	Not detected	-----	-----	Not detected
2213	<10	-----	<10	<10	<10
2216	None Detected	-----	-----	-----	None Detected
2218	-----	-----	-----	-----	-----
2236	<10.0	N/A	<50.0	<10.0	<5.0
2250	<1	not analyzed	<1	<1	<0,1
2256	not determined	-----	-----	-----	not determined
2258	Not detected	not analyzed	not analyzed	not analyzed	Not detected
2265	< 20	-----	-----	-----	< 0,4
2272	-----	-----	-----	-----	-----
2284	<10	<5	<10	<10	<10
2287	<5	-----	-----	-----	<5
2290	<20	-----	<20	<20	<20
2293	-----	-----	-----	-----	-----
2295	<10	-----	<10	<10	<1
2301	<10	-----	<10	<10	<10
2310	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2314	-----	-----	-----	-----	-----
2316	28.2169	not detected	not detected	not detected	not detected
2320	<5	-----	<5	<5	<5
2326	Not detected	Not detected	Not detected	Not detected	Not detected
2330	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
2339	<1	-----	<1	<1	<1
2347	<8	<8	-----	-----	<2
2350	<5	<8	<5	<5	<2
2352	-----	-----	-----	-----	-----
2353	not detected	not detected	not determined	not determined	not detected
2355	＜8	＜8	＜5	＜5	＜2
2357	<8	<8	<5	<10	<2
2358	not detected	not determined	not detected	not detected	not detected
2362	-----	-----	-----	-----	-----
2363	<2	<8	<5	<5	<2
2365	＜8	＜8	-----	-----	＜2
2366	<8	<8	<50	<50	<2
2369	<2	-----	<5	<5	<2
2370	<2	<8	<2	<2	<2
2373	not detected	not applicable	not detected	not applicable	not detected
2375	<10	<8	<10	<10	<10
2378	-----	-----	-----	-----	-----
2379	Not detected	Not Analyzed	Not Analyzed	Not Analyzed	Not detected
2380	-----	-----	-----	-----	-----
2381	not detected	-----	not detected	not detected	not detected
2382	＜10	＜8	＜10	＜10	＜5
2384	Not Detected	Not Detected	-----	-----	Not Detected
2385	<5	<1	<5	<5	<0.1
2387	Not Detected	Not Detected	-----	-----	Not Detected
2392	Not detected	Not detected	Not detected	Not detected	Not detected

lab	Cr	Cr6+	Cu	Mn	Hg
2406	not detected	-----	-----	-----	not detected
2410	-----	-----	-----	-----	-----
2413	Not Detected	Not Analyzed	Not Detected	Not Detected	Not Detected
2424	not detected	-----	10.5	not detected	0.0114
2426	Not Detected	Not Analyzed	Not Analyzed	Not Detected	Not Detected
2431	-----	-----	-----	-----	-----
2444	-----	0.00	-----	-----	0.00
2453	-----	-----	-----	-----	-----
2459	ND	-----	ND	BDL	ND
2460	-----	-----	-----	-----	-----
2475	-----	-----	-----	-----	-----
2476	-----	-----	-----	-----	-----
2492	-----	-----	-----	-----	-----
2494	not detected	not detected	not detected	not detected	not detected
2500	<10	-----	<10	<10	<10
2503	below detectable limit	-----	-----	-----	2.394
2504	<2	<5	<2	<2	<2
2511	-----	-----	-----	-----	-----
2526	Not Detected	-----	-----	-----	Not Detected
2529	-----	-----	-----	-----	-----
2560	<10	not analyzed	<10	<10	<10
2561	0.706	-----	0.254	0.016	not detected
2564	-----	-----	-----	-----	-----
2569	Not Detected	Not Determined	Not Detected	Not Determined	Not Detected
2572	<20	-----	<20	<20	<20
2573	-----	-----	-----	-----	-----
2590	< L.O.Q.	not performed	< L.O.Q.	< L.O.Q.	< L.O.Q.
