

Test Report

No. TAOEC2300333517

Date: 13 Feb 2023

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Client Name : SHANDONG JINGDAO MICROELECTRONICSCO., LTD

Client Address : NO.166 CHUNQIU EAST ROAD, QUFU, JINING, SHANDONG

Sample Name : SMALL SIGNAL PRODUCTS (NO INCLUDING GPP CHIP)

Model No. : SOD-123W

Client Ref. Information : SOD-123HE、SOD-323HE、SOT-23、SOD-523、SOD-123W、SOD323W、SO T-26、SOT23-4、SOD323FLW、SMBF-W、SMA-W、SMAHE-W、UMB-T、SO P-B、MBF-T(SOP-5)、SOP-4

The above sample(s) and information were provided by the client.

SGS Job No. : QP23-000211 - QD

Date of Sample Received : 16 Jan 2023

Testing Period : 16 Jan 2023 - 03 Feb 2023

Test Requested : Selected test(s) as requested by the client.

Test Method(s) : Please refer to next page(s).

Test Result(s) : Please refer to next page(s).

Result Summary :

Test Requested	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	PASS
Halogen	See Results
Element(s)	See Results
Polyvinyl chloride (PVC) component	See Results
Alkanes C10-C13, chloro (short-chain chlorinated paraffins) (SCCP), Alkanes C14-C17, chloro (Medium-chain Chlorinated Paraffins) (MCCP)	See Results
Tetrabromobisphenol A (TBBP-A)	See Results
Hexabromocyclododecane (HBCDD)	See Results
Perfluorooctanesulfonate (PFOS) and its derivatives and Perfluorooctanoic Acid (PFOA) and its salts	See Results
Phthalates	See Results



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 Inspection & Testing Services

SGS Center, No.143, Zhuzhou Road, Laoshan District, Qingdao, Shandong, China 266101
 中国·山东·青岛市崂山区株洲路143号通标中心 邮编: 266101

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Polycyclic aromatic hydrocarbons (PAHs)

See Results

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Qingdao) Co., Ltd.

claire

Wang Bo, Claire
Approved Signatory

scan to see the report



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SGS Center, No.143, Zhuzhou Road, Laoshan District, Qingdao, Shandong, China 266101
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Test Result(s) :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	TAO23-003335.017	black solid with silvery metal(mix all)

Remarks :

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

Test Method : With reference to IEC 62321-5:2013, IEC 62321-4:2013+AMD1:2017, IEC 62321-7-2:2017, IEC 62321-6:2015 and IEC 62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	017
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	6
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND



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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Bis (2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series
- (3) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.
- (4) Hexavalent Chromium was not detected on the sample. Analysis was performed by IEC 62321-7-1:2015 boiling-water-extraction.

Halogen

Test Method : With reference to EN 14582: 2016, analysis was performed by Ion Chromatograph (IC).

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Element(s)

Test Method : With reference to US EPA Method 3052:1996, analysis was performed by ICP-OES.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Antimony (Sb)	mg/kg	10	ND
Phosphorus (P)	mg/kg	20	126
Arsenic (As)	mg/kg	10	ND



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<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Beryllium (Be)	mg/kg	5	ND
Tin (Sn)	mg/kg	5	9336
Sb ₂ O ₃ ♦	mg/kg	12	ND

Notes :

- ♦Calculated concentration of Sb₂O₃ is based on the identified Sb

Polyvinyl chloride (PVC) component

Test Method : SGS In house method(SHTC-CHEM-SOP-347-T), analysis was performed by Pyrolysis-GC-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Polyvinyl chloride component	%	0.05	ND

Notes :

- (1) Polyvinyl chloride component includes its present in copolymer.
- (2) The test was subcontracted to SGS Shanghai chemical lab.

