

# Test Report

No.: SHAEC24017492111

Date: Aug 19, 2024

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Client Name: Suzhou Goodark Electronics Co.,Ltd

Client Address: No.31 Tongxi Road, TongAn Economic Development Zone, Suzhou, P.R. China

Sample Name: ASMA SKY Halogen-Free product

Model No.: ASMA SKY

Client Ref. Information: ASMA MSMA ASMB ASMC MSMC SMA SMB SMC SKY (Halogen-Free) products

Main Substance: Cu,Sn,Epoxy Resin

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

SGS Job No.: SUP24-002437

Sample Receiving Date: Aug 02, 2024

Testing Period: Aug 02, 2024 ~ Aug 16, 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        |
| Halogen   | See Results |
| Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid (PFOS) and its derivatives   | See Results |

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

Annie Liu

Annie Liu  
Approved Signatory

scan to see the report



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**Test Result(s):**

Test Part Description:

| SN ID | Sample No. | SGS Sample ID           | Description                 |
|-------|------------|-------------------------|-----------------------------|
| SN1   | A12        | SHA24-0174921-0001.C012 | Black body with silvery pin |

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 biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)**

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

| Test Item(s)                              | Limit | Unit(s) | MDL | A12                |
|---|-------|---------|-----|--------------------|
| Lead (Pb)                                 | 1000  | mg/kg   | 2   | 17316 <sup>▲</sup> |
| Mercury (Hg)                              | 1000  | mg/kg   | 2   | ND                 |
| Cadmium (Cd)                              | 100   | mg/kg   | 2   | ND                 |
| Hexavalent Chromium (Cr(VI))              | 1000  | mg/kg   | 8   | ND                 |
| Polybromobiphenyl (PBB)                   | 1000  | mg/kg   | -   | ND                 |
| Monobrominated biphenyl (MonoBB)          | -     | mg/kg   | 5   | ND                 |
| Dibrominated biphenyl (DiBB)              | -     | mg/kg   | 5   | ND                 |
| Tribrominated biphenyl (TriBB)            | -     | mg/kg   | 5   | ND                 |
| Tetrabrominated biphenyl (TetraBB)        | -     | mg/kg   | 5   | ND                 |
| Pentabrominated biphenyl (PentaBB)        | -     | mg/kg   | 5   | ND                 |
| Hexabrominated biphenyl (HexaBB)          | -     | mg/kg   | 5   | ND                 |
| Heptabrominated biphenyl (HeptaBB)        | -     | mg/kg   | 5   | ND                 |
| Octabrominated biphenyl (OctaBB)          | -     | mg/kg   | 5   | ND                 |
| Nonabrominated biphenyl (NonaBB)          | -     | mg/kg   | 5   | ND                 |
| Decabrominated biphenyl (DecaBB)          | -     | mg/kg   | 5   | ND                 |
| Polybromodiphenyl ether (PBDE)            | 1000  | mg/kg   | -   | ND                 |
| Monobrominated diphenyl ether (MonoBDE)   | -     | mg/kg   | 5   | ND                 |
| Dibrominated diphenyl ether (DiBDE)       | -     | mg/kg   | 5   | ND                 |
| Tribrominated diphenyl ether (TriBDE)     | -     | mg/kg   | 5   | ND                 |
| Tetrabrominated diphenyl ether (TetraBDE) | -     | mg/kg   | 5   | ND                 |
| Pentabrominated diphenyl ether (PentaBDE) | -     | mg/kg   | 5   | ND                 |
| Hexabrominated diphenyl ether (HexaBDE)   | -     | mg/kg   | 5   | ND                 |
| Heptabrominated diphenyl ether (HeptaBDE) | -     | mg/kg   | 5   | ND                 |



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| Test Item(s)                            | Limit | Unit(s) | MDL | A12 |
|---|-------|---------|-----|-----|
| 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.
- (4)▲ According to the declaration from the client, Lead (Pb) 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).

More information about exemption can be found via the following link:

<https://rohs.sgsonline.com.cn/PDFLinks/en/RSTS-TP-037%20RoHS%20Exemption%20%28EN%29.pdf>

**Halogen**

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

| Test Item(s) | Unit(s) | MDL | A12 |
|--------------|---------|-----|-----|
| Fluorine(F)  | mg/kg   | 20  | ND  |
| Chlorine(Cl) | mg/kg   | 50  | ND  |
| Bromine(Br)  | mg/kg   | 50  | ND  |
| Iodine(I)    | mg/kg   | 50  | ND  |

**Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid (PFOS) and its derivatives**

**Test Method:** Modified EN 17681-1:2022, analysis was performed by LC-MS or LC-MS/MS.

| Test Item(s)  | CAS No.    | Unit(s) | MDL   | A12 |
|---|------------|---------|-------|-----|
| <b>PFOS, its salts and related compounds</b>                |            |         |       |     |
| 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  |



