

## Test Report

No. SHAEC2106884401

Date: 23 Apr 2021

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SH ELECTRONICS SUZHOU CO., LTD.

NO.123,LONGTAN RD.3RD DISTRICT,SUZHOU INDUSTRIAL PARK,SUZHOU,JIANGSU,CHINA(215126).

The following sample(s) was/were submitted and identified on behalf of the clients as : SILVER (Lead Frame Plated Layer)

SGS Job No. : SP21-011122 - SUZ  
Model No. : SILVER (Plated Layer)  
Date of Sample Received : 15 Apr 2021  
Testing Period : 15 Apr 2021 - 21 Apr 2021  
Test Requested : Selected test(s) as requested by client.  
Test Method : Please refer to next page(s).  
Test Results : Please refer to next page(s).  
Conclusion : Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

*Denki Zheng*

Denki Zheng  
Approved Signatory

scan to see the report



SHAEC2106884401



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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA21-068844.001	Silver Metal

Remarks :

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

**RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU**

- Test Method :
- (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
  - (2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
  - (3) With reference to IEC 62321-4:2013+AMD1:2017, determination of Mercury by ICP-OES.
  - (4) With reference to IEC 62321-7-1:2015, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
  - (5) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.
  - (6) With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm <sup>2</sup>	0.10	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



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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
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
Di-2-Ethyl Hexyl 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. IEC 62321 series is equivalent to EN 62321 series  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2)▼ = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI  
 b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating  
 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.

**Halogen**

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

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</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



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**Element(s)**

Test Method : With reference to US EPA Method 3050B:1996, analysis was performed by ICP-OES.

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Antimony (Sb)		mg/kg	10	ND
Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> ) ♦		mg/kg	12	ND
Beryllium (Be)		mg/kg	5	ND
Beryllium oxide (BeO) ♦		mg/kg	15	ND
Arsenic (As)		mg/kg	10	ND
Diarsenic trioxide (As <sub>2</sub> O <sub>3</sub> ) ♦	1327-53-3	mg/kg	10	ND
Diarsenic pentoxide (As <sub>2</sub> O <sub>5</sub> ) ♦	1303-28-2	mg/kg	10	ND

Notes :

- (1) ♦ Calculated concentration of BeO is based on the identified Be
- Calculated concentration of Sb<sub>2</sub>O<sub>3</sub> is based on the identified Sb
- Calculated concentration of diarsenic pentoxide and diarsenic trioxide are based on the identified arsenic

**PVC(Polyvinyl chloride)**

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>001</u>
Polyvinyl chloride component	%	0.05	ND

Notes :

- (1) Polyvinyl chloride component includes its present in copolymer.

**Polychlorinated Naphthalenes (PCNs)**

Test Method : With reference to US EPA 8081B: 2007, analysis was performed by GC-MS

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
2-Chlorinated Naphthalene	mg/kg	5	ND
1,4-Dichlorinated Naphthalene	mg/kg	5	ND
1,5-Dichlorinated Naphthalene	mg/kg	5	ND



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<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
1,2-Dichlorinated Naphthalene	mg/kg	5	ND
1,8-Dichlorinated Naphthalene	mg/kg	5	ND
1,2,3-Trichlorinated Naphthalene	mg/kg	5	ND
1,2,3,4-Tetrachlorinated Naphthalene	mg/kg	5	ND
1,2,3,4,6-Pentachlorinated Naphthalene	mg/kg	5	ND
Octa-chlorinated Naphthalene	mg/kg	5	ND
1-Chlorinated Naphthalene	mg/kg	5	ND

### Organic-tin Compounds

Test Method : With reference to DIN 38407-13:2001, analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Tributyltin (TBT)	mg/kg	0.02	ND
Triphenyltin (TPHT)	mg/kg	0.02	ND
Tributyl Tin Oxide (TBTO) ♦	mg/kg	0.02	ND
Dioctyltin (DOT)	mg/kg	0.02	ND
Dibutyltin (DBT)	mg/kg	0.02	ND

Notes :

(1) ♦ = TBTO is back calculated based on the worst-case scenario of TBT.