Alkanes C10-C13, chloro (short-chain chlorinated paraffins) (SCCP), Alkanes C14-C17, chloro (Medium-chain Chlorinated Paraffins) (MCCP)

Test Method : With reference to ISO 22818:2021, analysis was performed by GC-NCI-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Short Chain Chlorinated Paraffin(C10-C13)(SCCP)	mg/kg	50	ND
Medium Chain Chlorinated Paraffin(C14-C17)(MCCP)	mg/kg	50	ND

Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to US EPA 3550C - ULTRASONIC EXTRACTION: 1996, analysis was performed by LC-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>017</u>
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND



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Hexabromocyclododecane (HBCDD)

Test Method : With reference to US EPA 3550C:2007, analyzed by GC-MS.

Test Item(s)	Unit	MDL	017
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

Perfluorooctanesulfonate (PFOS) and its derivatives and Perfluorooctanoic Acid (PFOA) and its salts

Test Method : With reference to CEN/TS 15968:2010, analysis was performed by LC-MS-MS.

Test Item(s)	CAS NO.	Unit	MDL	017
Perfluorooctanesulfonate (PFOS) and its derivatives	-	mg/kg	-	ND
Perfluorooctane Sulfonates (PFOS)^	1763-23-1	mg/kg	0.01	ND
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	mg/kg	0.01	ND
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (EtFOSE)	1691-99-2	mg/kg	0.01	ND
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	mg/kg	0.01	ND
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (MeFOSE)	24448-09-7	mg/kg	0.01	ND
Perfluorooctane sulfonamide (PFOSA)	754-91-6	mg/kg	0.01	ND
Perfluorooctanoic Acid (PFOA) and its salts+		mg/kg	0.01	ND

Notes :

(1) ^ PFOS refer to its acid, salts/derivatives including PFOS (CAS No.: 1763-23-1), PFOS-K (CAS No.: 2795-39-3), PFOS-Li (CAS No.: 29457-72-5), PFOS-NH₄ (CAS No.: 29081-56-9), PFOS-NH(OH)₂ (CAS No.: 70225-14-8) and PFOS-N(C₂H₅)₄ (CAS No.: 56773-42-3), PFOS-N(CH₃)₂(C₁₀H₂₁)₂ (CAS No.: 251099-16-8) and POSF (CAS No.: 307-35-7).

(2) PFOA and its salts+ refer to its acid / salts including PFOA (CAS No.: 335-67-1), PFOA-Na (CAS No.: 335-95-5), PFOA-K (CAS No.: 2395-00-8), PFOA-Ag (CAS No.: 335-93-3), PFOA-F (CAS No.: 335-66-0) and APFO (CAS No.: 3825-26-1)

Phthalates

Test Method : With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	017
Dibutyl Phthalate (DBP)	84-74-2	%	0.005	ND
Benzylbutyl Phthalate (BBP)	85-68-7	%	0.005	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	%	0.005	ND



