Test Report Report No.: 220506132GZU-007 Date: May 26, 2022

Applicant: Zhaoqing Beryl Electronic Technology Co., Ltd

No.2 Plant Area, West of Duanzhou 8th Road,
South of Zhaoqing Avenue, Duanzhou District, Zhaoqing City,
Guangdong Province, P. R. China

Sample Description:

The following submitted samples said to be part used for:

Item Name	:	**Polymer Aluminum electrolytic capacitors**
Model No.	:	SMD Type
Material	:	AL
Date of Sample Received	:	May 11, 2022
Testing Period	:	May 11, 2022 to May 24, 2022

Tests conducted:

As requested by the applicant, refer to following pages for details.

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch:

Prepared by:

Hay Zhao

Hay Zhao
Engineer

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Asst. Technical Supervisor

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Conclusion:

Tested Sample	Standard	Result
Tested components of submitted sample	Restriction of the use of certain hazardous substance in electrical and electronic equipment (RoHS Directive 2011/65/EU and (EU) 2015/863)	Pass
	AfPS GS 2019:01 PAK (PAH) on Polycyclic Aromatic Hydrocarbons (PAHs) Content	See Test Conducted 2
	Test Item	Result
	Perfluorooctane Sulfonates (PFOS) Content	See Test Conducted 3
	Metal Element Content	See Test Conducted 4
	Phthalate Content	See Test Conducted 5
	Halogen (F, Cl, Br, I) Content	See Test Conducted 6
	Tetrabromobisphenol A (TBBPA) Content:	See Test Conducted 7
	Sulphur(S) Content	See Test Conducted 8

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Tests conducted:

Tested sample:
(1) Grey metal
(2) Silver color metal with grey coating
(3) Silver color metal
(4) Silver color metal
(5) White paper
(6) Black plastic
(7) Yellow cellotape
(8) Dark blue liquid
(9) Black plastic
(10) Red wet paint

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1. RoHS Chemical Test

(A)Test Result Summary:

Test Item	Result (mg/kg)					
	(5)	(6)	(7)	(8)	(9)	(10)
Cadmium (Cd) Content	ND	ND	ND	ND	ND	ND
Lead (Pb) Content	ND	ND	ND	ND	ND	ND
Mercury (Hg) Content	ND	ND	ND	ND	ND	ND
Chromium (VI)(Cr^{6+}) Content	ND	ND	ND	ND	ND	ND
Sum of Polybrominated Biphenyls (PBBs)	ND	ND	ND	ND	ND	ND
Monobromobiphenyl (MonoBB)	ND	ND	ND	ND	ND	ND
Dibromobiphenyl (DiBB)	ND	ND	ND	ND	ND	ND
Tribromobiphenyl (TriBB)	ND	ND	ND	ND	ND	ND
Tetrabromobiphenyl (TetraBB)	ND	ND	ND	ND	ND	ND
Pentabromobiphenyl (PentaBB)	ND	ND	ND	ND	ND	ND
Hexabromobiphenyl (HexaBB)	ND	ND	ND	ND	ND	ND
Heptabromobiphenyl (HeptaBB)	ND	ND	ND	ND	ND	ND
Octabromobiphenyl (OctaBB)	ND	ND	ND	ND	ND	ND
Nonabromobiphenyl (NonaBB)	ND	ND	ND	ND	ND	ND
Decabromobiphenyl (DecaBB)	ND	ND	ND	ND	ND	ND
Sum of Polybrominated Diphenyl Ethers (PBDEs)	ND	ND	ND	ND	ND	ND
Monobromodiphenyl Ether (MonoBDE)	ND	ND	ND	ND	ND	ND
Dibromodiphenyl Ether (DiBDE)	ND	ND	ND	ND	ND	ND
Tribromodiphenyl Ether (TriBDE)	ND	ND	ND	ND	ND	ND
Tetrabromodiphenyl Ether (TetraBDE)	ND	ND	ND	ND	ND	ND
Pentabromodiphenyl Ether (PentaBDE)	ND	ND	ND	ND	ND	ND
Hexabromodiphenyl Ether (HexaBDE)	ND	ND	ND	ND	ND	ND
Heptabromodiphenyl Ether (HeptaBDE)	ND	ND	ND	ND	ND	ND
Octabromodiphenyl Ether (OctaBDE)	ND	ND	ND	ND	ND	ND
Nonabromodiphenyl Ether (NonaBDE)	ND	ND	ND	ND	ND	ND
Decabromodiphenyl Ether (DecaBDE)	ND	ND	ND	ND	ND	ND
Phthalates						
Bis(2-ethylhexyl) phthalate (DEHP)	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate (BBP)	ND	ND	ND	ND	ND	ND
Dibutyl phthalate (DBP)	ND	ND	ND	ND	ND	ND
Diisobutyl phthalate (DIBP)	ND	ND	ND	ND	ND	ND

Testing Item	Result			
	(1)	(2)	(3)	(4)
Cadmium (Cd) Content (mg/kg)	ND	ND	ND	ND
Lead (Pb) Content (mg/kg)	ND	ND	ND	ND
Mercury (Hg) Content (mg/kg)	ND	ND	ND	ND
Chromium (VI)(Cr^{6+}) Result (By Boiling Water Extraction on Metal)(μg/cm^2)	Negative	Negative	Negative	Negative

ND = Not detected
mg/kg= milligram per kilogram
Negative = The Cr (VI) concentration is less than 0.10 μg/cm^2.The sample is negative for Cr (VI).

