



Test Report

No.: SHAPH24013272203

Date: Jul 25, 2024

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Client Name: JIANGSU XINSHUN MICROELECTRONICS CO.,LTD

Client Address: NO.78 CHANGSHAN RD.,JIANGYIN CITY,JIANGSU PRO.,CHINA

Sample Name: the chip for using three layer diffusion semiconductor material

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

SGS Job No.: SHIN2406004632PL02

Sample Receiving Date: Jun 18, 2024

Testing Period: Jun 18, 2024 ~ Jun 26, 2024

Test Requested: Select 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).

Test Requirement	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	Pass
Element(s)	See Results
Halogen	See Results
Red Phosphorus	See Results
European Regulation POPs (EU) 2020/784 amending to Regulation (EU) 2019/1021 Annex I - Perfluorooctanoic acid (PFOA) and its salts, PFOA-Related Substances, Perfluorooctane sulfonic acid (PFOS) and its derivatives	Pass
Persistent, Bioaccumulative, and Toxic (PBT) Chemicals under US EPA Toxic Substances Control Act (TSCA) Section 6(h)	Pass
AfPS GS 2019:01 PAK-Polycyclic Aromatic Hydrocarbons (PAHs)	Pass

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

Mei Shen
Approved Signatory

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Test Result(s):

Test Part Description

SN ID	Sample No.	SGS Sample ID	Description
SN1	002	SHA24-0132722-0001.C002	Color silicon wafer

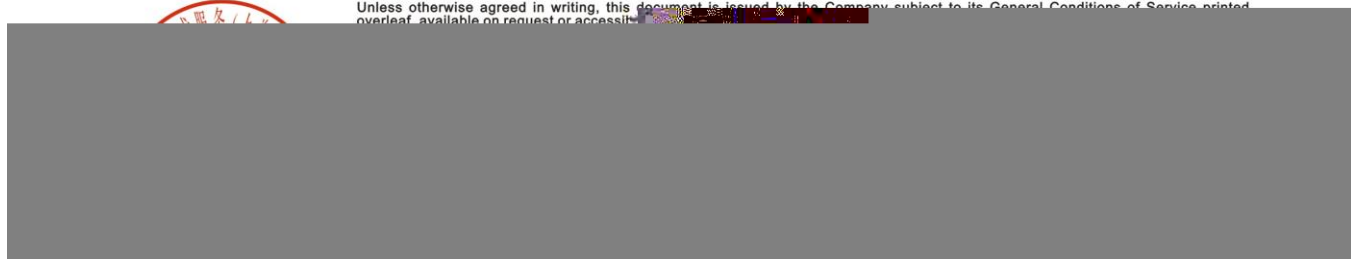
Remarks:

- (1) 1 mg/kg = 1 ppm = 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
 506.81 673.06 133.9142.04 reWEMC /T4 569.71 Tm0 g0 G(Cadm)



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Test Item(s)	Limit	Unit(s)	MDL	002
Octabrominated diphenyl ether (OctaBDE)	-	mg/kg	5	ND
Nonabrominated diphenyl ether (NonaBDE)	-	mg/kg	5	ND
Decabrominated diphenyl ether (DecaBDE)	-	mg/kg	5	ND
Bis(2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	1000	mg/kg	50	ND
Dibutyl phthalate (DBP)	1000	mg/kg	50	ND
Diisobutyl phthalate (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.

Element(s)

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

Test Item(s)	Unit(s)	MDL	002
Arsenic(As)	mg/kg	10	ND
Antimony(Sb)	mg/kg	10	ND

Halogen

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

Test Item(s)	Unit(s)	MDL	002
Fluorine(F)	mg/kg	20	378
Chlorine(Cl)	mg/kg	50	ND
Bromine(Br)	mg/kg	50	ND
Iodine(I)	mg/kg	50	ND

Red Phosphorus

Test Method: With reference to SGS In house method, analysis was performed by ICP-OES and Pyrolysis-GC-MS.

Test Item(s)	CAS No.	Unit(s)	MDL	002
Red Phosphorus	7723-14-0	mg/kg	500	ND

Notes:

- (1) The testing result is based on the worst-case scenario, and confirmed by Pyrolysis-GC-MS.