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Test Item(s)	CAS NO.	Unit	MDL	017
Diisononyl Phthalate (DINP)	28553-12-0/ 68515-48-0	%	0.005	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.005	ND
Diisodecyl Phthalate (DIDP)	26761-40-0/ 68515-49-1	%	0.005	ND
Dimethyl Phthalate (DMP)	131-11-3	%	0.005	ND
Diethyl Phthalate (DEP)	84-66-2	%	0.005	ND
Dipropyl Phthalate (DPrP)	131-16-8	%	0.005	ND
Diisobutyl Phthalate (DIBP)	84-69-5	%	0.005	ND
Diundecyl Phthalate (DUDP)	3648-20-2	%	0.005	ND
Di-n-pentyl Phthalate (DnPP)	131-18-0	%	0.005	ND
1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear (DHP)	68515-50-4	%	0.005	ND
Dicyclohexyl Phthalate (DCHP)	84-61-7	%	0.005	ND
Diphenyl Phthalate (DPhP)	84-62-8	%	0.005	ND
Dibenzyl Phthalate (DBzP)	523-31-9	%	0.005	ND
Dinonyl Phthalate (DNP)	84-76-4	%	0.005	ND
Diisooctyl Phthalate (DIOP)	27554-26-3	%	0.005	ND
Bis(2-methoxyethyl) Phthalate (DMEP)	117-82-8	%	0.005	ND
Diallyl Phthalate (DAP)	131-17-9	%	0.005	ND
n-decyl, n-octyl Phthalate (nDnOP)	119-07-3	%	0.005	ND
Di-n-decyl Phthalate (DnDP)	84-77-5	%	0.005	ND
Diisopentyl Phthalate (DIPP)	605-50-5	%	0.005	ND
n-pentyl Isopentyl phthalate (nPIPP)	776297-69-9	%	0.005	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	%	0.005	ND
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	%	0.005	ND
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	71888-89-6	%	0.005	ND
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear (DPP)	84777-06-0	%	0.005	ND
Di(2-ethylhexyl) adipate (DEHA)	103-23-1	%	0.005	ND
Diisononyl adipate (DINA)	33703-08-1	%	0.005	ND
Di-n-octyl adipate (DNOA)	123-79-5	%	0.005	ND
Bis(4-methyl-2-pentyl) Phthalate (BMPP)	146-50-9	%	0.005	ND
Bis(2-ethoxyethyl) Phthalate (DEEP)	605-54-9	%	0.005	ND
Bis(2-n-butoxyethyl) Phthalate (DBEP)	117-83-9	%	0.005	ND
Bis(2-ethylhexyl) terephthalate (DOTP)	6422-86-2	%	0.005	ND
Di(2-propylheptyl) Phthalate (DPHP)	53306-54-0	%	0.005	ND

Polycyclic aromatic hydrocarbons (PAHs)



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Test Method : With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	017
Benzo(a)pyrene(BaP)	mg/kg	0.1	ND
Benzo(e)pyrene(BeP)	mg/kg	0.1	ND
Benzo(a)anthracene(BaA)	mg/kg	0.1	ND
Benzo(b)fluoranthene(BbF)	mg/kg	0.1	ND
Benzo(j)fluoranthene(BjF)	mg/kg	0.1	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.1	ND
Chrysene(CHR)	mg/kg	0.1	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.1	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.1	ND
Phenanthrene(PHE)	mg/kg	0.1	ND
Pyrene(PYR)	mg/kg	0.1	ND
Anthracene(ANT)	mg/kg	0.1	ND
Fluoranthene(FLT)	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.1	ND
Sum of 15 PAHs	mg/kg	-	ND

Notes :

As per client information, the tested sample is not children product which is under the directive of German ProdSG.



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AfPS (German commission for Product Safety) : PAHs requirements

Parameter (mg/kg)	Category 1	Category 2		Category 3	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age.	a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (BeP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (CHR) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (DBA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT)	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene (NAP)	< 1	< 2		< 10	
Sum of 15 PAHs	<1	< 5	< 10	< 20	< 50

Note:

^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No. 1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28) "foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.

Remark: The German committee on Product Safety (AfPS) published a new PAHs document (AfPS GS 2019:01 PAK) on April 10, 2020, which will be binding for the issue of GS mark certificate from July 1, 2020.

Note:

- The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value and only for reference.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule ($w=0$) stated in ILAC-G8:09/2019.