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(B) RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr^{6+})	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)
Phthalates(DEHP, BBP, DBP, DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from 2011/65/EU and (EU) 2015/863 for homogeneous material.

(C) Test Method:

Testing Item	Testing Method	Detection Limit
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321-4:2013+AMD1:2017 CSV, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr^{6+}) Content	With reference to IEC 62321-7-2 Edition 1.0:2017, Hexavalent chromium – Determination of hexavalent chromium (Cr(VI) in polymers and electronics by the colorimetric method	10 mg/kg
Chromium (VI)(Cr^{6+}) Content	With reference to IEC 62321-7-1 edition 1.0:2015, by boiling water extraction and determined by UV-VIS spectrophotometer	0.10 μg/cm^2
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321-6 Edition 1.0:2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg
Phthalates(DEHP, BBP, DBP, DIBP) Content	With reference to IEC 62321-8 Edition 1.0:2017,by solvent extraction and determined by GC/MS	100mg/kg

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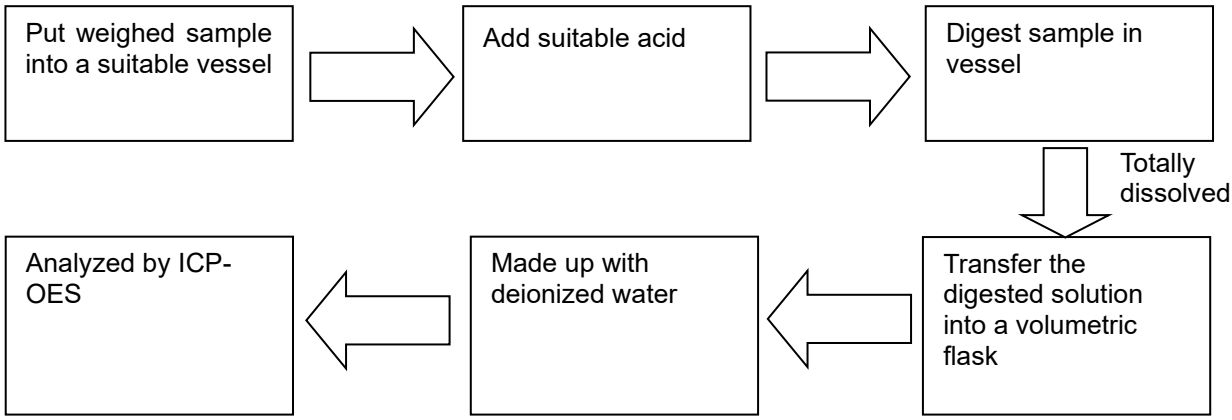
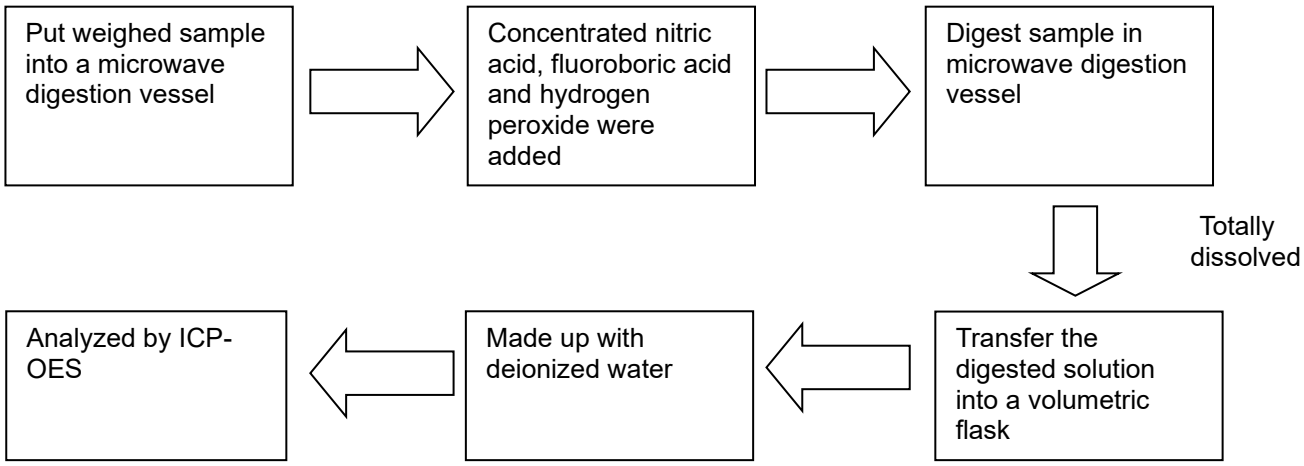
(D)Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content



