Results of Proficiency Test
Brominated Flame retardants
September 2017

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1 INTRODUCTION

Worldwide, many consumer products with plastic parts are produced which contain brominated compounds as flame retardants. These brominated compounds are exceptionally effective for fire prevention.

Since the 1990s, scientists have questioned the safety of the Poly Brominated Biphenyls (PBB) and Poly Brominated Diphenyls Ethers (PBDE), because it may bio accumulate in blood, breast milk and fat tissues. As of June 1, 2006 the State of California began prohibiting the manufacture, distribution, and processing of flame retardant products, containing Pentabromodiphenyl ether (Penta-BDE) and Octabromodiphenyl ether (Octa-BDE). The European Union decided to ban the use of both PBB and PBDE in electric and electronic devices. This ban was formalised in the RoHS Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, and an upper limit of 1000 mg/kg for the sum of PBB and PBDE was set.
Hexabromocyclododecane (HBCDD) has been under suspicion since 2008, when it was placed on the list of Substances of Very High Concern of the European Chemicals Agency. HBCDD is toxic to water-living organisms. It has been included in the EPA's List of Chemicals of Concern since 2010. In 2011 it was listed in the Annex XIV of REACH and hence is subject to Authorisation. HBCDD is slowly banned worldwide.

A proficiency testing scheme (laboratory-evaluating interlaboratory study) for the determination of Poly Brominated Biphenyls (PBB) and Poly Brominated Diphenyls Ethers (PBDE) was started by the Institute for Interlaboratory Studies in 2009 and the PT was extended with Hexabromocyclododecane (HBCDD) in 2015. It was decided to continue with the interlaboratory study for the determination of Brominated Flame Retardants in the annual proficiency testing program 2017/2018. In this interlaboratory study 73 laboratories from 22 different countries have registered for participation (see appendix 3). In this report, the results of the 2017 proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET-UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organiser of this proficiency test. Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send 2 different plastic samples (approximately 3 gram each), positive (artificially fortified) on Brominated Flame Retardants and labelled #17605 and #17606 respectively. Participants were requested to report rounded and unrounded test results and some details of the test methods used. The unrounded test results were preferably used for statistical evaluation.

2.1   ACCREDITATION

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

2.2   PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of March 2017 (iis-protocol, version 3.4). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3   CONFIDENTIALITY STATEMENT

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

2.4   SAMPLES

Two different samples were selected. The first material (#17605) was a Polyvinylchloride (PVC) granulate, artificially fortified with Decabromodiphenylether (Deca-BDE). The second material (#17606) was also a PVC granulate artificially fortified with Hexabromocyclododecane (HBCDD).
Sample #17605 and sample #17606 were both divided over 100 subsamples of approx. 3 grams. The homogeneity of subsamples #17605 and #17606 was checked by the determination of Deca-BDE and HBCDD content respectively on 8 stratified randomly selected subsamples.

	Deca-BDE #17605 in mg/kg	HBCDD #17606 in mg/kg
Sample 1	587	2023
Sample 2	612	1985
Sample 3	586	2021
Sample 4	565	1920
Sample 5	576	1992
Sample 6	601	2080
Sample 7	574	2125
Sample 8	597	2013

Table 1: homogeneity test results of subsamples #17605 and #17606

From the above test results the repeatabilities were calculated and compared with 0.3 times the corresponding target reproducibilities, in agreement with the procedure of ISO 13528, Annex B2 in the next table;

	Deca-BDE #17605 in mg/kg	HBCDD #17606 in mg/kg
r (observed)	44	173
reference test method	IEC62321-6:15	IMEP-26 see ref. 17
0.3 x R (ref. test method)	125	424

Table 2: evaluation of the repeatabilities of subsamples #17605 and #17606

Both observed repeatabilities were in agreement with 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples of #17605 and #17606 was assumed.

To each of the participating laboratories one set of samples; 1 times sample #17605 and 1 times sample #17606 was sent on August 9, 2017.

2.5   ANALYSES

The participants were requested to determine on both samples: Octabromodiphenyl ether, Nonabromodiphenyl ether, Decabromodiphenyl ether, Hexabromocyclododecane, Octabromodiphenyl, Nonabromodiphenyl and Decabromodiphenyl. Also some method details were requested to report. 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 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 test results can't be used for meaningful statistical calculations.

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 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 were 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.kpmd.co.uk/sgs-iis-cts/.

3   RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment.

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

3.1   STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of March 2017 (iis-protocol, version 3.4).
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.

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

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

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

3.2   GRAPHICS

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

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

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

3.3   Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, 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. In some cases, a reproducibility based on former iis proficiency tests could be used.
When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.
The z-scores were calculated according to:

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

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

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

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

4   EVALUATION

In this interlaboratory study, no problems were encountered with the dispatch of the samples. Two participants reported test results after the final reporting date and seven participants did not report any test result at all. Not all laboratories were able to report all components requested.

Finally, the 66 reporting laboratories reported 195 numerical test results. Observed were 14 outlying test results, which is 7.2% of all reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

For the determination of PBB and PBDE, the IEC62321-6 method is considered to be the official EC test method. The 2015 version of IEC62321 does mention precision data and have been used for the evaluation of the two PBDEs (Nona and Deca) found in sample #17605.

Unfortunately no official test method exists for the determination of HBCDD. Normally, when no (suitable) reproducibility requirement from a test method is available, target requirements are estimated from the Horwitz equation. Fortunately, an Interlaboratory Comparison report is available: IMEP-26 Determination of Brominated Flame Retardants in plastic. From the IMEP-26 results (ref. 17) it was clear that target standard deviations of 3 – 12% earlier used in iis PTs were not realistic for non-expert laboratories and that a more realistic PT target standard deviation is 25% of the assigned value. The reproducibility is calculated to be 2.8 times the standard deviation of 25% of the assigned value.

About 80% of the participants reported to have used the IEC62321 method for the determination of PBB, PBDE and HBCDD. A few laboratories adapted the test method to the analyte to be determined and used for the analyses of HBCDD a different test method compared to the test method used for the determination of PBB and PBDE.

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.

4.1 EVALUATION PER SAMPLE AND PER COMPONENT

In this section, the results are discussed per sample and per component.

Sample #17605

Nona-BDE: This determination was problematic for a number of laboratories. Seven statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the target reproducibility from test method IEC62321-6:2015.

Deca-BDE: This determination was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the target reproducibility from test method IEC62321-6:2015.

Sample #17606

HBCDD: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the target reproducibility from IMEP-26.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility found for the group of participating laboratories. The calculated reproducibilities and the target reproducibilities derived from the literature reference test method are compared in the next tables.

Analytes	unit	n	Average	2.8 * sd	R (target)
Nona-BDE	mg/kg	40	34.4	36.8	37.3
Deca-BDE	mg/kg	58	584	269	415

Table 3: performance overview for sample #17605

Analytes	unit	n	Average	2.8 * sd	R (target)
HBCDD	mg/kg	44	1920	2081	1344

Table 4: performance overview for sample #17606

Without further statistical calculations, it could be concluded that for the analyses of Nona-BDE and Deca-BDE in PVC at these concentration levels there is a good compliance of the group of participating laboratories with the relevant reference test method. However, for the analyses of HBCDD in PVC at this concentration level there is no compliance of the group of participating laboratories with the relevant reference test method.

4.3 COMPARISON OF PROFICIENCY TEST OF SEPTEMBER 2017 AGAINST PREVIOUS PTS

The uncertainties in the test results of the determined Brominated Flame Retardants in the iis17P07 PT are listed in the next table and are comparable with previous proficiency tests.

	2017	2016	2015	2014	2013	target *)	
						IMEP-26	IEC62321-1
Nona-BDE	38%	36%	46%	32-33%	33-38%	25%	26 - 44% (<500mg/kg)
Deca-BDE	16%	18%	17%	24%	14-21%	25%	26 - 29% (<5000mg/kg)
HBCDD	39%	24%	49%	n.e.	n.e.	25%	n.a.

Table 5: development of uncertainties over the last years

*) For PTs of 2015 and earlier the value of 25% from IMEP-26 has been taken for the target uncertainty of the BDEs as well as for HBCDD. In the 2016 and 2017 PT a target uncertainty range from IEC62321-1 was used for the BDEs as the uncertainty is concentration dependent.

4.4 EVALUATION OF THE ANALYTICAL DETAILS

The reported details of the analytical test methods that were used by the participants are listed in appendix 2. About 88% of the participating laboratories reported to be accredited for the determination of brominated flame retardants in polymer.

A variety of analytical details was reported, e.g. particle size (cut/grinded or as received), extraction technique and the use of extraction solvent(s).
It appeared that about 74% of the participants reduced the sample size before testing by cutting or grinding. However, no effect was observed on the reported test results for Nona-DBE and Deca-DBE in sample #17605, nor on the test results of HBCDD in sample #17606.
Almost all participants used toluene (or a toluene mixture) as extraction solvent. About 58% of the participants used a Soxhlet extraction and about 38% of the participants used the ultrasonic technique (both techniques are mentioned in IEC62321-6).
The ultrasonic technique according to IEC62321-6 is only applicable to soluble polymers. The used polymer in this PT is PVC and it is soluble in THF, but not in toluene. Most laboratories that used the ultrasonic technique also used toluene only as extraction solvent. A few laboratories used a (slightly) different analytical pathway for the determination of HBCDD than for to the determination of PBBs and PDBE.
Again, no effect was observed on the reported test results for Nona-DBE and Deca-DBE in sample #17605, nor on the test results for HBCDD in sample #17606.