European Regulation POPs (EU) 2020/784 amending to Regulation (EU) 2019/1021 Annex I - Perfluorooctanoic acid (PFOA) and its salts, PFOA-Related Substances, Perfluorooctane sulfonic acid (PFOS) and its derivatives



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Test Method: Modified CEN/TS 15968:2010, analysis was performed by LC-MS or LC-MS/MS and GC-MS.

Test Item(s)	CAS No.	Limit	Unit(s)	MDL	002
PFOS, its salts and related compounds					
Perfluorooctane sulfonic acid (PFOS), its salts^	1763-23-1	-	mg/kg	0.010	ND
N-ethylperfluoro-1-octanesulfonamide (N-EtFOSA)	4151-50-2	-	mg/kg	0.010	ND
N-methylperfluoro-1-octanesulfonamide (N-MeFOSA)	31506-32-8	-	mg/kg	0.010	ND
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE)	1691-99-2	-	mg/kg	0.010	ND
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)	24448-09-7	-	mg/kg	0.010	ND
Perfluorooctane sulfonamide (PFOSA), its salts^	754-91-6	-	mg/kg	0.010	ND
Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives	-	10	mg/kg	-	ND
PFOA, its salts					
Perfluorooctanoic acid (PFOA), its salts^	335-67-1	0.025	mg/kg	0.010	ND
PFOA-related compounds					
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS), its salts^	39108-34-4	-	mg/kg	0.010	ND
Methyl perfluorooctanoate (Me-PFOA)	376-27-2	-	mg/kg	0.100	ND
Ethyl perfluorooctanoate (Et-PFOA)	3108-24-5	-	mg/kg	0.100	ND
1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA)	27905-45-9	-	mg/kg	0.100	ND



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Test Item(s)	CAS No.	Limit	Unit(s)	MDL	002
Conclusion					Pass

Notes:

1. ^=Substances refer to its salts/derivative listed in below table.

Substance Name	CAS No.
PFOS, its salts & derivatives	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1
Potassium Perfluorooctanesulfonate (PFOS-K)	2795-39-3
Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
Sodium perfluorooctanesulfonate (PFOS-Na)	4021-47-0
Ammonium perfluorooctanesulfonate (PFOS-NH ₄)	29081-56-9
Perfluorooctane sulfonate diethanolamine salt (PFOS-NH ₂ (C ₂ H ₄ OH) ₂)	70225-14-8
Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C ₂ H ₅) ₄)	56773-42-3
N-decyl-N,N-dimethyldecyl-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-N(C ₁₀ H ₂₁) ₂ (CH ₃) ₂)	251099-16-8
TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C ₄ H ₉) ₄)	111873-33-7
Perfluorooctane Sulfonyl fluoride (PFOS-F)	307-35-7
Magnesium bis(heptadecafluorooctanesulphonate) (PFOS-Mg)	91036-71-4
Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
PFOA, its salts	
Perfluorooctane Sulfonamide (PFOA)	754-91-6
Perfluorooctanesulfonamide lithium salt (1:1) (PFOA-Li)	76752-79-9
Perfluorooctanesulfonamide Sodium salt (1:1) (PFOA-Na)	76752-78-8
Perfluorooctanesulfonamide Potassium salt (1:1) (PFOA-K)	76752-70-0
Perfluorooctanesulfonamide Ammonium salt (1:1) (PFOA-NH ₄)	76752-72-2
PFOA, its salts & derivatives	
Perfluorooctanoic acid (PFOA)	335-67-1
Sodium perfluorooctanoate (PFOA-Na)	335-95-5
Potassium perfluorooctanoate (PFOA-K)	2395-00-8
Silver perfluorooctanoate (PFOA-Ag)	335-93-3
Perfluorooctanoyl fluoride (PFOA-F)	335-66-0
Ammonium pentadecafluorooctanoate (APFO)	3825-26-1
Lithium perfluorooctanoate (PFOA-Li)	17125-58-5
Cobalt perfluorooctanoate (PFOA-Co)	35965-01-6
Cesium perfluorooctanoate (PFOA-Cs)	17125-60-9
Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, chromium(3+) (PFOA-Cr(3+))	68141-02-6
Pentadecafluorooctanoic acid--piperazine (2/1)PFOA-NH(C ₄ H ₁₀ N)	423-52-9
Pentadecafluorooctanoate (anion)	45285-51-6
Perfluorooctanoic Anhydride	33496-48-9
8:2 FTS, its salts	
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	39108-34-4
Potassium 1H,1H,2H,2H-Perfluorodecane sulfonate (8:2 FTS-K)	438237-73-1
Ammonium 1H,1H,2H,2H-Perfluorodecane sulfonate (8:2 FTS-NH ₄)	149724-40-3
Sodium 1H,1H,2H,2H-Perfluorodecane sulfonate (8:2 FTS-Na)	27619-96-1