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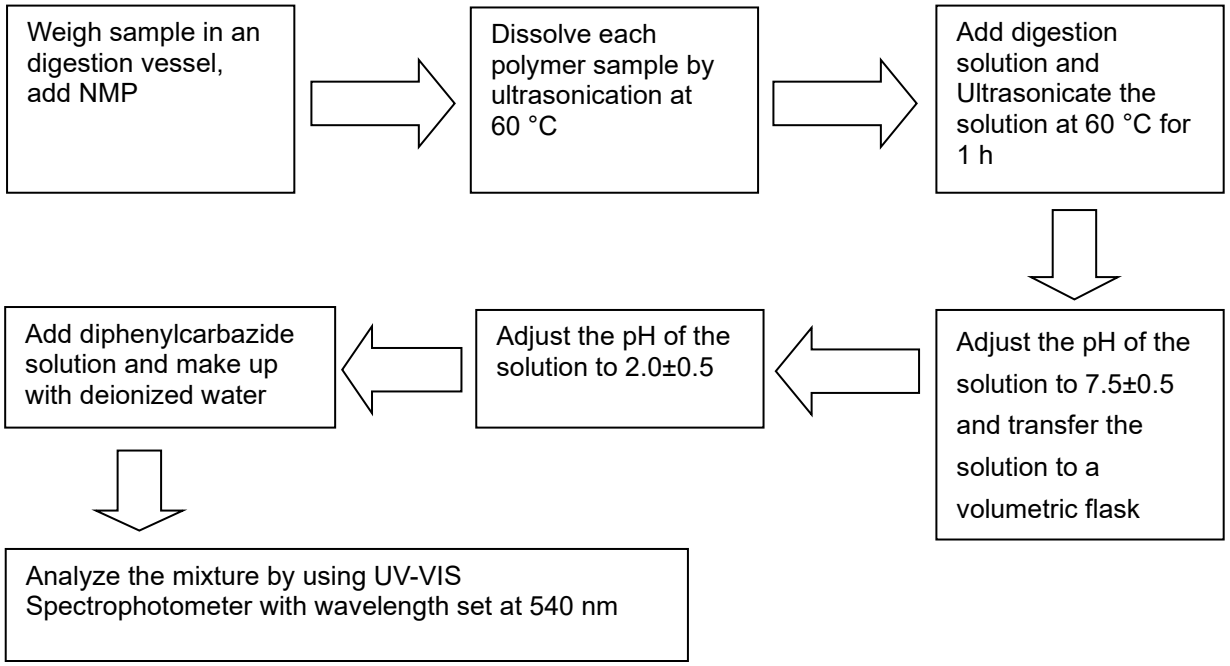
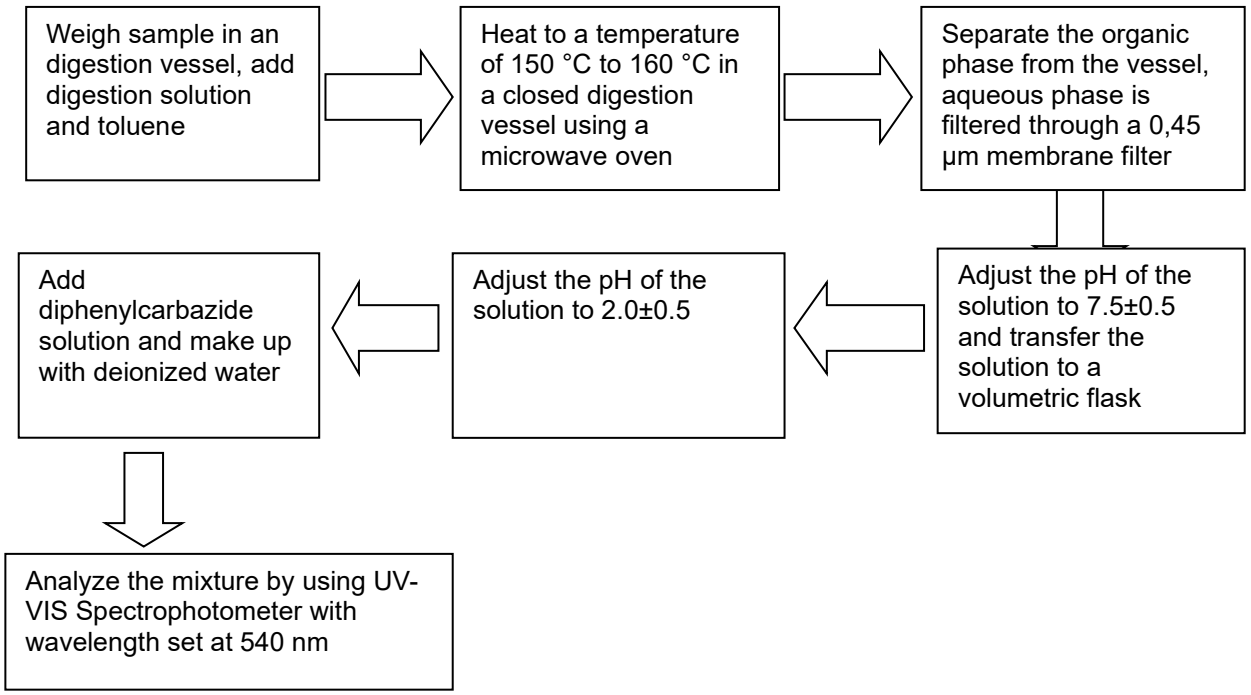
3. Test for Chromium (VI) (Cr^{6+}) Content

