

**Test Report** Date: 13 Feb 2023 No. TAOEC2300333509 Page 1 of 22

SHANDONG JINGDAO MICROELECTRONICSCO., LTD

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

Sample Name: PLASTIC SEALING DEVICE ( NO INCLUDING GPP CHIP )

Model No.: **SMC** 

Client Ref. Information: SOD-123、SOD-323、SOD-323FL、SMAF、SMBF、SMA、SMA2、SMA-C、S

MAF-C、SMBF-C、SMB、ABS、ABF、MBS、MBF、UMB、UMBT、UMSB、U

LBF、SMAHE-C、SOD123HE-C、SOD-123FL、SMB-C、SMC-C

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.

中国・山东・青岛市崂山区株洲路143号通标中心

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
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium and Hexavalent chromium	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



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Phthalates	See Results
Polycyclic aromatic hydrocarbons (PAHs)	See Results

Signed for and on behalf of

SGS-CSTC Standards Technical Services (Qingdao) Co., Ltd.



Wang Bo, Claire Approved Signatory



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Test Result(s):

#### **Test Part Description:**

Specimen No. SGS Sample ID **Description** SN<sub>1</sub> TAO23-003335.009 silvery metal SN<sub>2</sub> TAO23-003335.010 black solid(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)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	-	mg/kg	2	8931▲
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



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Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>010</u>	
Tetrabromodiphenyl ether	-	mg/kg	5	ND	
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) According to the declaration from the client, Lead (Pb) in No.010 is exempted by EU RoHS directive 2011/65/EU based on |ANNEX III 7(a)|: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead).

# EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium and Hexavalent chromium

Test Method: With reference to IEC 62321-5:2013, IEC 62321-4:2013+AMD1:2017, IEC 62321-7-1:2015, analyzed by ICP-OES,AAS and UV-Vis.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>009</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	17
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	μg/cm²	0.10	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) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm². The sample coating is considered to contain CrVI
  - b. The sample is negative for CrVI if CrVI is ND (concentration less than  $0.10~\mu g/cm^2$ ). The coating is considered a non-CrVI based coating



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c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive unavoidable coating variations may influence the determination Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

Date: 13 Feb 2023

#### Halogen

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

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (CI)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
lodine (I)	mg/kg	50	ND

## Element(s)

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

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Antimony (Sb)	mg/kg	10	ND
Phosphorus (P)	mg/kg	20	180
Arsenic (As)	mg/kg	10	ND
Beryllium (Be)	mg/kg	5	ND
Tin (Sn)	mg/kg	5	981
Sb <sub>2</sub> O <sub>3</sub> ◆	mg/kg	12	ND

### Notes:

- ◆Calculated concentration of Sb<sub>2</sub>O<sub>3</sub> is based on the identified Sb

#### Polyvinyl chloride (PVC) component

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

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Polyvinyl chloride component	%	0.05	ND

#### Notes:



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- (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.

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</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.

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

#### Hexabromocyclododecane (HBCDD)

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

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
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.	<u>Unit</u>	<u>MDL</u>	<u>010</u>
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	1691-99-2	mg/kg	0.01	ND
(FtEOSE)				



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Test Item(s)		CAS NO.	<u>Unit</u>	<u>MDL</u>	<u>010</u>	
N-methylperfluoro-1-octanesulfonan	nide (MeFOSA)	31506-32-8	mg/kg	0.01	ND	
2-(N-methylperfluoro- 1-octanesulfor (MeFOSE)	namido) -ethanol	24448-09-7	mg/kg	0.01	ND	
Perfluorooctane sulfonamide (PFOS	(A)	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.	<u>Unit</u>	<u>MDL</u>	<u>010</u>
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
Diisononyl Phthalate (DINP)	28553-12-0/	%	0.005	ND
	68515-48-0			
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.005	ND
Diisodecyl Phthalate (DIDP)	26761-40-0/	%	0.005	ND
	68515-49-1			
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,	68515-50-4	%	0.005	ND
branched and linear (DHP)				
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