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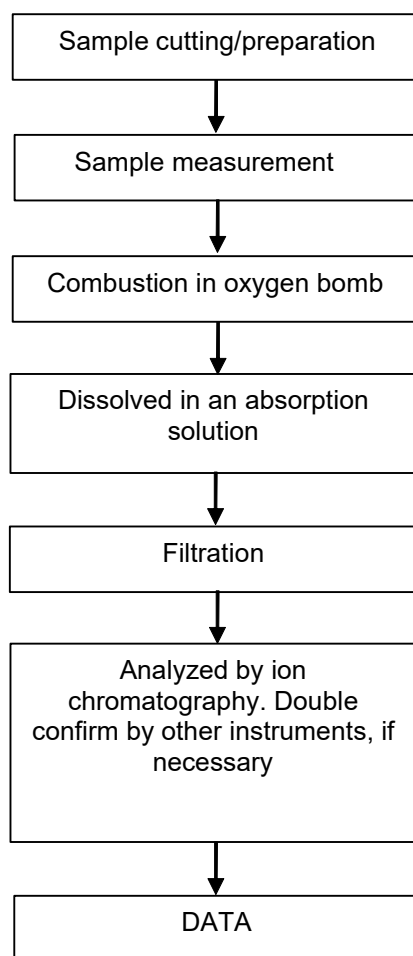
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SGS Center, No.143, Zhuzhou Road, Laoshan District, Qingdao, Shandong, China 266101
中国·山东·青岛市崂山区株洲路143号通标中心 邮编: 266101

t (86-532) 68999888 www.sgsgroup.com.cn
t (86-532) 68999888 sgs.china@sgs.com

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Halogen Testing Flow Chart

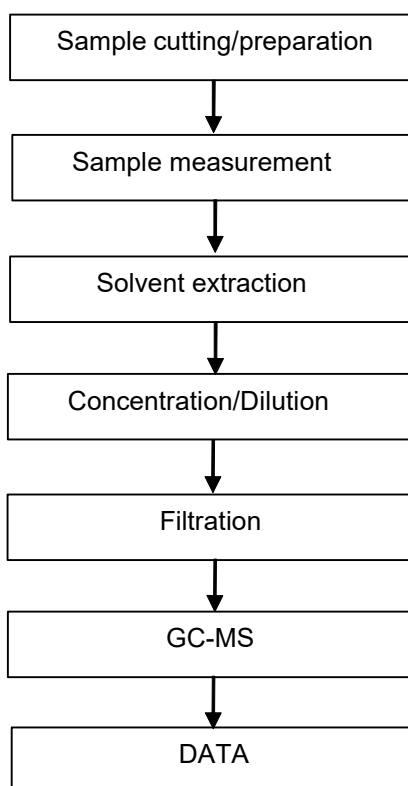


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HBCDD Testing Flow Chart

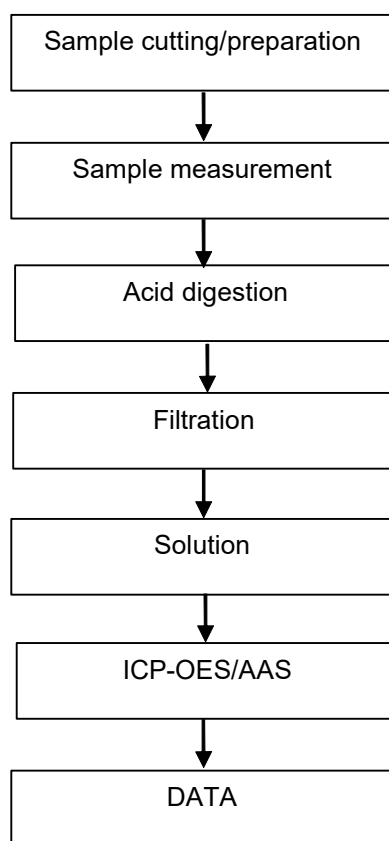


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Elementary Testing Flow Chart