In this PT, also the Ion masses for quantification and for qualification were requested to be reported. The majority of the participants used the ion masses which are mentioned in IEC62321-6 for quantification and qualification. The participants that mentioned to have used different ion masses for quantification and/or qualification reported no significant different test results for sample #17605.
Sample #17606 only contained HBCDD for which no reference ion masses may be available.

5   DISCUSSION

The two different materials used in this PT were both PVC granulates (sample #17605 and #17606). To extract the requested components (see chapter 2.6) from a solid like a polymer, the extraction solvent, the extraction conditions and the contact surface area are important variables.

In the PT of 2017 on Brominated Flame Retardants it was decided, just as in the previous proficiency tests of 2015 and 2016 to use PVC samples positive on Deca-BDE and HBCDD. And as also observed in the previous proficiency tests, it appeared that none of the requested analytical details was dominant as the calculated reproducibilities for the Deca-BDE determination, using all reported test results and thus including all different test details, were in agreement with the target reproducibility limits of IEC62321-1.

Also for the HBCDD determination, none of the analytical details appears to be dominant.

The majority of the group identified all added PBDE and HBCDD correctly: sample #17605 contained Nona-BDE and Deca-BDE and sample #17606 contained HBCDD only.

According to the RoHS Directive 2011/65/EU, electrical and electronic equipment are not allowed to contain more than 1000 mg/kg PBB + PBDE in total (see §1 Introduction). When the results of this interlaboratory study were compared with respect to the above regulation, it is noticed that most of the reporting laboratories would accept sample #17605, only 5 laboratories would reject sample #17605 for containing too much PBDE.

For HBCDD no upper limit of HBCDD is defined yet in governmental regulations. Therefore, no significant conclusions were drawn with respect to acceptation or rejection of sample #17606 for containing to much HBCDD.

6   CONCLUSION

The conclusion is that many of the participants may be able to determine Nona-BDE, Deca-BDE and HBCDD in the polymer matrix, but still a large variation is found between participant's test results. This variation obviously is dependent on the chosen sample pre-treatment and extraction procedure. Not surprisingly, the determination of Nona-BDE, Deca-BDE and HBCDD becomes more reproducible when sample pre-treatments are chosen that release Nona-BDE, Deca-BDE and HBCDD more effectively from the polymer. Such a pathway could be grinding the polymer prior the extraction. By grinding the polymer is reduced to small particles, and the contact surface is increased, which facilitates the release of Nona-BDE, Deca-BDE and HBCDD from the matrix.

Each laboratory should evaluate its performance in this study and make decisions about necessary corrective actions. 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 Nonabromodiphenyl ether CAS no. 63387-28-0 on sample #17605; results in mg/kg

lab	method	value	Mark	z(targ)	remarks
110	IEC62321-6 - GC/MS	29.26		-0.39	
324	IEC62321-6 - GC/MS	31.40		-0.23	
339	In house	<2		<-2.43	False negative? #17605 and #17606 possibly mixed-up
551	IEC62321-6 - GC/MS	N.D.		-----	
622		-----		-----	
826	IEC62321-6 - GC/MS	51.5		1.28	
1213	IEC62321-6 - GC/MS	<50		-----	
1370	IEC62321-6 - GC/MS	14.36		-1.50	
2129	IEC62321-6 - GC/MS	38.8		0.33	
2132	In house	<50		-----	
2137	IEC62321-6	9.8		-1.85	
2156	IEC62321-6 - GC/MS	115	R(0.01)	6.05	
2159	IEC62321-6 - GC/MS	11.05		-1.75	
2165	IEC62321-6 - GC/MS	40.0		0.42	
2172	IEC62321-6 - GC/MS	42.913		0.64	
2184	IEC62321-6 - GC/MS	45		0.79	
2199	IEC62321-6 - GC/MS	<50		-----	
2202	IEC62321-6 - GC/MS	113	R(0.01)	5.90	
2212	In house	N/A		-----	
2213	IEC62321-6 - GC/MS	17		-1.31	
2216	IEC62321-6 - GC/MS	<100		-----	
2232	In house	31.09		-0.25	
2247	IEC62321-6 - GC/MS	58.82		1.83	
2271	IEC62321-6 - GC/MS	42.1		0.58	
2295	IEC62321-6 - GC/MS	46	C	0.87	First reported: 250
2301		-----		-----	
2309	IEC62321-6 - GC/MS	110.0	R(0.01)	5.67	
2310	IEC62321-6 - GC/MS	113.2	R(0.01)	5.91	
2316	IEC62321-6 - GC/MS	116	R(0.01)	6.12	
2347	IEC62321-6 - GC/MS	45		0.79	
2350	IEC62321-6 - GC/MS	47.6		0.99	
2352	IEC62321-6 - GC/MS	35.3		0.07	
2354	IEC62321-6 - GC/MS	17.149		-1.30	
2355	IEC62321-6 - GC/MS	33.56		-0.06	
2363	IEC62321-6 - GC/MS	37		0.19	
2365	GB/T26125	30.9		-0.26	
2366	IEC62321-6 - GC/MS	<50		-----	
2369	IEC62321-6 - GC/MS	33	C	-0.11	First reported: <5 (fr. as Nonabromodiphenyl)
2370	IEC62321-6	21.1		-1.00	
2372	IEC62321-6 - GC/MS	18.82		-1.17	
2379	IEC62321-6 - GC/MS	24.00		-0.78	
2380	IEC62321-6 - GC/MS	43.94		0.71	
2384	IEC62321-6 - GC/MS	57.05		1.70	
2386	IEC62321-6 - GC/MS	<25		-----	
2387	IEC62321-6 - GC/MS	10.35		-1.81	
2389		-----		-----	
2410	IEC62321-6 - GC/MS	51	C	1.24	First reported:- (fr. as Nonabromodiphenyl)
2488	IEC62321-6 - GC/MS	25.93		-0.64	
2492	In house	23.78		-0.80	
2504	IEC62321-6 - GC/MS	102.37	R(0.01)	5.10	
2508		-----		-----	
2515	In house	35.96		0.12	
2571	In house	40.195	C	0.43	First reported: n.d.
2602		-----		-----	
2629	IEC62321-6 - GC/MS	ND		-----	
2674	IEC62321-6 - GC/MS	47		0.94	
2723		-----		-----	
2774	IEC62321-6 - GC/MS	36		0.12	
2780		-----		-----	
2785	In house	240	C,R(0.01)	15.42	First reported: <50 (fr. as sample #17606)
2792		-----		-----	
3100	IEC62321-6 - GC/MS	20.06		-1.08	
3146	In house	<30		-----	
3163		-----		-----	
3172		-----		-----	
3182	IEC62321-6 - GC/MS	38.62		0.32	
3190		-----		-----	
3197	IEC62321-6 - GC/MS	45		0.79	
3200	IEC62321-6 - GC/MS	<100		-----	
3209		-----		-----	
3210		-----		-----	
3228	IEC62321-6 - GC/MS	49		1.09	
3239		-----		-----	

normality	OK
n	40
outliers	7
mean (n)	34.410
st.dev. (n)	13.1486
R(calc.)	36.816
R(IEC62321-6:15)	37.320

RSD = 38.2%

Compare R(IMEP-26) = 24.087

Kernel Density
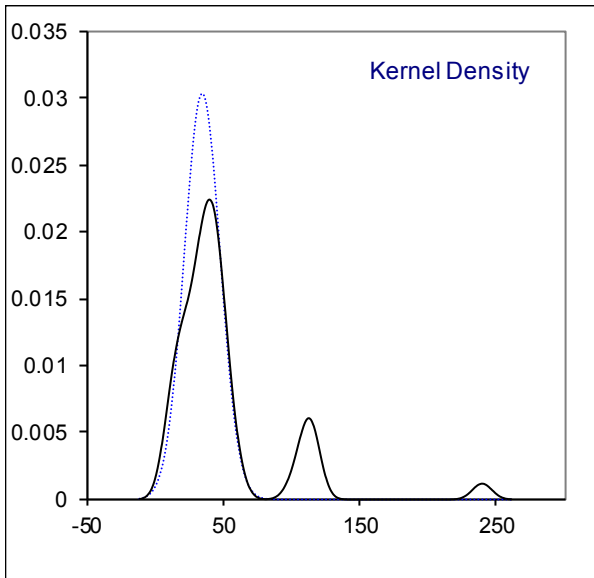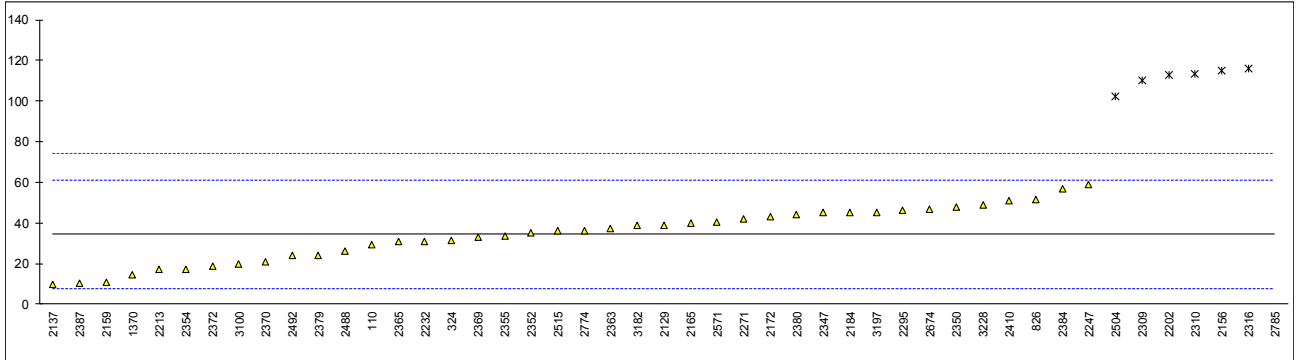
Determination of Decabromodiphenyl ether CAS no. 1163-19-5 on sample #17605; results in mg/kg

