

Test Report

No. TSNEC1702209403

Date: 19 Dec 2017

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QINGDAO SUNGMOON ELECTRONICS CO.,LTD

NO.5 YANTAI ROAD,ECONOMY DEVELOP AREA,PINGDU QINGDAO-CITY,SHANDONG-PROVINCE
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : ALUMINIUM-ZINC
METALLIZED POLYESTER FILM

SGS Job No. : TP17-009112 - TJ
Model No. : ZT
Date of Sample Received : 07 Dec 2017
Testing Period : 07 Dec 2017 - 19 Dec 2017
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).

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



Reabeca Zhou
Approved Signatory



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SGS-CSTC Standards Technical Services (Tianjin) Co., Ltd.
Chemical Laboratory

SGS Mansion, No.41, The 5th Avenue TEDA, Tianjin, China 300457 t (86-22) 65288000 f (86-22) 25295252 www.sgs.com.cn
中国·天津市经济技术开发区第五大街41号SGS大厦 邮编: 300457 t (86-22) 65288000 f (86-22) 25295252 e sgs.china@sgs.com

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	TSN17-022094.003	transparent plastic film with silver gray metal plating(mix all)

Remarks :

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

Cadmium, Lead, Mercury, Hexavalent Chromium, PBBs(Polybrominated biphenyls), PBDEs (Polybrominated biphenyl ethers),Dibutyl phthalate (DBP),Butyl benzyl phthalate (BBP),Bis (2-ethylhexyl) phthalate (DEHP) and Diisobutyl Phthalates (DIBP)

Test Method : With reference to IEC 62321-5:2013, IEC 62321-4:2013+A1:2017, 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	003
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))	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>003</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
Dibutyl phthalate (DBP)	1000	mg/kg	50	ND
Butyl benzyl 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.

IEC 62321 series is equivalent to EN 62321 series

http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.

(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) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.

(5) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

(6) 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>003</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND



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<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Element(s)

Test Method : SGS in house method -TJChemLab-TOP-004-2 (With reference to US EPA 3052:1996、 US EPA 3051A:2007、 US EPA 6010C:2007), analyzed by ICP-OES.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Arsenic (As)	mg/kg	10	ND
Antimony (Sb)	mg/kg	10	123

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>003</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.

Perfluorooctane Sulfonates (PFOS) and Perfluorooctanoic Acid (PFOA)

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

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Perfluorooctane Sulfonates (PFOS)^	1000	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

Notes :

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- (1) Max. limit specified by commission regulation (EU) No. 757/2010 amending Regulation (EC) No 850/2004 (previously restricted under entry 53 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006).
- (2) ^: PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

Tetrabromobisphenol A (TBBP-A)

Test Method : SGS in house method-TJChemLab-TOP-036-2 (With reference to US EPA 3550C:2007、 US EPA 3540C:1996、 US EPA 8270D:2014), analyzed by GC-MS.

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

Red Phosphorus

Test Method : SGS in house method(SHTC- CHEM- SOP -342-T), Analysis was performed by ICP-OES and Pyrolysis-GC/MS

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Red Phosphorus	mg/kg	500	ND

Notes :

- (1) For Positive result, the testing result is based on the worst-case scenario, and confirmed by Pyrolysis-GC-MS.
- (2) The test was subcontracted to SGS Shanghai chemical lab.

Commission Regulation (EU) No 412/2012 and Entry 61 of Annex XVII of REACH Regulation (EC) No 1907/2006 - Dimethyl fumarate(DMF)

Test Method : SGS in house method -TJChemLab-TOP-064 (With reference to US EPA 3550C:2007、 US EPA 8270D:2014), analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Dimethyl fumarate(DMF)	0.1	mg/kg	0.1	ND

Hexabromocyclododecane (HBCDD)

Test Method : With reference to IEC 62321:2008, analysis was performed by GC-MS.



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<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

Phthalates

Test Method : With reference to EN14372: 2004, analysis was performed by GC-MS.