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H₂PFDA/8:2 FTCA, its salts	
2H,2H-Perfluorodecane Acid (H ₂ PFDA/8:2 FTCA)	27854-31-5
Tetrabutylphosphonium 2H,2H-Perfluorodecanoate (8:2 FTCA-P(C ₄ H ₉) ₄)	882489-14-7
8:2diPAP, its salts	
Bis(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptafluorodecyl)hydrogen phosphate (8:2diPAP)	678-41-1
Sodium bis(1H,1H,2H,2H-perfluorodecyl)phosphate (8:2diPAP-Na)	114519-85-6
H₄PFUnDA/ 8:3 FTCA, its salts	
2H,2H,3H,3H-Perfluoroundecanoic acid (H ₄ PFUnDA/ 8:3 FTCA)	34598-33-9
Potassium 2H,2H,3H,3H-Perfluoroundecanoate (H ₄ PFUnDA-K)	83310-58-1

Persistent, Bioaccumulative, and Toxic (PBT) Chemicals under US EPA Toxic Substances Control Act (TSCA) Section 6(h)

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

Test Item(s)	CAS No.	Limit	Unit(s)	MDL	002
Decabromodiphenyl ether (DecaBDE) ¹	1163-19-5	Prohibited	mg/kg	5	ND
Phenol, isopropylated phosphate (3:1) (PIP 3:1) ²	68937-41-7	Prohibited	mg/kg	5	ND
2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP) ³	732-26-				



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Test Item(s)	CAS No.	Limit	Unit(s)	MDL	002
Benzo(a)pyrene (BaP)	50-32-8	1	mg/kg	0.1	ND
Benzo(e)pyrene (BeP)	192-97-2	1	mg/kg	0.1	ND
Benzo(a)anthracene (BaA)	56-55-3	1	mg/kg	0.1	ND
Benzo(b)fluoranthene (BbF)	205-99-2	1	mg/kg	0.1	ND
Benzo(j)fluoranthene (BjF)	205-82-3	1	mg/kg	0.1	ND
Benzo(k)fluoranthene (BkF)	207-08-9	1	mg/kg	0.1	ND
Chrysene (CHR)	218-01-9	1	mg/kg	0.1	ND
Dibenzo(a,h)anthracene (DBA)	53-70-3	1	mg/kg	0.1	ND
Benzo(g,h,i)perylene (BPE)	191-24-2	1	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene (IPY)	193-39-5	1	mg/kg	0.1	ND
Phenanthrene (PHE)	85-01-8	-	mg/kg	0.1	ND
Pyrene (PYR)	129-00-0	-	mg/kg	0.1	ND
Anthracene (ANT)	120-12-7	-	mg/kg	0.1	ND
Fluoranthene (FLT)	206-44-0	-	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	-	50	mg/kg	-	ND
Naphthalene (NAP)	91-20-3	10	mg/kg	0.1	ND
Sum of 15 PAHs	-	50	mg/kg	-	ND
Material Category	-	-	-	-	3
Conclusion					Pass

Notes:

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

AfPS German commission for Product Safety : PAHs requirements

Parameter	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.	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact ^c with skin during the intended or foreseeable use ^d .		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.	
		a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1



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Benzo(e)pyrene (BeP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF)mg/kg	< 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) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT), mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene (NAP) mg/kg	< 1	< 2		< 10	
Sum of 15 PAHs	<1	< 5	< 10	< 20	< 50

Notes:

^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.