lab	method	value	mark	z(targ)	remarks
110	IEC62321-6 - GC/MS	521.90		-0.42	
324	IEC62321-6 - GC/MS	613.4		0.20	
339	In house	<10		<-3.87	False negative? #17605 and #17606 possibly mixed-up
551	IEC62321-6 - GC/MS	675.488		0.62	
622	IEC62321-6 - GC/MS	324.82		-1.75	
826	IEC62321-6 - GC/MS	508.12		-0.51	
1213	IEC62321-6 - GC/MS	487.0		-0.66	
1370	IEC62321-6 - GC/MS	1604.07	R(0.01)	6.88	
2129	IEC62321-6 - GC/MS	483		-0.68	
2132	In house	600		0.11	
2137	IEC62321-6	502		-0.55	
2156	IEC62321-6 - GC/MS	440		-0.97	
2159	IEC62321-6 - GC/MS	1265.33	R(0.01)	4.60	
2165	IEC62321-6 - GC/MS	662.0		0.52	
2172	IEC62321-6 - GC/MS	611.141		0.18	
2184	IEC62321-6 - GC/MS	652		0.46	
2199	IEC62321-6 - GC/MS	612		0.19	
2202	IEC62321-6 - GC/MS	613		0.19	
2212	In house	578		-0.04	
2213	IEC62321-6 - GC/MS	627	C	0.29	First reported: 446
2216	IEC62321-6 - GC/MS	313.67		-1.83	
2232	In house	843.86		1.75	
2247	IEC62321-6 - GC/MS	555.83		-0.19	
2271	IEC62321-6 - GC/MS	635.2		0.34	
2295	IEC62321-6 - GC/MS	1800	R(0.01)	8.20	
2301		-----		-----	
2309	IEC62321-6 - GC/MS	554.0		-0.20	
2310	IEC62321-6 - GC/MS	552.1		-0.22	
2316	IEC62321-6 - GC/MS	541		-0.29	
2347	IEC62321-6 - GC/MS	622		0.25	
2350	IEC62321-6 - GC/MS	504.8		-0.54	
2352	IEC62321-6 - GC/MS	615.2		0.21	
2354	IEC62321-6 - GC/MS	614.16		0.20	
2355	IEC62321-6 - GC/MS	621.20		0.25	
2363	IEC62321-6 - GC/MS	615		0.21	
2365	GB/T26125	610.2		0.18	
2366	IEC62321-6 - GC/MS	665.8		0.55	
2369	IEC62321-6 - GC/MS	633	C	0.33	First reported: <5 (fr. as Decabromodiphenyl)
2370	IEC62321-6	598		0.09	
2372	IEC62321-6 - GC/MS	405.5	C	-1.21	First reported: n.d. (fr. as Octabromodiphenyl ether)
2379	IEC62321-6 - GC/MS	498.61		-0.58	
2380	IEC62321-6 - GC/MS	541.43		-0.29	
2384	IEC62321-6 - GC/MS	579.46		-0.03	
2386	IEC62321-6 - GC/MS	595		0.07	
2387	IEC62321-6 - GC/MS	718.27		0.90	
2389		484.24		-0.67	
2410	IEC62321-6 - GC/MS	518	C	-0.45	First reported:- (fr. as Decabromodiphenyl)
2488	IEC62321-6 - GC/MS	561.02		-0.16	
2492	In house	622.46		0.26	
2504	IEC62321-6 - GC/MS	23466.78	C,R(0.01)	154.39	First reported: 2025.56
2508		-----		-----	
2515	In house	703.92	C	0.81	First reported: 139.86
2571	In house	436.634		-1.00	
2602		-----		-----	
2629	IEC62321-6 - GC/MS	ND		-----	Possibly false negative if ND=not detected
2674	IEC62321-6 - GC/MS	660		0.51	
2723		-----		-----	
2774	IEC62321-6 - GC/MS	531		-0.36	
2780		-----		-----	
2785	In house	79000	C,R(0.01)	529.09	First reported: <100 (fr. as sample #17606)
2792		-----		-----	
3100	IEC62321-6 - GC/MS	654.44		0.47	
3146	In house	626.3333333		0.28	
3163		-----		-----	
3172	IEC62321-6 - GC/MS	617.26		0.22	
3182	IEC62321-6 - GC/MS	735.32		1.02	
3190	IEC62321-6 - HPLC-	743.2		1.07	
3197	IEC62321-6 - GC/MS	710		0.85	
3200	IEC62321-6 - GC/MS	568.0		-0.11	
3209	In house	625.26		0.28	
3210		-----		-----	
3228	IEC62321-6 - GC/MS	657		0.49	
3239	IEC62321-6 - GC/MS	486.42		-0.66	

normality	suspect
n	58
outliers	5
mean (n)	584.218
st.dev. (n)	96.1476
R(calc.)	269.213
R(IEC62321-6:15)	414.984

RSD = 16.5%

Compare R(IMEP-26) = 408.953
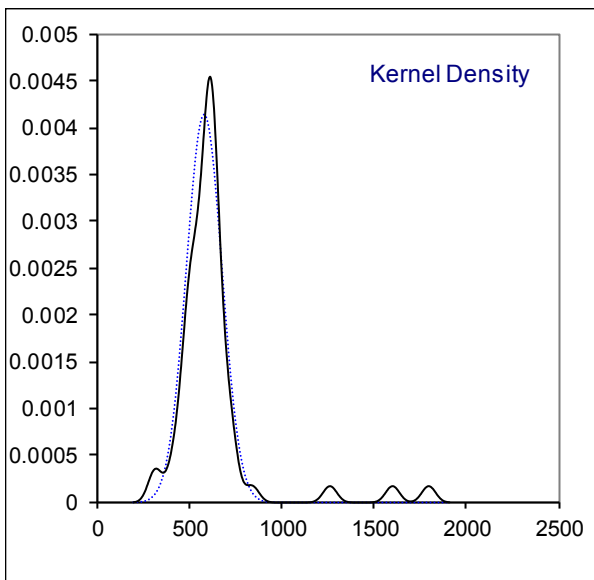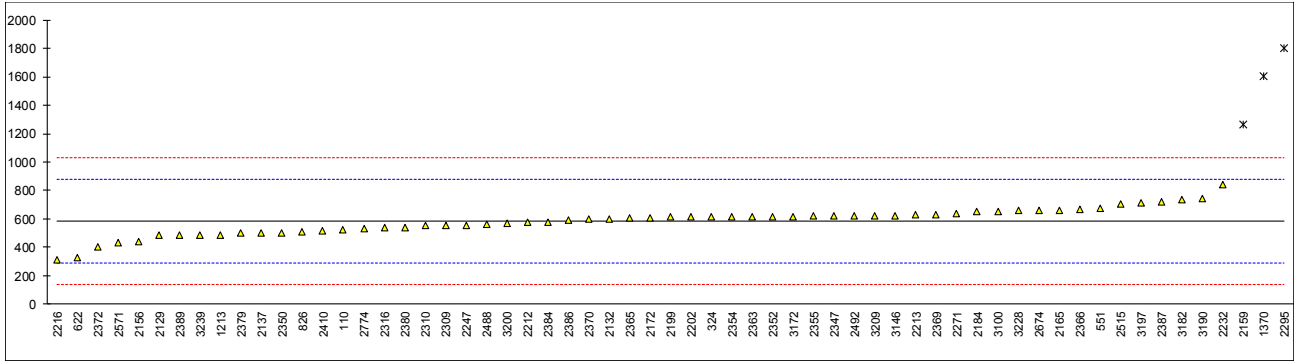
Determination of Octabromodiphenyl ether CAS no. 32536-52-0 and Hexabromocyclododecane CAS no. 3194-55-6 on sample #17605; results in mg/kg