<u>Test Item(s)</u>	<u>CAS NO.</u>	<u>Unit</u>	<u>MDL</u>	<u>003</u>
Dibutyl Phthalate (DBP)	84-74-2	% (w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	% (w/w)	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	% (w/w)	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0/ 68515-48-0	% (w/w)	0.01	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	% (w/w)	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0/ 68515-49-1	% (w/w)	0.01	ND
Dimethyl Phthalate (DMP)	131-11-3	% (w/w)	0.003	ND
Diethyl Phthalate (DEP)	84-66-2	% (w/w)	0.003	ND
Dipropyl Phthalate (DPrP)	131-16-8	% (w/w)	0.003	ND
Diisobutyl Phthalate (DIBP)	84-69-5	% (w/w)	0.003	ND
Di-n-pentyl Phthalate (DnPP)	131-18-0	% (w/w)	0.003	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	% (w/w)	0.003	ND
Dicyclohexyl Phthalate (DCHP)	84-61-7	% (w/w)	0.003	ND
Diphenyl Phthalate (DPhP)	84-62-8	% (w/w)	0.003	ND
Dibenzyl Phthalate (DBzP)	523-31-9	% (w/w)	0.003	ND
Dinonyl Phthalate (DNP)	84-76-4	% (w/w)	0.003	ND
Diisooctyl Phthalate (DIOP)	27554-26-3	% (w/w)	0.01	ND
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear (DPP)	84777-06-0	% (w/w)	0.01	ND

Notes :

- (1) DBP, BBP, DEHP Reference information: Entry 51 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC):
- i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1% by weight of the plasticised material, in toys and childcare articles.
 - ii) Toys and childcare articles containing these phthalates in a concentration greater than 0.1% by weight of the plasticised material shall not be placed on the market.
- Please refer to Regulation (EC) No 552/2009 to get more detail information

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DINP, DNOP, DIDP Reference information: Entry 52 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC):

- i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1% by weight of the plasticised material, in toys and childcare articles which can be placed in the mouth by children.
- ii) Such toys and childcare articles containing these phthalates in a concentration greater than 0.1% by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information.

Polycyclic aromatic hydrocarbons (PAHs)

Test Method : With reference to AfPS GS 2014:01 PAK, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	003
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) and 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
Acenaphthylene(ANY)	mg/kg	0.1	ND
Acenaphthene(ANA)	mg/kg	0.1	ND
Fluorene(FLU)	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 Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Pyrene, Anthracene, Fluoranthene	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.1	ND
Sum of 18 PAHs	mg/kg	-	ND



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AfPS (German commission for Product Safety) : GS PAHs requirements

Parameter	Category 1 Material indented to be put in the mouth or toys with intended skin contact (longer than 30 s).	Category 2		Category 3	
		Toy under 2009/48/EC	Other products under ProdSG	Toy under 2009/48/EC	Other products under ProdSG
Benzo(a)pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene Mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Acenaphthylene, Acenaphthene, fluorene, phenanthrene, pyrene, anthracene, fluoranthene, mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene, mg/kg	< 1	< 2		< 10	
Sum of 18 PAHs	< 1	< 5	< 10	< 20	< 50

Remark:

(1) The German committee on Product Safety (AfPS) adopted a new PAHs document on August 4, 2014, which is taken into account by the GS certification bodies for the certification process of the GS mark now. The transitional arrangements and deadlines contained therein shall determine the procedure for existing certificates and new certificates; also there are exceptions.