2591	-----	-----	-----	-----	-----
2624	-----	-----	-----	-----	-----
2674	<10	<10	-----	-----	<10
2678	-----	-----	-----	-----	-----
2734	-----	-----	-----	-----	-----
2737	-----	-----	-----	-----	-----
2741	<10	<10	<100	<10	<10
2758	not detected	not determined	not detected	not detected	not detected
2794	not detected	not analyzed	not detected	not detected	not detected
2798	not detected	-----	not detected	-----	not detected
2817	-----	-----	-----	-----	-----
2826	Not detected	Not detected	-----	-----	Not detected
2829	-----	-----	-----	-----	-----
2833	-----	-----	-----	-----	-----
2835	Not detected	Not detected	Not detected	Not detected	Not detected
2851	-----	-----	-----	-----	-----
2853	-----	-----	-----	-----	-----
2864	-----	not determined	-----	-----	not determined
2885	-----	-----	-----	-----	Not detected
2900	ND	-----	-----	-----	ND
2910	not detected	not analyzed	not analyzed	not analyzed	not detected
2924	not detected	-----	-----	-----	not detected
2937	Not detected	Not applicable	Not detected	Not detected	Not detected
2948	Not detected	Not detected	Not detected	Not detected	Not detected
2952	-----	-----	-----	-----	-----
2959	<10	-----	<10	<10	<10
2960	-----	-----	-----	-----	-----
2977	not detected	not analyzed	not detected	not detected	not detected
2986	-----	-----	-----	-----	-----
2995	not detected	not detected	-----	-----	2.91
3011	-----	-----	-----	-----	-----
3100	<10	<10	<10	<10	<10
3110	-----	-----	-----	-----	-----
3116	-----	-----	-----	-----	-----
3118	5.8086	Not Detected	11.8346	6.5871	Not Detected
3122	not detected	0.784	not detected	not detected	not detected
3127	below detection limit	-----	-----	-----	-----
3146	< 10	not analyzed	< 10	< 10	< 1.0
3153	Not detected	Not detected	Not detected	Not detected	Not detected
3154	-----	-----	-----	-----	-----
3160	not detected	-----	not detected	not detected	-----
3163	-----	-----	-----	-----	-----
3166	0.15	-----	0.075	0.065	not detected
3172	< 10	< 10	-----	-----	< 10
3182	-----	<10	-----	-----	<13
3185	<10	<10	<10	<10	<10
3197	<10	<10	<10	<10	<10
3200	<10.00	-----	-----	-----	<10.00
3209	<10.0	-----	-----	-----	<10.0
3210	<10	-----	<10	<10	<0,02
3214	< 10	< 8	< 10	< 10	< 10

lab	Cr	Cr6+	Cu	Mn	Hg
3225	-----	-----	-----	-----	-----
3228	<10	-----	-----	-----	<10
3230	-----	-----	-----	-----	-----
3233	< 1	< 1	< 1	< 1	< 1
3237	-----	-----	-----	-----	-----
3239	not detected	<50.00	not analyzed	not analyzed	not detected
3246	not detected	not detected	not detected	not detected	not detected
3248	not analyze	not analyze	not analyze	not analyze	not analyze
6379	0.118	-----	0.048	0.077	-----
8005	<7	-----	-----	-----	<5
8008	-----	-----	-----	-----	-----

Other reported Metals in sample #22701; results in mg/kg - continued -

lab	Ni	Sn	Zn	
210	-----	-----	-----	
310	0.1985	0.1595	9.9155	
339	-----	-----	-----	
523	-----	-----	-----	
551	-----	-----	-----	
623	not detected	not detected	not detected	
826	N.D.	-----	-----	
840	<2	<2	<10	
1051	-----	-----	-----	
1126	-----	-----	-----	
1213	not detected	not detected	<10	
2115	-----	-----	6.81	
2120	< 33	-----	-----	
2121	-----	-----	-----	
2132	-----	-----	-----	
2135	-----	-----	-----	