lab	method	Octa-BDE	mark	method	HBCDD	mark
110		-----			-----	
324	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	NA	
339	In house	<1		In house	5160	False pos? **
551	IEC62321-6 - GC/MS	N.D.			-----	
622		-----			-----	
826		-----			-----	
1213	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
1370	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	NT	
2129		-----			-----	
2132	In house	<50		In house	<50	
2137		-----			-----	
2156	IEC62321-6 - GC/MS	5		IEC62321-6 - GC/MS	5	
2159		-----			-----	
2165	IEC62321-6 - GC/MS	n.d.			-----	
2172		-----			-----	
2184	IEC62321-6 - GC/MS	n.d.			-----	
2199	IEC62321-6 - GC/MS	<50			-----	
2202	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2212	In house	< 100		In house	N/A	
2213	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2216	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
2232		-----			-----	
2247	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2271	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2295		-----			-----	
2301		-----			-----	
2309	IEC62321-6 - GC/MS	ND[DL-50mg/kg]		IEC62321-6 - GC/MS	ND[DL-100mg/kg]	
2310	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2316	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2347	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2350	IEC62321-6 - GC/MS	0		In house	0	
2352	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2354	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2355	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<10	
2363	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2365	GB/T26125	ND		In house	ND	
2366	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2369	IEC62321-6 - GC/MS	<5			-----	
2370	IEC62321-6	n.d.		IEC62321-6	n.d.	
2372	IEC62321-6 - GC/MS	ND	C *	IEC62321-6 - GC/MS	n.d.	
2379	IEC62321-6 - GC/MS	n.d.			-----	
2380		-----			-----	
2384	IEC62321-6 - GC/MS	5.00		IEC62321-6 - GC/MS	<10	
2386	IEC62321-6 - GC/MS	<25		IEC62321-6 - GC/MS	<50	
2387	IEC62321-6 - GC/MS	<5			-----	
2389		n.d.	C *		-----	
2410		-----			-----	
2488	IEC62321-6 - GC/MS	N/A		IEC62321-6 - GC/MS	N/A	
2492		-----			-----	
2504	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2508		-----			-----	
2515		-----			-----	
2571	In house	N.D.		In house	N.D.	
2602	In house	0.694			-----	
2629	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2674	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	N/A	
2723		-----			-----	
2774	IEC62321-6 - GC/MS	< 50		IEC62321-6 - GC/MS	< 50	
2780		-----			-----	
2785	In house	120	C *, False pos?	In house	<10	C *
2792		-----			-----	
3100	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
3146	In house	<10		In house	<10	
3163		-----			-----	
3172		-----			-----	
3182	IEC62321-6 - GC/MS	less than 5		IEC62321-6 - GC/MS	less than 5	
3190		-----			-----	
3197	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
3200	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
3209		-----			-----	
3210		-----			-----	
3228	IEC62321-6 - GC/MS	ND			-----	
3239		-----			-----	

normality	n.a.	normality	n.a.
n	48	n	33
outliers	n.a.	outliers	n.a.
mean (n)	<100	mean (n)	<100
st.dev. (n)	n.a.	st.dev. (n)	n.a.
R(calc.)	n.a.	R(calc.)	n.a.
R(IEC62321-6:15)	n.a.	R(IEC62321-6:15)	n.a.

*)
lab 2372: first reported Octabromodiphenyl ether = 405.5 (fr. as Decabromodiphenyl ether)
lab 2389: first reported Octabromodiphenyl ether = 87.22
lab 2785: first reported Octabromodiphenyl ether <10 and Hexa bromocyclododecane = 165100 (fr. as sample #17606) (sample mix-up)

**)
lab 339: false positive Hexabromocyclododecane? Sample #17605 possibly mixed-up with sample #17606

Determination of Octabromodiphenyl CAS no. 69278-61-1 and Nonabromodiphenyl CAS no. 69278-62-2 on sample #17605; results in mg/kg

lab	method	Octa-BDP	mark	method	Nona-BDP	mark
110		-----			-----	
324	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
339	In house	<1		In house	<2	
551	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
622		-----			-----	
826		-----			-----	
1213	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
1370	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2129		-----			-----	
2132	In house	<50		In house	<50	
2137		-----			-----	
2156	IEC62321-6 - GC/MS	5		IEC62321-6 - GC/MS	5	
2159		-----			-----	
2165	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2172		-----			-----	
2184	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2199	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2202	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2212	In house	N/A		In house	N/A	
2213	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2216	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
2232		-----			-----	
2247	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2271	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2295		-----			-----	
2301		-----			-----	
2309		-----			-----	
2310	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2316	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2347	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2350	IEC62321-6 - GC/MS	0		IEC62321-6 - GC/MS	0	
2352	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2354	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2355	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2363	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2365	GB/T26125	ND		GB/T26125	ND	
2366	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2369	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	C *
2370	IEC62321-6	n.d.		IEC62321-6	n.d.	
2372	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2379	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2380		-----			-----	
2384	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2386	IEC62321-6 - GC/MS	<25		IEC62321-6 - GC/MS	<25	
2387	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2389		-----			-----	
2410		-----			-----	C *
2488	IEC62321-6 - GC/MS	N/A		IEC62321-6 - GC/MS	N/A	
2492		-----			-----	
2504	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2508		-----			-----	
2515		-----			-----	
2571	In house	N.D.		In house	N.D.	
2602		-----			-----	
2629	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2674	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2723		-----			-----	
2774	IEC62321-6 - GC/MS	< 50		IEC62321-6 - GC/MS	< 50	
2780		-----			-----	
2785	In house	<10		In house	<10	
2792		-----			-----	
3100	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
3146	In house	<10		In house	<10	
3163		-----			-----	
3172		-----			-----	
3182	IEC62321-6 - GC/MS	less than 5		IEC62321-6 - GC/MS	less than 5	
3190		-----			-----	
3197	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
3200	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
3209		-----			-----	
3210		-----			-----	
3228	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
3239		-----			-----	

normality	n.a.		normality	n.a.
n	44		n	44
outliers	n.a.		outliers	n.a.
mean (n)	<100		mean (n)	<100
st.dev. (n)	n.a.		st.dev. (n)	n.a.
R(calc.)	n.a.		R(calc.)	n.a.
R(IEC62321-6:15)	n.a.		R(IEC62321-6:15)	n.a.

*)
lab 2369: first reported Nonabromodiphenyl = 33 (fr. as Nonabromodiphenyl ether)
lab 2410: first reported Nonabromodiphenyl = 51 (fr. as Nonabromodiphenyl ether)

Determination of Decabromodiphenyl CAS no. 39282-95-6 and Other Brominated Flame Retardant(s) on sample #17605; results in mg/kg

lab	method	Deca-BDP	mark	method	Other BFRs	mark
110		-----			-----	
324	IEC62321-6 - GC/MS	<5			-----	
339	In house	<10		In house	<loq	
551	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
622		-----			-----	
826		-----			-----	
1213	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	NA	
1370	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	12.79	***
2129		-----			-----	
2132	In house	<50		In house	<50	
2137		-----			-----	
2156	IEC62321-6 - GC/MS	5		IEC62321-6 - GC/MS	5	***
2159		-----			-----	
2165	IEC62321-6 - GC/MS	n.d.			-----	
2172		-----			-----	
2184	IEC62321-6 - GC/MS	n.d.			-----	
2199	IEC62321-6 - GC/MS	<50			-----	
2202	IEC62321-6 - GC/MS	N.D.			-----	
2212	In house	N/A		In house	N/A	
2213	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2216	IEC62321-6 - GC/MS	<100			-----	
2232		-----			-----	
2247	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	traces	***
2271	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2295		-----		IEC62321-6 - GC/MS	12	***
2301		-----			-----	
2309		-----			-----	
2310	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2316	IEC62321-6 - GC/MS	ND			-----	
2347	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2350	IEC62321-6 - GC/MS	0		IEC62321-6 - GC/MS	0	
2352	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2354	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2355	IEC62321-6 - GC/MS	<5			-----	
2363	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2365	GB/T26125	ND		GB/T26125	ND	
2366	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2369	IEC62321-6 - GC/MS	<5	C *	IEC62321-6 - GC/MS	<5	
2370	IEC62321-6	n.d.		IEC62321-6	n.d.	
2372	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2379	IEC62321-6 - GC/MS	n.d.			-----	
2380		-----			-----	
2384	IEC62321-6 - GC/MS	<5			-----	
2386	IEC62321-6 - GC/MS	<50			-----	
2387	IEC62321-6 - GC/MS	<5			-----	
2389		-----			-----	
2410		-----	C *		-----	
2488	IEC62321-6 - GC/MS	N/A		IEC62321-6 - GC/MS	N/A	
2492		-----			-----	
2504	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	n.a.	
2508		-----			-----	
2515		-----			-----	
2571	In house	N.D.		In house	N.D.	
2602		-----			-----	
2629	IEC62321-6 - GC/MS	121.87	False pos?	IEC62321-6 - GC/MS	ND	
2674	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	N/A	
2723		-----			-----	
2774	IEC62321-6 - GC/MS	< 50			-----	
2780		-----			-----	
2785	In house	<10		In house	120	C * / ***
2792		-----			-----	
3100	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
3146	In house	<10			-----	
3163		-----			-----	
3172		-----			-----	
3182	IEC62321-6 - GC/MS	less than 5		IEC62321-6 - GC/MS	less than 5	
3190		-----			-----	
3197	IEC62321-6 - GC/MS	ND			-----	
3200	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
3209		-----			-----	
3210		-----			-----	
3228	IEC62321-6 - GC/MS	ND			-----	
3239		-----			-----	

normality	n.a.		normality	n.a.
n	43		n	26
outliers	n.a.		outliers	n.a.
mean (n)	<100		mean (n)	<100
st.dev. (n)	n.a.		st.dev. (n)	n.a.
R(calc.)	n.a.		R(calc.)	n.a.
R(IEC62321-6:15)	n.a.		R(IEC62321-6:15)	n.a.