### Short-chain Chlorinated Paraffin (SCCP)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-ECD / GC-NCI-MS

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Short-chain Chlorinated Paraffin (SCCP) (C <sub>10</sub> -C <sub>13</sub> )	mg/kg	50	ND

### Hexabromocyclododecane (HBCDD/HBCD)

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



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<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Hexabromocyclododecane (HBCDD/HBCD)	25637-99-4, 3194-55-6	mg/kg	10	ND

### Polychlorinated Terphenyls (PCTs)

Test Method : With reference to US EPA 8082A: 2007, analysis was performed by GC-MS

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Aroclor 5432	mg/kg	5	ND
Aroclor 5442	mg/kg	5	ND
Aroclor 5460	mg/kg	5	ND

### Phthalates Content

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

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Di-butyl Phthalate (DBP)	84-74-2	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	85-68-7	mg/kg	50	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	117-81-7	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	84-69-5	mg/kg	50	ND
Diisopentylphthalate (DiPP)	605-50-5	mg/kg	50	ND
iso-pentyl n-Pentyl phthalate (iPnPP)	776297-69-9	mg/kg	50	ND
Di-n-pentyl Phthalates (DnPP)	131-18-0	mg/kg	50	ND
Diisoheptyl phthalate (DIHP)	71888-89-6	mg/kg	50	ND
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters(DHNUP)	68515-42-4	mg/kg	50	ND
Bis(2-methoxyethyl) Phthalate (DMEP)	117-82-8	mg/kg	50	ND
Dihexyl Phthalates (DHP, DHxP)	84-75-3	mg/kg	50	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	mg/kg	50	ND
Diisononyl Phthalate (DINP)	28553-12-0	mg/kg	50	ND
	/68515-48-0			
Diisodecyl Phthalate (DIDP)	26761-40-0	mg/kg	50	ND
	/68515-49-1			
Bis-n-heptyl phthalate (DHpP)	3648-21-3	mg/kg	50	ND
1,2-Benzenedicarboxylic,dihexylester, branched and linear	68515-50-4	mg/kg	50	ND



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

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

Test Item(s)	CAS NO.	Unit	MDL	001
Perfluorooctane Sulfonates (PFOS)^	1763-23-1	mg/kg	0.01	ND
Perfluorooctanoic Acid (PFOA) and its salts+		mg/kg	0.01	ND

Notes :

- (1) + PFOA refer to its salts including 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);
- (2) ^ PFOS including 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), PFOS-N(C2H5)4 (CAS No.: 56773-42-3), PFOS-DDA(CAS No.:251099-16-8) and POSF (CAS No.: 307-35-7)

**Polychlorinated Biphenyls (PCBs)**

Test Method : With reference to US EPA 8082A: 2007, analysis was performed by GC-MS

Test Item(s)	CAS NO.	Unit	MDL	001
2,4,4'-Trichlorobiphenyl (PCB 28)	7012-37-5	mg/kg	0.5	ND
2,2',5,5'-Tetrachloro-biphenyl (PCB 52)	35693-99-3	mg/kg	0.5	ND
2,2',4,5,5'-Pentachloro-biphenyl (PCB 101)	37680-73-2	mg/kg	0.5	ND
2,3',4,4',5-Pentachlorobiphenyl (PCB 118)	31508-00-6	mg/kg	0.5	ND
2,2',3,4,4',5'-Hexachloro-biphenyl (PCB 138)	35065-28-2	mg/kg	0.5	ND
2,2',4,4',5,5'-Hexachloro-biphenyl (PCB 153)	35065-27-1	mg/kg	0.5	ND
2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)	35065-29-3	mg/kg	0.5	ND