2137	-----	-----	-----	
2146	-----	-----	-----	
2156	<5	<5	13.15	
2165	-----	-----	-----	
2177	-----	-----	-----	
2179	not applicable	not applicable	not applicable	
2182	not determined	not determined	not determined	
2184	-----	-----	-----	
2199	-----	-----	-----	
2201	<10	<10	<10	
2202	Not detected	-----	-----	
2213	<10	<10	<10	
2216	-----	-----	-----	
2218	-----	-----	-----	
2236	<10.0	<10.0	<50.0	
2250	<1	<1	<10	
2256	-----	-----	-----	
2258	not analyzed	not analyzed	not analyzed	
2265	-----	-----	-----	
2272	-----	-----	14.4	
2284	<10	<10	<10	
2287	-----	-----	-----	
2290	<20	<20	<20	
2293	-----	-----	-----	
2295	<10	<10	<10	
2301	<10	-----	-----	W
2310	not detected	not detected	not detected	
2311	Not Detected	Not Detected	Not Detected	
2313	Not Applicable	Not Applicable	Not Applicable	
2314	-----	-----	-----	
2316	38.7324	not applicable	not detected	
2320	<5	<5	10.119	
2326	Not detected	Not detected	Not detected	
2330	Not Analyzed	Not Analyzed	Not Analyzed	
2339	<1	<1	6	
2347	-----	-----	-----	
2350	<5	<10	11.8	
2352	-----	-----	-----	
2353	not determined	not determined	not determined	
2355	＜5	＜10	＜20	
2357	<5	<10	<20	
2358	not detected	not detected	not detected	
2362	-----	-----	-----	
2363	<5	<5	9.8	
2365	＜10	-----	-----	
2366	<10	<12	<50	
2369	<5	<5	9.10	
2370	<2	<2	8.58	
2373	not detected	not applicable	not applicable	
2375	<10	<10	<10	
2378	-----	-----	-----	
2379	Not Analyzed	Not Analyzed	Not Analyzed	
2380	-----	-----	-----	
2381	not detected	not detected	not detected	
2382	＜10	＜20	＜20	
2384	-----	-----	-----	
2385	<5	<5	<10	
2387	-----	-----	-----	
2392	Not detected	Not detected	Not analyzed	

lab	Ni	Sn	Zn	
2406	-----	-----	-----	
2410	-----	-----	-----	
2413	Not Detected	Not Detected	Not Detected	
2424	not detected	16.1	-----	
2426	Not Detected	Not Analyzed	Not Analyzed	
2431	-----	-----	57.51	
2444	-----	-----	-----	
2453	-----	-----	-----	
2459	BDL	BDL	BDL	
2460	-----	-----	-----	
2475	-----	-----	-----	
2476	-----	-----	-----	
2492	-----	-----	-----	
2494	not detected	not detected	not detected	
2500	<10	<10	<10	
2503	-----	-----	-----	
2504	<2	<2	18.68	
2511	-----	-----	-----	
2526	-----	-----	-----	
2529	-----	-----	-----	
2560	<10	<10	<10	
2561	not detected	8.043	6.998	
2564	-----	-----	-----	
2569	Not Detected	Not Detected	Not Detected	
2572	<20	<20	<20	
2573	-----	-----	-----	
2590	< L.O.Q.	< L.O.Q.	9.60	
2591	-----	-----	-----	
2624	-----	-----	-----	
2674	-----	-----	-----	
2678	-----	-----	-----	
2734	-----	-----	-----	
2737	-----	-----	-----	
2741	<10	<10	<50	
2758	not detected	not detected	not detected	
2794	not detected	not detected	21.2	C
2798	not detected	-----	-----	
2817	-----	-----	-----	
2826	-----	-----	-----	
2829	-----	-----	-----	
2833	-----	-----	-----	
2835	Not detected	Not detected	Not detected	
2851	-----	-----	-----	
2853	-----	-----	-----	
2864	-----	-----	-----	
2885	-----	-----	-----	
2900	-----	-----	-----	
2910	not analyzed	not analyzed	not analyzed	
2924	-----	-----	-----	
2937	Not detected	Not detected	Not applicable	
2948	Not detected	Not detected	Not detected	
2952	-----	-----	-----	
2959	<10	<10	<10	
2960	-----	-----	-----	
2977	not detected	not detected	11.22	