*)
lab 2369: first reported Decabromodiphenyl = 633 (fr. as Decabromodiphenyl ether)
lab 2785: First reported: <320 (fr. as sample #17606) (sample mix-up)
lab 2410: first reported Decabromodiphenyl = 518 (fr. as Decabromodiphenyl ether)

***) other brominated flame retardant
lab 1370: BDE No. 207, CAS 437701-79-6
lab 2156: Di, Tri, Tetra, Penta, Hexa, Hepta
lab 2247: Other isomers of Nona BDE found in trace
lab 2295: 2,2,3,4,4,5,5,6 octobromodiphenylether BDE 203, CAS No: 337513-72-1
lab 2785: heptabromodiphenyl ethers

Determination of Hexabromocyclododecane CAS no. 3194-55-6 on sample #17606; results in mg/kg

lab	method	value	mark	z(targ)	remarks
110	IEC62321-6 - GC/MS	2544.39		1.30	
324	IEC62321-6 - GC/MS	NA		-----	
339	In house	<10		<-3.98	False negative? #17605 and #17606 possibly mixed-up
551		-----		-----	
622	IEC62321-6 - GC/MS	978.66		-1.96	
826	In house	2286.77		0.76	
1213	IEC62321-6 - GC/MS	2398.5		1.00	
1370	IEC62321-6 - GC/MS	NT		-----	
2129	In house	2075		0.32	
2132	In house	2197		0.58	
2137		-----		-----	
2156	IEC62321-6 - GC/MS	1634		-0.60	
2159		-----		-----	
2165		-----		-----	
2172	IEC62321-6 - GC/MS	2024.34		0.22	
2184		-----		-----	
2199		-----		-----	
2202	IEC62321-6 - GC/MS	2400		1.00	
2212	In house	N/A		-----	
2213	IEC62321-6 - GC/MS	1478	C	-0.92	First reported: 378
2216	IEC62321-6 - GC/MS	2033.33		0.24	
2232	In house	279.03	C	-3.42	First reported: 130.04
2247	IEC62321-6 - GC/MS	#		-----	#: detected in the range 2000-3500 ppm
2271		2125		0.43	
2295	IEC62321-6 - GC/MS	2500		1.21	
2301		-----		-----	
2309	IEC62321-6 - GC/MS	3754		3.82	
2310	IEC62321-6 - GC/MS	3862		4.05	
2316	IEC62321-6 - GC/MS	5739	C,R(0.01)	7.96	First reported: 3625
2347		1753		-0.35	
2350	In house	2399.5		1.00	
2352		2027.4		0.22	
2354	IEC62321-6 - GC/MS	1373.35		-1.14	
2355	EPA3550C	1909.88		-0.02	
2363	In house	2050		0.27	
2365	In house	1937.7		0.04	
2366	In house	1871.9		-0.10	
2369		-----		-----	
2370	IEC62321-6	1910		-0.02	
2372	IEC62321-6 - GC/MS	2057.8		0.29	
2379		-----		-----	
2380	IEC62321-6 - GC/MS	1333.99		-1.22	
2384	IEC62321-6 - GC/MS	2000.40		0.17	
2386	IEC62321-6 - GC/MS	1687		-0.49	
2387		-----		-----	
2389	In house	1956	C	0.08	First reported: 12.26
2410	In house	2726		1.68	
2488	IEC62321-6 - GC/MS	N/A		-----	
2492	In house	1069.04		-1.77	
2504	IEC62321-6 - GC/MS	1018.10		-1.88	
2508		-----		-----	
2515	In house	204.06		-3.57	
2571	In house	2885.158		2.01	
2602		-----		-----	
2629	IEC62321-6 - GC/MS	225.6		-3.53	
2674	IEC62321-6 - GC/MS	N/A		-----	
2723		-----		-----	
2774	IEC62321-6 - GC/MS	1663		-0.54	
2780		-----		-----	
2785	In house	165100	C,R(0.01)	339.97	First reported: <10 (fr. as sample #17605)
2792		-----		-----	
3100	IEC62321-6 - GC/MS	1745.26		-0.36	
3146	In house	2078.117647		0.33	
3163		-----		-----	
3172	IEC62321-6 - GC/MS	1522.53		-0.83	
3182	IEC62321-6 - GC/MS	2856.16		1.95	
3190		-----		-----	
3197	IEC62321-6 - GC/MS	1750		-0.35	
3200	IEC62321-6 - GC/MS	2215.6		0.62	
3209	In house	1680.12		-0.50	
3210		-----		-----	
3228		-----		-----	
3239		-----		-----	

normality	suspect
n	44
outliers	2
mean (n)	1919.925
st.dev. (n)	743.24761
R(calc.)	2081.093
R(IMEP-26:11)	1343.9471

RSD = 38.7%
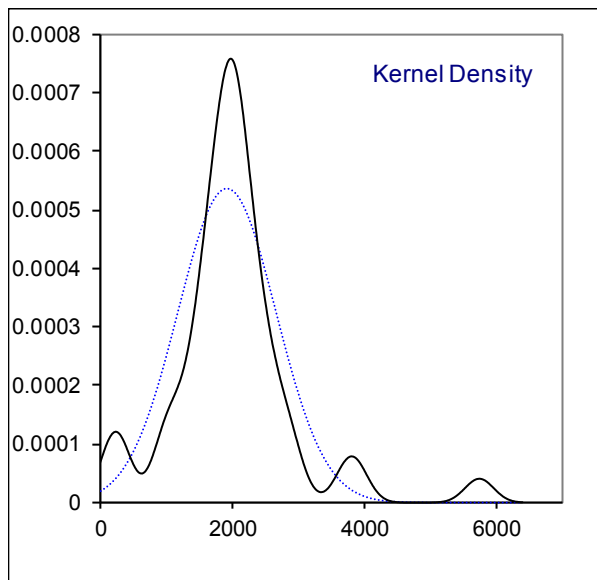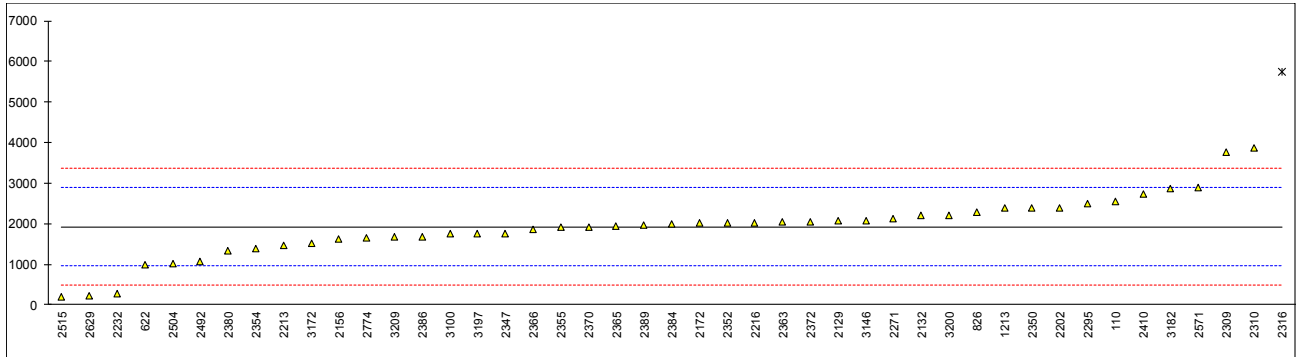
Determination of Octabromodiphenyl ether CAS no. 32536-52-0, Nonabromodiphenyl ether CAS no. 63387-28-0 and Decabromodiphenyl ether CAS no. 1163-19-5 on sample #17606; results in mg/kg