Soluble polymers:



Insoluble/unknown polymers and electronics without Sb:



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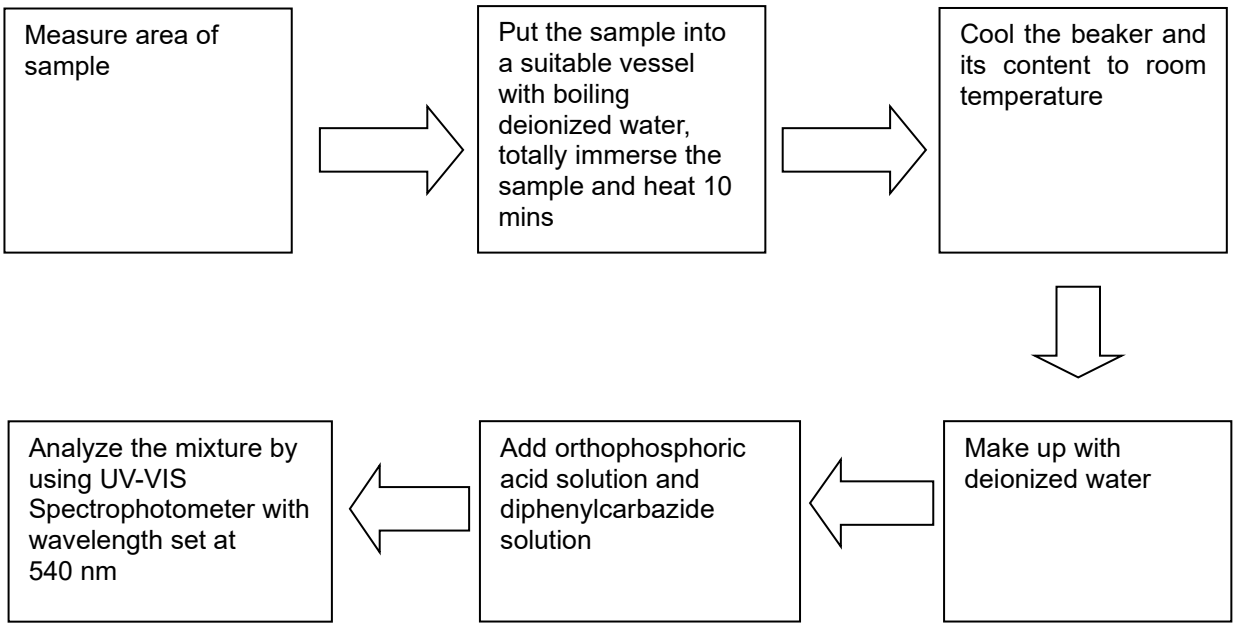
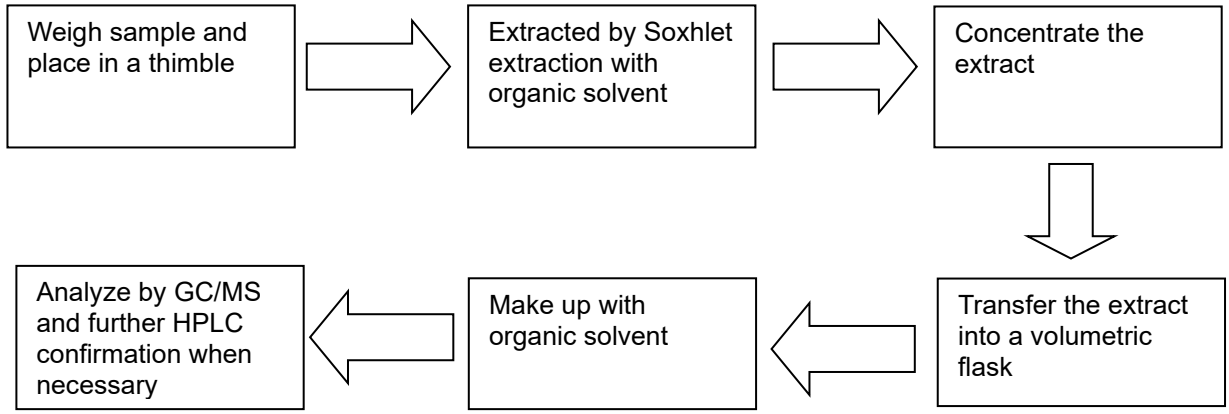
4. Test for Chromium (VI) (Cr^{6+}) Content (Boiling Water Extraction)



