Results of Proficiency Test
Metals in Plastics
September 2014

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

World-wide, many consumer products with plastic parts are produced and transported. These plastic parts are produced under strict regulations. For instance in the European Directive 2002/95/EC maximum concentrations are specified for metals in plastic: the sum of Lead (Pb), Mercury (Hg), Cadmium (Cd) and hexavalent Chromium (CrVI) may not exceed 0.1%M/M, while the maximum concentration for Cadmium may not exceed 100 mg/kg.
The determination of metals in plastics is known to give some times problems with regard to the comparability of laboratory results. However, still only few plastic reference materials are available (ref 16.). As an alternative, participation in a proficiency test may enable the laboratories to check their performance and thus to increase this comparability. Therefore, a proficiency testing scheme (laboratory-evaluating interlaboratory study) for the determination of metals in plastics is organised by the Institute for Interlaboratory Studies since 1998 (see reference 16). Starting with only total Cadmium, over the years the scope was extended with total Lead, total Chromium, Chromium (VI) and total Mercury. In this year's proficiency test the scope was extended with Antimony and Cobalt. Both metals Antimony and Cobalt are listed on the "Substance of Very High Concern" list and are subject to authorisation under the REACH regulation.
In the interlaboratory study of September 2014, 187 laboratories from 39 different countries participated (See appendix 3). In this report, the results of the proficiency test are presented and discussed. This report is also electronically available through the iis internet site www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. It was decided to send 2 different samples (approximately 5 gram each), labelled #14150 and #14151, both positive (artificially fortified) on one or more metals. The analyses for fit-for-use and for homogeneity testing were subcontracted to an ISO17025 accredited laboratory. Participants were requested to report also some details of the test methods used.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in accordance with ISO/IEC 17043:2010, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie, see also www.RVA.nl). This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentially of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3), which can be downloaded from www.iisnl.com.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

Two different samples, both artificially fortified to be positive on one or more metals, were selected. The materials were divided over plastic bags, approx. 5 grams for each sample and labelled respectively #14150 and #14151.
The homogeneity of the subsamples #14150 was checked by determination of total Cobalt (Co) and total Chromium (Cr) content on 8 stratified randomly selected subsamples. The homogeneity test results varied for total Cobalt between 113.6 and 116.9 mg/kg and for total Chromium between 45.8 and 48.6 mg/kg. From the test results, the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the target method in agreement with the procedure of ISO 13528, Annex B2, in table 1.
The second batch, labeled #14151, was used in a previous proficiency test (iis06P03, sample #0650). The homogeneity of this batch was confirmed in proficiency test iis06P03 as the observed reproducibility (of the group of 76 laboratories) was in full agreement with the EN1211:01 target reproducibility.

	Total Cobalt in #14150 in mg/kg	Total Chromium in #14150 in mg/kg
r (observed)	3.2	2.8
reference method	Horwitz	Horwitz
0.3 x R (reference method)	7.6	3.6

Table 1: evaluation of repeatability of the subsamples #14150

	Total Cadmium in #14151 in mg/kg
R (calc iis06P03)	20.4
reference method	EN1122:01
R (reference method)	24.1

Table 2: evaluation of reproducibility of the subsample #14151

Based on the data in table 1 and 2, the homogeneity of all subsamples was assumed. To each of the participating laboratories one set of samples, (1* sample #14150 and 1* sample #14151) was sent on August 13, 2014.

2.5 ANALYSIS

The participants were requested to determine on both samples: total Antimony, total Cadmium, total Chromium, hexavalent Chromium (VI), total Cobalt, total Lead and total Mercury. It was explicitly requested to treat the samples as if it were routine samples and to report the analytical results using the indicated units on the report form. And not to round the results, but report as much significant figures as possible.
It was also requested not to report ‘less than’ results, which are above the detection limit, because such results cannot be used for meaningful statistical calculations.
To get comparable results a detailed report form, on which the units were prescribed, was sent together with each set of samples. In addition, a letter of instructions was added to the package.
The laboratories were also requested to report some details of the test methods used.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were received. The original data are tabulated per sample in the appendix 1 of this report. The laboratories are represented by their code numbers.

Directly after deadline, a reminder was sent to those laboratories that did not report results at that moment. Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected results are used for the data analysis and the original results are placed under 'Remarks' in the result tables in appendix 1. A list of abbreviations used in the tables can be found in appendix 4.

3.1 STATISTICS

Statistical calculations were performed as described in the report ’iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ of April 2014 (iis-protocol, version 3.3)
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as ‘<…’ or ‘>…” were not used in the statistical evaluation.

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

According to ISO 5725 (1986 and 1994, lit. 7 and 8) the original results per determination were submitted subsequently to Dixon’s, Grubbs' and Rosner outlier tests. Outliers are marked by D(0.01) for the Dixon’s test, by G(0.01) or DG(0.01) for the Grubbs’ test and by R(0.01) for the Rosner General ESD test (ref. 20). 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 General ESD test.

Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are under the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 4, no 17 and 18). Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This target standard deviation was calculated from the literature reproducibility by division with 2.8.

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 $z_{(target)}$-scores were calculated according to:

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

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

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

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

4 EVALUATION

In this interlaboratory study some problems were encountered with the dispatch of the samples. Thirty-one participants reported the results after the final reporting date and six participants did not report any results at all due to several reasons. Not all laboratories were able to report all analyses requested.
Finally, the 181 reporting laboratories submitted 1078 numerical results. Observed were 54 outlying results, which is 4.8% of all reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

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

When the analytical details, reported by the laboratories, were evaluated, it was striking to see, that some reported details were quite strange. Several participants reported that they reduced the samples by cutting, but nevertheless the particle size used was “as received”. Other participants reduced the particle size to less than 0.010µm (?).

Ten laboratories reported deviating results on the metals (Cr, Pb, Hg and Co) of sample #14150. At least two of the four reported test results were statistical outliers for each of the laboratories. As the four test results are not independent (one digestion), it was decided not to use any of the reported results of these laboratories for the statistical evaluation.

4.1 PERFORMANCE EVALUATION OF THE GROUP OF LABORATORIES

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

For the determination of the metals Chromium, Lead, Cobalt and Mercury in plastics, the method IEC62321 part 5 is considered to be the official test method. In the new 2014 version of this test method, precision data are mentioned. Regretfully it is not clear which precision data can be used as reference values, as there is no significant correlation between the concentration of the metal, the quantification method and type of sample. Therefore, it qwas decided not to use the precision data mentioned in IEC62321-part 5: 2014, but to estimate the reproducibility from the Horwitz equation.

Parameter	unit	n	Average	2.8 * sd	R (target)
Total Chromium as Cr	mg/kg	134	48.1	14.5	12.0
Hexavalent Chromium (VI) as Cr	mg/kg	59	15.9	18.5	(4.7)
Total Cobalt as Co	mg/kg	117	128.4	40.1	27.7
Total Lead as Pb	mg/kg	158	161.4	46.6	33.6
Total Mercury as Hg	mg/kg	131	141.8	69.7	30.1

Table 3: performance overview for sample #14150

Parameter	unit	n	Average	2.8 * sd	R (target)
Total Cadmium as Cd	mg/kg	167	97.8	18.1	24.4

Table 4: performance overview for sample #14151

*) Between brackets is near or below the lower detection limit

Without further statistical calculations, it can be concluded that there is not a good compliance of the group of participating laboratories with the relevant target reproducibility for sample #14150.

The analytes that were problematic are discussed in paragraph 4.2.

4.2 EVALUATION PER ELEMENT

In this section, the results are discussed per analyte.

Total Chromium: This determination may be problematic. In total fifteen statistical outliers were observed and five results were excluded from the statistical calculation.
For sample #14150 the calculated reproducibility, after rejection of suspect data is not in agreement with the estimated reproducibility limit calculated using the Horwitz equation.
For sample #14151 a few participants reported a positive test result (>10 mg/kg) for total Chromium. Chromium was not added to this sample.

Chromium VI: This determination was very problematic.
For sample #14150 the calculated reproducibility, after rejection of two statistical outliers and exclusion of nine test results (reported a result below the detection limit of the test method “<2 mg/kg”, see page 86, IEC62321:2008), is not at all in agreement with the estimated reproducibility limits calculated using the Horwitz equation.
The chemical, that was used to add Chromium VI to the plastic, was pure Potassium chromate (K_2CrO_4). Therefore, the hexavalent Chromium content should in principle be equal to the total Chromium content. The majority of the reporting laboratories did detect Chromium VI in sample #14150. However, the laboratories agreed on a test result of approx 15.9 mg/kg. Regretfully, only one of the participants reported a test result near 48.2 mg/kg, being in agreement with the assigned value of total Chromium for sample #14150. As the average recovery is poor (<34%) for this sample, it was decided not the calculate z-scores.

Total Cobalt: This determination may be problematic. In total, five statistical outliers were observed and five test results were excluded from the statistical calculations. For sample #14150, the calculated reproducibility after rejection of the suspect data is not in agreement with the estimated reproducibility limits calculated using the Horwitz equation.
For sample #14151 no participants reported a positive test result (>10 mg/kg) for total Cobalt. Cobalt was not added to this sample.

Total Lead: This determination may be problematic. In total eleven statistical outliers were observed and six test results were excluded from the statistical calculations.
For sample #14150, the calculated reproducibility after rejection of the suspect data is not in agreement with the estimated reproducibility limits calculated using the Horwitz equation.
For sample #14151 one participant reported a positive test result (>10 mg/kg) for total Lead. Lead was not added to this sample.

Total Mercury: This determination may be problematic. In total eleven statistical outliers were observed and eight test results were excluded from the statistical calculations.
For sample #14150, the calculated reproducibility after rejection of the suspect data is not in agreement with the estimated reproducibility limits calculated using the Horwitz equation.
For sample #14151 one participant reported a positive test result (>10 mg/kg) for total Mercury. Mercury was not added to this sample.

Total Cadmium: This determination was problematic for a number of laboratories. In total nine statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of EN1122:01 for sample #14151.
For sample #14150 some participants reported a positive test result for total Cadmium. Cadmium was not added to this sample.

Total Antimony: For sample #14150 and for #14151 some participants reported a positive test result for total Antimony. Antimony was not added to these samples.

4.3 EVALUATION OF THE METHODS USED

The reported analytical details of the methods for the determinations of Chromium, Cobalt, Lead, Mercury and Cadmium that were used by the participants are listed in appendix 2.
Although the reported analytical details varied much for particle size of the sample used and for the microwave temperature program, the overall average recoveries are good in comparison with the added amounts. Regretfully, no clear significant conclusions could be drawn between reported test results and reported analytical details.
However, several participants reported details which are in contradiction with each other, e.g. the sample was cut, while at the same time the particle size was reported as “as received”. Other participants reported to have cut the samples to size of less than 0.01µm.

For the determination of total Chromium in plastics, test method IEC62321-5 is available. In the new 2014 version of this method, a number of precision data is present. Regretfully, large differences in precision data between the different concentration levels and the quantification methods are visible. In this interlaboratory study, the majority of the group used the IEC62321 or EPA 3050, 3051 or EPA 3052 methods. One participant reported to have used EN1122, which is in principle only meant for Cadmium. Eleven participants used CPSD-CH-E1002-08. No clear correlation between the method used and the quality of the test results could be found.

For the determination of hexavalent Chromium in plastics, test method IEC62321:2008 is available, regretfully without precision data. The method is based on EPA 3060A and EPA 7196. In this interlaboratory study, 55 laboratories used this method and 25 other participants reported to have used EPA 3060A or an in house method. The test method for CrVI does contain several parts that may influence the test results strongly, for example the grain size of the plastic particles and the mixture /solution that is used to extract the CrVI ions. Therefore, strict adherence to the test method is advised.

For the determination of total Lead in plastics, test method IEC62321-5 is available. In the new 2014 version of this method a number of precision data is present. Regretfully, large differences in precision data between the different concentration levels and the quantification methods are visible. In this interlaboratory study, the majority of the group used the IEC62321 or EPA 3052/3051A. No clear correlation between the method used and the quality of the test results could be found.

For the determination of total Mercury in plastics, test method IEC62321 is available, regretfully without precision data. In this interlaboratory study, the majority of the group used the IEC62321 or EPA 3052 methods. No clear correlation between the method used and the quality of the test results could be found.

For the determination of total Cadmium in plastics, the EN1122 test method is considered to be the official EC test method. In this proficiency test 61 participants (37% of all) used a version of EN1122. No clear correlation between the method used and the quality of the results could be found.

4.4 COMPARISON WITH PREVIOUS PROFICIENCY TESTS

The number of participants increased from 66 in 2005 to 187 in this round. The percentage of outliers decreased over the years from 10.3% in 2005 to 4.9% of the numerical results in 2014.

The evolution of the reproducibilities for cadmium, lead, chromium, chromium VI and mercury as observed in this proficiency scheme and the comparison with the findings in previous rounds are visualized in table 5.