Lab	method	Octa-BDE	mark	Nona-BDE	mark	Deca-BDE	mark
110		-----		-----		-----	
324	IEC62321-6 - GC/MS	<5		<5		3.963	
339	In house	<1		15.50		541	False pos? **
551	IEC62321-6 - GC/MS	N.D.		N.D.		N.D.	
622		-----		-----		10	
826		-----		-----		-----	
1213	IEC62321-6 - GC/MS	<50		<50		<50	
1370	IEC62321-6 - GC/MS	<10		<10		<10	
2129		-----		-----		-----	
2132	In house	<50		<50		<50	
2137		-----		-----		-----	
2156	IEC62321-6 - GC/MS	5		5		5	
2159		-----		-----		-----	
2165	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2172		-----		-----		-----	
2184	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2199	IEC62321-6 - GC/MS	<50		<50		<50	
2202	IEC62321-6 - GC/MS	N.D.		N.D.		N.D.	
2212	In house	<100		N/A		<100	
2213	IEC62321-6 - GC/MS	<10		<10		<10	
2216	IEC62321-6 - GC/MS	<100		<100		<100	
2232		-----		-----		-----	
2247	IEC62321-6 - GC/MS	nd		nd		nd	
2271		<5		<5		<5	
2295		-----		-----		-----	
2301		-----		-----		-----	
2309	IEC62321-6 - GC/MS	ND[DL-50mg/kg]		ND[DL-50mg/kg]		ND[DL-50mg/kg]	
2310	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2316	IEC62321-6 - GC/MS	ND		ND		ND	
2347		<5		<5		<5	
2350	IEC62321-6 - GC/MS	0		0		0	
2352		nd		nd		nd	
2354	IEC62321-6 - GC/MS	N.D.		N.D.		N.D.	
2355	EPA3550C	<5		<5		<5	
2363	IEC62321-6 - GC/MS	ND		ND		ND	
2365	GB/T26125	ND		ND		ND	
2366	In house	<50		<50		<50	
2369		-----		-----		-----	
2370	IEC62321-6	n.d.		n.d.		n.d.	
2372	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2379	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2380		-----		-----		-----	
2384	IEC62321-6 - GC/MS	<5		<5		<5	
2386	IEC62321-6 - GC/MS	<25		<25		<50	
2387	IEC62321-6 - GC/MS	<5		<5		<5	
2389		-----		-----		-----	
2410		-----		-----		-----	
2488	IEC62321-6 - GC/MS	N/A		N/A		11.44	
2492		-----		-----		-----	
2504	IEC62321-6 - GC/MS	<50		<50		<50	
2508		-----		-----		-----	
2515		-----		-----		-----	
2571	In house	N.D.		N.D.		N.D.	
2602		-----		-----		-----	
2629	IEC62321-6 - GC/MS	ND		ND		ND	
2674	IEC62321-6 - GC/MS	n.d.		n.d.		n.d.	
2723		-----		-----		-----	
2774	IEC62321-6 - GC/MS	< 50		< 50		< 50	
2780		-----		-----		-----	
2785	In house	<10	C *	<50	C *	<100	C *
2792		-----		-----		-----	
3100	IEC62321-6 - GC/MS	<5		<5		<5	
3146	In house	<10		<10		<10	
3163		-----		-----		-----	
3172		-----		-----		-----	
3182	IEC62321-6 - GC/MS	less than 5		less than 5		less than 5	
3190		-----		-----		-----	
3197	IEC62321-6 - GC/MS	ND		ND		ND	
3200	IEC62321-6 - GC/MS	<100		<100		<100	
3209		-----		-----		-----	
3210		-----		-----		-----	
3228	IEC62321-6 - GC/MS	ND		ND		ND	
3239		-----		-----		-----	

normality	n.a.	n.a.	n.a.
n	44	43	45
outliers	n.a.	n.a.	n.a.
mean (n)	<100	<100	<100
st.dev. (n)	n.a.	n.a.	n.a.
R(calc.)	n.a.	n.a.	n.a.
R(IEC62321-6:15)	n.a.	n.a.	n.a.

*)
lab 2785: First reported Octabromodiphenyl ether = 120, Octabromodiphenyl ether = 240 and Decabromodiphenyl ether = 79000
    (fr. as sample #17605) (sample mix-up)

**)
lab 339: false positive Decabromodiphenyl ether? Sample #17605 possibly mixed-up with sample #17606

Determination of Octabromodiphenyl CAS no. 69278-61-1 and Nonabromodiphenyl CAS no. 69278-62-2 on sample #17606; results in mg/kg

lab	method	Octa-BDP	mark	method	Nona-BDP	mark
110		-----			-----	
324	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
339	In house	<1		In house	<2	
551	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
622		-----			-----	
826		-----			-----	
1213	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
1370	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2129		-----			-----	
2132	In house	<50		In house	<50	
2137		-----			-----	
2156	IEC62321-6 - GC/MS	5		IEC62321-6 - GC/MS	5	
2159		-----			-----	
2165	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2172		-----			-----	
2184	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2199	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2202	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2212	In house	N/A		In house	N/A	
2213	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2216	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
2232		-----			-----	
2247	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2271		<5			<5	
2295		-----			-----	
2301		-----			-----	
2309		-----			-----	
2310	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2316	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2347		<5			<5	
2350	IEC62321-6 - GC/MS	0		IEC62321-6 - GC/MS	0	
2352		nd			nd	
2354	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2355	EPA3550C	<5		EPA3550C	<5	
2363	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2365	GB/T26125	ND		GB/T26125	ND	
2366	In house	<50		In house	<50	
2369		-----			-----	
2370	IEC62321-6	n.d.		IEC62321-6	n.d.	
2372	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2379	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2380		-----			-----	
2384	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2386	IEC62321-6 - GC/MS	<25		IEC62321-6 - GC/MS	<25	
2387	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
2389		-----			-----	
2410		-----			-----	
2488	IEC62321-6 - GC/MS	N/A		IEC62321-6 - GC/MS	N/A	
2492		-----			-----	
2504	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	<50	
2508		-----			-----	
2515		-----			-----	
2571	In house	N.D.		In house	N.D.	
2602		-----			-----	
2629	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2674	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2723		-----			-----	
2774	IEC62321-6 - GC/MS	< 50		IEC62321-6 - GC/MS	< 50	
2780		-----			-----	
2785	In house	<10		In house	<10	
2792		-----			-----	
3100	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
3146	In house	<10		In house	<10	
3163		-----			-----	
3172		-----			-----	
3182	IEC62321-6 - GC/MS	less than 5		IEC62321-6 - GC/MS	less than 5	
3190		-----			-----	
3197	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
3200	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
3209		-----			-----	
3210		-----			-----	
3228	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
3239		-----			-----	

normality	n.a.	normality	n.a.
n	43	n	43
outliers	n.a.	outliers	n.a.
mean (n)	<100	mean (n)	<100
st.dev. (n)	n.a.	st.dev. (n)	n.a.
R(calc.)	n.a.	R(calc.)	n.a.
R(IEC62321-6:15)	n.a.	R(IEC62321-6:15)	n.a.

Determination of Decabromodiphenyl CAS no. 39282-95-6 and Other Brominated Flame Retardant(s) on sample #17606; results in mg/kg

lab	method	Deca-BDP	mark	method	Other BFRs	mark
110		-----			-----	
324	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	NA	
339	In house	<10		In house	<loq	
551	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
622		-----			-----	
826		-----			-----	
1213	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	NA	
1370	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2129		-----			-----	
2132	In house	<50		In house	<50	
2137		-----			-----	
2156	IEC62321-6 - GC/MS	5		IEC62321-6 - GC/MS	5	***
2159		-----			-----	
2165	IEC62321-6 - GC/MS	n.d.			-----	
2172		-----			-----	
2184	IEC62321-6 - GC/MS	n.d.			-----	
2199	IEC62321-6 - GC/MS	<50			-----	
2202	IEC62321-6 - GC/MS	N.D.			-----	
2212	In house	N/A		In house	N/A	
2213	IEC62321-6 - GC/MS	<10		IEC62321-6 - GC/MS	<10	
2216	IEC62321-6 - GC/MS	<100			-----	
2232		-----			-----	
2247	IEC62321-6 - GC/MS	nd		IEC62321-6 - GC/MS	nd	
2271		<5			<5	
2295		-----			-----	
2301		-----			-----	
2309		-----			-----	
2310	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2316	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2347		<5			<5	
2350	IEC62321-6 - GC/MS	0		IEC62321-6 - GC/MS	0	
2352		nd			nd	
2354	IEC62321-6 - GC/MS	N.D.		IEC62321-6 - GC/MS	N.D.	
2355	EPA3550C	<5			-----	
2363	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2365	GB/T26125	ND		GB/T26125	ND	
2366	In house	<50		In house	<50	
2369		-----			-----	
2370	IEC62321-6	n.d.		IEC62321-6	n.d.	
2372	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	n.d.	
2379	IEC62321-6 - GC/MS	n.d.			-----	
2380		-----			-----	
2384	IEC62321-6 - GC/MS	<5			-----	
2386	IEC62321-6 - GC/MS	<50			-----	
2387	IEC62321-6 - GC/MS	<5			-----	
2389		-----			-----	
2410		-----			-----	
2488	IEC62321-6 - GC/MS	N/A		IEC62321-6 - GC/MS	N/A	
2492		-----			-----	
2504	IEC62321-6 - GC/MS	<50		IEC62321-6 - GC/MS	n.a	
2508		-----			-----	
2515		-----			-----	
2571	In house	N.D.		In house	N.D.	
2602		-----			-----	
2629	IEC62321-6 - GC/MS	ND		IEC62321-6 - GC/MS	ND	
2674	IEC62321-6 - GC/MS	n.d.		IEC62321-6 - GC/MS	N/A	
2723		-----			-----	
2774	IEC62321-6 - GC/MS	< 50			-----	
2780		-----			-----	
2785	In house	<10		In house	<320	C *
2792		-----			-----	
3100	IEC62321-6 - GC/MS	<5		IEC62321-6 - GC/MS	<5	
3146	In house	<10			-----	
3163		-----			-----	
3172		-----			-----	
3182	IEC62321-6 - GC/MS	less than 5		IEC62321-6 - GC/MS	less than 5	
3190		-----			-----	
3197	IEC62321-6 - GC/MS	ND			-----	
3200	IEC62321-6 - GC/MS	<100		IEC62321-6 - GC/MS	<100	
3209		-----			-----	
3210		-----			-----	
3228	IEC62321-6 - GC/MS	ND			-----	
3239		-----			-----	

normality	n.a.	normality	n.a.
n	43	n	26
outliers	n.a.	outliers	n.a.
mean (n)	<100	mean (n)	<100
st.dev. (n)	n.a.	st.dev. (n)	n.a.
R(calc.)	n.a.	R(calc.)	n.a.
R(IEC62321-6:15)	n.a.	R(IEC62321-6:15)	n.a.