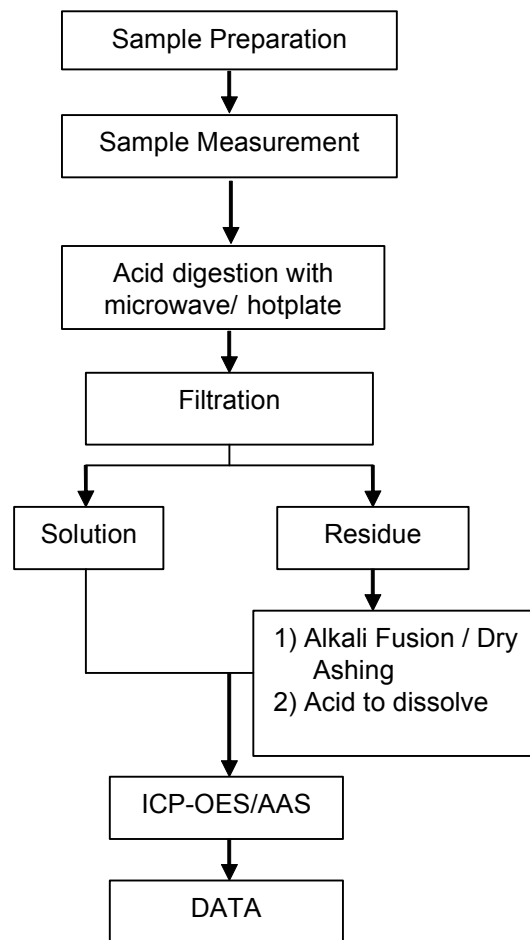
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ATTACHMENTS

Elements (IEC62321) Testing Flow Chart

- 1) Name of the person who made testing: Meria Jin/Sielina Song
- 2) Name of the person in charge of testing: Luna Xu/Bob Zhang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart.



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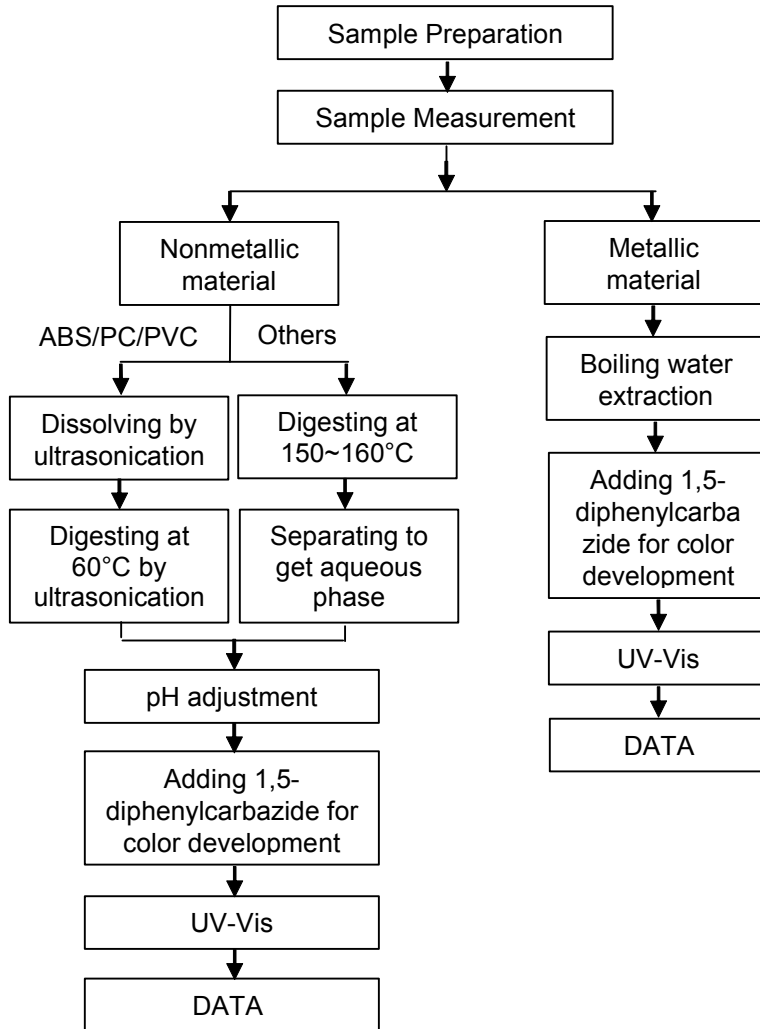
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**Hexavalent Chromium (Cr(VI)) Testing Flow Chart**