	25-250 mg Cd/kg	50-500 mg Pb/kg	25-250 mg Co/kg	25-250 mg Cr/kg	50-250 mg Cr VI/kg	5-125 mg Hg/kg
2002	18%	29%	--	--	--	--
2003	11%	36%	--	--	--	--
2004	12%	--	--	--	--	--
2005	8%	--	--	12%	--	--
2006	7%	9%	--	11%	--	--
2007	8%	8-11%	--	15%	--	--
2008	9%	9%	--	9%	57-76%	--
2009	10%	7-10%	--	10-11%	55-62%	37-46%
2010	8-10%	9%	--	10%	23%	32%
2011	9%	8-11%	--	19-23%	64%	20%
2012	7-8%	6-8%	--	7-16%	48-57%	23-43%
2013	8-9%	7-9%	--	9-22%	39%	14-32%
2014	7%	10%	11%	11%	42%	18%
EN1122:01	9%	--	--	--	--	--
IEC62321-5:14	3-8%	1-34%	--	4-23%	--	--
Horwitz	----	6-9%	7-10%	7-10%	7-9%	8-15%

Table 5: comparison of the uncertainties for Cd, Pb, Co, Cr, CrVI and Hg (in %) in the previous rounds and in the present round

Sample #14151 was used in a previous PT iis06P03 as sample #0650. When the assigned value of both PTs are compared the resemblance is stricking. see below table

	unit	Average		2.8 * sd	
		#0650	#14151	#0650	#14151
Total Cadmium as Cd	mg/kg	96.3	97.8	20.4	18.1

Table 6: comparison of samples #0650 and #14151

In general, it can be concluded from the reproducibilities of the Lead, Cadmium, Chromium and Mercury determinations that the quality of the testing of Lead, Cadmium, Chromium and Mercury in plastic is acceptable. The determination of chromium VI obviously still requires improvements to reach the desired quality level.

APPENDIX 1

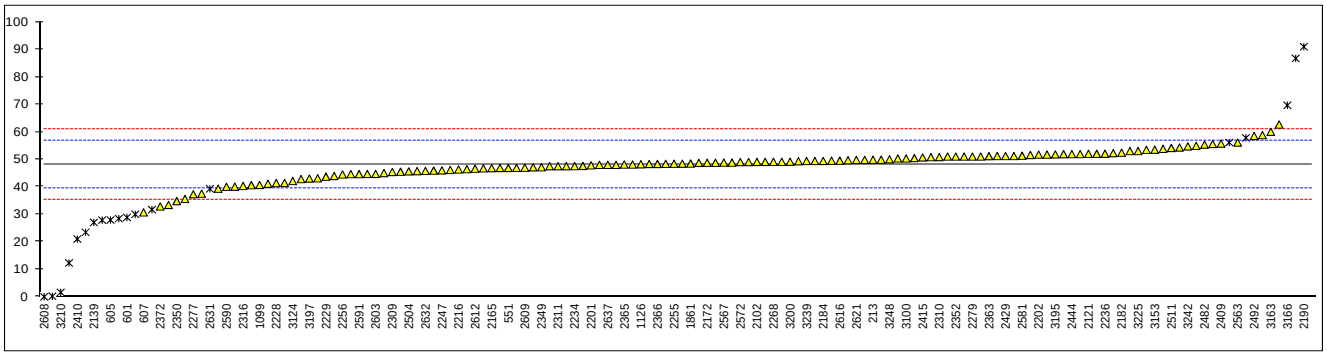
Determination of total Chromium as Cr on sample #14150; results in mg/kg

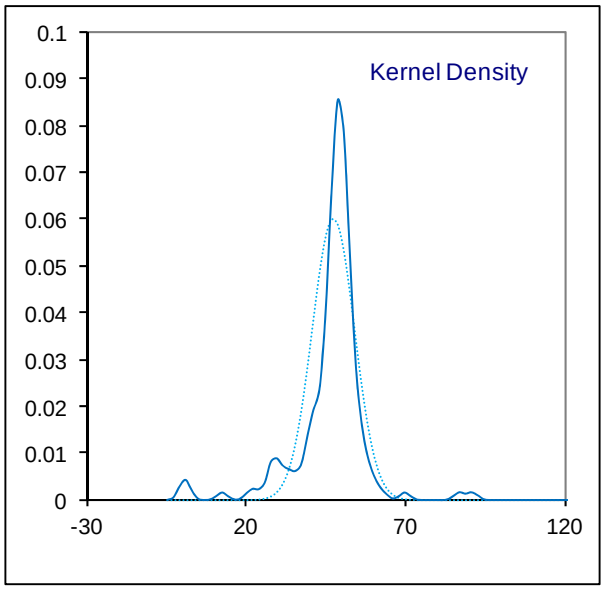
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	47.61		-0.11	2311	EPA3052	47.5		-0.14
213	CPSC-CH-E1002-08.1	49.85		0.41	2316	IEC62321	40.3		-1.82
330		-----		-----	2349	EPA3052	47.1		-0.23
339	INH-344	51.2		0.72	2350	IEC62321-5	34.79		-3.10
348	in house	50.30		0.51	2352	IEC62321-5	51		0.67
362		-----		-----	2359	IEC62321-5	48.7		0.14
452		-----		-----	2361	EPA3051	48.42		0.07
551	IEC62321	46.85		-0.29	2363	EPA3052	51.149		0.71
601	IEC62321-5	28.86	R(0.01)	-4.48	2365	GB/T26125	48.1		0.00
605	IEC62321-5	27.93	R(0.01)	-4.70	2366	IEC62321-5	48.32		0.05
607	IEC62321-5	30.69		-4.05	2369	IEC62321-5	49.5		0.33
622	IEC62321-5	n.d.		-----	2370	IEC62321-5	48.1		0.00
632	in house	37.5		-2.47	2372	in house	32.84		-3.55
826	IEC62321-5	47.5		-0.14	2379	IEC62321-5	27.87	R(0.01)	-4.71
840	IEC62321	40.05		-1.87	2380	IEC62321-5	51		0.67
1051	CPSC-CH-E1002-08.3	46.87		-0.29	2385	in house	45.7		-0.56
1099	INH-118	40.68		-1.73	2389		-----		-----
1126	in house	48.2		0.02	2390	CPSC	58.8		2.49
1195	in house	12.3	R(0.01)	-8.33	2409	IEC62321	55.69		1.77
1213	IEC62321-5	55.58		1.74	2410	IEC62321-5	21	R(0.01)	-6.31
1861	IEC62321-5	48.46		0.08	2413	INH-94/62	23.46	R(0.01)	-5.74
1911		-----		-----	2415	IEC62321-5	50.69		0.60
2102	in house	49.050		0.22	2424		-----		-----
2115		-----		-----	2425	IEC62321-5	54.9		1.58
2121	in house	51.99	C	0.90	2426		-----		-----
2129	IEC62321	50.770		0.62	2429	CPSC-CH-E1002-08.3	51.2		0.72
2132	in house	53.46		1.25	2431	INH-019	50.4557		0.55
2135	INH-29	86.7	R(0.01)	8.98	2432		-----		-----
2137	IEC62321-5	31.7	ex	-3.82	2433	IEC62321	49.07		0.23
2139	IEC62321-5	27.02	R(0.01)	-4.91	2442		-----		-----
2146		-----		-----	2444	IEC62321	51.90		0.88
2156	IEC62321	42.8		-1.23	2453		-----		-----
2165	EPA3052	46.8		-0.30	2460		-----		-----
2167		-----		-----	2464	IEC62321	41.4		-1.56
2169	IEC62321-5	56.1	ex	1.86	2470	ASTM F963	57.8	ex	2.26
2172	IEC62321-5	48.74		0.15	2477		-----		-----
2182	IEC62321-5	52.4		1.00	2482	IEC62321-5	55.35		1.69
2184	IEC62321-5	49.4		0.30	2488	IEC62321-6	51.72		0.84
2186	in house	477	R(0.01)	99.83	2489	IEC62321-5	44.68		-0.80
2190	IEC62321-5	90.95	R(0.01)	9.97	2492	in house	58.5		2.42
2196	IEC62321-5	46.7		-0.33	2493	IEC62321-5	35.575		-2.92
2201	IEC62321-5	47.8		-0.07	2495	EPA3052	51.2		0.72
2202	in house	51.7		0.84	2503	CPSC-CH-E1002-08.3	49.1		0.23
2212	in house	53.8		1.33	2504	IEC62321	45.62		-0.58
2216	IEC62321	46.3		-0.42	2511	EN1122	54.13		1.40
2218		-----		-----	2529		-----		-----
2225	CPSC-CH-E1002	48.0		-0.02	2532	EPA3050B	43.9344		-0.97
2226	EPA3051	41.1		-1.63	2538	ISO11885	47.08		-0.24
2228	CPSD-AN-00164	41.3625		-1.57	2563	IEC62321-8	56.1	C	1.86
2229	IEC62321-5	43.68		-1.03	2564		-----		-----
2230	EPA3051A	45.47		-0.61	2566		-----		-----
2234	IEC62321	47.53		-0.13	2567	EPA3051A	48.8		0.16
2236	EPA3052	52.02		0.91	2572	IEC62321-5	49.0		0.21
2240	CPSC-CH-E1002-08.1	48.34		0.06	2581	in house	51.3		0.74
2246		-----		-----	2582	IEC62321-5	44.60		-0.82
2247	IEC62321-5	45.97		-0.50	2590	EN14602	40.0		-1.89
2254	in house	54.3		1.44	2591	CPSC-CH-E1002-08.3	44.60		-0.82
2255	EPA3052	48.4		0.07	2603	in house	44.6869		-0.80
2256	EPA3051A	44.5		-0.84	2608	IEC62321-5	0	R(0.01)	-11.20
2268	CPSC-CH-E1002-08.3	49.1		0.23	2609	EPA3052/EPA6010C	46.95		-0.27
2269	in house	40.6		-1.75	2612	EN11885	46.6		-0.35
2272	ISO17072-2	49.38		0.30	2616	EPA3051/EPA6010C	49.5		0.33
2277	EPA3051/EPA6010	37.3		-2.51	2620	IEC62321-5	48.3		0.05
2279	in house	51		0.67	2621	ASTM E1479	49.789		0.39
2282	IEC62321-5	45.9		-0.51	2624	EN1122	33.41		-3.42
2289	IEC62321-5	47.5		-0.14	2628	in house	n.d.		-----
2290	IEC62321-5	51.0		0.67	2629		-----		-----
2293		-----		-----	2630	IEC62321-5	51.9		0.88
2295		-----		-----	2631	EPA3051	39.258	ex	-2.06
2296	INH-38	49.6745		0.37	2632	IEC62321	45.77		-0.54
2298	CPSC-CH-E1002-08.3	52		0.91	2634		-----		-----
2300	IEC62321-5	0.19	R(0.01)	-11.15	2636		-----		-----
2309	IEC62321	45.4		-0.63	2637	EN17294-2	48		-0.02
2310	EPA3052	50.8		0.63	2641	IEC62321-5	43.1		-1.16

2642		-----		-----
3100	IEC62321-5	50.3		0.51
3106		-----		-----
3107	EPA3051A	46.4		-0.40
3110	in house	49.01		0.21
3113		-----		-----
3116	CPSC-CH-E1002-08.1	51		0.67
3122	in house	39.3		-2.05
3124	EPA3052	42.1		-1.40
3127	DIN-22022-3	46.12		-0.46
3146	IEC62321-5	53.0		1.14
3153	IEC62321-5	53.5		1.26
3154	IEC62321-5	46.84		-0.29
3160	CPSC-CH-E1002-08.3	51.87		0.88
3163	IEC62321-5	60		2.77
3166	in house	69.65	R(0.01)	5.02
3167	IEC62321-5	62.66		3.39
3172	IEC62321-5	51.58		0.81
3176	in house	49.3		0.28
3180	in house	28.42	R(0.01)	-4.58
3182	IEC62321-5	49.86		0.41
3190	IEC62321-5	48		-0.02
3192		-----		-----
3195	ISO17294-2Mod.	51.8		0.86
3197	IEC62321-5	43.0		-1.19
3199		-----		-----
3200	IEC62321-5	49.13		0.24
3210	ISO17072-2	1.6	R(0.01)	-10.82
3218	IEC62321-5	48.8		0.16
3220	EPA3050B	30.0	ex	-4.21
3225	IEC62321-5	53.0		1.14
3228	IEC62321-5	45		-0.72
3237	in house	48.753		0.15
3239	IEC62321	49.37		0.29
3242	IEC62321-5	54.70		1.54
3243	IEC62321-5	49.80		0.40
3246	in house	52.263		0.97
3248	EPA	50	C	0.44
8005		-----		-----

normality	suspect	
n	134	
outliers	15	+ 5 excl
mean (n)	48.103	
st.dev. (n)	5.1833	
R(calc.)	14.513	
R(Horwitz)	12.030	

Lab 2121: first reported 51.65
Lab 3248: first reported 45





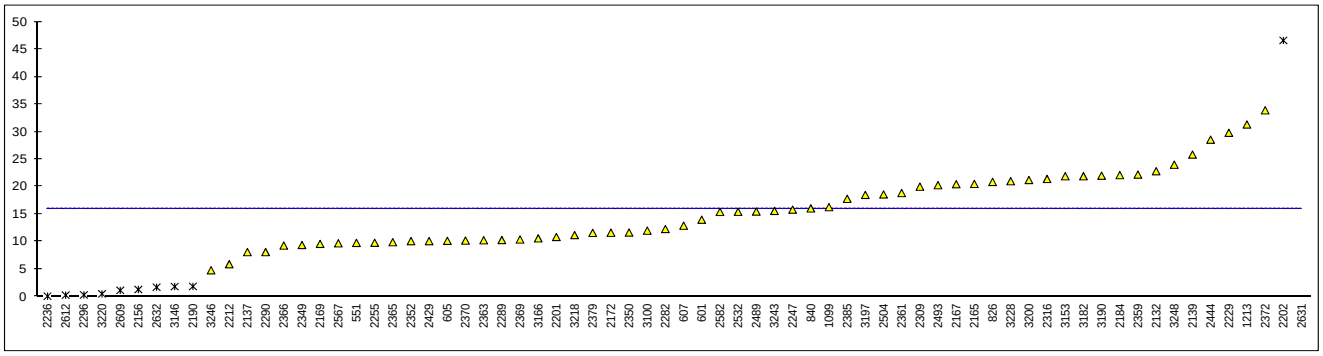
Determination of Hexavalent Chromium as Cr^{6+} on sample #14150; results in mg/kg