*)
lab 2785: First reported other brominated flame retardant = 120 (fr. as sample #17605) (sample mix-up)

***) other brominated flame retardant
lab 2156: Di, Tri, Tetra, Penta, Hexa, Hepta

APPENDIX 2: Analytical Details

lab	ISO/IEC17025 accredited for this test	Sample pretreatment	Final estimated particle size	Technique release/extract the analyte(s)	Solvent (mixture) to release analyte(s)	Extraction temperature (°C)	and time (minutes)
110	Yes	Cut	2mm x 2mm	Ultrasonic	Toluene	60	60
324	Yes	Grinded		Soxhlet	toluene	1200	boiling toluene
339	No	Used as received		Ultrasonic	TOLUENE	60minutes	60°C
551	Yes	Grinded	<500 um	Soxhlet	Toluene	120	
622	Yes	Cut		Soxhlet	Toluene	360 minute	110
826	Yes	Grinded	1mm x 1mm x 1mm	Ultrasonic	toluene	60 minutes	50 ¨¬C
1213	Yes	Cut	< 2 mm	Ultrasonic	THF	60 minutes	< 45 oC
1370	Yes	Used as received	As received	Soxhlet	Toluene	16 hours	110
2129	Yes	Grinded	fine powder	Ultrasonic	dichloromethane for PBDE and toluene for HBCDD	30 min (DCM) / 60 min (toluene)	RT (DCM) / 60 °C (toluene)
2132	No	Grinded	powder	Ultrasonic	Toluene	3 hours	60°C
2137	Yes	Used as received		Soxhlet			
2156	Yes	Cut	500um	Other (Soxtec extr.)	Toluene	300	~200
2159	Yes	Cut	1x1 mm	Ultrasonic	Toluene	120	60
2165	Yes	Used as received	3mm*3mm	Ultrasonic	Toluene	180	60
2172	Yes	Cut	1mm*1mm*1mm	Soxhlet	toluene	120min	70°C
2184	Yes	Used as received	3mm X 3mm	Ultrasonic	Toluene	1 hour	60
2199	Yes	Cut	~2mm	Soxhlet	Toluene	3600	110
2202	Yes	Used as received	-	Mechanical Shaking	Tetrahydrofuran(THF):Toluene:Hexane	6 hours	room temperature
2212	Yes	Cut	<1000um	Ultrasonic	Toluene	60	60
2213	Yes	Cut		---			
2216	Yes	Grinded	1 mm max	Soxhlet	toluene for BB and BDE, acetone and hexane for HBCD	2 hrs (PBB, PBDE), 1 hr (HBCD)	reflux (PBB, PBDE), room temp. (HBCD)
2232	Yes	Used as received	3mm*3mm*3mm	Ultrasonic	Toluene for #17605; Methanol for #17606	120 minutes for #17605; 30 minutes for #17606	70°C for #17605; 40°C for #17606
2247	Yes	Grinded	approx 1 micron	Soxhlet	toluene	120 to 180 mins	80 -90
2271	Yes	Cut	1mmx1mm	Ultrasonic	Toluene	60	50
2295	Yes	Cut	1-2mm	Soxhlet	Toluene, methanol for GC-MS samples	2 h	185
2301	---	---		---			
2309	Yes	Grinded	passes through 250 micron sieve.	Soxhlet	Toluene	120 min	Reflux the extract
2310	No	Cut		Soxhlet	Toluene	120 minutes	-
2316	Yes	Grinded	<500 µm	Soxhlet	TOLUENE	150 Minutes	80
2347	Yes	Cut	1mm*1mm*1mm	Soxhlet	toluene	6hours	

lab	ISO/IEC17025 accredited for this test	Sample pretreatment	Final estimated particle size	Technique release/extract the analyte(s)	Solvent (mixture) to release analyte(s)	Extraction temperature (°C)	and time (minutes)
2350	Yes	Grinded		Soxhlet	Toluene	180min	
2352	Yes	Cut	0.5mm*0.5mm*0.5mm	Soxhlet	Toluene	240min	115
2354	Yes	Grinded	0.5mm x 0.5mm x 0.5mm	Soxhlet	Toluene	120 mins	Reflux
2355	Yes	Cut	500um*500um	Soxhlet	Toluene	16h	PBBPBDE:Soxhlet HBCDD:60
2363	Yes	Cut	0.5mm*0.5mm*0.5mm	Soxhlet	toluene	4 hours	reflux
2365	Yes	Cut	PBB&PBDE:0.5mm*0.5mm ;HBCDD:1mm*1mm	Soxhlet	Toluene	6 hours	200
2366	Yes	Cut	0.5mmX0.5mmX0.5mm	17605 soxhlet, 17606 ultrasonic	toluene	for 17605 6h, for 17606 1h	for 17605 : reflux , for 17606: 60
2369	---	---		---			
2370	Yes	Grinded	Sieved through a sieve of.0.5 mm	Soxhlet	Toluene	2 hrs	250
2372	Yes	Grinded	<0.5mm	Soxhlet	Toluene	#17605: 90 #17606:120	#17605: 250 #17606: 60
2379	Yes	Grinded		Soxhlet	Toluene	2-3 min/1 cycle (40-60 cycle), Temp 58 ± 2 dgs	
2380	No	Used as received	2-3 mmx2-3 mm	Ultrasonic	Toluene	60 minute	50 °C
2384	Yes	Cut	<500um	Soxhlet	Toluene	16-21 hours at reflux temperature	
2386	Yes	Grinded	<1mm	Soxhlet	Toluol	240	
2387	Yes	Cut	< 500 um	Soxhlet	Toluene	960-1260	Reflux Temperature
2389	No	Used as received		Soxhlet	Toulene	2 hours	
2410	Yes	Grinded	500 um	Soxhlet	toluene, 1-propanol	180 min	
2488	Yes	Cut	≤1 mm	---	Toluen		
2492	Yes	Cut	0.5 cm	Ultrasonic	Toluene	45 min	Ambient Condition
2504	Yes	Grinded	500 um	Ultrasonic	toluene	120 mins	60
2508	---	---		---			
2515	Yes	Cut	≤1 mm	Ultrasonic	Toluene for PBBs & PBDEs analysis; THF/ACN for HBCDD analysis	2 hours PBBs & PBDEs ; 1 hours HBCDD analysis	70°C PBBs & PBDEs; 40°C HBCDD
2571	Yes	Grinded	50 - 300 um	Soxhlet	Toluene	150 min	120°C
2602	Yes	Used as received	5 mm x 5 mm	Ultrasonic	cyclohexane	60	40
2629	Yes	Used as received		Ultrasonic	Tetrahydrofurane	60 minutes	40
2674	No	Cut	3mm*3mm	Ultrasonic	Toluene - Hexane	180mins	60
2723	---	---		---			
2774	Yes	Used as received	500µm	Other (SOXTHERM)	Toluene	120	200
2780	---	---		---			
2785	Yes	Grinded	<0.05 mm	Ultrasonic	22% THF, 24% Toluene, 8%	60	70

lab	ISO/IEC17025 accredited for this test	Sample pretreatment	Final estimated particle size	Technique release/extract the analyte(s)	Solvent (mixture) to release analyte(s)	Extraction temperature (°C)	and time (minutes)
					Methylene Chloride, 1% Acetone, 1% Acetonitrile, 1% Diethel ether, 26.66% Methanol, 13.33% Hexane		
2792	---	---		---			
3100	Yes	Cut	1mm*1mm	Soxhlet	Toluene	120min	/
3146	Yes	Used as received	2x2	Ultrasonic	THF:Acetonitrile 5:10	30 min US + 30 min shake + 30 min US	70°C
3163	---	---		---			
3172	Yes	Grinded	< 0.5 um	Soxhlet	Toluene	120	--
3182	No	Grinded	500 um.	Soxhlet	Toluene	about 30 minutes	lab used soxhlet to extract at 2.5 min /cycle
3190	Yes	Grinded	<500µm	Soxhlet	Toluene	4 h	/
3197	Yes	Cut	2 x 2 mm	Soxhlet	Toluene	120 min.	Reflux T (Boiling Point Toluene:110C)
3200	Yes	Used as received	5mm	Ultrasonic	toluene	120	70
3209	Yes	Used as received	Used as received	Ultrasonic	toluene	1hour	60 degrees
3210	---	---		---			
3228	Yes	Used as received	3mm*3mm	Ultrasonic	Toluene	180mins	60
3239	Yes	Grinded	less than 0.5mm	Soxhlet	Toluene	120	110