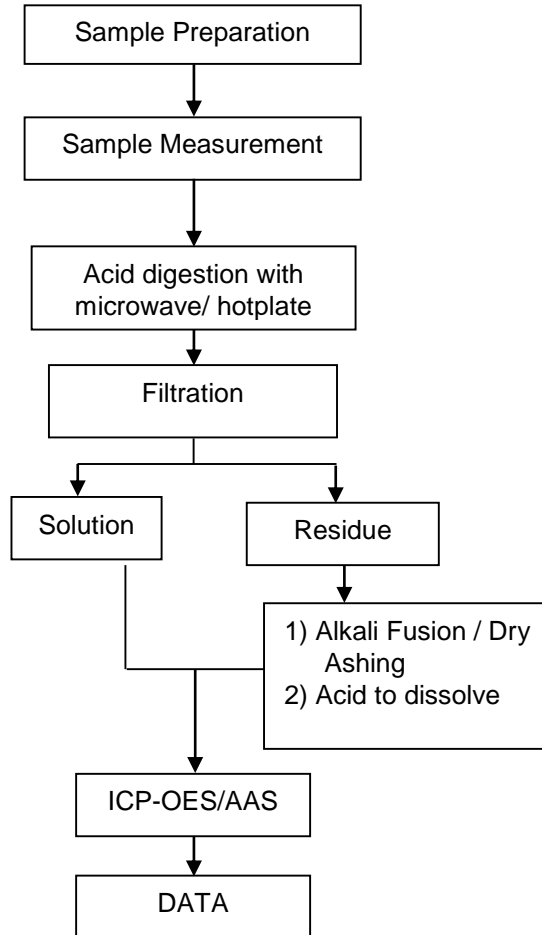
Remark:

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.



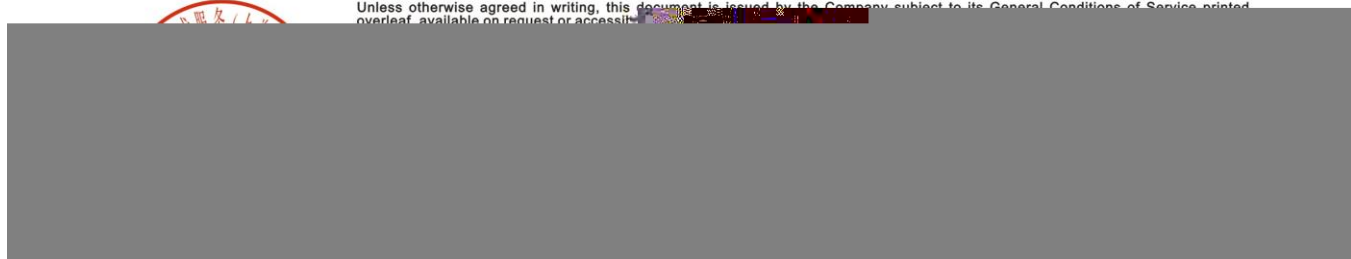
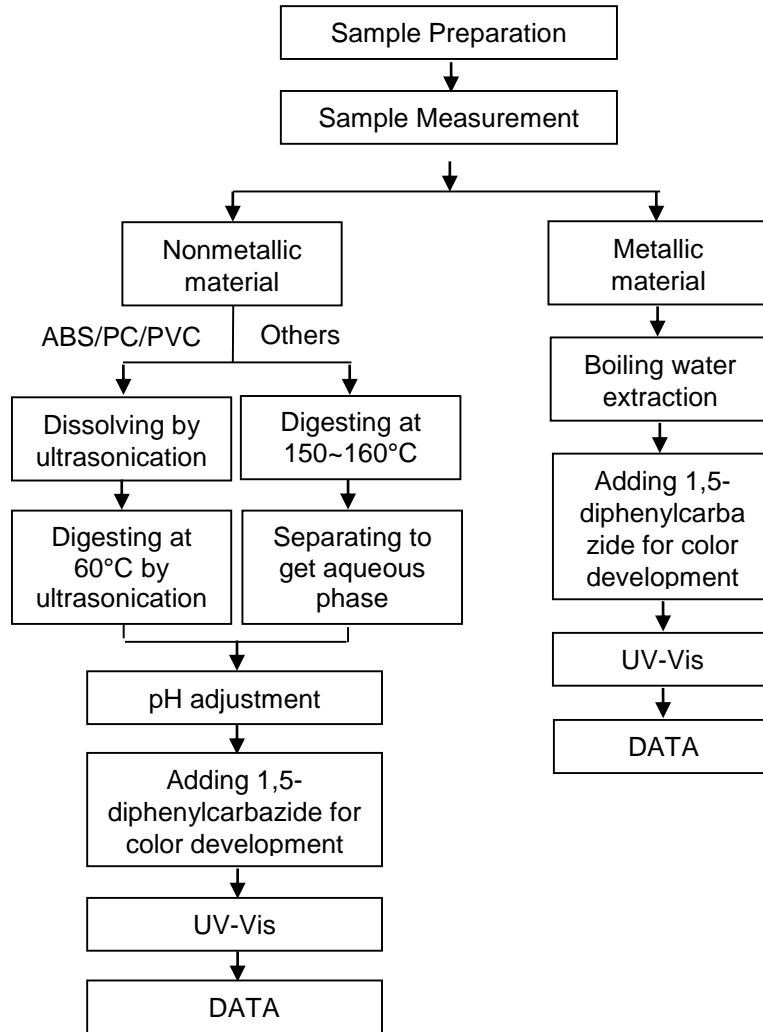
Elements Testing Flow Chart