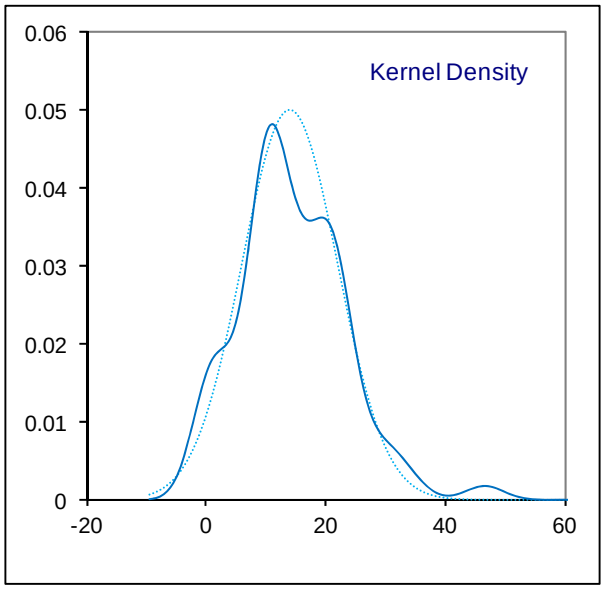
lab	Method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	n.d.		-----	2311		-----		-----
213		-----		-----	2316	IEC62321	21.4		-----
330		-----		-----	2349	IEC62321	9.39		-----
339	INH-341	<5		-----	2350	IEC62321	11.668		-----
348		-----		-----	2352	IEC62321	10.1		-----
362		-----		-----	2359	IEC62321	22.2		-----
452		-----		-----	2361	EPA3060A	18.84		-----
551	IEC62321	9.78		-----	2363	IEC62321	10.26		-----
601	IEC62321	13.99		-----	2365	GB/T26125	9.9		-----
605	IEC62321	10.15		-----	2366	IEC62321	9.292		-----
607	IEC62321	12.91		-----	2369	IEC62321	10.4		-----
622	in house	n.d.		-----	2370	IEC62321	10.2		-----
632		-----		-----	2372	in house	33.89		-----
826	IEC62321	20.867		-----	2379	IEC62321	11.6		-----
840	IEC62321	16.05		-----	2380	EPA3060A	n.d.		-----
1051		-----		-----	2385	EPA3060A	17.8		-----
1099	INH-269	16.28		-----	2389		-----		-----
1126		-----		-----	2390	ISO17075	n.d.		-----
1195		-----		-----	2409	IEC62321	n.d.		-----
1213	IEC62321	31.31		-----	2410		-----		-----
1861		-----		-----	2413		-----		-----
1911		-----		-----	2415		-----		-----
2102		-----		-----	2424		-----		-----
2115		-----		-----	2425	IEC62321-5	n.d.		-----
2121		-----		-----	2426		-----		-----
2129	in house	<3		-----	2429	IEC62321	10.1		-----
2132	IEC62321	22.81		-----	2431		-----		-----
2135		-----		-----	2432		-----		-----
2137	EPA3060A	8.1		-----	2433	IEC62321	n.d.		-----
2139	EPA3060A	25.84		-----	2442		-----		-----
2146		-----		-----	2444	IEC62321	28.55		-----
2156	IEC62321	1.3	ex	-----	2453		-----		-----
2165	IEC62321-5	20.5		-----	2460		-----		-----
2167	IEC62321-5	20.45		-----	2464		-----		-----
2169	IEC62321	9.6		-----	2470		-----		-----
2172	IEC62321	11.627		-----	2477		-----		-----
2182		-----		-----	2482		-----		-----
2184	IEC62321	22.1		-----	2488		-----		-----
2186		-----		-----	2489	IEC62321-5	15.48		-----
2190		1.86	ex	-----	2492		-----		-----
2196		-----		-----	2493	IECTC111	20.2743		-----
2201	IEC62321	10.85		-----	2495		-----		-----
2202	in house	46.6	R(0.01)	-----	2503		-----		-----
2212	in house	5.9		-----	2504	IEC62321	18.59		-----
2216	IEC62321	<24		-----	2511		-----		-----
2218		-----		-----	2529		-----		-----
2225		-----		-----	2532	IEC62321-5	15.4291		-----
2226		-----		-----	2538		-----		-----
2228		-----		-----	2563		-----		-----
2229	IEC62321	29.8		-----	2564		-----		-----
2230		-----		-----	2566		-----		-----
2234		-----		-----	2567	EPA3060A	9.7		-----
2236	IEC62321	0.081	ex	-----	2572		-----		-----
2240		-----		-----	2581		-----		-----
2246		-----		-----	2582	IEC62321-5	15.41		-----
2247	IEC62321-5	15.83		-----	2590		-----		-----
2254		-----		-----	2591		-----		-----
2255	EPA3060A	9.8		-----	2603	GB/T261215	n.d.		-----
2256		-----		-----	2608		-----		-----
2268		-----		-----	2609	INH-2004	1.14	ex	-----
2269		-----		-----	2612	IEC62321	0.2735	ex	-----
2272		-----		-----	2616		-----		-----
2277		-----		-----	2620		-----		-----
2279		-----		-----	2621	IEC62321	n.d.		-----
2282	IEC62321-5	12.3		-----	2624		-----		-----
2289	IEC62321	10.3		-----	2628		-----		-----
2290	IEC62321	8.107		-----	2629		-----		-----
2293		-----		-----	2630		-----		-----
2295		-----		-----	2631	EPA3051	162.697	R(0.01)	-----
2296	INH-63	0.32	ex	-----	2632	IEC62321	1.72	ex	-----
2298		-----		-----	2634		-----		-----
2300		-----		-----	2636		-----		-----
2309	IEC62321	20		-----	2637	EN17294-2	<5		-----
2310		-----		-----	2641		-----		-----
2642		-----		-----	3182	IEC62321-5	21.9		-----

3100	IEC62321	12.0		-----
3106		-----		-----
3107		-----		-----
3110		-----		-----
3113		-----		-----
3116		-----		-----
3122		-----		-----
3124		-----		-----
3127		-----		-----
3146	IEC62321-8	1.83	ex	-----
3153	IEC62321	21.9		-----
3154		-----		-----
3160		-----		-----
3163		-----		-----
3166	EPA7199	10.6		-----
3167		-----		-----
3172		-----		-----
3176		-----		-----
3180		-----		-----
3190	IEC62321	22		-----
3192		-----		-----
3195		-----		-----
3197	IEC62321-5	18.5		-----
3199		-----		-----
3200	EPA3060A	21.21		-----
3210		-----		-----
3218	IEC62321	11.2		-----
3220	in house	0.5	ex	-----
3225		-----		-----
3228	IEC62321	21		-----
3237		-----		-----
3239	IEC62321	n.d.		-----
3242	IEC62321-5	n.d.		-----
3243	INH-121	15.6		-----
3246	in house	4.8		-----
3248	EPA	24	C	-----
8005		-----		-----

normality	OK	
n	59	
outliers	2	+ 9 excl
mean (n)	15.940	
st.dev. (n)	6.6239	
R(calc.)	18.547	
R(Horwitz)	(4.707)	

Lab 3248: First reported <10





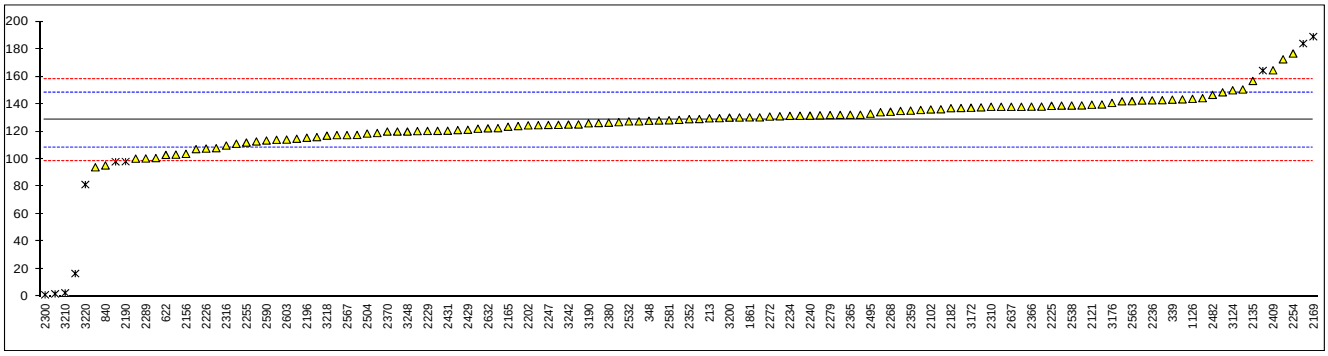
Determination of total Cobalt as Co on sample #14150; results in mg/kg

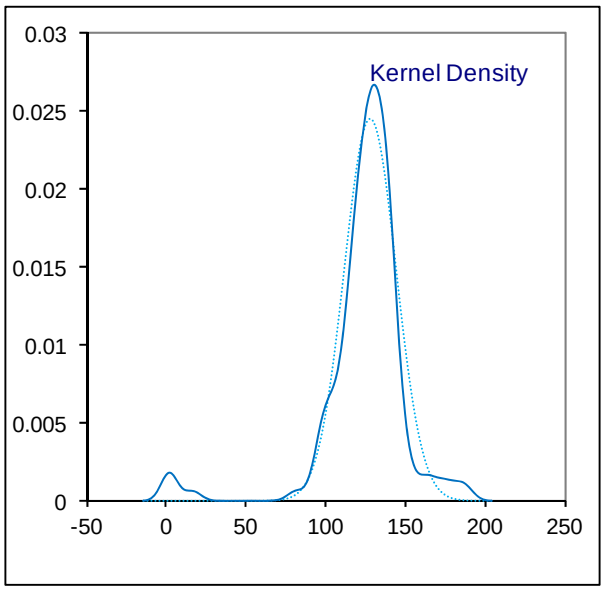
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	129.765		0.14	2311	EPA3052	138		0.97
213	CPSC-CH-E1002-08.1	129.611		0.12	2316	IEC62321	109.8		-1.88
330		-----		-----	2349	EPA3052	142.6		1.43
339	in house	143.2		1.49	2350	EPA3052	107.9		-2.07
348	in house	127.85		-0.06	2352	EPA3052	129		0.06
362		-----		-----	2359	EPA3052	135.2		0.69
452		-----		-----	2361	EPA3051	124.6		-0.39
551	IEC62321	122.47		-0.60	2363	EPA3052	124.86		-0.36
601		-----		-----	2365	GB/T26125	132.2		0.38
605		-----		-----	2366	IEC62321-5	138.1		0.98
607		-----		-----	2369	EPA3052	131.5		0.31
622	in house	103.02		-2.57	2370	EPA3052	120		-0.85
632	in house	134.05		0.57	2372	in house	107.2		-2.14
826	EPA3052	131.1		0.27	2379		-----		-----
840	IEC62321	95.36		-3.34	2380	EPA3052	126.44		-0.20
1051		-----		-----	2385	in house	139		1.07
1099	INH-233	114.0		-1.46	2389		-----		-----
1126	in house	143.8		1.55	2390	CPSC	132.2		0.38
1195		-----		-----	2409	IEC62321	164.55		3.65
1213	IEC62321-5	138.14		0.98	2410	EPA3052	94		-3.48
1861	IEC62321-5	130.29		0.19	2413		-----		-----
1911		-----		-----	2415	IEC62321	100.7		-2.80
2102	in house	136.077		0.77	2424		-----		-----
2115		-----		-----	2425	EPA3052	120.5		-0.80
2121	in house	139.51	C	1.12	2426		-----		-----
2129	IEC62321	144.262		1.60	2429	CPSC-CH-E1002-08.3	121.3		-0.72
2132	in house	126.84		-0.16	2431	INH-019	120.6023		-0.79
2135	INH-29	156.8		2.87	2432		-----		-----
2137	EPA3052	98.0	ex	-3.07	2433	IEC62321	128.05		-0.04
2139	EPA3052	114.77		-1.38	2442		-----		-----
2146		-----		-----	2444		-----		-----
2156	EPA3052	103.8		-2.49	2453		-----		-----
2165	EPA3052	123.5		-0.50	2460		-----		-----
2167		-----		-----	2464		112.8		-1.58
2169	IEC62321-5	189	R(0.01)	6.12	2470	ASTM F963	164.3	ex	3.63
2172	IEC62321-5	117.4		-1.11	2477		-----		-----
2182	in house	137.0		0.87	2482		146.69		1.85
2184	IEC62321-5	130.2		0.18	2488		-----		-----
2186	in house	184	ex	5.62	2489	EPA3050B	122.08		-0.64
2190		98.16	ex	-3.06	2492	in house	150.6		2.24
2196	IEC62321	115.5		-1.31	2493	IEC62321-5	142.83	C	1.46
2201	IEC62321-5	118.9		-0.96	2495	EPA3052	133.0		0.46
2202	in house	124.5		-0.40	2503		-----		-----
2212		-----		-----	2504	EPA3052	118.53		-1.00
2216		-----		-----	2511	in house	148.52		2.03
2218		-----		-----	2529		-----		-----
2225	CPSC-CH-E1002	138.7		1.04	2532	EPA3050B	127.3824		-0.10
2226	EPA3051	107.6		-2.10	2538	ISO11885	138.9		1.06
2228		-----		-----	2563		142.1		1.38
2229		120.45		-0.81	2564		-----		-----
2230	EPA3051A	115.95		-1.26	2566		-----		-----
2234	IEC62321	131.4		0.30	2567	EPA3051A	117.4		-1.11
2236	EPA3052	142.7		1.44	2572		-----		-----
2240	CPSC-CH-E1002-08.1	131.56		0.32	2581	in house	128.19		-0.02
2246		-----		-----	2582	EPA3050B	127.41		-0.10
2247	EPA3050B	124.76		-0.37	2590	EN14602	113.5		-1.51
2254	in house	176.75		4.88	2591	CPSC-CH-E1002-08.3	143.40		1.51
2255	EPA3052	112.0		-1.66	2603	in house	114.1412		-1.44
2256		-----		-----	2608		1.9	R(0.01)	-12.79
2268	CPSC-CH-E1002-08.3	134.4		0.60	2609	EPA3052/EPA6010C	121.04		-0.75
2269	in house	103.2		-2.55	2612	EN11885	124		-0.45
2272	ISO17072-2	130.90		0.25	2616	EPA3051/EPA6010C	132.1		0.37
2277	EPA3051/EPA6010	100.3		-2.84	2620		-----		-----
2279	in house	132		0.36	2621	ASTM E1479	137.59		0.93
2282	IEC62321-5	129.1		0.07	2624		-----		-----
2289	IEC62321-5	100.4		-2.83	2628		-----		-----
2290	IEC62321-5	117.5		-1.10	2629		-----		-----
2293		-----		-----	2630		-----		-----
2295		-----		-----	2631	EPA3051	16.691	R(0.01)	-11.29
2296	INH-38	136.1878		0.79	2632	IEC62321	122.35		-0.61
2298		-----		-----	2634		-----		-----
2300	IEC62321-5	1.25	R(0.01)	-12.85	2636		-----		-----
2309	IEC62321	126.2		-0.22	2637	EN17294-2	138		0.97
2310	EPA3052	138		0.97	2641		-----		-----
2642		-----		-----	3182	IEC62321-5	125.16		-0.33