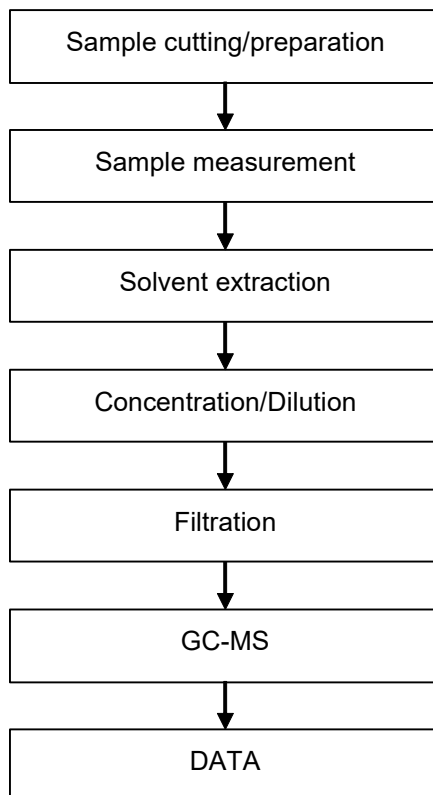


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PAHs Testing Flow Chart

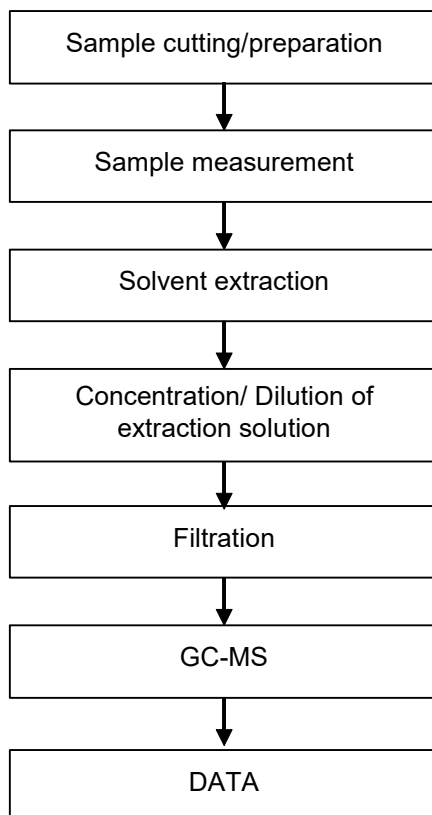


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PBBs/PBDEs Testing Flow Chart

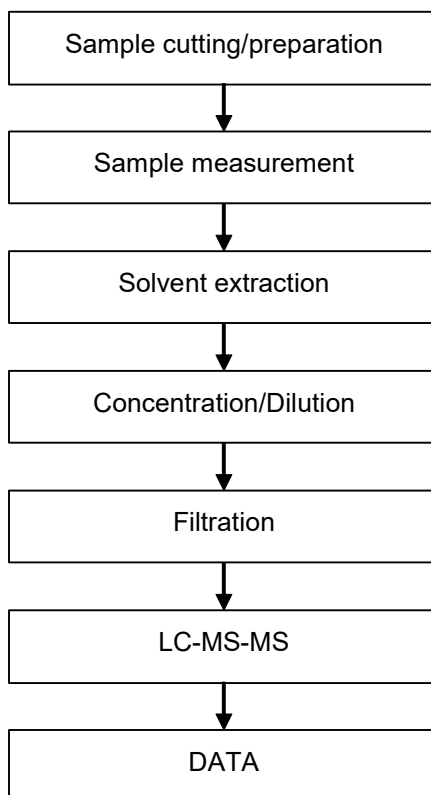


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PFOS/PFOA Testing Flow Chart