- 1) Name of the person who made testing: Alex Wang
- 2) Name of the person in charge of testing: Xiaolong Yang



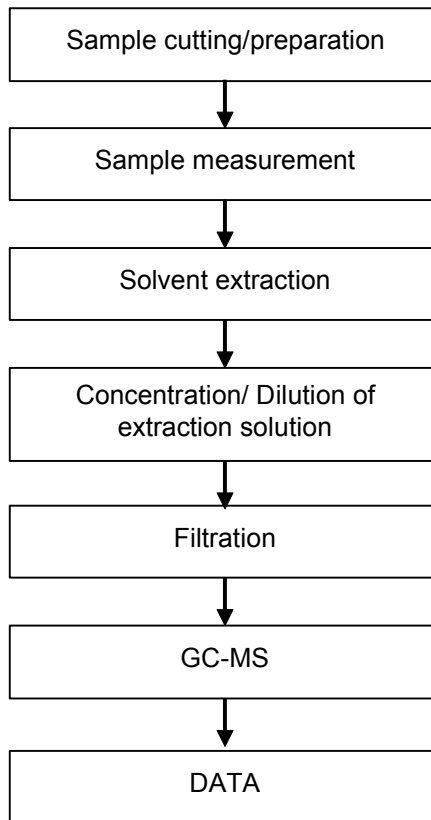
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PBBs/PBDEs Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Myra Ma



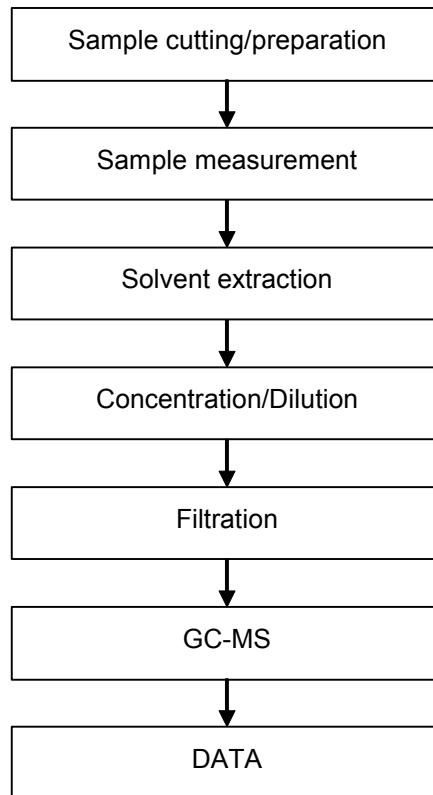
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### Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Alina Li
- 2) Name of the person in charge of testing: Jason Zhang



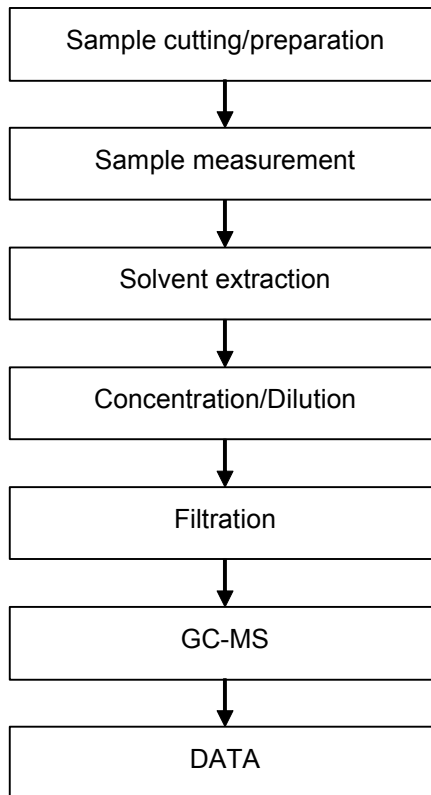
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### HBCDD Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Myra Ma