3100	IEC62321-5	138.0		0.97
3106		-----		-----
3107		-----		-----
3110		-----		-----
3113		-----		-----
3116		-----		-----
3122		-----		-----
3124	EPA3052	150		2.18
3127		-----		-----
3146	IEC62321-5	142		1.37
3153	IEC62321-5	130.3		0.19
3154		135.7		0.74
3160	CPSC-CH-E1002-08.3	138.87		1.06
3163		-----		-----
3166	in house	137.1		0.88
3167	IEC62321-5	120.3		-0.82
3172		137.29		0.90
3176	in house	140.8		1.25
3180	in house	172.54		4.46
3190	IEC62321-5	126		-0.24
3192		-----		-----
3195	ISO17294-2Mod.	135		0.67
3197	EPA3050B	111.1		-1.75
3199		-----		-----
3200	EPA3052	130.14		0.17
3210	ISO17072-2	2.6	R(0.01)	-12.72
3218	IEC62321-5	117.0		-1.15
3220	EPA3050B	81.4	ex	-4.75
3225	in house	131.8		0.34
3228	IEC62321-5	120		-0.85
3237		-----		-----
3239		-----		-----
3242	IEC62321-5	125.049		-0.34
3243	INH-126	128.5		0.01
3246	in house	139.706		1.14
3248	EPA	120	C	-0.85
8005		-----		-----

normality	suspect	
n	117	
outliers	5	+ 5 excl
mean (n)	128.419	
st.dev. (n)	14.3265	
R(calc.)	40.114	
R(Horwitz)	27.703	

Lab 2121: first reported 139.21
Lab 2493: first reported 83.100
Lab 3248: first reported 110





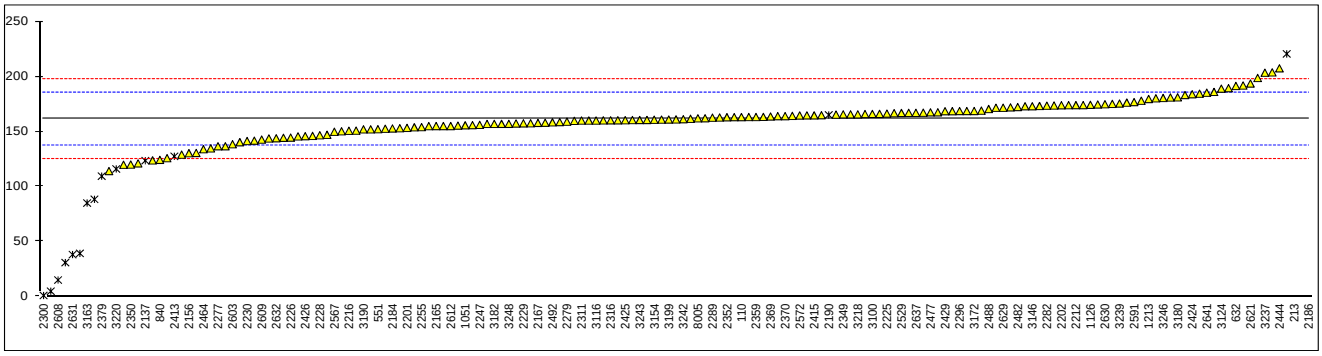
Determination of total Lead as Pb on sample #14150; results in mg/kg

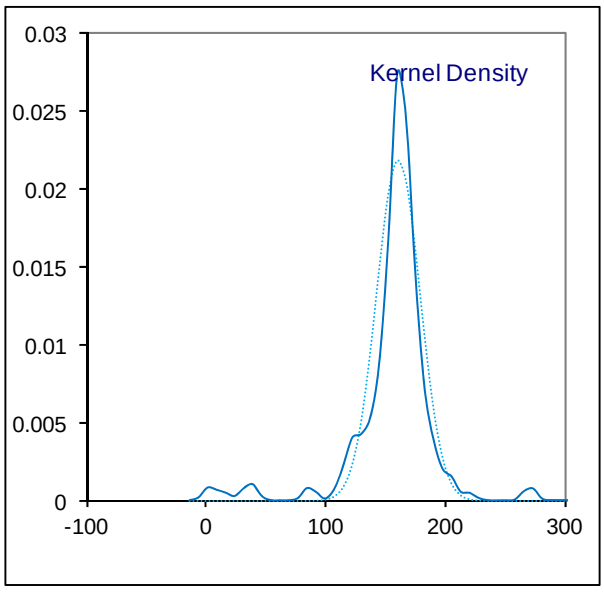
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	163.14		0.14	2311	EPA3052	160		-0.12
213	CPSC-CH-E1002-08.1	269.192	R(0.01)	8.97	2316	IEC62321	160.2		-0.10
330	in house	154.914		-0.54	2349	EPA3052	165.6		0.35
339	INH-344	172		0.88	2350	IEC62321-5	120.0		-3.45
348	CPSC-CH-E1002-08.3	174.62		1.10	2352	IEC62321-5	163		0.13
362		-----		-----	2359	IEC62321-5	163.2		0.15
452		-----		-----	2361	EPA3051	164.7		0.27
551	IEC62321	152.12		-0.77	2363	EPA3052	160.15		-0.11
601	IEC62321-5	121.04		-3.36	2365	GB/T26125	161.6		0.02
605	IEC62321-5	130.53		-2.57	2366	IEC62321-5	163.2		0.15
607	IEC62321-5	144.32		-1.42	2369	IEC62321-5	163.7		0.19
622	IEC62321-5	114.08		-3.94	2370	IEC62321-5	164		0.22
632	in house	191.45		2.50	2372	in house	136.6		-2.07
826	IEC62321	164.0		0.22	2379	IEC62321-5	109.45	ex	-4.32
840	IEC62321	124.25		-3.09	2380	IEC62321-5	160.22		-0.10
1051	CPSC-CH-E1002-08.3	155.68		-0.48	2385	in house	155		-0.53
1099	INH-118	146.0		-1.28	2389	CPSC-CH-E1002-08.1	171.60		0.85
1126	in house	174.3		1.07	2390	CPSC	172.98		0.96
1195	in house	30.8	R(0.01)	-10.87	2409	IEC62321	189.45		2.33
1213	IEC62321-5	179.59		1.51	2410	IEC62321-5	129		-2.70
1861	IEC62321-5	157.49		-0.33	2413	INH-94/62	127.50	ex	-2.82
1911		-----		-----	2415	IEC62321-5	164.7		0.27
2102	in house	180.954		1.63	2424	CPSC-CH-E1002-08	183.9		1.87
2115		-----		-----	2425	IEC62321-5	160.3		-0.09
2121	in house	158.59	C	-0.23	2426	EPA3051A	145.79		-1.30
2129	IEC62321	164.862		0.29	2429	CPSC-CH-E1002-08.3	168.5		0.59
2132	in house	174.05		1.05	2431	INH-019	155.8151		-0.47
2135	INH-29	165.4		0.33	2432		-----		-----
2137	IEC62321-5	123.5	ex	-3.16	2433	IEC62321	153.02		-0.70
2139	IEC62321-5	160.83		-0.05	2442		-----		-----
2146		-----		-----	2444	IEC62321	207.47		3.83
2156	IEC62321	130.3		-2.59	2453	EN1122	<15	false -	<-12.19
2165	EPA3052	155.0		-0.53	2460	CPSC-CH-E1002-08.3	180.2		1.56
2167	IEC62321-5	157.86		-0.30	2464	IEC62321-5	133.9		-2.29
2169	IEC62321-5	272	R(0.01)	9.20	2470	ASTM F963	220.6	ex	4.93
2172	IEC62321-5	155.4		-0.50	2477	IEC62321-5	167.45878		0.50
2182	IEC62321-5	166.7		0.44	2482	IEC62321-5	172.25		0.90
2184	IEC62321-5	152.8		-0.72	2488	IEC62321-6	170.45		0.75
2186	in house	1900	R(0.01)	144.70	2489	IEC62321-5	167.14		0.48
2190	IEC62321-5	165.06	ex	0.30	2492	in house	158.4		-0.25
2196	IEC62321-5	141.7		-1.64	2493	IEC62321-5	123.75		-3.13
2201	IEC62321-5	153.3		-0.68	2495	EPA3052	176.3		1.24
2202	in house	173.9		1.04	2503	CPSC-CH-E1002-08.3	156.9		-0.38
2212	CPSC-CH-E1002-08.3	174.0		1.05	2504	IEC62321-5	147.03		-1.20
2216	IEC62321	150.67		-0.89	2511	CPSC-CH-E1002-08.3	191.87		2.53
2218	CPSC-CH-E1002-08.1	162.77		0.11	2529	CPSC-CH-E1002-08.3	166.88		0.46
2225	CPSC-CH-E1002	166.3		0.41	2532	IEC62321-5	160.5202		-0.07
2226	EPA3051	144.5		-1.41	2538	ISO11885	161.0		-0.03
2228	CPSD-AN-00164	146.625		-1.23	2563	IEC62321-8	183.2		1.81
2229	IEC62321-5	157.45		-0.33	2564	CPSC-CH-E1002-08.1	198.7		3.10
2230	EPA3051A	141.35		-1.67	2566		-----		-----
2234	IEC62321	163.3		0.16	2567	CPSC-CH-E1002-08.3	149.8		-0.97
2236	EPA3052	173.2		0.98	2572	IEC62321-5	164.6		0.27
2240	CPSC-CH-E1002-08.1	168.51		0.59	2581	in house	163.1		0.14
2246	CPSC	159.69		-0.14	2582	IEC62321-5	168.63		0.60
2247	IEC62321-5	156.05		-0.45	2590	EN14602	119.8		-3.46
2254	in house	125.75		-2.97	2591	CPSC-CH-E1002-08.3	176.80		1.28
2255	EPA3052	154.0		-0.62	2603	GB/T261215	138.4359		-1.91
2256	CPSC-CH-E1002-08.3	145.6		-1.32	2608	IEC62321-5	15.0	R(0.01)	-12.19
2268	CPSC-CH-E1002-08.3	165.6		0.35	2609	EPA3052/EPA6010C	142.68		-1.56
2269	in house	143.7		-1.47	2612	EN11885	155		-0.53
2272	ISO17072-2	140.3		-1.76	2616	EPA3051/EPA6010C	178		1.38
2277	EPA3051/EPA6010	136.6		-2.07	2620	IEC62321-5	169		0.63
2279	in house	159		-0.20	2621	IEC62321-5	193.67		2.68
2282	IEC62321-5	173.5		1.01	2624	EN1122	173.98		1.05
2289	IEC62321-5	162.6		0.10	2628	in house	39.2	R(0.01)	-10.17
2290	IEC62321-5	160.0		-0.12	2629	CPSC-CH-E1002-08.2	171.66		0.85
2293	CPSC-CH-E1002-08.3	203.8		3.53	2630	IEC62321-5	174.8		1.11
2295		-----		-----	2631	EPA3051	38.132	R(0.01)	-10.26
2296	INH-38	168.6184		0.60	2632	IEC62321	143.87		-1.46
2298	CPSC-CH-E1002-08.3	157		-0.37	2634		-----		-----
2300	IEC62321-5	0.9	R(0.01)	-13.36	2636	IEC62321	134.7		-2.22
2309	IEC62321	164.2		0.23	2637	EN17294-2	167		0.46
2310	EPA3052	167		0.46	2641	IEC62321-5	185.3		1.99
2642	CPSC-CH-E1002-8.3	153.85		-0.63	3182	IEC62321-5	156.96		-0.37