5. Test for PBBs/PBDEs Contents



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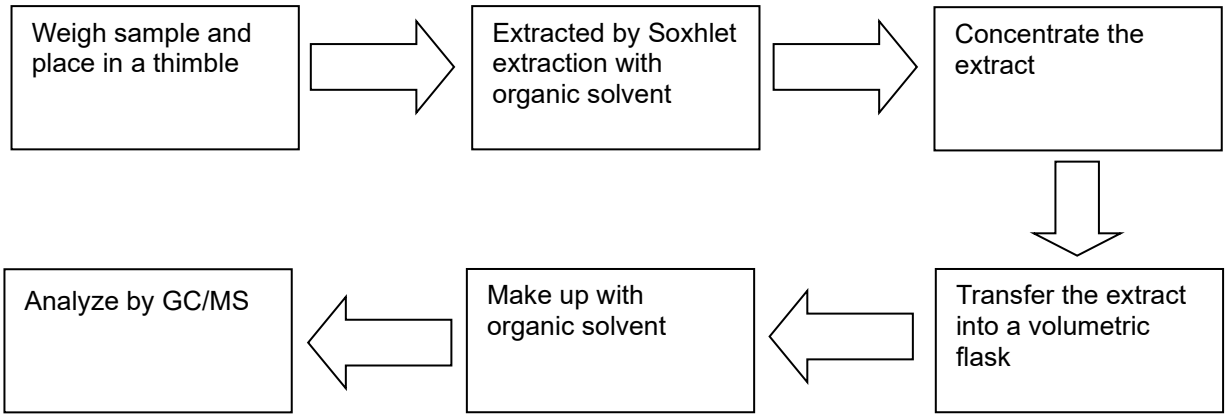
6. Test for Phthalate Contents



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2. Polycyclic Aromatic Hydrocarbons (PAHs) Content

With reference to AfPS GS 2019:01 PAK (PAH), by solvent extraction and determined by Gas Chromatography - Mass Spectrometer (GC/MS).

(I) Test Result

Other consumer products:

Compound	CAS No.	Result (mg/kg)						Limit (mg/kg)		
		(5)	(6)	(7)	(8)	(9)	(10)	Category 1	Category 2b	Category 3b
Phenanthrene	85-01-8	ND	ND	ND	ND	ND	ND	--	--	--
Anthracene	120-12-7	ND	ND	ND	ND	ND	ND	--	--	--
Fluoranthene	206-44-0	ND	ND	ND	ND	ND	ND	--	--	--
Pyrene	129-00-0	ND	ND	ND	ND	ND	ND	--	--	--
Sum (4 PAHs):	--	ND	ND	ND	ND	ND	ND	1	10	50
Naphthalene	91-20-3	ND	ND	ND	ND	ND	ND	1	2	10
Benzo(a)Anthracene	56-55-3	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Chrysene	218-01-9	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Indeno(1,2,3-cd)Pyrene	193-39-5	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(b)Fluoranthene	205-99-2	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(k)Fluoranthene	207-08-9	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(a)Pyrene	50-32-8	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Dibenzo(a,h)Anthracene	53-70-3	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(g,h,i)Perylene	191-24-2	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(e)Pyrene	192-97-2	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Benzo(j)Fluoranthene	205-82-3	ND	ND	ND	ND	ND	ND	0.2	0.5	1
Sum (15 PAHs):	--	ND	ND	ND	ND	ND	ND	1	10	50

ND = Not detected (less than reporting limit)
Detected limit = 0.2 mg/kg

(II) Categories for Products

Parameter	Product
Category 1	Materials intended to be put into the mouth, or materials in toys according to Directive 2009/48 / EC or materials in articles for use by children up to three years of age Skin contact (longer than 30s) when used as intended
Category 2	Materials that are not covered by category 1, with prolonged skin contact (longer than 30s) or repeated short-term skin contact if used as intended or foreseeable 2a. used by children 2b. other consumer products
Category 3	Materials that are not covered by category 1 or 2, with short-term skin contact (up to 30 s) when used as intended or foreseeable 3a. used by children 3b. other consumer products

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3. Perfluorooctane Sulfonates (PFOS) Content

With reference to CEN/TS 15968:2010, solvent extraction was used and followed by Liquid Chromotography Mass Spectrometric (LCMS) analysis.

Test item	Result # (mg/kg) Tested component						Detected limit (mg/kg)
	(5)	(6)	(7)	(8)	(9)	(10)	
Perfluorooctane Sulfonates (PFOS)	ND	ND	ND	ND	ND	ND	1

ND = Not detected
# = The reported value was calculated by summation of the values of Perfluoroctanesulfonic acid, Perfluoroctanesulfonamide, N-Methyl-Perfluoroctanesulfonamide, N-Ethyl-Perfluoroctanesulfonamide, N-Methyl-Perfluoroctanesulfonamidoethanol and N-Ethyl-Perfluoroctanesulfonamidoethanol.

4. Metal Element Content Analyze

Acid digestion method was used and inorganic metal element content was determined by Inductively Coupled Argon Plasma Spectrometry.