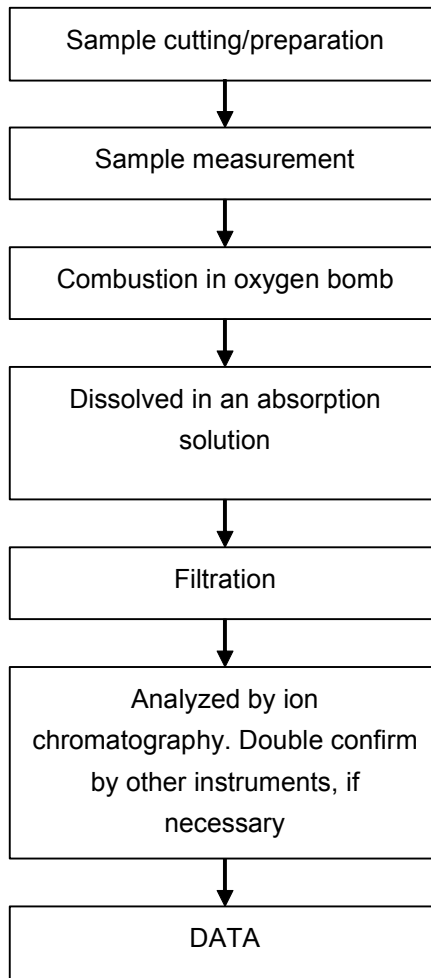
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**Halogen Testing (oxygen bomb) Flow Chart**

- 1) Name of the person who made testing: Kevin Xu
- 2) Name of the person in charge of testing: Allen Chen



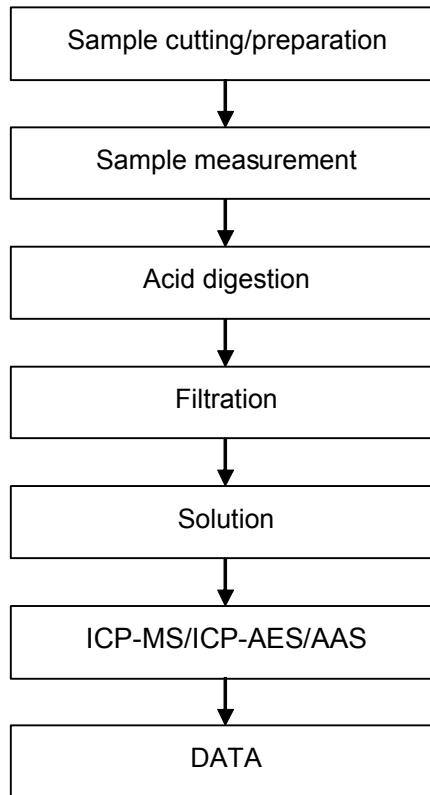
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### Elements Testing Flow Chart

- 1) Name of the person who made testing: Meria Jin/Sielina Song
- 2) Name of the person in charge of testing: Luna Xu/Bob Zhang



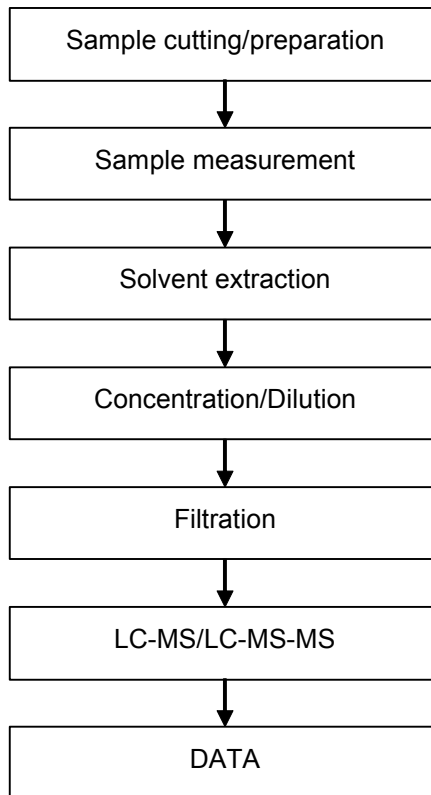
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### PFASs/ PFOS/PFOA Testing Flow Chart

- 1) Name of the person who made testing: Joe Qiao
- 2) Name of the person in charge of testing: Richer Yu