3100	IEC62321-5	166.0		0.38
3106		-----		-----
3107	EPA3051A	162.1		0.06
3110	in house	157.32		-0.34
3113	JETRO	152.54		-0.74
3116	CPSC-CH-E1002-08.1	160		-0.12
3122	in house	186		2.05
3124	EPA3052	189		2.30
3127	DIN22022-3	166.06		0.39
3146	IEC62321-5	173		0.96
3153	IEC62321-5	165.9		0.37
3154	IEC62321-5	160.7		-0.06
3160	CPSC-CH-E1002-08.3	173.65		1.02
3163	IEC62321-5	85	R(0.01)	-6.36
3166	in house	184.4		1.91
3167	IEC62321-5	150.8		-0.88
3172	IEC62321-5	168.66		0.60
3176	in house	88.4	C,R(0.01)	-6.08
3180	in house	181.12		1.64
3190	IEC62321-5	152		-0.78
3192	in house	175.15		1.14
3195	ISO17294-2Mod.	152		-0.78
3197	IEC62321-5	150.2		-0.93
3199	in house	160.9		-0.04
3200	IEC62321-5	160.41		-0.08
3210	ISO17072-2	4.8	R(0.01)	-13.03
3218	IEC62321-5	165.6		0.35
3220	EPA3050B	116.0	ex	-3.78
3225	IEC62321-5	167.5		0.51
3228	IEC62321-5	158		-0.28
3237	in house	203.470		3.50
3239	IEC62321	175.46		1.17
3242	IEC62321-5	161.20		-0.02
3243	IEC62321-5	160.5		-0.08
3246	in house	180.489		1.59
3248	CPSC	157	C	-0.37
8005	INH-02	162		0.05

normality	OK
n	158
outliers	11 + 6 excl
mean (n)	161.413
st.dev. (n)	16.6369
R(calc.)	46.583
R(Horwitz)	33.643

Lab 2121: first reported 228.09
Lab 3176: first reported 60.83
Lab 3248: first reported 140





Determination of Mercury as Hg on sample #14150; results in mg/kg

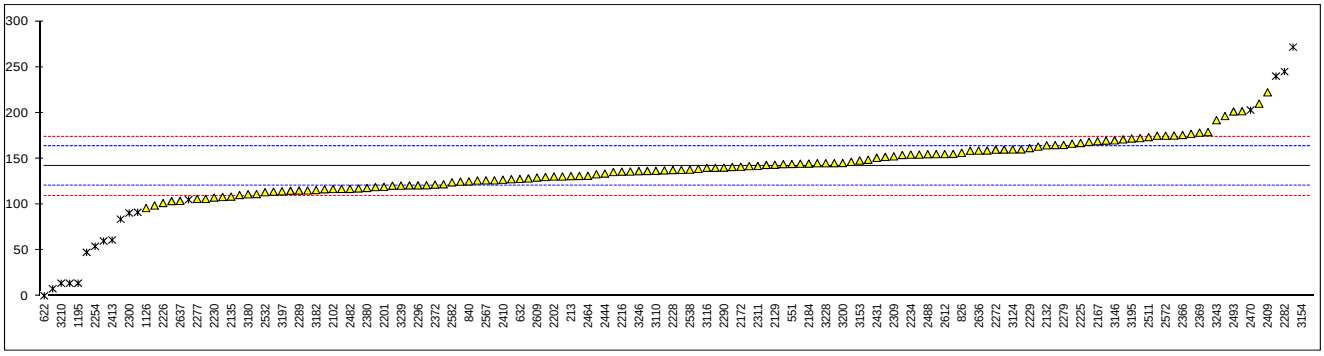
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	118.99		-2.12	2311	EPA3052	142		0.02
213	CPSC-CH-E1002-08.1	130.932		-1.01	2316	IEC62321	138.9		-0.27
330		-----		-----	2349	EPA3052	177.1		3.28
339	INH-344	114		-2.58	2350	IEC62321-5	106.1		-3.32
348	in house	168.35		2.46	2352	IEC62321-4	171		2.71
362		-----		-----	2359	EPA3052	166.3		2.27
452		-----		-----	2361	EPA3051	155.0		1.22
551	IEC62321	144.23	C	0.22	2363	EPA3052	169.71		2.59
601	IEC62321-5	111.41		-2.83	2365	GB/T26125	146.6		0.44
605	IEC62321-5	115.29		-2.46	2366	IEC62321-4	175.8		3.16
607	IEC62321-5	117.47		-2.26	2369	IEC62321-4	178.4		3.40
622	in house	0.41	R(0.01)	-13.14	2370	IEC62321-4	133		-0.82
632	in house	127.85		-1.30	2372	in house	121.7		-1.87
826	IEC62321	156.4		1.35	2379	IEC62321-5	83.88	ex	-5.38
840	IEC62321	125.19		-1.54	2380	EPA3052	118		-2.21
1051		-----		-----	2385	in house	121		-1.93
1099	INH-118	98.89		-3.99	2389		-----		-----
1126	in house	96.1		-4.25	2390	CPSC	172.4		2.84
1195	in house	14.1	R(0.01)	-11.87	2409	IEC62321	222.40		7.49
1213	IEC62321-4	143.15		0.12	2410	IEC62321-4	127		-1.38
1861		-----		-----	2413	INH-94/62	61.25	ex	-7.48
1911		-----		-----	2415	IEC62321	108.2		-3.12
2102	in house	116.874		-2.32	2424	in house	140.9		-0.09
2115		-----		-----	2425	IEC62321-5	116.6		-2.34
2121	in house	201.76	C	5.57	2426		-----		-----
2129	IEC62321	143.331		0.14	2429	CPSC-CH-E1002-08.3	124.9		-1.57
2132	in house	164.54		2.11	2431	INH-019	150.9551		0.85
2135	INH-29	108.6		-3.09	2432		-----		-----
2137	IEC62321-4	105.2	ex	-3.40	2433	IEC62321	175.0		3.08
2139	IEC62321-4	126.15		-1.46	2442		-----		-----
2146		-----		-----	2444	IEC62321	133.75		-0.75
2156	IEC62321	47.8	C,R(0.01)	-8.73	2453		-----		-----
2165	EPA3052	144.5		0.25	2460		-----		-----
2167	IEC62321-5	168.99		2.52	2464		131.3		-0.98
2169	IEC62321-4	240	ex	9.12	2470	ASTM F963	203.0	ex	5.68
2172	IEC62321-4	141.2		-0.06	2477		-----		-----
2182	IEC62321-4	154.0		1.13	2482		117	C	-2.31
2184	IEC62321-5	144.6		0.26	2488	IEC62321-6	154.88		1.21
2186	in house	1370	R(0.01)	114.10	2489	IEC62321-5	128.39		-1.25
2190		91.43	ex	-4.68	2492	in house	158.9		1.59
2196	IEC62321	120.8		-1.95	2493	IEC62321-5	201.50		5.54
2201	IEC62321-4	119.2		-2.10	2495	EPA3052	179.0		3.45
2202	in house	130.5		-1.05	2503	CPSC-CH-E1002-08.3	158.6		1.56
2212	in house	155.2		1.24	2504	IEC62321	135.96		-0.54
2216	IEC62321	135.83		-0.56	2511	in house	173.52		2.94
2218		-----		-----	2529	CPSC-CH-E1002-08.3	160.09		1.70
2225	CPSC-CH-E1002	167.1		2.35	2532	IEC62321-5	113.3675		-2.64
2226	EPA3051	101.6		-3.74	2538	INH-19	138.0		-0.35
2228	CPSD-AN-00164	137.625		-0.39	2563		-----		-----
2229	IEC62321-4	161.50		1.83	2564		-----		-----
2230	EPA3051A	107.57		-3.18	2566		-----		-----
2234	IEC62321	154.4		1.17	2567	EPA3051A	126.3		-1.44
2236	EPA3052	148.8		0.65	2572	IEC62321-5	175.0		3.08
2240	CPSC-CH-E1002-08.1	136.55		-0.49	2581	in house	163.19		1.99
2246		-----		-----	2582	IEC62321-5	124.15		-1.64
2247	IEC62321-5	122.01		-1.84	2590	EN14602	103.7		-3.54
2254	in house	54.4	R(0.01)	-8.12	2591	CPSC-CH-E1002-08.3	271.70	R(0.01)	12.07
2255	EPA3052	110.3		-2.93	2603	GB/T261215	131.1494		-0.99
2256	EPA3051A	135.4		-0.60	2608	IEC62321	8.0	R(0.01)	-12.43
2268	CPSC-CH-E1002-08.3	164.8		2.13	2609	EPA3052/EPA6010C	129.39		-1.15
2269	in house	137.2		-0.43	2612	ISO16772	155		1.22
2272	ISO17072-2	159.84		1.67	2616	EPA3051/EPA6010C	210		6.33
2277	EPA3051/EPA6010	106.1		-3.32	2620	IEC62321-4	127.5		-1.33
2279	in house	165		2.15	2621	IEC62321-4	130.51		-1.05
2282	IEC62321-5	245.0	R(0.01)	9.59	2624		-----		-----
2289	IEC62321-4	115.2		-2.47	2628	in house	<59.5	false -	<-7.65
2290	IEC62321-5	140.2		-0.15	2629		-----		-----
2293		-----		-----	2630		-----		-----
2295		-----		-----	2631	EPA3051	60.1259	ex	-7.59
2296	INH-38	120.8602		-1.95	2632	IEC62321	141.89		0.01
2298	CPSC-CH-E1002-08.3	117		-2.31	2634		-----		-----
2300	IEC62321-5	90.69	ex	-4.75	2636	IEC62321	158.8		1.58
2309	IEC62321	152.5		0.99	2637	EN17294-2	104		-3.51
2310	EPA3052	152		0.95	2641		-----		-----
2642		-----		-----	3182	IEC62321-5	115.77		-2.42

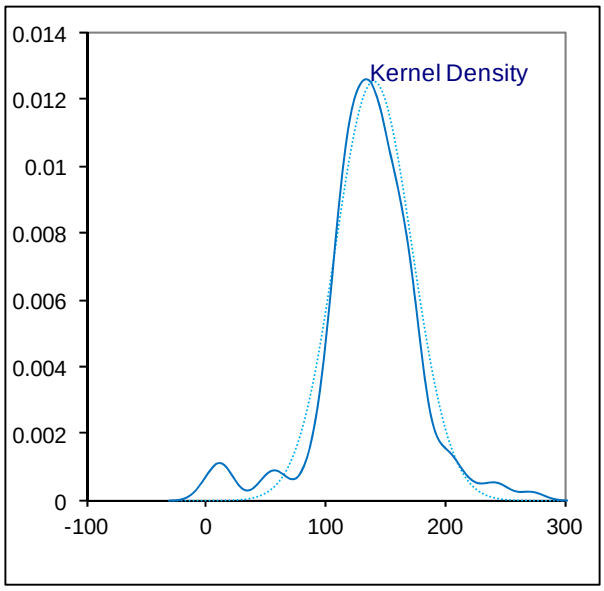
3100	IEC62321-4	154.4		1.17
3106		-----		-----
3107	EPA3051A	159.9		1.68
3110	in house	136.68		-0.48
3113		-----		-----
3116	CPSC-CH-E1002-08.1	140		-0.17
3122	in house	126.3		-1.44
3124	EPA3052	160		1.69
3127		-----		-----
3146	IEC62321-5	170		2.62
3153	IEC62321-5	148.0		0.57
3154		701.0	R(0.01)	51.95
3160		-----		-----
3163	IEC62321-5	145		0.30
3166	in house	145.1		0.30
3167	IEC62321-4	137.7		-0.38
3172		144.04		0.21
3176	in house	175.2		3.10
3180	in house	111.15		-2.85

3190	IEC62321-4	130	-1.10
3192		-----	-----
3195	EPA7473	172	2.80
3197	IEC62321-5	114.4	-2.55
3199		-----	-----
3200	IEC62321-4	145.23	0.32
3210	ISO17072-2	14 R(0.01)	-11.87
3218	IEC62321-4	120.5	-1.98
3220	EPA3050B	14.0 R(0.01)	-11.87
3225		-----	-----
3228	IEC62321-4	145	0.30
3237	in house	196.496	5.08
3239	IEC62321	120.55	-1.98
3242	IEC62321-5	115.049	-2.49
3243	INH-126	192	4.66
3246	in house	136.375	-0.51
3248		140	-0.17
8005		-----	-----

normality	OK	
n	131	
outliers	11	+ 8 excl
mean (n)	141.821	
st.dev. (n)	24.8807	
R(calc.)	69.666	
R(Horwitz)	30.140	