Element	Detected limit (mg/kg)	Result(mg/kg)			
		(1)	(2)	(3)	(4)
Antimony (Sb)	10	ND	ND	ND	ND
Arsenic (As)	10	ND	ND	30	ND
Beryllium (Be)	10	ND	ND	ND	ND

ND = Not detected

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5. Phthalate Content

With reference to EN14372, by Gas Chromatographic-Mass Spectrometric (GC-MS) analysis.

Test item	CAS No.	Result (%) Tested component						Detected limit (%)
		(5)	(6)	(7)	(8)	(9)	(10)	
Dipentyl phthalate (DPP)	131-18-0	ND	ND	ND	ND	ND	ND	0.010
Di-isopentylphthalate (DIPP)	605-50-5	ND	ND	ND	ND	ND	ND	0.010
n-pentyl iso-pentylphthalate (PIPP)	776297-69-9	ND	ND	ND	ND	ND	ND	0.010
Bis(2-methoxyethyl)phthalate (BMEP/DMEP)	117-82-8	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid, di-C_{6-8}-branched alkyl esters, C_7-rich (DIHP)	71888-89-6	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid,di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	ND	ND	ND	ND	ND	ND	0.010
Di-(iso-butyl) phthalate (DIBP)	84-69-5	ND	ND	ND	ND	ND	ND	0.010
Benzyl butyl phthalate (BBP)	85-68-7	ND	ND	ND	ND	ND	ND	0.010
Di-(2-ethyl hexyl) phthalate (DEHP)	117-81-7	ND	ND	ND	ND	ND	ND	0.010
Dibutyl phthalate (DBP)	84-74-2	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	84777-06-0	ND	ND	ND	ND	ND	ND	0.010
1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters with ≥ 0.3% of dihexyl phthalate (EC No. 201-559-5)	68515-51-5	ND	ND	ND	ND	ND	ND	0.010
1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters or mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate (EC No. 201-559-5)	68648-93-1	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	68515-50-4	ND	ND	ND	ND	ND	ND	0.010
Di-n-hexyl phthalate (DnHP)	84-75-3	ND	ND	ND	ND	ND	ND	0.010
Dicyclohexyl phthalate(DCHP)	84-61-7	ND	ND	ND	ND	ND	ND	0.010
Diisohexyl phthalate	71850-09-4	ND	ND	ND	ND	ND	ND	0.010
di-n-octyl phthalate (DNOP)	117-84-0	ND	ND	ND	ND	ND	ND	0.010
Di-iso-decyl phthalate (DIDP)	26761-40-0	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid, di-C9-11-Branched alkyl esters, C10-Rich(DIDP)	68515-49-1							
Di-iso-nonyl phthalate (DINP)	28553-12-0	ND	ND	ND	ND	ND	ND	0.010
1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich(DINP)	68515-48-0							

ND = Not detected
% = Percentage based on dry weight of sample

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6. Halogen Content

(1) Test Result Summary:

Test item	Result (mg/kg)					
	Tested component					
	(5)	(6)	(7)	(8)	(9)	(10)
Fluorine (F) Content	ND	314	ND	ND	3993	ND
Chlorine (Cl) Content	115	ND	ND	ND	ND	ND
Bromine (Br) Content	ND	ND	ND	ND	ND	ND
Iodine (I) Content	ND	ND	ND	ND	ND	ND

ND= Not detected

(2) Test Method:

Testing Item	Testing Method	Detected limit
Halogen (F, Cl, Br, I) Content	With reference to BS EN 14582:2016, by calorimetric bomb and determined by Ion Chromatography	50 mg/kg