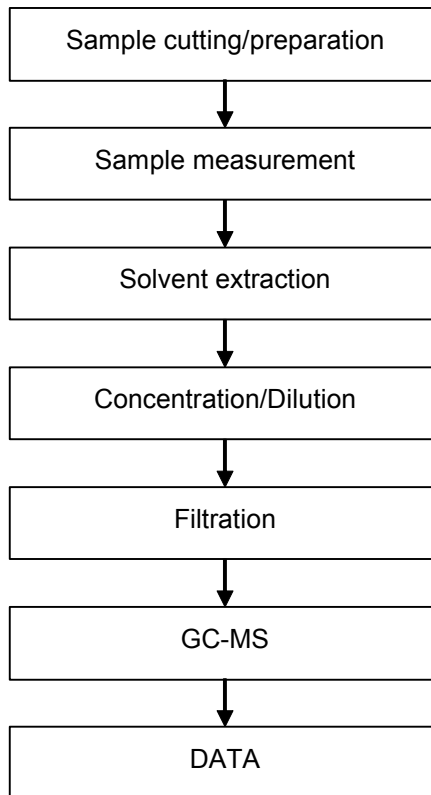
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### PCB Testing Flow Chart

- 1) Name of the person who made testing: David Dai
- 2) Name of the person in charge of testing: Jessy Huang



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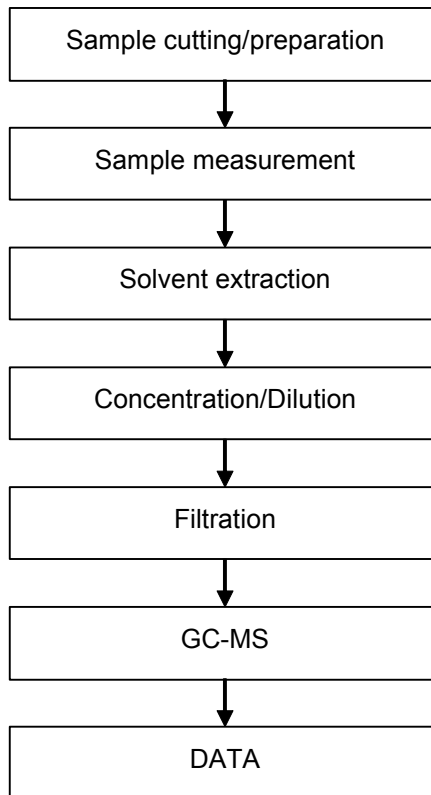
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### PCN Testing Flow Chart

- 1) Name of the person who made testing: David Dai
- 2) Name of the person in charge of testing: Jessy Huang



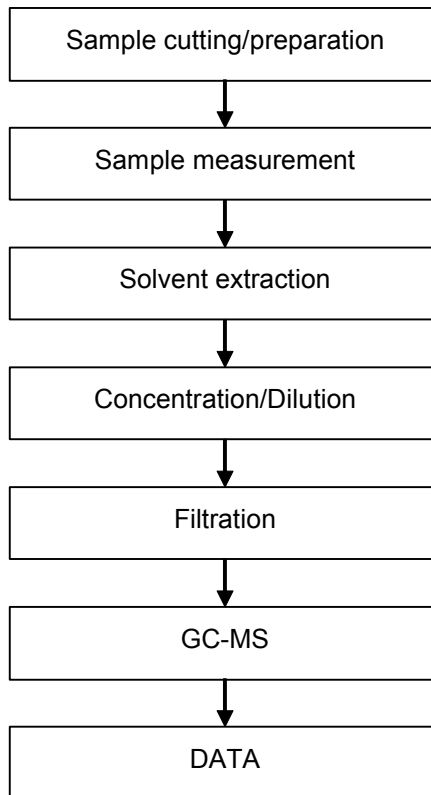
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PCT Testing Flow Chart

- 1) Name of the person who made testing: David Dai
- 2) Name of the person in charge of testing: Jessy Huang