Lab 551 : first reported 828.75
Lab 2121: first reported 248.10
Lab 2156: first reported 19.7
Lab 2482: first reported 268.87





Determination of total Cadmium as Cd on sample #14151; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
110	INH-3352	85.32		-1.43	2311	EPA3052	102		0.48
213	CPSC-CH-E1002-08.1	101.090		0.38	2316	IEC62321	89.8		-0.91
330	in house	95.352		-0.28	2349	EN1122	93.86		-0.45
339	INH-344	107		1.06	2350	EN1122	95.30		-0.28
348	in house	100.66		0.33	2352	EN1122	98		0.03
362	EN1122	100.6		0.32	2359	EN1122	101.4		0.41
452		-----		-----	2361	EPA3051	106.5		1.00
551	IEC62321	90.16		-0.87	2363	EPA3052	101.02		0.37
601	IEC62321-5	87.78		-1.15	2365	GB/T26125	96.1		-0.19
605	IEC62321-5	90.25		-0.86	2366	EN1122	100.3		0.29
607	IEC62321-5	90.48		-0.84	2369	EN1122	101.2		0.39
622	EN1122	n.d.		-----	2370	IEC62321-5	101		0.37
632	in house	112.1		1.64	2372	in house	90.37		-0.85
826	IEC62321	101.2		0.39	2379	EN1122	70.02	R(0.01)	-3.18
840	EN1122	106.77		1.03	2380	EN1122	105.34		0.87
1051	EN1122	96.89		-0.10	2385	in house	111		1.51
1099	INH-118	85.41		-1.42	2389	CPSC-CH-E1002-08.1	101.03		0.37
1126	in house	96.0		-0.20	2390	CPSC	101.3		0.40
1195	IEC62321	82.9		-1.70	2409	IEC62321	118.84		2.41
1213	IEC62321-5	103.76		0.69	2410	EN1122	96		-0.20
1861	IEC62321-5	99.56		0.20	2413	INH-94/62	66.25	R(0.01)	-3.61
1911	in house	99.63		0.21	2415	EN1122	89.94		-0.90
2102	in house	103.424		0.65	2424	CPSC-CH-E1002-08	100.3		0.29
2115		-----		-----	2425	EN1122	104.2		0.74
2121	EN1122	103.85		0.70	2426	EPA3051A	97.25		-0.06
2129	IEC62321	97.608		-0.02	2429	CPSC-CH-E1002-08.3	98.1		0.04
2132	in house	94.90		-0.33	2431	INH-019	101.1424		0.39
2135	INH-29	110.8		1.49	2432	in house	95.68		-0.24
2137	EN1122	94.1		-0.42	2433	IEC62321	85.74		-1.38
2139	EN1122	92.96		-0.55	2442	in house	98.40		0.07
2146	EN1122	95.3		-0.28	2444	IEC62321	97.36		-0.05
2156	EN1122	88.6		-1.05	2453	EN1122	45.7	R(0.01)	-5.97
2165	EN1122	97.2		-0.07	2460	EN1122	95.9		-0.22
2167	IEC62321-5	87.20		-1.21	2464	EN1122	104.1		0.72
2169	IEC62321-5	184	R(0.01)	9.88	2470	ASTM F963	114.9		1.96
2172	IEC62321-5	97.31		-0.05	2477	IEC62321-5	93.92319		-0.44
2182	EN1122	105.8		0.92	2482	EN1122	99.314		0.18
2184	EN1122	98.1		0.04	2488	EN1122	99.675		0.22
2186	in house	n.d.		-----	2489	IEC62321-5	98.28		0.06
2190	EN1122	100.29		0.29	2492	in house	96.5		-0.15
2196	IEC62321	94.7		-0.35	2493	IEC62321-5	75.650	C	-2.53
2201	IEC62321-5	99.8		0.23	2495	EPA3052	92.3		-0.63
2202	in house	104.5		0.77	2503	CPSC-CH-E1002-08.3	90.63		-0.82
2212	in house	102.2		0.51	2504	EN1122	92.06		-0.65
2216	IEC62321	100.67		0.33	2511	EN1122	99.93		0.25
2218	in house	97.00		-0.09	2529	IEC62321	96.53		-0.14
2225	EN1122	101.6		0.44	2532	EN1122	95.2683		-0.29
2226	EPA3051	98.5		0.08	2538	ISO11885	105.4		0.87
2228	CPSD-AN-00164	114.8375		1.95	2563	IEC62321-8	88.5		-1.06
2229	EN1122	94.26		-0.40	2564	CPSC-CH-E1002-08.1	102.5		0.54
2230	EPA3051A	91.40		-0.73	2566		-----		-----
2234	EN1122	100.8		0.35	2567	EN1122	104.1		0.72
2236	EPA3052	99.97		0.25	2572	IEC62321-5	90.1		-0.88
2240	CPSC-CH-E1002-08.1	104.32		0.75	2581	in house	100.24		0.28
2246	EN1122	97.41		-0.04	2582	EN1122	85.14		-1.45
2247	IEC62321-5	94.63		-0.36	2590	EN14602	102.5		0.54
2254	in house	106		0.94	2591	CPSC-CH-E1002-08.3	96.70		-0.12
2255	EN1122	86.2		-1.33	2603	GB/T26125	95.4625		-0.27
2256	EN1122	105.3		0.86	2608	EN1122	0.692013	R(0.01)	-11.12
2268	CPSC-CH-E1002-08.3	99.5		0.20	2609	EPA3052/EPA6010C	94.79		-0.34
2269	in house	89.5		-0.95	2612	EN11885	90.5		-0.83
2272	EN1122	91.0		-0.78	2616	EPA3051/EPA6010C	103.1		0.61
2277	EPA3051/EPA6010	96.0		-0.20	2620	IEC62321-5	100.2		0.28
2279	in house	98		0.03	2621	IEC62321-5	100.22		0.28
2282	IEC62321-5	90.9		-0.79	2624	EN1122	39.46	R(0.01)	-6.68
2289	IEC62321-5	96.7		-0.12	2628	in house	51.5	R(0.01)	-5.30
2290	EN1122	96.9		-0.10	2629	CPSC-CH-E1002-08.2	94.66		-0.36
2293	EN1122	99.373	C	0.18	2630	IEC62321-5	101.6		0.44
2295		-----		-----	2631	EPA3051	n.d.	false -	-----
2296	INH-38	94.6020		-0.36	2632	IEC62321	100.31		0.29
2298	CPSC-CH-E1002-08.3	105		0.83	2634		-----		-----
2300	EN1122	0.04	R(0.01)	-11.20	2636	IEC62321	96.2		-0.18
2309	IEC62321	102.59		0.55	2637	EN17294-2	93		-0.55
2310	EPA3052	103		0.60	2641	IEC62321-5	100.8		0.35
2642		-----		-----	3182	EN1122	102.24		0.51

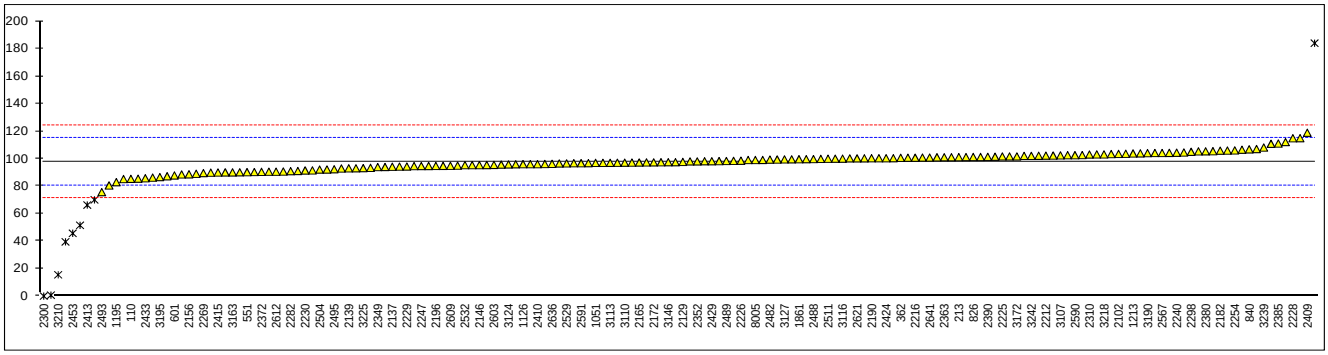
3100	IEC62321-5	102.1	0.50	3190	EN1122	104	0.71
3106		-----	-----	3192	in house	105.89	0.93
3107	EN1122	102.35	0.52	3195	ISO17294-2Mod.	86.6	-1.28
3110	EN1122	97.05	-0.08	3197	IEC62321-5	93.3	-0.51
3113	JETRO	96.95	-0.09	3199		-----	-----
3116	CPSC-CH-E1002-08.1	100	0.25	3200	IEC62321-5	97.13	-0.07
3122	in house	90	-0.89	3210	EN1122	15.5 R(0.01)	-9.42
3124	EPA3052	95.8	-0.23	3218	IEC62321-5	103.1	0.61
3127	DIN22022-3	99.44	0.19	3220	EN1122	80.5	-1.98
3146	IEC62321-5	97.4	-0.04	3225	IEC62321-5	93.1	-0.54
3153	EN1122	98.2	0.05	3228	EN1122	99	0.14
3154	IEC62321	92.85	-0.56	3237	in house	94.758	-0.35
3160	CPSC-CH-E1002-08.3	103.54	0.66	3239	IEC62321	108.11	1.18
3163	IEC62321-5	90	-0.89	3242	IEC62321-5	102.0	0.48
3166	in house	91.43	-0.73	3243	EN1122	92.1	-0.65
3167	EN1122	94.20	-0.41	3246	in house	103.313	0.63
3172	EN1122	101.60	0.44	3248	EN1122	89 C	-1.01
3176	EN1122	99.04	0.14	8005	EN1122	99	0.14
3180	EN1122	96.74	-0.12				

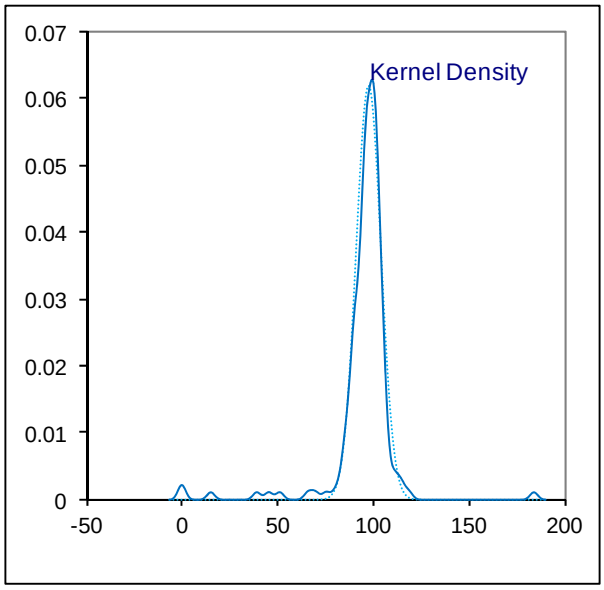
normality	suspect
n	167
outliers	9
mean (n)	97.777
st.dev. (n)	6.4629
R(calc.)	18.096
R(EN1122:01)	24.444

Lab 2293: first reported <LOD

Lab 2493: first reported 50.650

Lab 3248: first reported 100





Determination of other metals in plastics on sample #14150 and #14151; results in mg/kg

	#14150		#14151					
Lab	Sb	Cd	Sb	Cr	Cr6+	Co	Pb	Hg
110								
213								
330								
339								
348	1.21	0.15	0.43	0.28			0.56	
362								
452								
551								
601								
605								
607								
622	0.48		0.05	19.48	1.91			126.72
632								
826					3.032			
840								
1051								
1099					13.85			0.22
1126								
1195								
1213								
1861								
1911								
2102	0.637	0.208	0.302				0.736	0.040
2115								
2121								
2129		0.067	0.325	0.655				0.463
2132								
2135						1.3	1.4	
2137	0.9	1.5	0.8	8.9	1.1	0.9	6.4	5.2
2139								
2146								
2156	4.5	0.5	5.0	0.5	1.0	0.5	1.0	5.0
2165								
2167							2.28	2.68
2169	3.7	0.2	0.7	0.6	0.6		1.4	
2172								
2182								
2184								
2186								
2190	12.39	0.25	9.53	3.16	0.68	0.12	13.18	1.32
2196								
2201								
2202								
2212								
2216								
2218								
2225								
2226								
2228		0.1625	3.375	0.5875			1.0625	
2229								
2230								
2234								
2236	10.52	0.263	3.771	3.740	0.069	0.500	1.730	0.530
2240								
2246								
2247								
2254								
2255								
2256								
2268								
2269								
2272								
2277								
2279								
2282								
2289								
2290								
2293								
2295								
2296	0.2104	0.1205		0.4045		1.2033	4.652	
2298								
2300	0.95	0.02	1.9	0.04		0.08		