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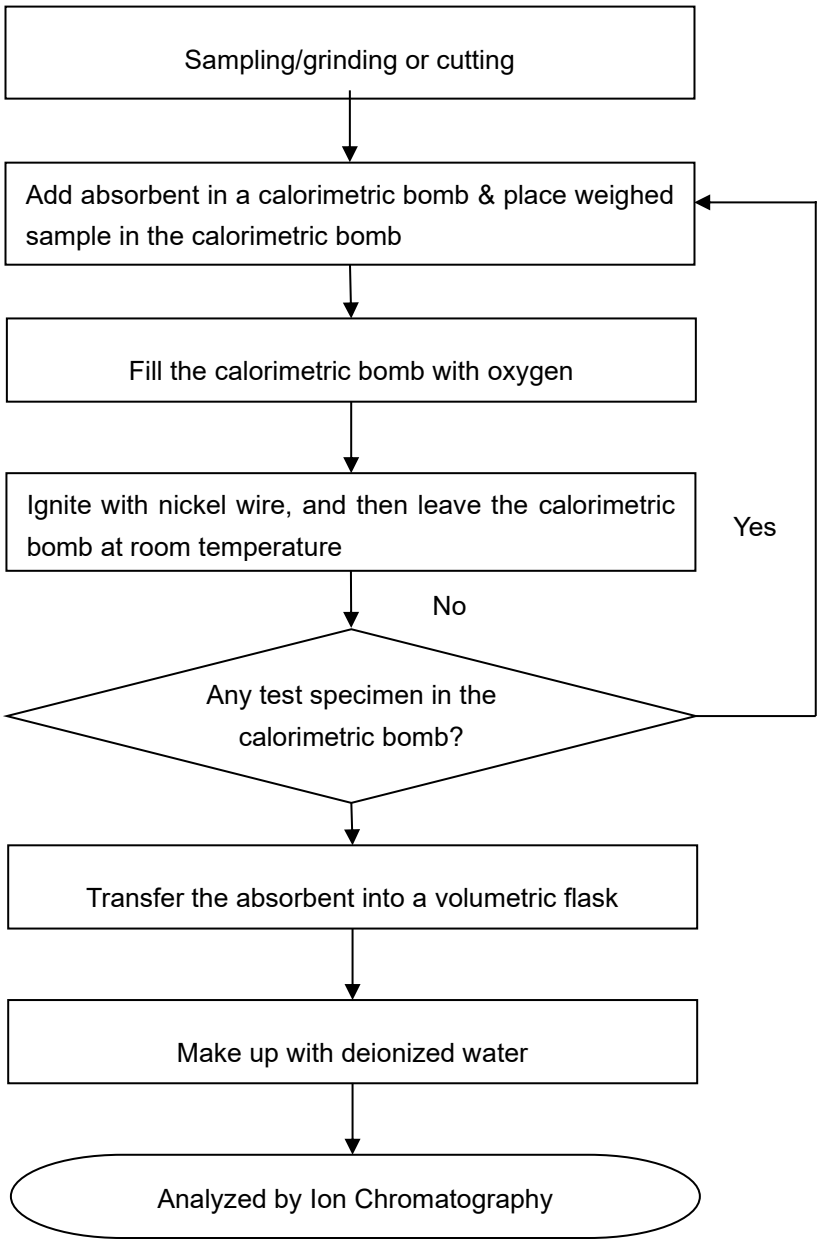
(3) Measurement Flowchart:
Test for Halogen Content (Reference Method: BS EN 14582:2016)



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7. Tetrabromobisphenol A (TBBPA) Content:

With reference to DIN 53313, by solvent extraction and followed by Gas Chromatographic-Mass Spectrometric (GC-MS) analysis.

Tested Component	Result (mg/kg)	Detected limit (mg/kg)
(5)	ND	10
(6)	ND	10
(7)	ND	10
(8)	ND	10
(9)	ND	10
(10)	ND	10

ND= Not detected

8. Sulphur (S) content

With reference to BS EN 14582:2016, by calorimetric bomb and determined by Ion Chromatography.

Element	Detected limit (mg/kg)	Result (mg/kg)		
		(6)	(7)	(9)
Sulphur(S)	10	455	ND	203

ND= Not detected

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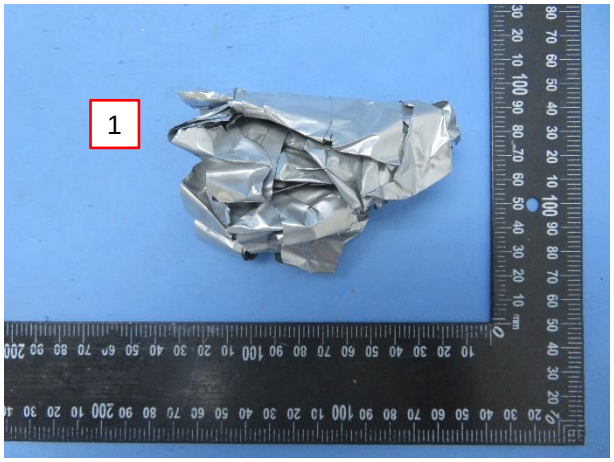
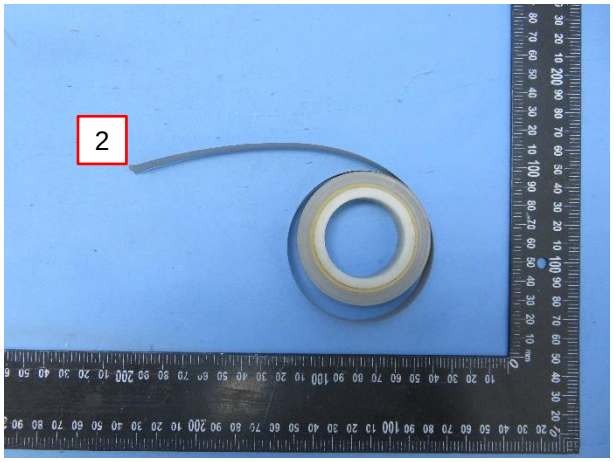
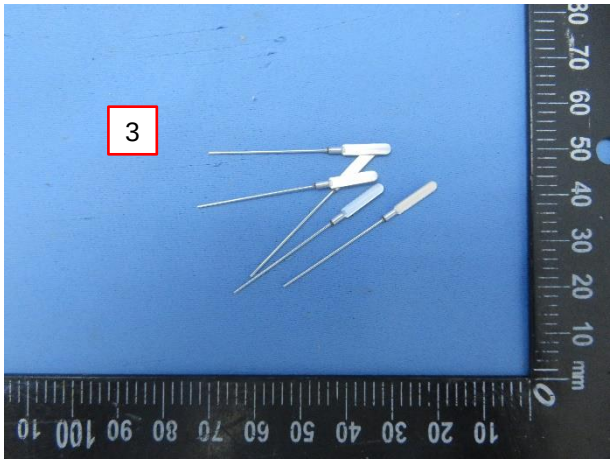
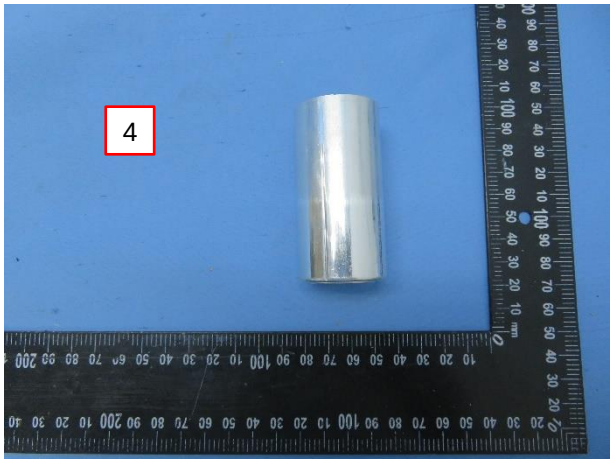
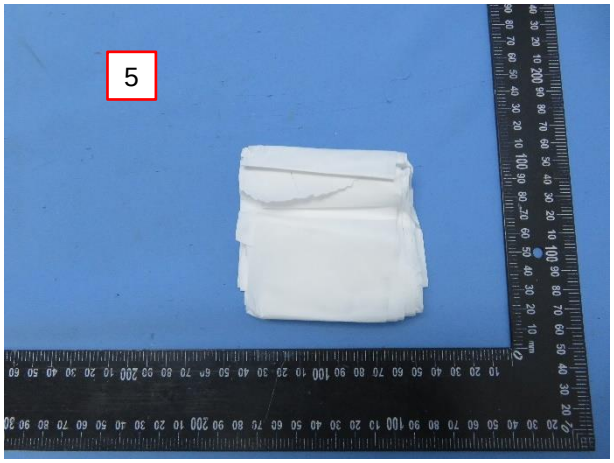
Sample photo