2986	-----	-----	-----	
2995	-----	-----	-----	
3011	-----	-----	-----	
3100	<10	<10	<10	
3110	-----	-----	-----	
3116	-----	-----	-----	
3118	Not Detected	Not Detected	28.3300	C
3122	not detected	not detected	not detected	
3127	-----	0.36	4.2	
3146	< 10	< 10	< 10	
3153	Not detected	Not detected	Not detected	
3154	-----	-----	-----	
3160	not detected	not detected	8.71	
3163	-----	-----	-----	
3166	0.035	0.073	8.15	
3172	< 10	< 5	-----	
3182	-----	-----	-----	
3185	<10	<10	<10	
3197	<10	<10	<10	
3200	-----	-----	-----	
3209	-----	<10.0	-----	
3210	<10	<10	<10	
3214	< 10	< 10	< 10	

lab	Ni	Sn	Zn	
3225	-----	-----	-----	
3228	-----	-----	-----	
3230	-----	-----	-----	
3233	1.08	11.00	16.2	C
3237	-----	-----	-----	
3239	not analyzed	not analyzed	not analyzed	
3246	not detected	not detected	not detected	
3248	not analyze	not analyze	not analyze	
6379	0.054	0.022	8.885	
8005	-----	-----	-----	
8008	-----	-----	-----	

Lab 2301 test result withdrawn, reported 29.79 for Total Zinc as Zn
Lab 2794 first reported 33.43 for Total Zinc as Zn
Lab 3118 first reported 228.6787 for Total Zinc as Zn
Lab 3233 first reported 37.20 for Total Zinc as Zn

APPENDIX 3 Analytical details

lab	ISO17025 accreded	sample preparation	sample intake (g)	Cr6+ solvent	Cr6+ composition of digestion	Cr6+ extraction time (min)	Cr6+ extraction temp. (°C)
210	---	---	---	---	---	---	---
310	Yes	Further cut	0.10	---	---	---	---
339	---	---	---	---	---	---	---
523	---	---	---	---	---	---	---
551	---	---	---	---	---	---	---
623	Yes	Further cut	0.2 gram	Digest solution toluene buffer PO4	NaOH, Na2CO3	1.5 x 60 minutes	160
826	---	---	Cr(VI) : 0.15 g	Toluene	Toluene + Water(20 g NaOH + 30 g Na2CO3 with water in a 1 L Vol. flask)	90 min	150 °C
840	Yes	Further cut	3.0g	organic/alkaline solution	toluene/Sodium carbonate/Sodium hydroxide/Magnesium chloride/Phosphate buffer	90 minutes	(150-160)°C
1051	Yes	Further cut	---	---	---	---	---
1126	No	Further cut	0,1 gram	n.v.t.	n.v.t.	n.v.t.	n.v.t.
1213	Yes	Further cut	Total heavy metal: 0.3g Cr VI: 0.15g	Toluene	Alkaline	90 mins	150oc
2115	Yes	Used as received	0.12 g	---	---	---	---
2120	Yes	Used as received	0,15 g/ 50 ml for EN 16711-1, 0,3 g/25 ml for CPSC-CH-E1002-08.3 and 0,5 g/50 ml for EN 1122	---	---	---	---
2121	Yes	Further cut	150 mg	---	---	---	---
2132	Yes	Further cut	---	---	---	---	---
2135	Yes	Further cut	0,25	Phosphate buffer pH 8,0	2g/100ml	180	20°C
2137	Yes	Further cut	0.2	---	---	---	---
2146	No	Further cut	0,2 g	---	---	---	---
2156	Yes	Further cut	0.10g	Toluene	20g/l of NaOH and 30g/l of Na2CO3 in water	90 minutes	150-160 degree Celsius
2165	Yes	Further cut	0.1g nearest to 0.1mg.	Toluene.	NaOH,Na2CO3	90 mins.	150°C
2177	Yes	Further cut	0.1g	---	---	---	---
2179	---	---	---	---	---	---	---
2182	Yes	Used as received	Lead: 0.1g Cadmium: 0.5g	---	---	---	---
2184	Yes	Further cut	Cd: 0.5g Pb, Cr, Hg, Cr(VI): 0.15g	---	NaOH, Na2CO3, toluene	1.5hr	150oC
2199	Yes	Further grinded	0.15-0.25g	Toluene	Sodium Hydroxide and sodium carbonate	1.5hrs	155DegC
2201	Yes	Further cut	0.2g for total,0.15g for Cr6+.	Toluene	Dissolve 20.0 ¡À 0.05g NaOH and 30.0 ¡À 0.05g Na2CO3 in DI water	90 minutes	155