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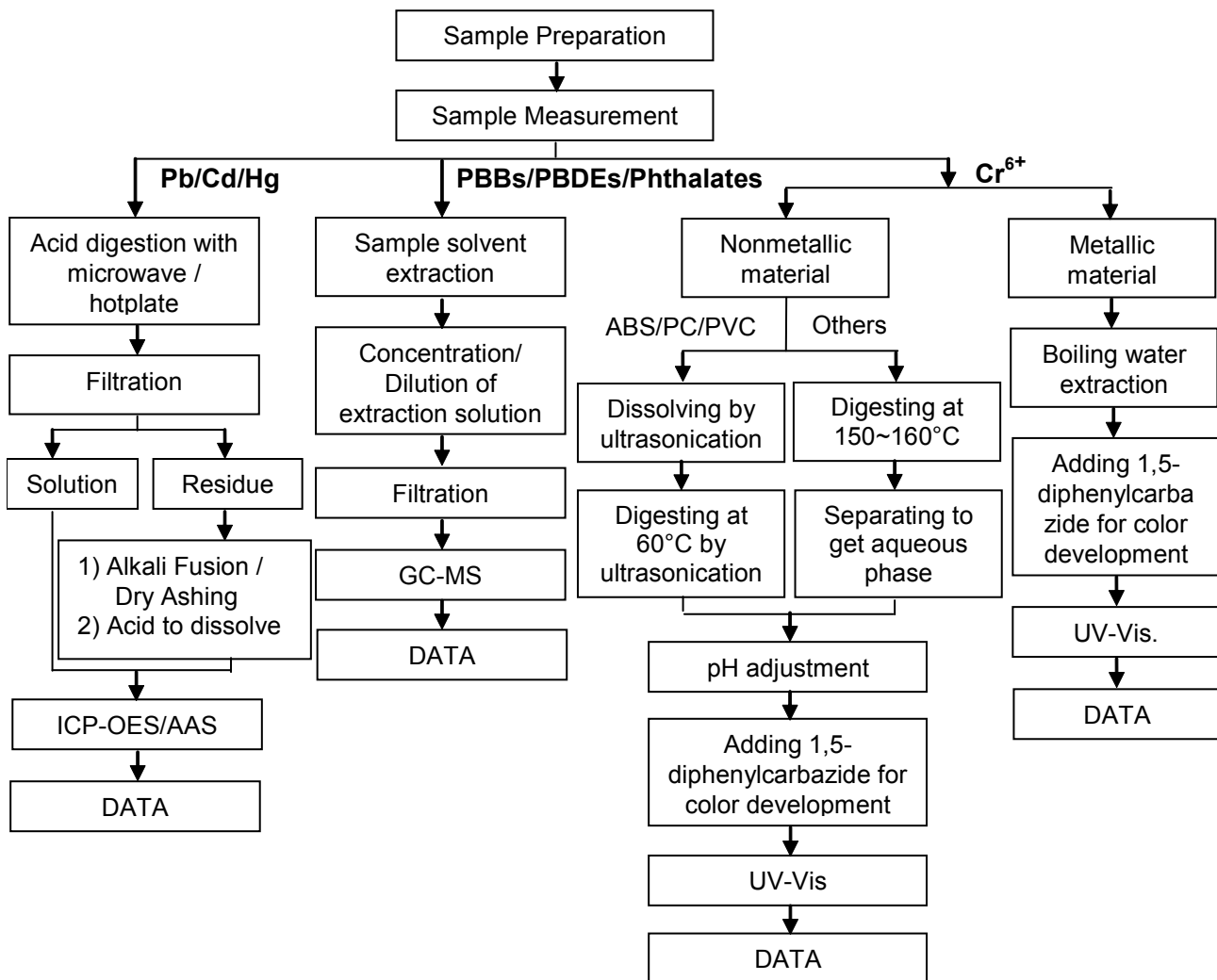
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Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs/Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Cathy Zhang/Crystal Wang/Ann Wang/Cyhan Chen
- 2) Name of the person in charge of testing: Aaron Wang/Rex Zhu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs /Phthalates test method excluded)



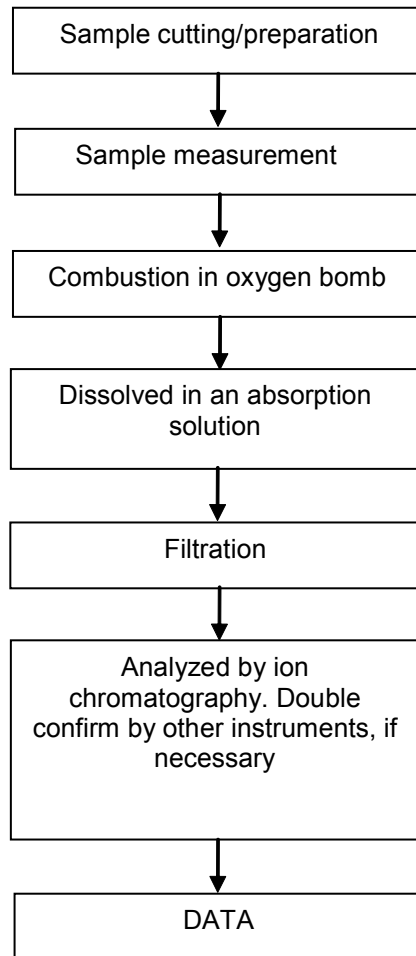
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Halogen Testing Flow Chart

- 1) Name of the person who made testing: Carson Fang
- 2) Name of the person in charge of testing: Rex Zhu