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	CAS NO.	<u>Uni</u>	t MDL	<u>010</u>
<b>'</b> )	117-82-8	%	0.005	ND
	131-17-9	%	0.005	ND
	119-07-3	%	0.005	ND
	84-77-5	%	0.005	ND
	605-50-5	%	0.005	ND
	776297-69-9	%	0.005	ND
	84-75-3	%	0.005	ND
1-branched	68515-42-4	%	0.005	ND
3-branched	71888-89-6	%	0.005	ND
rlester,	84777-06-0	%	0.005	ND
		24		
	33703-08-1			
	123-79-5	%	0.005	ND
PP)	146-50-9	%	0.005	ND
	605-54-9	%	0.005	ND
)	117-83-9	%	0.005	ND
P)	6422-86-2	%	0.005	ND
	53306-54-0	%	0.005	ND
	No. TAOEC23 P) 11-branched 8-branched rlester, PP)	117-82-8 131-17-9 119-07-3 84-77-5 605-50-5 776297-69-9 84-75-3 68515-42-4  3-branched 71888-89-6  Plester, 84777-06-0  103-23-1 33703-08-1 123-79-5 146-50-9 605-54-9 117-83-9 6422-86-2	CAS NO. Uni 117-82-8 % 131-17-9 % 119-07-3 % 84-77-5 % 605-50-5 776297-69-9 % 84-75-3 % 11-branched 68515-42-4 % 8-branched 71888-89-6 % 103-23-1 % 33703-08-1 123-79-5 % 117-83-9 % 6422-86-2 %	CAS NO. Unit MDL  117-82-8 % 0.005 131-17-9 % 0.005 119-07-3 % 0.005 84-77-5 % 0.005 605-50-5 % 0.005 776297-69-9 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 84-75-3 % 0.005 91-branched 68515-42-4 % 0.005 8-branched 71888-89-6 % 0.005 8-branched 71888-89-6 % 0.005 91-33703-08-1 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005 123-79-5 % 0.005

## Polycyclic aromatic hydrocarbons (PAHs)

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

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
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



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Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>010</u>
Fluoranthene(FLT)	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT),	mg/kg	-	ND
Fluoranthene(FLT)			
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

AfPS (German commission for Product Safety): PAHs requirements

	Category 1	Cate	gory 2	Categor	y 3
Parameter (mg/kg)	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	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact <sup>o</sup> with skin during the intended or foreseeable use <sup>d</sup> .		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use.	
	or -for the use by children <sup>a,b</sup> 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

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.



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<sup>&</sup>lt;sup>a</sup> 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.

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.



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#### 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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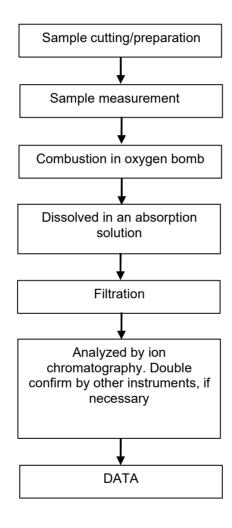
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## **Halogen Testing Flow Chart**





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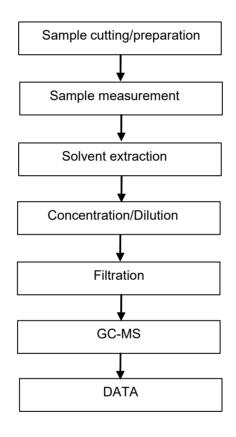
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## **HBCDD Testing Flow Chart**





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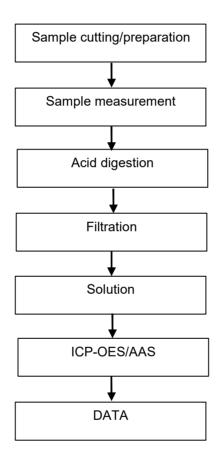
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## **Elementary Testing Flow Chart**





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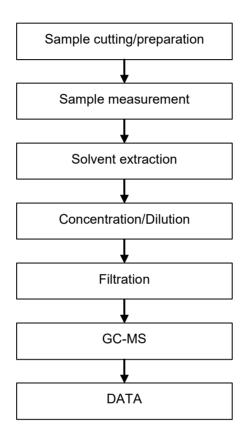
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## **PAHs Testing Flow Chart**

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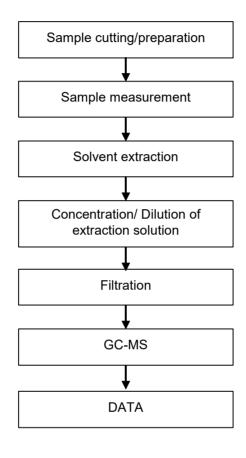
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## PBBs/PBDEs Testing Flow Chart