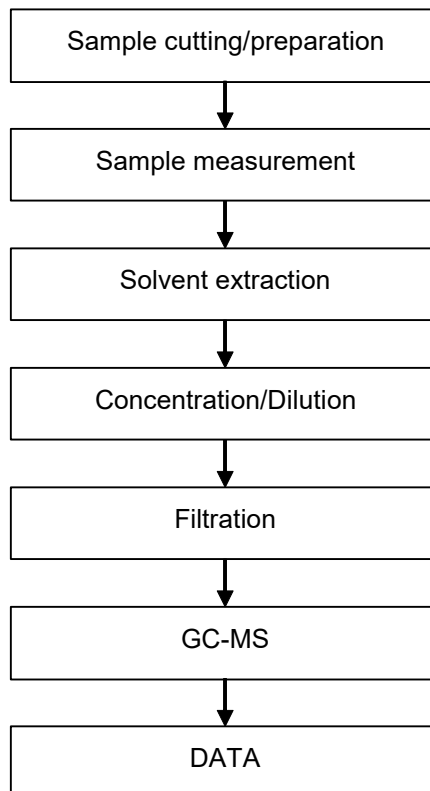


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Phthalates Testing Flow Chart

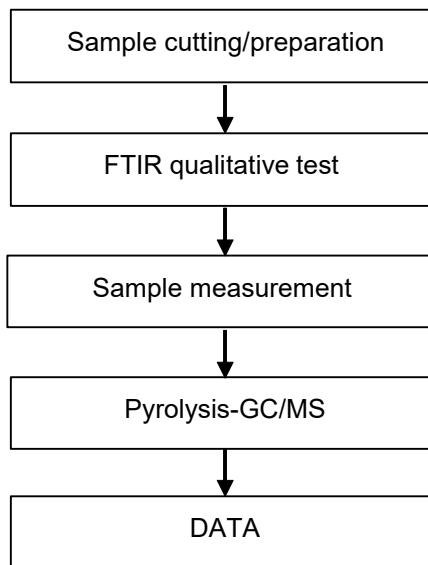


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PVC Testing Flow Chart

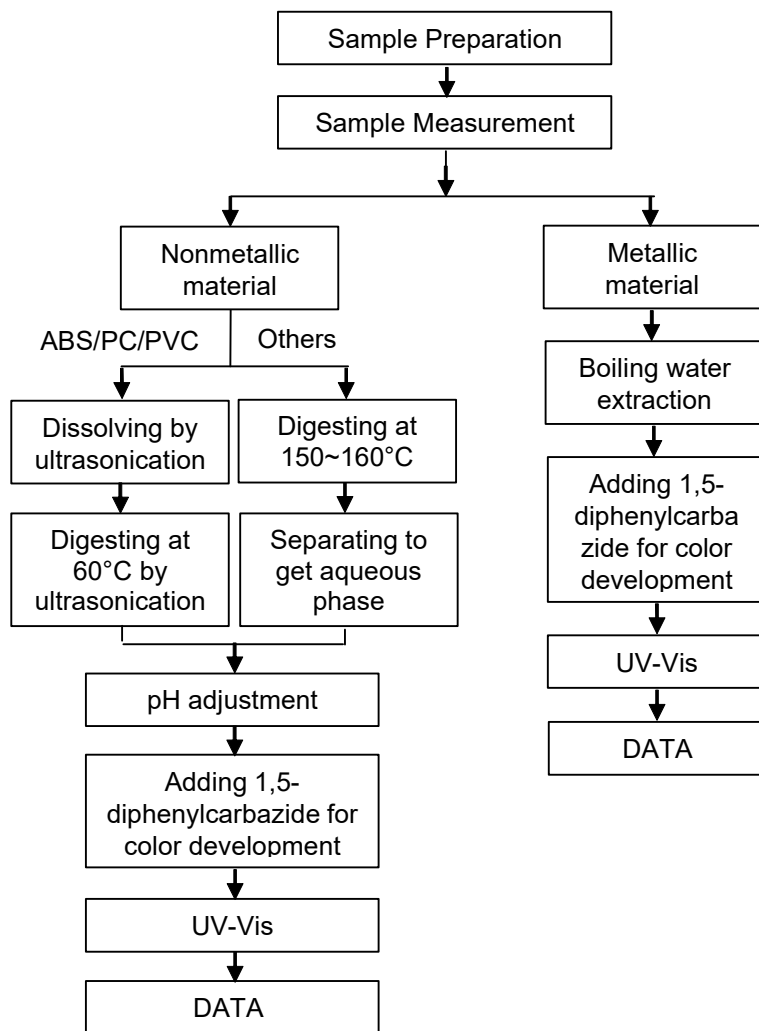


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Hexavalent Chromium (Cr(VI)) Testing Flow Chart