2202	Yes	Used as received	0.3 g	Trichloroben zene(TCB)	(NaOH + Na2CO3) solution	12hr	room temp.
2213	Yes	Further cut	0.2 gm	---	---	---	---
2216	Yes	Further grinded	4.2792 g both samples	Toluene	Solution of NaOH and Na2CO3	90	155
2218	Yes	Further cut	0.15g	---	---	---	---
2236	Yes	Further cut	0.1	N/A	N/A	N/A	N/A
2250	Yes	Used as received	0,1	---	---	---	---
2256	Yes	Further cut	#22700:0.2022g #22701:0.2123g	---	---	---	---
2258	---	---	---	---	---	---	---
2265	Yes	Further cut	0,1g	---	---	---	---
2272	Yes	Further cut	0.15	---	---	---	---
2284	Yes	Further cut	4g	methylbenze ne	NaOH Na2CO3	1.5hours	160°C
2287	Yes	Further cut	0.1g	---	---	---	---
2290	Yes	---	---	---	---	---	---
2293	Yes	Further cut	0.1	---	---	---	---
2295	Yes	Further cut	0.1 g	---	---	---	---
2301	Yes	#22700: Further cut #22701: Used as received	#22700 : 0.2011 #22701 : 0.2092	---	---	---	---
2310	Yes	Used as received	0.2	Toluene	2% NaoH and 3% Na2Co3	90	150

lab	ISO17025 accreded	sample preparation	sample intake (g)	Cr6+ solvent	Cr6+ composition of digestion	Cr6+ extraction time (min)	Cr6+ extraction temp. (°C)
2311	Yes	Further cut	0.1	Toluene	Magnesium chloride, Phosphate buffer	90min	150
2313	No	Further cut	0.25g	---	---	---	---
2314	Yes	Further cut	0.2 grams	Not applicable	Not applicable	Not applicable	Not applicable
2316	Yes	Further cut	0.15 gram	Toulene	Sodium Hydroxide and sodium carbonate	90 minutes	155° C
2320	Yes	Used as received	0.25 grams	---	---	---	---
2326	Yes	Further cut	0.2 gm	Digestion solution Mgcl2 Phosphate buffer	20g NaOH+30g Na2CO3 in 1L	180 mints	92°C
2330	---	---	0.25 g	---	---	---	---
2339	No	Used as received	0.2 g	---	---	---	---
2347	Yes	Further cut	IEC 62321-4/5:0.2g IEC 62321-7-2:0.15g	No	NaoH+NaCO3	90min	160℃
2350	Yes	Further grinded	6 g	Toluene	Na2Co3+NaOH	90 min	155 °C
2352	Yes	Further cut	3g	Toluene	Toluene NaOH Na2CO3	90mins	160℃
2353	Yes	Further grinded	1g	---	---	---	---
2355	Yes	Further cut	1g	甲苯	强碱消解液（30 g/LNaCO3+ 20 g/LNaOH）	1.5h	160℃
2357	---	---	---	---	---	---	---
2358	Yes	Further grinded	0.25	---	---	---	---
2362	Yes	Further grinded	0.25g	---	---	---	---
2363	Yes	Further cut	#22700:0.1g #22701:0.25g Cr6+:#22700:0.15g Cr6+:#22701:0.15g	Toluene	Mixed solution of NaOH and NaCO3	90mins	150~160℃
2365	Yes	Further grinded	0.2g	10 mL of digestion solution + 5 mL of toluene+400 mg MgCl2 and 0.5 mL of 1.0 mol/L phosphate buffer	20.00 g NaOH + 30.00 gNa2CO3 in water in a 1 L volumetric	90min	150℃~160℃
2366	---	---	---	---	---	---	---
2369	---	---	---	---	---	---	---
2370	Yes	#22700: cut; #22701: received #22700 further cut; #22701 used as received	0.1 - 0.2g	digestion solution (4.2 h)) and 5 ml of toluene (4.2 i)	Dissolve 20,0 g ± 0,05 g NaOH and 30,0 g ± 0,05 g Na2CO3 in water	1.5 h	160°C
2373	Yes		150mg	not applicable	not applicable	not applicable	not applicable
2375	Yes	---	---	---	---	---	---
2378	Yes	Further cut	0.2	---	---	---	---
2379	Yes	Further cut	0.25 g	---	---	---	---
2380	Yes	Further cut	0.25 gm	Digestion solution, toluene, magnesium chloride.	Sodium hydroxide and sodium carbonate.	90 minutes.	150°C.