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



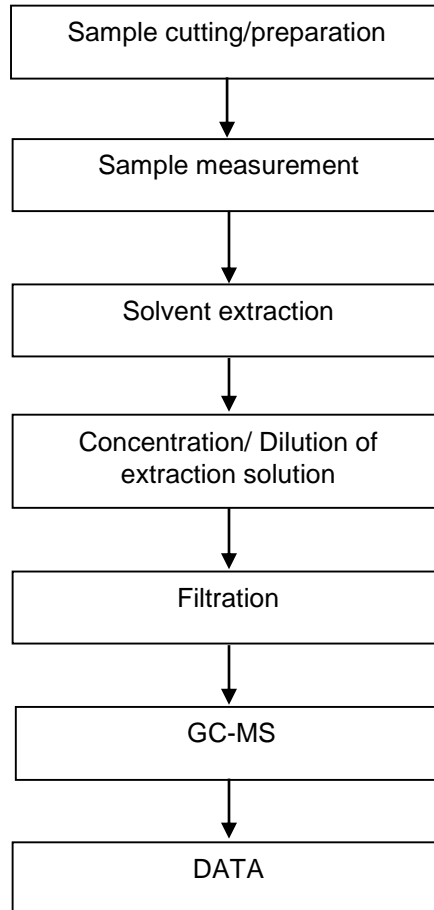


Hexavalent Chromium (Cr(VI)) Testing Flow Chart



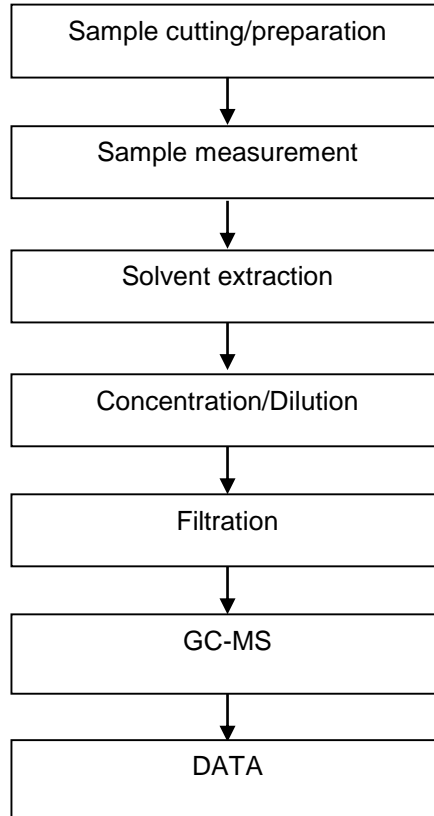


PBB/PBDE Testing Flow Chart





Phthalates Testing Flow Chart





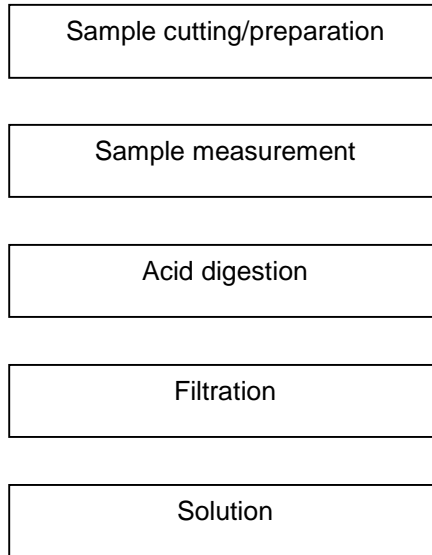
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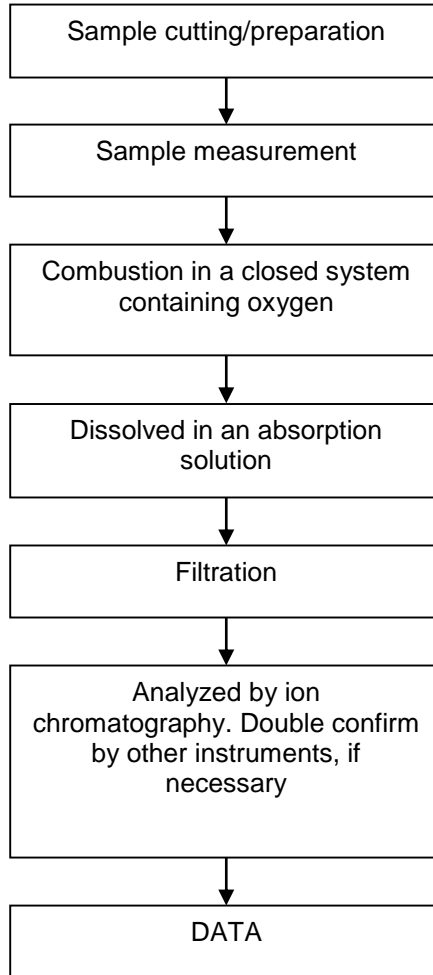