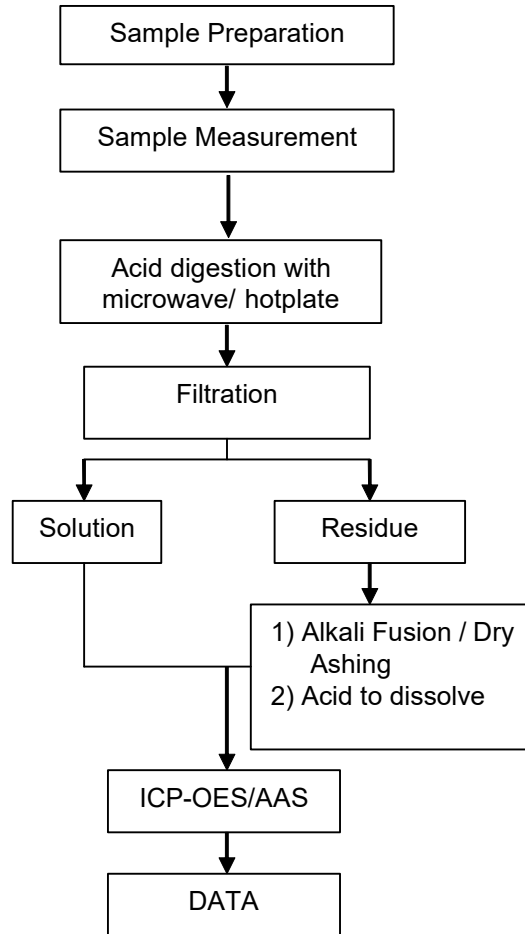
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Elements (IEC62321) Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart.



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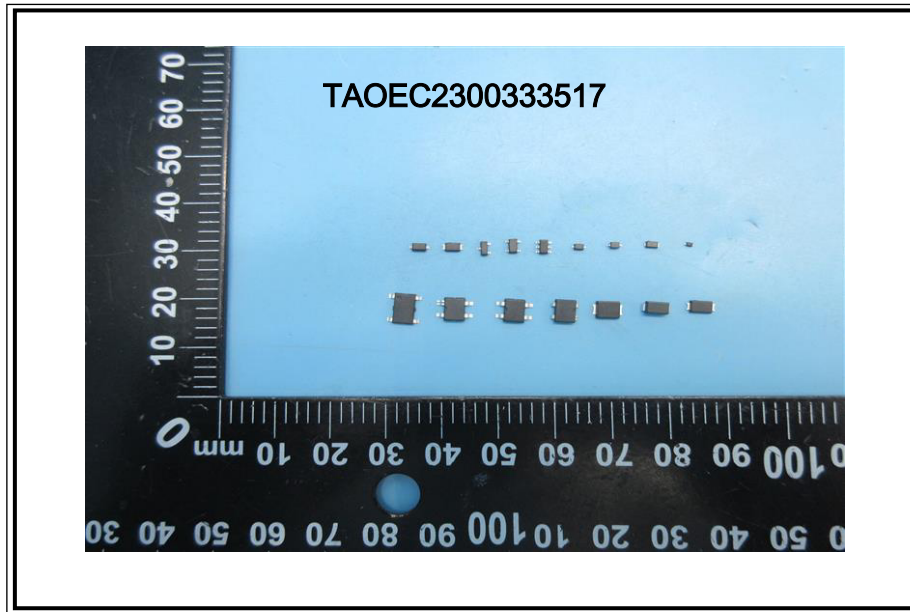
Test Report

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Date: 13 Feb 2023

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