2309								
2310								
2311								
2316								
2349								
2350								
2352								
2359								
2361								
2363								
2365								
2366								
2369								
2370								
2372								
2379								
2380								
2385								
2389								
2390								
2409	0.492	0.479	0.036	0.949			1.292	2.246
2410								
2413								
2415								
2424								
2425								
2426								
2429								
2431								
2432								
2433				30.93				
2442								
2444		0.75		0.63			3.40	
2453								
2460								
2464								
2470							1.4	
2477		0.12124					0.048615	
2482								
2488								
2489								
2492								
2493				2.3850	1.3310			
2495								
2503	1.995	1.622		1.067			1.511	1.330
2504								
2511								
2529								
2532								
2538		1.3		2.2		0.5	0.9	0.2
2563				11				
2564								
2566								
2567								
2572								
2581								
2582								
2590							0.9	1.0
2591								
2603								
2608	4.8		0.5			5.4	8.0	1.0
2609								
2612	1.22		0.712	1.84	0.6776		0.97	0.13
2616		0.085		2.65		0.132	0.749	0.55
2620								
2621								
2624								
2628								
2629								
2630		2.2		0.8			1.7	
2631		117.029	97.335		1.929		2.146	
2632								
2634								
2636								
2637	0.1	0.1	0.1	0.2		0.02	0.3	
2641								
2642								

3100								
3106								
3107								
3110								
3113								
3116								
3122	1.885		0.328	0.872		0.188		
3124	0.618	0.103	0.147	0.0576		0.103	0.591	0.655
3127		0.12		3.38			2.82	
3146								
3153								
3154								
3160		4.59						
3163		15		7				
3166	1.031	0.0793	0.1293	3.739		1.024	2.616	0.38
3167				12.1			4.564	
3172								
3176	3.87			2.50			4.98	
3180								
3182								
3190								
3192								
3195	0.403	0.0804	0.149				0.984	
3197								
3199								
3200								
3210								
3218								
3220			15.2				1.0	
3225								
3228								
3237		0.102		0.609			0.389	4.813
3239								
3242								
3243	6.62	1.01	4.42	0.78	0.16	1.84	0.99	0.334
3246								
3248								
8005								

APPENDIX 2

Analytical details for sample #14150

lab	reduced	Particle size	Elements measured	technique	Temp. program	Acid mixture
110	no	as received		Microwave	140ºC/8min, 240ºC/17min,240º-15min	H20+HNO3+H2O2+HCl (1:4:0.85:1)
213	no	as received	all (excl Cr6+)	Microwave	140ºC/5min, 190ºC/10min,210ºC/5min, 210ºC-20min (700-800W)	HNO3 (6%)
330	--					
339	no	as received		Acid digestion		HNO3+H2O2
348	no	as received		Microwave	100ºC/3min, 175ºC/10min, 210ºC/5min, 210ºC-20 min (700-800W)	HNO3 (67%)
362	--					
452	--					
551	cut		all (excl Cr6+)	Microwave		HNO3+H2O2
601	cut	2000µm	Cd, Pb, Hg, Cr	Microwave	power program	HNO3+HF
605	cut	2000µm	Cd, Pb, Hg, Cr	Microwave	power program	HNO3+HF
607	cut	2000µm	Cd, Pb, Hg, Cr	Microwave	power program	HNO3+HF
622	cut	0.001µm	all (excl Cr6+)	Acid digestion	At 500ºC	H2SO4 / HNO3+HF
632		250µm	all (excl Cr6+)	Microwave	250ºC/20 min (1500W)	HF+HNO3
826	no		all (excl Cr6+)	Microwave	200ºC/60min, 200ºC-5min	HNO3+HCl
840	milled	1µm		Microwave	180ºC/10min, 180ºC-20min	HNO3+HF
1051	no	as received	Pb, Cr, Cd	Microwave	210ºC/20min, 210ºC-55min	H2SO4
1099	milled	<500µm	all (excl Cr6+)	Microwave	170, 200, 50	HNO3+H2O2
1126	cut	2000µm	all (excl Cr6+)	Microwave	100, 200	HNO3+HCl+H2O2 (5:1:1)
1195				ED-XRF		
1213	milled	250µm		Microwave	165ºC/10min, 165ºC-5min, 185ºC/10min, 185ºC-12 min	HNO3+H2O2
1861	no	as received		Microwave	120ºC/30min, 150ºC/30min, 180ºC/30min	HNO3+H2O2
1911	cut	5000µm	Cd	Dry Ashing	210min	H2SO4
2102	cut	1000µm	all (excl Cr6+)	Microwave	200ºC/4min, 200ºC-8min	HNO3+H2O2+H2O (5:1:2)
2115	--					
2121	no	as received		Microwave	150ºC, 220ºC	HNO3+HCl (5:1)
2129	no	as received	all (excl Cr6+)	Microwave	33ºC, 80ºC, 230ºC	HNO3
2132	cut	200µm	all (excl Cr6+)	Microwave	120ºC/15min, 165ºC/12min, 210ºC/15min, 210ºC-10min	HNO3+HCl
2135	no	as received		Microwave	130, 150, 180, 205	HNO3
2137	milled	500µm	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-15min	HNO3+HF (10:1)
2139	Ground	<250µm	all (excl Cr6+)	Microwave	200ºC, 180ºC	HNO3+HF
2146	cut	<3000µm	Cd	Acid digestion		H2SO4+H2O2
2156	cut	<100µm		Microwave	180ºC/55min, 180ºC-9.5min	HF+HCl+H2O2
2165	cut	1000µm	all (excl Cr6+)	Microwave	140ºC/5min, 190ºC/5min, 190ºC-20 min	HNO3
2167	milled	<500µm	Cd, Hg, Pb	Microwave	until dry, 330W-450W 4 min	HBF4+HNO3
2169	cut	2000µm	all (excl Cr6+)	Microwave	250-500W	HNO3+HF (3:1)
2172	milled	250µm	all (excl Cr6+)	Microwave	130ºC, 170ºC, 190ºC	HNO3
2182	cut	as received		Microwave	210ºC/20min, 210ºC-10min (1000W)	H2O2+H2SO4, HNO3
2184	no	as received	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-10min	HNO3+H2SO4 (10:1)
2186				XRF		
2190	--					
2196	cut	<500µm	all (excl Cr6+)	Microwave	600-800W (70min)	HNO3+H2O2+H2O (5:2:1)
2201	cut	500µm		Microwave	180ºC/25min,180ºC-20min	HNO3
2202	no			no		THF
2212	cut	1000µm		Microwave	200ºC/20min, 200ºC-10min	HNO3+HCl (3:1)
2216	ground			Acid digestion		HNO3
2218	no	as received		Microwave	200ºC/20min, 200ºC-15min	HNO3
2225	cut	500µm	all (excl Cr6+)	Microwave	120ºC/5min, 180ºC/3min, 200ºC/5min	HNO3
2226	cut	<2mm	all (excl Cr6+)	Microwave	150ºC/5min, 204ºC/20min	HNO3+HCl+H2O2 (8:2:1)
2228	cut			Microwave	150ºC, 190ºC, 210ºC	HNO3+H2O2
2229	cut	1000µm		Microwave	150ºC/5min, 180ºC/5min, 210ºC/5min	HNO3+H2O2 (4:1)
2230	cut	<3000µm		Microwave	150ºC, 190ºC, 210ºC	HNO3+H2O2 (10:1)
2234	cut	2000µm		Microwave	120ºC/5min, 150ºC/5min, 200ºC/5min, 200ºC-15min	HNO3
2236	no	as received	all (excl Cr6+)	Microwave	165ºC/12min, 210ºC/12min, 210ºC-35min	HNO3+HCl (3:1)
2240	no	as received	all (excl Cr6+)	Microwave	200ºC-45min	HNO3
2246	--					
2247	milled	<500µm	all (excl Cr6+)	Microwave	150ºC, 180ºC, 200ºC	HNO3
2254	cut		all (excl Cr6+)	Microwave	120ºC/38min, 215ºC/30min	HNO3+HCl+H2O2 (7:3:2)
2255	cut	small sized	all (excl Cr6+)	Microwave	200ºC/20min. 200ºC-10min	HNO3/H2O2
2256	cut		all (excl Cr6+)	Microwave	150ºC, 190ºC, 210ºC	HNO3

2268	cut	2000µm	all (excl Cr6+)	Microwave	600W/5min-15min, 800W/5min-15min	HNO3
2269	cut	0.005µm	all (excl Cr6+)	Acid digestion		HNO3
2272	cut			Microwave	190ºC/25min, 190ºC-20min	HNO3
2277	cut	<50000µm	all (excl Cr6+)	Microwave	205ºC/30min	HNO3+HCl+H2O2 (8:2:1)
2279	cut	<3000µm	all (excl Cr6+)	Microwave		HNO3
2282	cut		all (excl Cr6+)	Microwave	130ºC/5min, 150ºC/5min, 180ºC/5min, 180ºC-15min	HNO3
2289	cut		all (excl Cr6+)	Microwave	120ºC, 200ºC	HNO3
2290	cut	1000µm	all (excl Cr6+)	Microwave	165ºC, 210ºC	HNO3+H2O2 (10:3)
2293	cut	1000µm	Pb, Cd	Microwave	203ºC/30min, 203ºC-10min	HNO3
2295	--					
2296	cut	as received		Microwave	210ºC	HNO3
2298	ground			Microwave		
2300	cut	received	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-40min	H2SO4+HNO3+H2O2
2309	miled	250µm		Microwave	190, 200, 210	HNO3+HF
2310	cut	5mm	all (excl Cr6+)	Microwave	180ºC/20min, 180ºC-15min (1000W)	HNO3+H2O2
2311	cut	<5mm	all (excl Cr6+)	Microwave	210ºC/14min, 210ºC-5min	HNO3+H2O2
2316	cryo milled	250µm	all (excl Cr6+)	Microwave	120ºC/5min, 200ºC/10min, 220ºC/25min	HNO3+HF
2349	--					
2350	milled	<1mm	all (excl Cr6+)	Microwave	80ºC/5min, 210ºC/15min, 210ºC-18min	HNO3+HF+HClO4
2352	cut	500µm	all (excl Cr6+)	Microwave	130ºC/6min, 160ºC/5min, 190ºC/5min, 190ºC-18min	HNO3+HF+HCl
2359	cut	2000µm	all (excl Cr6+)	Microwave	80ºC/5min, 140ºC/5min, 190ºC/5min, 210ºC/3min-15min	HNO3+H2O2 (8:2)
2361	ground	<1000µm	all (excl Cr6+)	Microwave	140ºC/3min, 190ºC/5min, 190ºC/20min	HNO3
2363	cut	2000µm	all (excl Cr6+)	Microwave	150ºC/7min, 180ºC/5min, 200ºC/5min, 200ºC-15 min	HNO3+HCl+HF
2365	cut	500µm	all (excl Cr6+)	Microwave	165ºC/10min, 205ºC/7min, 205ºC-30min	HNO3+HF+H2O2+H3BO4
2366	cut	500µm	all (excl Cr6+)	Microwave	160ºC/5min, 210ºC/5min, 210ºC-30min	HNO3+H2O2 (8:2)
2369	cut	1mm	all (excl Cr6+)	Microwave	140ºC, 160ºC, 180ºC, 200ºC	HNO3+HF+H2O2
2370	milled	250µm		Microwave	170ºC, 190ºC	HNO3+HF
2372	cut	2-3mm	all (excl Cr6+)	Microwave	165ºC/20min, 165ºC-10min, 190ºC/20min, 190ºC-10min	HNO3+HF
2379	cut	2µm		Microwave	180ºC	HNO3
2380	cut	5000µm	all (excl Cr6+)	Microwave	140, 190, 210	HNO3+H2O2 (10+2)
2385	no	as received	all (excl Cr6+)	Microwave		HNO3+H2O2
2389	cut		Pb, Cd	Microwave	140ºC, 180ºC, 210ºC	HNO3
2390	no	as received	all (excl Cr6+)	Microwave	210ºC/45min, 210ºC-10min	
2409	cut	<2µm		Microwave	210ºC/15min	HNO3+HCl
2410	cut		all (excl Cr6+)	Microwave	180ºC/10min, 200ºC/12min, 210ºC/20min (400-800W)	HNO3+H2O2, H2SO4+H2O2
2413	no	as received		Microwave	200ºC/10min, 200ºC-15min	HNO3
2415	cut	as received	all (excl Cr6+)	Microwave	150, 180, 210	HNO3+H2O2
2424	no	as received	Pb, Cd, Hg	Microwave	200ºC/20min, 200ºC-10min	HNO3+HCl
2425	no	as received	all (excl Cr6+)	Microwave	190ºC/10min, 190ºC-25min	HNO3+H2O2
2426	no	500µm		Microwave	210ºC/20min, 210ºC-10min	HNO3
2429	cut	500µm	all (excl Cr6+)	Microwave	205ºC/30min, 205ºC-20min	HNO3
2431	no	as received	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-10min	HNO3+HCl (5:1)
2432	cut		Cd	Acid digestion		
2433	milled	as received	all (excl Cr6+)	Microwave	220ºC/30min, 230ºC/30min	HNO3
2442	cut	as received	Cd	Microwave	210ºC	HNO3
2444	milled	<250µm		Microwave	600W/60min	HNO3+H2O2
2453	--					
2460	cut	2000µm	Pb	Microwave	215ºC/20min, 215ºC-10min	HNO3
2464	no			Microwave		
2470	cut	1500µm	all (excl Cr6+)	Microwave	200ºC/25min, 200ºC-10min	HNO3
2477	no		Cd, Pb	Microwave	210ºC/25min, 210ºC-15min (400W)	HNO3
2482	not					
2488	cut		Pb, Cr, Hg, Cd	Microwave	150ºC/10min, 150ºC-20min (1200-1600W)	HF+HNO3+HCl+H2O2
2489	milled	<500µm	all (excl Cr6+)	Microwave	150ºC, 180ºC, 200ºC	HNO3
2492	cut	as received	all (excl Cr6+)	Microwave	120ºC/10min, 180ºC/15min, 200ºC/15min, 210ºC/15min - 30min	HNO3
2493	milled			Microwave		
2495	no	as received	all (excl Cr6+)	Microwave	230ºC/20min, 230ºC-25min	HNO3
2503	no	as received	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-10min	
2504	cut	2mm	all (excl Cr6+)	Microwave	200ºC/10min, 200ºC-30min	HNO3
2511	--					
2529	no	as received	Sb, Cd,Pb, Hg	Microwave	208ºC/20min, 208ºC-25min	HNO3
2532	cut	0.00102µm	all (excl Cr6+)	Microwave	1000W/15min, 1000W-25min	HNO3+H2O2 (9:1)
2538	milled		all (excl Cr6+)	Microwave	100ºC/5min, 130ºC/5min, 200ºC/5min, 200ºC-10 min	HNO3+HCl
2563	milled	1000µm	all (excl Cr6+)	Microwave	95ºC, 160ºC, 225ºC, 270ºC	HNO3+H2O2
2564	cut	3mm		Microwave	200ºC/20min, 200ºC-10min	HNO3
2566	--					