2381	Yes	Further cut	0.25 Total heavy Metal : 0.1g CrVI :	Alkaline digestion solution	NaOH、Na2CO3	90min	160℃
2382	Yes	Further cut	0.15g	Toluene	Sodium Carbonate and Sodium Hydroxide	105 minutes	155
2384	Yes	Further cut	0.25 gram				
2385	Yes	Further cut	0.10 - 0.12				
2387	Yes	Further cut	0.2grams	Toluene	Sodium Hydroxide and Sodium Carbonate	105 minutes	155 'C
2392	Yes	Further grinded and Further cut	0.15 g	Toluene	Alkaline digestion solution, Phosphate Buffer.	1.5 Hr	150-160 degree Celsius.
2406	Yes	Further cut	0.1 gram	---	---	---	---

lab	ISO17025 accreded	sample preparation	sample intake (g)	Cr6+ solvent	Cr6+ composition of digestion	Cr6+ extraction time (min)	Cr6+ extraction temp. (°C)
2410	Yes	Further grinded	0.2 g	Toluene	Dissolve 20.0 g NaOH and 30.0 g Na2CO3 in water in a 1 L volumetric flask	90 min	160 °C
2413	Yes	Further cut	Sample 22700 0.1523g Sample 22701 0.1532g	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2424	Yes	Further cut	0.1	NMP	20 g NaOH, 30 g NaCO3 in 1 L water	180	60
2426	Yes	Further cut	0.1 g	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2431	Yes	Further cut	---	---	---	---	---
2444	Yes	Further cut	0.2 grams for Cd and Pb and 0.1 grams for Cr6+	Digestion solution+Toluene+MgCl2 +Phosphate Buffer	NaOH+Na2CO3+H2O	90 minutes	150-160 oC
2453	No	Further cut	±0.1g	---	---	---	---
2459	Yes	Used as received	0.2g for each replicate analysis	---	---	---	---
2460	Yes	#22700: Used as received / #22701: cut	Pb = 0.2 g, Cd = 0.5 g	---	---	---	---
2475	Yes	Used as received	0.1g	---	---	---	---
2476	---	---	---	---	---	---	---
2492	Yes	Further cut	0.1g	---	---	---	---
2494	Yes	Further cut	0.100 gram	N-Methyl-Pyrrolidone (NMP)	Sodium carbonate (Na2CO3) and Sodium hydroxide (NaOH)	Total 180 minutes	60 Degree Celcius
2500	Yes	Used as received	0.2	---	---	---	---
2503	---	---	---	---	---	---	---
2504	Yes	Further cut	0.25	Digestion solution , Phosphate Buffer , Toluene	1. NaOH 2. Na2CO3	1.5 hrs	150
2511	Yes	Used as received	0.15g	//	//	//	//
2526	Yes	Further grinded	0.1 gm	NMP (N-methyl-pyrolidone), digestion solution	20gm ±0.05g NaOH, 30.0 gm ±0.05gm Na2CO3 and dilute to 1L distilled water & maintaned pH 11.5		60°C
2529	No	#22700 was cyromilled and #22701 was used as received.	0.0150 g 3 trials	---	---	---	---
2560	Yes	Further cut	0.1000g	not analyzed	not analyzed	not analyzed	not analyzed
2561	Yes	Further cut	1g	---	---	---	---
2564	Yes	Further cut	---	---	---	---	---
2569	Yes	Further cut	0.25 g	Not performed	---	---	---
2572	---	---	---	---	---	---	---
2573	Yes	Further cut	0.15g	---	---	---	---
2590	Yes	#22700 further cut #22701 used as received	0.2	---	---	---	---
2591	Yes	Further cut	0.25 grams	---	---	---	---
2624	No	Further cut	0.513 gr for 22700 0.504 gr for 22701	---	---	---	---
2674	No	Further cut	about 0.1 g	Toluene	NaOH and Na2CO3	120 mins	150℃-160℃
2678	---	---	---	---	---	---	---
2734	---	---	---	---	---	---	---