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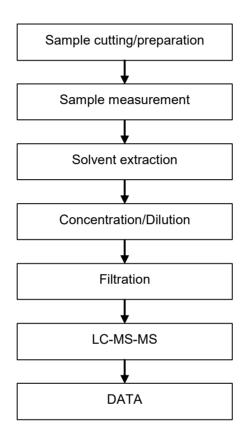
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## **PFOS/PFOA Testing Flow Chart**





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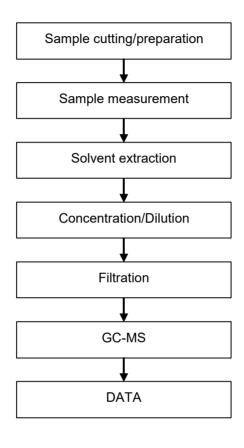
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## **Phthalates Testing Flow Chart**





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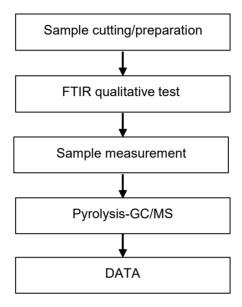
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## **PVC Testing Flow Chart**





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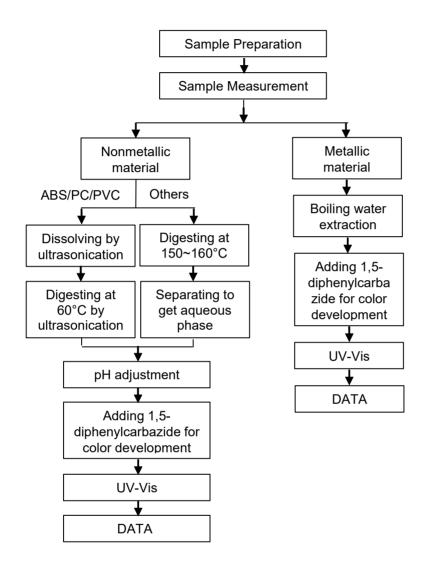
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## Hexavalent Chromium (Cr(VI)) Testing Flow Chart





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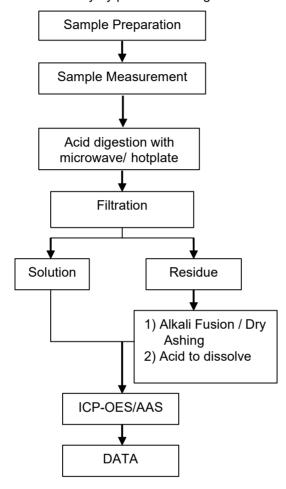
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## **Elements (IEC62321) Testing Flow Chart**

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





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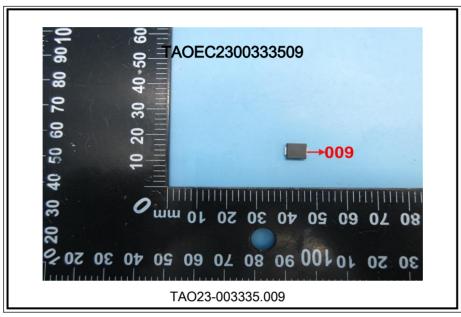


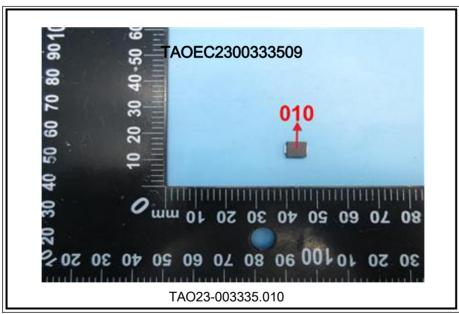
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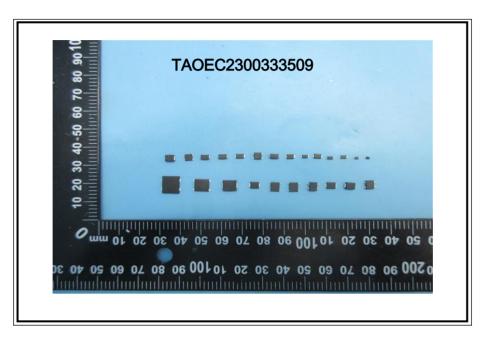




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