2567	cut	500µm		Microwave	140ºC/10min, 200ºC/5min, 200ºC-10min	HNO3+H2SO4
2572	--					
2581	cut		all (excl Cr6+)	Microwave		HNO3
2582	cut		all (excl Cr6+)	Microwave	120ºC, 180ºC, 200ºC	HNO3+H2O2
2590	no		all (excl Cr6+)	Microwave		HNO3
2591	cut		all (excl Cr6+)	Microwave	100ºC, 165ºC, 180ºC	HNO3+HCl
2603	no	as received	all (excl Cr6+)	Microwave	30ºC/15min, 210ºC/20min, 210ºC-30min	HNO3+H2O2
2608	cut			Acid digestion		
2609	cut	1mm	all (excl Cr6+)	Microwave	160ºC/5min, 190ºC/5min, 190ºC-20min	HNO3+H2O2 (9:1)
2612	no	as received	all (excl Cr6+)	Microwave	150ºC/10min, 220ºC/10min, 220ºC-14min	HNO3+HCl
2616	no	as received	all (excl Cr6+)	Microwave	230ºC/24min, 230ºC-33min	HNO3+HCl (3:1)
2620	cut		Cd, Cr, Hg, Pb	Microwave	110ºC, 215ºC	HNO3
2621	cut	200µm	all (excl Cr6+)	Microwave	600W/10min, 600W-10min, 800W/10min, 800W-30min	HNO3+H2O2 (9:2)
2624	no	as received	Pb, Cd, Cr	Microwave	100ºC/25min, 150ºC/10min, 200ºC/10min, 205ºC/35min	HNO3+HCl+H2O2
2628				XRF		
2629	cut		Pb, Cd	Microwave	200ºC/15 min	HNO3
2630	cut	2mm	Cd, Cr, Pb	Microwave	120ºC/14min, 150ºC/7min-10min, 180ºC/10min, 180ºC-20min	HNO3
2631	cut	1mm		Microwave	120ºC/1hr, 450ºC/4hr, 450ºC-2hr	HNO3
2632	cut	2mm	all (excl Cr6+)	Microwave	180ºC/5min, 200ºC-20min	HNO3
2634	--					
2636	no	as received	Pb, Cd, Hg	Microwave	110ºC/10min, 210ºC/12min, 210ºC-60min	HNO3
2637	no			Microwave	120ºC/10min, 150ºC/5min, 200ºC/10min, 200ºC-15min	HNO3+HF+H2O2
2641	no	as received	Cd, Cr, Pb	Microwave	120ºC/4min, 150ºC/4min, 190ºC/4min, 190ºC-12min	HNO3
2642	cut	2000µm	Pb	Microwave		HNO3
3100	no	<500µm	all (excl Cr6+)	Microwave	120ºC, 160ºC, 190ºC	HNO3
3106	--					
3107	no	as received	Cd, Cr, Pb, Hg	Microwave	120ºC/6min, 160ºC/7min, 215ºC/14min, 230ºC/7min	HNO3
3110	cut	2000µm	all (excl Cr6+)	Microwave	140ºC/5min,140ºC-10min, 210ºC/10min, 210ºC-10min	HNO3+HCl
3113	no	3000µm	Pb, Cd	Dry ashing	3 hrs	
3116	no	as received	Pb	Microwave	180ºC	HNO3
3122	--					
3124	no	as received	all (excl Cr6+)	Microwave	250W/15min, 520W/15min, 400W/20min	HNO3+HF+HCl (8:1:2)
3127	cut	500µm	Cd, Cr, Pb	Microwave	120ºC/3min, 160ºC/5min, 180ºC/5min, 200ºC/10min	HNO3
3146	no	as received	all (excl Cr6+)	Microwave	110ºC/6min, 210ºC/15min, 210ºC-15min (700-1000W)	HNO3/H2O2
3153	milled	<250µm		Microwave	140ºC, 200ºC	HNO3
3154	no	as received	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-25min	HNO3+H2O2
3160	cut	1000µm	all (excl Cr6+)	Microwave	210ºC/20min,210ºC-15min	HNO3+H2O2+HCl (9:2:1)
3163				XRF		
3166	milled		all (excl Cr6+)	Microwave	240ºC/15min, 240ºC-15min	
3167	milled	250µm		Microwave	120ºC/3min, 190ºC/10min, 220ºC/10min, 200ºC-30min	HNO3+H2O2
3172	milled		all (excl Cr6+)	Microwave	210ºC	HNO3
3176	no	as received		Microwave	170ºC, 190ºC, 200ºC, 210ºC	HNO3+H2SO4+HF
3180	cut	10µm		Microwave	70ºC, 200ºC, 250ºC	HCl+HNO3+H2O2 (2:12:1)
3182	milled	250µm		Microwave	200ºC/25min, 180ºC-10min	HNO3+H2O2 (9:1)
3190	no	as received	all (excl Cr6+)	Microwave	120ºC/5min, 160ºC/5min, 200ºC/5min, 200ºC-45min	HNO3
3192			Pb, Cd	Microwave		HNO3
3195	cut	as received	all (excl Cr6+)	Microwave	140ºC, 200ºC	HNO3
3197	no		all (excl Cr6+)	Microwave	120ºC/3min, 210ºC/25min, 210ºC-7min	HNO3
3199	no	as received	Pb	Microwave	210ºC/15min, 210ºC-60min	HNO3
3200	cut		all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-10min	HNO3+H2O2
3210	--					
3218	ground	0.25µm	all (excl Cr6+)	Microwave	120ºC/8min-8min,180ºC/8min-8min, 200ºC/8min-15min	HNO3+H2O2
3220	cut	2mm	all (excl Cr6+)	Microwave	220ºC	HNO3
3225	no	as received	all (excl Cr6+)	Microwave	120ºC/5min, 200ºC/15min, 200ºC-10min	
3228	milled	250µm		Microwave	120ºC/3min, 210ºC/15min, 210ºC-15min (800W)	HNO3+H2O2 (8:2)
3237	no		Cr, Cd, Pb, Hg	Microwave	160ºC/15min, 220ºC/13min, 220ºC-3min (1400-1650W)	HNO3
3239	cut	1000µm	Cr, Cd, Pb, Hg	Microwave	120ºC, 220ºC	HNO3
3242	no	as received		Microwave	220ºC/30min	HNO3+HCl
3243	milled	2µm	all (excl Cr6+)	Microwave	300W/4min, 600W/6min, 800W/15min	HNO3+HCl (3:1)
3246	cut	1000µm		Microwave	210ºC/25min, 210ºC-25min	HNO3
3248	cut	as received	all (excl Cr6+)	Microwave	130ºC, 170ºC, 190ºC	HNO3+H2O2
8005	no	as received	Pb	Microwave	210ºC	HNO3

APPENDIX 3

Analytical details for sample #14151, when deviating from #14150

lab	reduced	Particle size	Elements measured	technique	Temp. program	Acid mixture
213	cut	>500µm	all (excl Cr6+)	Microwave	140ºC/5min,190ºC/10min, 210ºC/5min, 210ºC-20min	HNO3 (6%)
348	cut	3000µm		Microwave	100ºC/3min, 175ºC/10min, 210ºC/5min, 210ºC-20 min	HNO3 (67%)
826	cut		all (excl Cr6+)	Microwave	200ºC/60min, 200ºC-5min	HNO3+HCl
1051	cut	2-3µm	Pb, Cr, Cd	Microwave	210ºC/20min, 210ºC-55min	H2SO4
1861	cut	3000µm		Microwave	120ºC/30min, 150ºC/30min, 180ºC/30min	HNO3+H2O2
2129	cut	3310µm	all (excl Cr6+)	Microwave	33ºC, 80ºC, 230ºC	HNO3
2202	no			no		Chlorobenzene+toluene
2226	cut	<5mm	all (excl Cr6+)	Microwave	150ºC/5min, 204ºC/20min	HNO3+HCl+H2O2 (8:2:1)
2234	cut	2000µm		Acid digestion		H2SO4
2236	cut	8µm	all (excl Cr6+)	Microwave	165ºC/12min, 210ºC/12min, 210ºC-35min	HNO3+HCl (3:1)
2240	cut	2000µm	all (excl Cr6+)	Microwave	200ºC-45min	HNO3
2293	cut	780µm	Pb, Cd	Microwave	203ºC/30min, 203ºC-10min	HNO3+H2O2 (5:1)
2385	cut	2mm	all (excl Cr6+)	Microwave		HNO3+H2O2
2477	cut	3000µm	Cd, Pb	Microwave	210ºC/25min, 210ºC-15min (400W)	HNO3
2503	cut	1000µm	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-10min	
2532	cut	0.00149µm	Cd	Acid digestion		H2SO4+H2O2 (10+20)
2612	cut	3mm	all (excl Cr6+)	Microwave	150ºC/10min, 220ºC/10min, 220ºC-14min	HNO3+HCl
2616	cut	5000µm	all (excl Cr6+)	Microwave	230ºC/24min, 230ºC-33min	HNO3+HCl (3:1)
2636	cut	100µm	Pb, Cd, Hg	Microwave	110ºC/10min, 210ºC/12min, 210ºC-60min	HNO3
3116	cut	4000µm	Cd	Microwave	180ºC	HNO3
3124	cut	1mm	all (excl Cr6+)	Microwave	250W/15min, 520W/15min, 400W/20min	HNO3+HF+HCl (8:1:2)
3146	cut	<3000µm	all (excl Cr6+)	Microwave	110ºC/6min, 210ºC/15min, 210ºC-15min (700-1000W)	HNO3/H2O2
3154	cut	3000µm	all (excl Cr6+)	Microwave	200ºC/20min, 200ºC-25min	HNO3+H2O2
3225	cut	3000µm	all (excl Cr6+)	Microwave	120ºC/5min, 200ºC/15min, 200ºC-10min	
3246	cut	5000µm		Microwave	210ºC/25min, 210ºC-25min	HNO3
3248	cut	5000µm	all (excl Cr6+)	Microwave	130ºC, 170ºC, 190ºC	HNO3+H2O2
8005	cut	4000µm	Cd	Acid digestion		H2SO4

APPENDIX 4

Number of participating laboratories per country

5 labs in BANGLADESH
1 lab in BRAZIL
1 lab in BULGARIA
1 lab in CAMBODIA
1 lab in CANADA
1 lab in DENMARK
1 lab in FINLAND
5 labs in FRANCE
15 labs in GERMANY
1 lab in GUATEMALA
21 labs in HONG KONG
1 lab in HUNGARY
11 labs in INDIA
2 labs in INDONESIA
1 lab in ISRAEL
6 labs in ITALY
1 lab in JAPAN
9 labs in KOREA
4 labs in MALAYSIA
3 labs in MEXICO
1 lab in MOROCCO
30 labs in P.R. of CHINA
3 labs in PAKISTAN
3 labs in PHILIPPINES
2labs in POLAND
2 labs in PORTUGAL
2 labs in SINGAPORE
1 lab in SLOVENIA
4 labs in SPAIN
1 lab in SRI LANKA
1 lab in SWITZERLAND
6 labs in TAIWAN R.O.C.
6 labs in THAILAND
3 labs in THE NETHERLANDS
1 lab in TUNESIA
5 labs in TURKEY
13 labs in U.S.A.
4 labs in UNITED KINGDOM
7 labs in VIETNAM

APPENDIX 5

Abbreviations:

C = final result after checking of first reported suspect result
D(0.01) = outlier in Dixon's outlier test
D(0.05) = straggler in Dixon's outlier test
G(0.01) = outlier in Grubbs' outlier test
G(0.05) = straggler in Grubbs' outlier test
DG(0.01) = outlier in Double Grubbs' outlier test
DG(0.05) = straggler in Double Grubbs' outlier test
R(0.01) = outlier in Rosner' outlier test
R(0.05) = straggler in Rosner' outlier test
n.a. = not applicable
n.d. = not detected
W = result withdrawn on request of participant
ex = excluded from calculations
fr. = first reported result

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