APPENDIX 2: Analytical Details - continued

lab	Ion masses for quantification	Ion masses used for qualification	Remarks on Additional Questions:
110	Deca BDE - 799, Nona-BDE - 719, HBCDD - 159	Deca BDE - 797, Nona-BDE - 881, HBCDD - 239	
324			
339	OctaBDE 141; Nona BDE 359.6; DecaBDE 399.7; OctBB 465.6; NonaBB 545.6; DecaBB 391.6	OctaBDE 641.5; Nona BDE 719.5; DecaBDE 799.5; OctBB 704.5; NonaBB 784.5; DecaBB 623.6	an second ion is used for qualification for each BB and BDE
551	DECA PBDE - 799	DECA PBDE - 797/959	
622			
826			
1213	NA	NA	
1370	Nona BDE: 717,4; Deka BDE: 797,3	Nona BDE: 719,4; Deka BDE 799,3	
2129			
2132	nonaBDE:641.6 , DecaBDE:799.5 , HBCDD:239	nonaBDE:643.6,639.6 , DecaBDE:797.5,801.5 , HBCDD:319,399	N/A
2137			
2156	Accordingly to IEC 62321-6	Accordingly to IEC 62321-6	Soxtec extraction
2159	nona-BDE (719,5) ; deca-BDE (799,6)	nona-BDE (879,5 + 641,6 + 359,7) ; deca-BDE (959,4+ 639,6+ 719,5)	-
2165	721.5, 799.4	719.4, 360.7, 797.3, 399.7	
2172	720, 799, 319	881, 880, 959, 719, 157, 239	
2184	642, 720, 799	724, 802, 879, 360, 957, 801	
2199	799	959	
2202	under the condition of IEC62321-6	under the condition of IEC62321-6	-
2212	799	959,797,801	
2213			
2216			
2232	720 and 799 for #17605; 641 for #17606	881,880,360,959,720 and 401 for #17605;639 and 643 for #17606	
2247	nona : 719 , 359 and 881 Deca:399 , 799, 959	nona:719 Deca:959	
2271	721.6, 799.5, 239		
2295	641, 721, 400 HBCDD:157	799, 641,799 HBCDD:319, 239	
2301			
2309	719.4,799.3	717.4,797.3	
2310	NONABDE-(719.4) ,DECABDE -(799.3) , HBCDD-(157)	NONABDE (717.4) ,(721.4) ,DECABDE -(797.3) ,(959.1) HBCDD-239, 319	
2316	NonaBDE = 879.36, DecaBDE = 959.17, HBCCD =319,	NonaBDE = 719.65, 721.62, DecaBDE = 400.00, 799.00, HBCCD = 237, 401	
2347			
2350			

lab	Ion masses for quantification	Ion masses used for qualification	Remarks on Additional Questions:
2352	719.40m/z for Nonabromodiphenyl,799.30m/z for Decabromodiphenyl, 321.00m/z for Hexabromocyclododeca	NonaBDE-717.4m/z and 721.4m/z , DecaBDE-797.3m/z and 959.1m/z,HBCDD-319.0m/z and 401.0m/z	
2354	DecaBDE: 799.3, NonaBDE: 719.4, HBCDD: 319.0	DecaBDE: 797.3/959.1, NonaBDE: 717.4/721.4, HBCDD: 237.0/401.0	Nil
2355	PBBPBDE£°9BDE-719£¬10BDE-799 HBCDD:319	PBBPBDE£°9BDE-721,717£»10BDE-959,797 HBCDD-239	PBBPBDE :Soxhlet HBCDD: Ultrasonic
2363	DecaBDE:799.3;NonaBDE:719.4;HBCDD:319	DecaBDE:797.3;959.1;NonaBDE:717.4,721.4;HBCDD:321,401	
2365	9-BDE:721;10-BDE:799;HBCDD:239	9-BDE:722,879,281;10-BDE:797,956;HBCDD:319,399,562	
2366	For 17605£° 799£¬ for 17606: 239	For 17605£° 799, 959£¬ 797£¬ for 17606 £°401, 319£¬ 560	For 17605 use soxhlet, for 17606 use ultrasonic
2369			
2370	#17605 NonaBDE 719, DecaBDE 799 en #17606 HexaBCDD 157	#17605 NonaBDE 721, 879, 717 DecaBDE 797, 959, 400 en #17606 HexaBCDD 239, 319, 401	
2372	#17605: 10BDE:799,9BDE:719 #17606:159	#17605: 10BDE:797,959, 9BDE:717,721,879 #17606:239,319,399	
2379			
2380	719.65, 400.00, 319	721.62, 879.36, 799.00, 959.17, 237, 401	
2384			
2386			
2387	719.4,717.4,721.4,799.3,797.3,959.1	719.4,717.4,721.4,799.3,797.3,959.1	
2389	237,319,401, 400,799,959, 641, 643,801	237,319,401, 400,799,959, 641, 643,801	
2410	NonaBDE 721.5 , DecaBDE 779.5, HBCDD 159.1	NonaBDE 894.4 , DecaBDE 797.5 HBCDD 239.1, 321.0	
2488			technique to quantify: GC-MS
2492	Deca BDE 800>639 / Nona BDE 720>559 / HBCDD 319>157	Deca BDE 800>720 / Nona BDE 880>720 / HBCDD 319>117	
2504	Nona-BDE : 719.4. Deca-BDE : 799.3, HBCDD : 318.9	Nona-BDE : 717.4, 727.4. Deca-BDE : 797.3, 959.6, HBCDD : 118.9	
2508			
2515	HBCDD: m/z = 640.7; nona-BDE: m/z = 719.5; deca-BDE: m/z = 799.4	HBCDD: m/z = 638.7 and 642.7; nona-BDE: m/z = 881.2, 879.5, 359.9; deca-BDE: m/z = 959.3, 719.5, 400.6	
2571			
2602	641.6	643.5 / 801.5	
2629			Hexabromocyclododecane (HBCDD) CAS no. 3194-55-6 is assay by LC-MS technique in negative mode.
2674	Octa-BDE 642, Nona-BDE 720, Deca-BDE 800	Octa-BDE 724, Nona-BDE 879, Deca-BDE 957	It does not dissolve in Toluene
2723			
2774	octaBB: 706.6/625.6 nonaBB: 784.5/703.6 decaBB: 463.7/943.4/783.3 octaBDE: 320.7/641.6 nonaBDE: 719.6/879.5 decaBDE: 799.5/959.4		used technique : SOXTHERM; further quant ions : nonaBDE: 719.6/879.5 decaBDE: 799.5/959.4
2780			
2785	For PBDE's: [M]+ +[M-Br2]+, for BP's [M]+, [M-BR]+, [M-BR2]+	For PBDE's: [M]+ +[M-Br2]+, for BP's [M]+, [M-BR]+, [M-BR2]+	4b continued: 26.66% Methanol, 13.33% Hexane
2792			

lab	Ion masses for quantification	Ion masses used for qualification	Remarks on Additional Questions:
3100	EI	/	/
3146			
3163			
3172	BDE209 488.5 (GC-NCI-MS); HBCD 640.5 (LC-MS)	BDE209 486.5 (GC-NCI-MS); HBCD 642.5 (LC-MS)	
3182	Hexabromocyclododecane : 239.0	Ion mass for Hexabromocyclododecane : 318.9 , 158.1	
3190	/	/	/
3197	DecaBDE:799.5; NonaBDE:721.0; HBCDD:159	DecaBDE:721.5/639.4; NonaBDE:799.0/643.0; HBCDD:319.0/239.0	
3200	319/799	399/239	
3209	Decabromodiphenyl ether£°799;Hexabromocyclododecane :91	Decabromodiphenyl ether£°797;Hexabromocyclododecane :159	
3210			
3228	721,799	723,801,879,959	
3239	719.40, 799.50	721.40, 959.10, 399.70	

APPENDIX 3

Number of participating laboratories per country

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 1 lab in  BANGLADESH
 1 lab in  BELGIUM
 2 labs in BRAZIL
 2 labs in FRANCE
 6 labs in GERMANY
 5 labs in HONG KONG
 5 labs in INDIA
 3 labs in INDONESIA
 1 lab in  ITALY
 5 labs in KOREA
 3 labs in MALAYSIA
16 labs in P.R. of CHINA
 1 lab in  PAKISTAN
 3 labs in SINGAPORE
 1 lab in  SLOVAKIA
 1 lab in  SWITZERLAND
 3 labs in TAIWAN R.O.C.
 3 labs in THAILAND
 1 lab in  THE NETHERLANDS
 4 labs in TURKEY
 3 labs in U.S.A.
 3 labs in VIETNAM
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APPENDIX 4

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
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
f.r.	= first reported
IMEP	= International Measurement Evaluation Programme

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