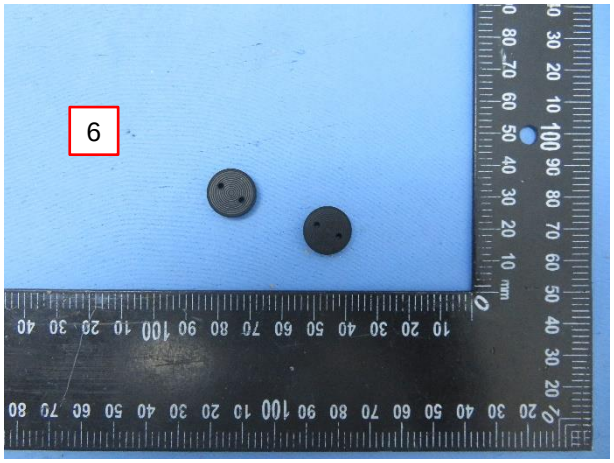












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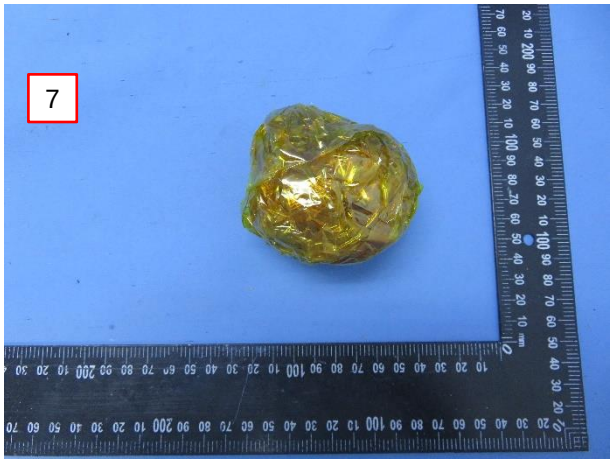

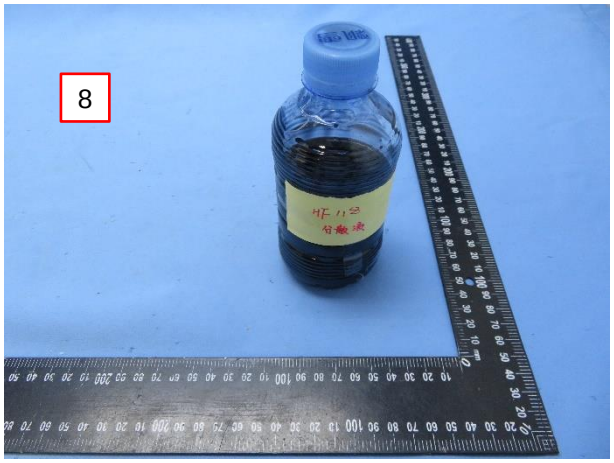

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End of report

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