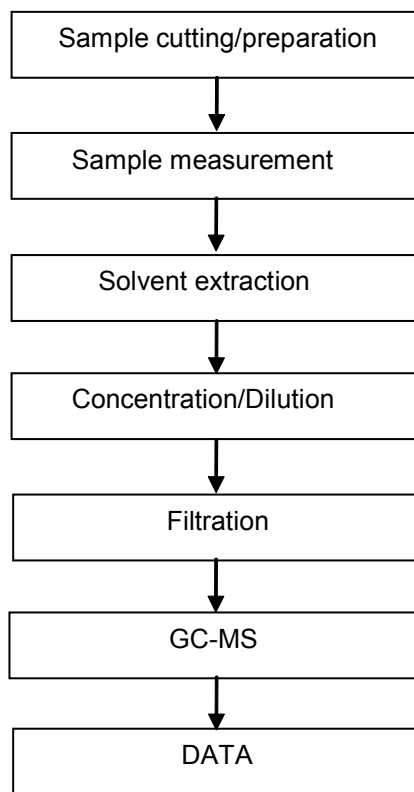
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Phthalate Testing Flow Chart

- 1) Name of the person who made testing: Allen Xiong
- 2) Name of the person in charge of testing: Rex Zhu



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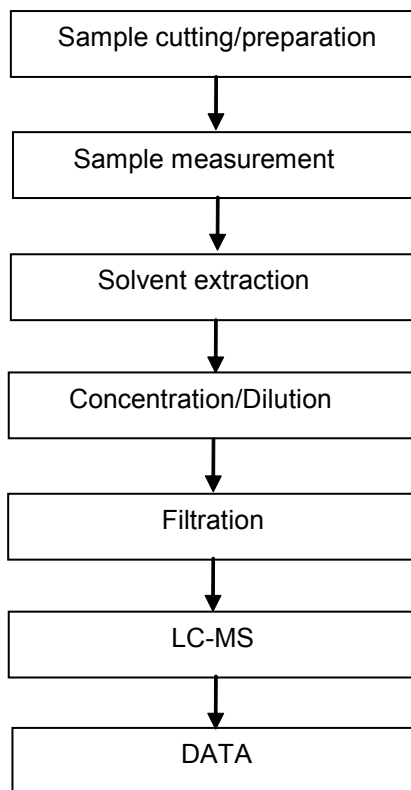
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PFOS/PFOA Testing Flow Chart

- 1) Name of the person who made testing: Jin Wang
- 2) Name of the person in charge of testing: Rex Zhu



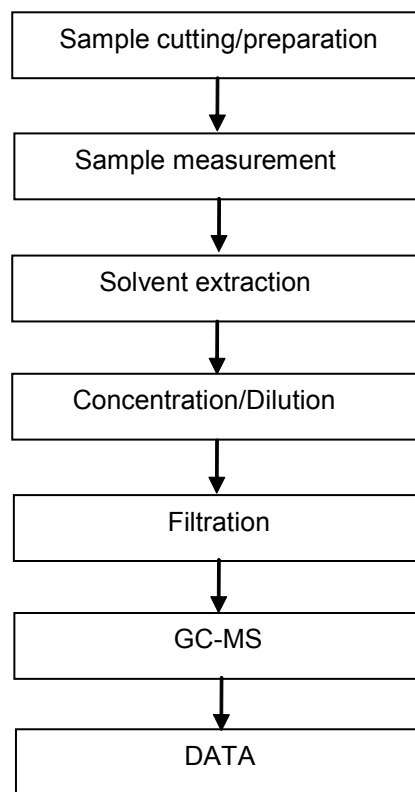
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PAHs Testing Flow Chart

- 1) Name of the person who made testing: Cyhan Chen
- 2) Name of the person in charge of testing: Rex Zhu



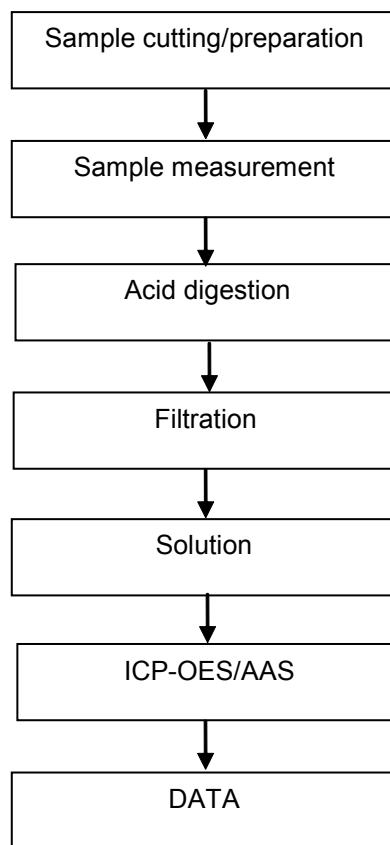
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Elementary Testing Flow Chart