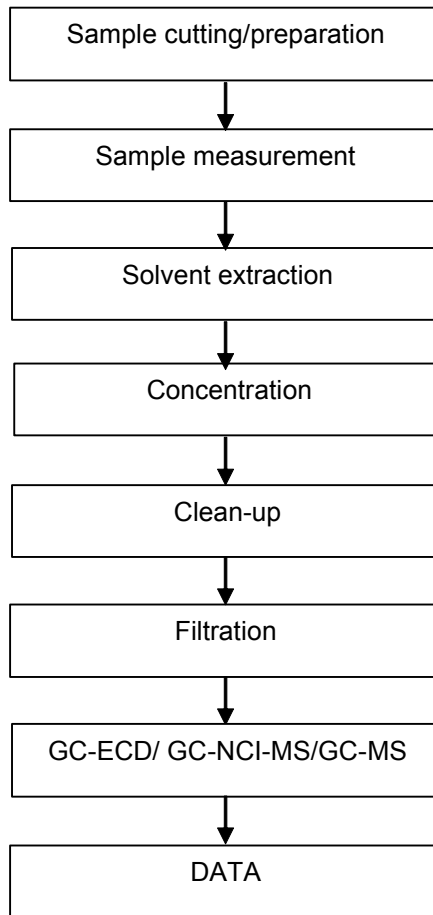
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**Chlorinated Paraffin Testing Flow Chart**

- 1) Name of the person who made testing: David Dai
- 2) Name of the person in charge of testing: Jessy Huang



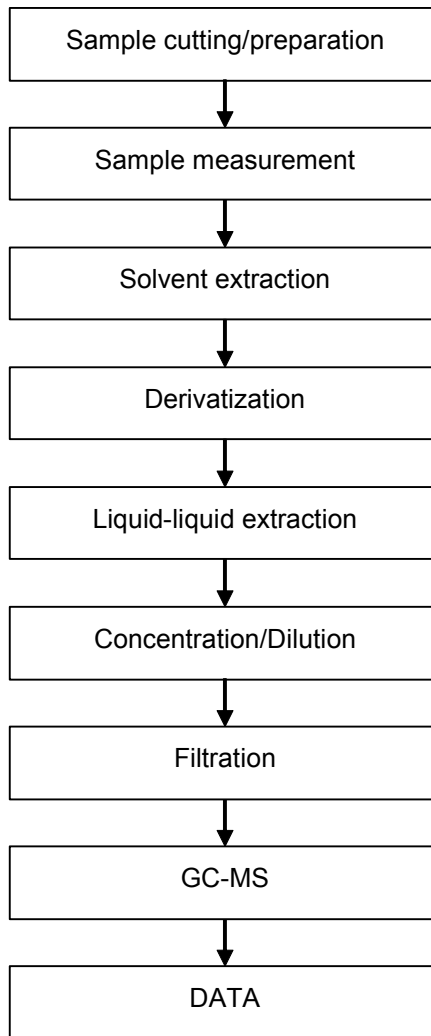
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Organotin Testing Flow Chart

- 1) Name of the person who made testing: Liyas Wang
- 2) Name of the person in charge of testing: Myra Ma



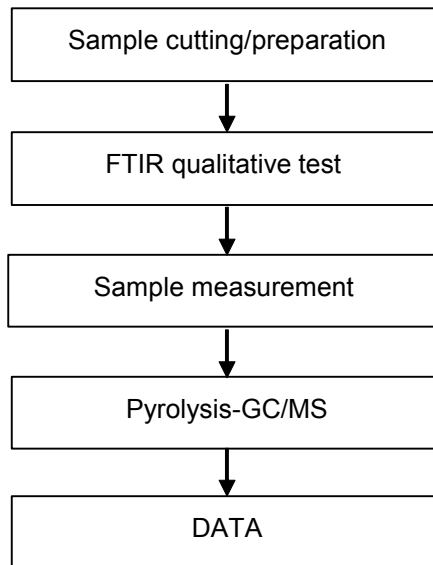
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### PVC Testing Flow Chart

- 1) Name of the person who made testing: Teresa Gao/ Roger Hu
- 2) Name of the person in charge of testing: Grace Chen



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