2737	Yes	Further cut	0.1g	NA	NA	NA	NA
2741	Yes	Further cut	0.15g	/	/	/	/
2758	No	Further cut	0.5	---	---	---	---
2794	No	Used as received	sample was scanned as such. Sufficient to cover the XRF aperture was used.	not tested	not tested	not tested	not tested
2798	Yes	Further cut	0.1g~0.15g	---	---	---	---
2817	---	---	---	---	---	---	---
2826	Yes	Further cut	Others 0.2g, CrVI 0.15g	Toluene	Sodium carbonate + sodium hydroxide	90	150-160oC
2829	Yes	Further cut	0.150	---	---	---	---

lab	ISO17025 accredited	sample preparation	sample intake (g)	Cr6+ solvent	Cr6+ composition of digestion	Cr6+ extraction time (min)	Cr6+ extraction temp. (°C)
2833	Yes	---	---	Not applicable	Not applicable	Not applicable	Not applicable
2835	Yes	Further cut	0.2 to 0.2099 g for heavy metal	Digestion Solution	Sodium Hydroxide and sodium carbonate	90 minutes	150 degree celsius to 160 degree celsius
2851	---	---	---	---	---	---	---
2853	Yes	Further cut	0.1	---	---	---	---
2864	Yes	Further cut	0.2	Toluene	Naoh+Na2CO3	90	160
2885	No	Further cut	0.20g	---	---	---	---
2900	Yes	Further cut	0.2032g & 0.2013g	---	---	---	---
2910	Yes	Further cut	0.1g	---	5mL toluene , 10mL digestion solution, 1mL 0.4g/mL MgCl2 and 0.5mL phosphate buffer	about 1.5h	150℃
2924	No	Further cut	---	---	---	---	---
2937	No	Further cut	0.10 - 0.15 gram	Not applicable	Not applicable	Not applicable	Not applicable
2948	Yes	Used as received	0.25	N/A	N/A	N/A	N/A
2952	Yes	Further cut	#22700 = 0.1986 g #22701 = 0.2291 g	---	---	---	---
2959	Yes	Further cut	---	---	---	---	---
2960	Yes	Further cut	0.05	---	---	---	---
2977	Yes	Used as received	0.1 g	Not performed	Not performed	Not performed	Not performed
2986	---	---	---	---	---	---	---
2995	No	Further cut	#22700 : Cd, Cr and Pb : 0.2g Cr6 : 0.15g Hg : 0.1g #22701 : Cd, Cr and Pb : 0.2g Cr6 : 0.15g Hg : 0.1g	5 ml toluene	20 g NaOH + 30 g Na2CO3 in 1 L H2O	90 min	T = 155°C
3011	---	---	---	---	---	---	---
3100	Yes	Further grinded	IEC 62321-5:2013 use 0.15g IEC 62321-7-2:2017 use 0.15g EN 1122:2001 method B use 0.5g IEC 62321-4:2013+AMD1:20 17 use 0.1g	Toluene, NaOH, Na2CO3	20g/LNaOH, 30g/LNa2CO3,Toluene	90 minutes	155°C
3110	---	---	---	---	---	---	---
3116	Yes	Used as received	---	---	---	---	---
3118	Yes	Further cut	0.15 gram, Cr (VI) = 2 gram	N-Methyl-pyrolidone Alkaline digestion solution	Sodium Hydroxide and Sodium Carbonate which it's dissolved to water	60	60
3122	Yes	Further grinded	0.2 grams	Na2CO3/NaOH	Alkaline digestion solution 0.28M Na2CO3/NaOH	60 minutes	95°C
3127	Yes	Further cut	0,25	---	---	---	---
3146	Yes	#22700: Further cut #22701: Used as received For Cr6+ analysis both samples were grinded.	0.25 g / CrVI: 0.15g	Sample preparation of insoluble polymers according to DIN EN 62321-7-2: 2017-12: toluene + digestion solution (20g NaOH + 30g Na2CO3 in 1 liter water) + magnesium chloride + phosphate buffer	Sample preparation of insoluble polymers according to DIN EN 62321-7-2: 2017-12: toluene + digestion solution (20g NaOH + 30g Na2CO3 in 1 liter water) + magnesium chloride + phosphate buffer	extraction is carried out in a microwave oven; the sample is heated to 155°C in 15 min and then kept at 155°C for 90 min; the sample is then cooled down again	155 °C