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Elements Testing Flow Chart



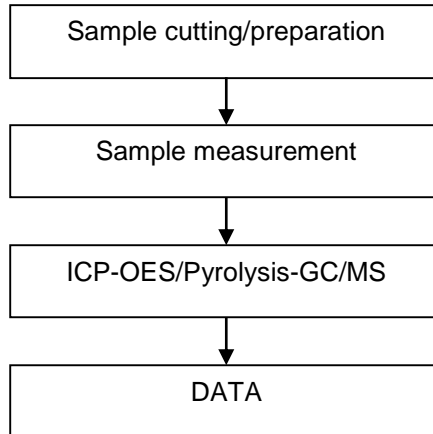


Halogen Testing Flow Chart



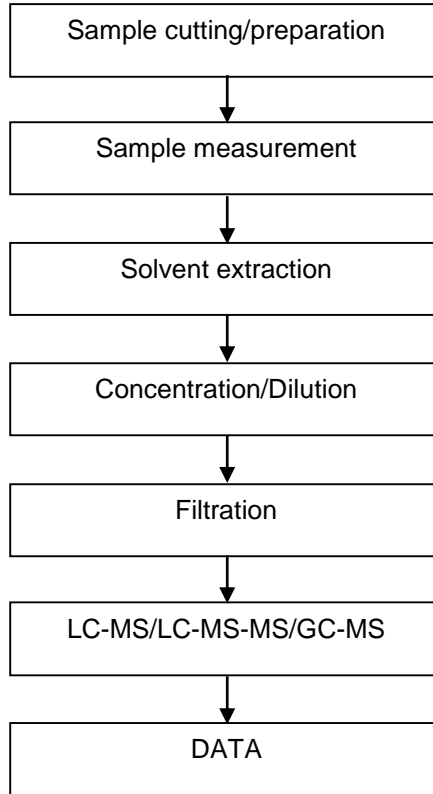


Red Phosphorus Testing Flow Chart





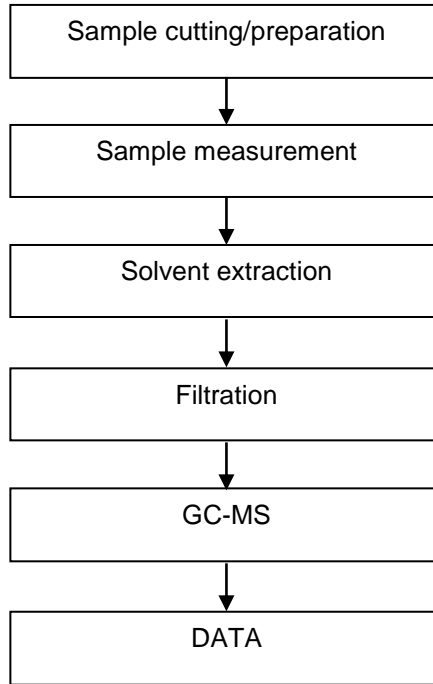
PFASs/ PFOS/PFOA Testing Flow Chart





ATTACHMENTS

Persistent, Bioaccumulative, and Toxic (PBT) Chemicals Testing Flow Chart





PAHs Testing Flow Chart