- 1) Name of the person who made testing: Cathy Zhang
- 2) Name of the person in charge of testing: Aaron Wang



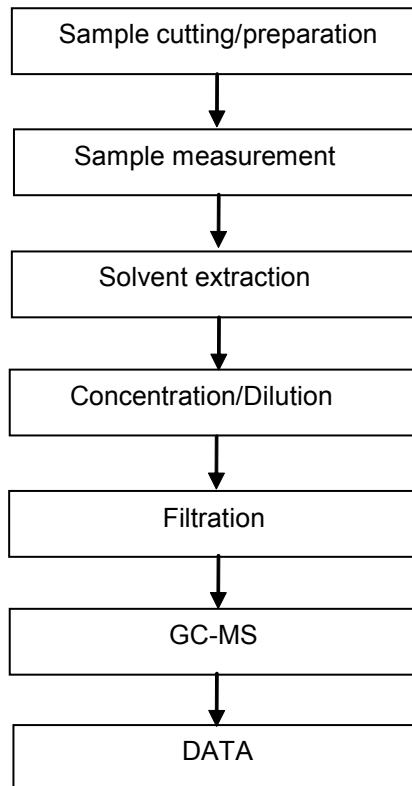
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DMF Testing Flow Chart

- 1) Name of the person who made testing: Jin Wang
- 2) Name of the person in charge of testing: Rex Zhu



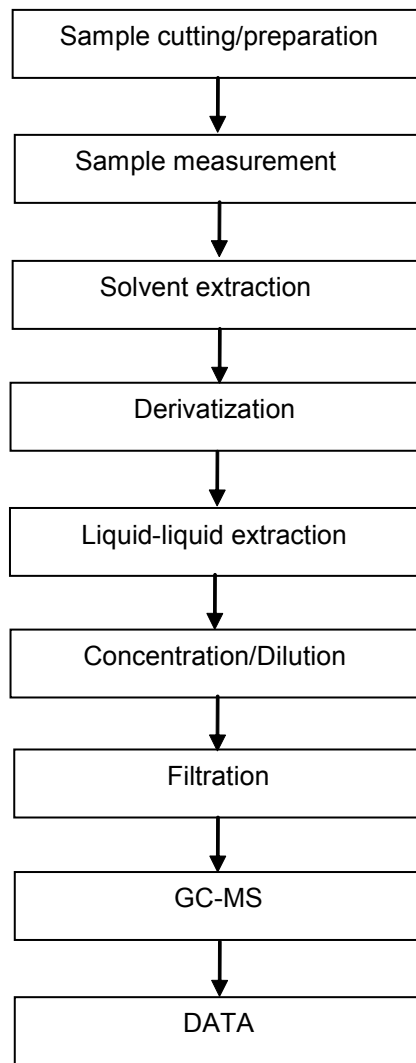
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TBBP-A Testing Flow Chart

- 1) Name of the person who made testing: Ann Wang
- 2) Name of the person in charge of testing: Rex Zhu



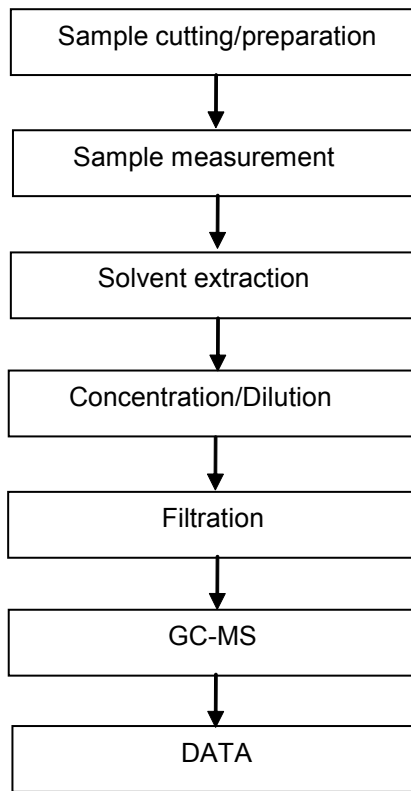
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HBCDD Testing Flow Chart

- 1) Name of the person who made testing: Ann Wang
- 2) Name of the person in charge of testing: Rex Zhu



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