3153	Yes	Further grinded	100 mg	Toluene	20g NaOH and 30g Na2CO4 in 1000mL water	90 minutes	160°C
3154	Yes	Further cut	0,2	---	---	---	---

lab	ISO17025 accreded	sample preparation	sample intake (g)	Cr6+ solvent	Cr6+ composition of digestion	Cr6+ extraction time (min)	Cr6+ extraction temp. (°C)
3160	Yes	Further cut	0.15 grams	---	---	---	---
3163	---	---	---	---	---	---	---
3166	Yes	Further grinded	0.2g	Not tested	Not tested	Not tested	Not tested
3172	---	---	---	---	---	---	---
3182	Yes	Further grinded	0.15 g	Toluene	10 mL digestion solution (sodium hydroxide + sodium carbonate), 5 mL toluene, 400 mg magnesium chloride, 0.5 M phosphate buffer	90 min	150-160 c
3185	Yes	Further cut	For Cr6+ 0.15g ; For Cd 0.5g ; For other elements 0.1g	sodium hydroxide + sudium Carbonate + toluene	20g/L sodium hydroxide + 30g/L sudium Carbonate + toluene	90 minutes	160°C
3197	Yes	Further grinded	0.1 g	Digest Solution	30 g ± 0,05 g Na2CO3 and 20 g ± 0,05 g NaOH are diluted to 1 L.	90 Minutes	150°C
3200	Yes	Further cut	0.1 gram	---	---	---	---
3209	Yes	Further cut	22700:0.1044g 22701:0.1066g	---	---	---	---
3210	---	---	---	---	---	---	---
3214	Yes	Further grinded	0.2 g	Toluene	Sodium hydroxide and Sodium carbonate	90 minutes	155 °C
3225	Yes	Further cut	0.5g for EN 1122 0.25g for CPSC	NA	NA	NA	NA
3228	Yes	Further cut	0.1-0.2g	---	---	---	---
3230	---	---	---	---	---	---	---
3233	No	#22700: cutted #22701: as received	#22700 : 0.1056g #22701 : 0.1112g	#22700 : water	#22700 : solution of 1,5-Diphénylcarbazide /sulfuric acid 10 % / buffer solution (NaH2PO4, H2O)	#22700 : 5 minutes	#22700 : 100°C
3237	Yes	Further cut	0,2	---	---	---	---
3239	Yes	Further grinded	0.1g	Toluene	Sodium Hydroxide & sodium carbonate	90	150-160
3246	Yes	Used as received	0.1-0.2g	Toluene	Alkaline digestion solution	1.5h	150°C
3248	Yes	Further cut	0.15	---	---	---	---
6379	No	Used as received	0,1g	---	---	---	---
8005	Yes	Used as received	---	---	---	---	---
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	EGYPT
2 labs in	FINLAND
7 labs in	FRANCE
7 labs in	GERMANY
2 labs in	GUATEMALA
21 labs in	HONG KONG
8 labs in	INDIA
4 labs in	INDONESIA
7 labs in	ITALY
2 labs in	JAPAN
7 labs in	KOREA, Republic of
4 labs in	MALAYSIA
1 lab in	MAURITIUS
6 labs in	MEXICO
1 lab in	MOROCCO
30 labs in	P.R. of CHINA
4 labs in	PAKISTAN
2 labs in	PORTUGAL
3 labs in	SINGAPORE
3 labs in	SPAIN
1 lab in	SRI LANKA
1 lab in	SWITZERLAND
3 labs in	TAIWAN
6 labs in	THAILAND
3 labs in	THE NETHERLANDS
3 labs in	TUNISIA
4 labs in	TURKEY
7 labs in	U.S.A.
1 lab in	UNITED KINGDOM
7 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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