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| Test Item(s)   | CAS No.    | Unit(s) | MDL   | A12 |
|--|------------|---------|-------|-----|
| 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)                         | 24448-09-7 | mg/kg   | 0.010 | ND  |
| Perfluorooctane Sulfonamide (PFOSA), its salts <sup>^</sup>                          | 754-91-6   | mg/kg   | 0.010 | ND  |
| Perfluorooctane sulfonamidoacetic Acid (FOSAA), its salts <sup>^</sup>               | 2806-24-8  | mg/kg   | 0.010 | ND  |
| N-Methylperfluoro-1-octanesulfonamidoacetic Acid (N-MeFOSAA), its salts <sup>^</sup> | 2355-31-9  | mg/kg   | 0.010 | ND  |
| N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA), its salts <sup>^</sup>    | 2991-50-6  | mg/kg   | 0.010 | ND  |
| Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives                      | -          | mg/kg   | -     | ND  |
| <b>PFOA, its salts</b>   |            |         |       |     |
| Perfluorooctanoic acid (PFOA), its salts <sup>^</sup>                                | 335-67-1   | mg/kg   | 0.010 | ND  |

**Notes:**

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

| Substance Name   | CAS No.     |
|--|-------------|
| <b>PFOS, its salts &amp; derivatives</b>   |             |
| 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 <sub>4</sub> )  | 29081-56-9  |
| Perfluorooctane sulfonate diethanolamine salt (PFOS-NH <sub>2</sub> (C <sub>2</sub> H <sub>4</sub> OH) <sub>2</sub> )  | 70225-14-8  |
| Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )  | 56773-42-3  |
| N-decyl-N,N-dimethyldecan-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 <sub>10</sub> H <sub>21</sub> ) <sub>2</sub> (CH <sub>3</sub> ) <sub>2</sub> ) | 251099-16-8 |
| TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )   | 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  |
| Perfluorooctanesulfonate   | 45298-90-6  |
| Triethylammonium perfluorooctane sulfonate (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> )  | 54439-46-2  |
| Tetramethylammonium perfluorooctane sulfonate (PFOS-N(CH <sub>3</sub> ) <sub>4</sub> )   | 56773-44-5  |
| N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N(C <sub>3</sub> H <sub>7</sub> ) <sub>3</sub> (C <sub>5</sub> H <sub>11</sub> ))  | 56773-56-9  |
| N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub> (CH <sub>3</sub> ))   | 124472-68-0 |



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| Iodonium, bis[4-(1,1-dimethylethyl)phenyl]-, salt with perfluoro-1-octanesulfonic acid (1:1)  | 213740-80-8  |
| Diphenyl(2,4,6-trimethylphenyl)sulfonium perfluoro-1-octanesulfonate  | 258341-99-0  |
| 1-Hexadecylpyridinium perfluoro-1-octanesulfonate   | 334529-63-4  |
| N,N,N-Triethyldecan-1-aminium heptadecafluorooctane-1-sulfonate   | 773895-92-4  |
| Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P (C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )   | 2185049-59-4 |
| Perfluorooctanesulfonic acid diethylamine salt (PFOS-C <sub>4</sub> H <sub>11</sub> N)  | 2205029-08-7 |
| heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-C <sub>15</sub> H <sub>30</sub> NO <sub>2</sub> ) | 1203998-97-3 |
| Perfluorooctane sulfonic anhydride (PFOSAN)   | 423-92-7     |
| <b>FOSAA, its salts</b>   |              |
| Perfluorooctane sulfonamidoacetic Acid (FOSAA)  | 2806-24-8    |
| N-[(Perfluorooctyl)sulfonyl]glycinate (FOSAA(anion))  | 909405-47-6  |
| N-[(Perfluorooctyl)sulfonyl]glycine potassium salt (1:1) (FOSAA-K)  | 75260-69-4   |
| N-[(Perfluorooctyl)sulfonyl]glycine sodium salt (1:1) (FOSAA-Na)  | 115716-87-5  |
| <b>N-MeFOSAA, its salts</b>   |              |
| N-Methylperfluoro-1-octanesulfonamidoacetic Acid (N-MeFOSAA)  | 2355-31-9    |
| 2-(N-Methylperfluorooctanesulfonamido)acetate (N-Me-FOSAA(anion))   | 909405-48-7  |
| Potassium N-((heptadecafluorooctyl)sulphonyl)-N-methylglycinate (N-Me-FOSAA-K)  | 70281-93-5   |
| <b>N-EtFOSAA, its salts</b>   |              |
| N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA)   | 2991-50-6    |
| Glycine, N-ethyl-N-[(heptadecafluorooctyl)sulfonyl]-, potassium salt (N-Et-FOSAA-K)   | 2991-51-7    |
| 2-(N-Ethyl-perfluorooctanesulfonamido)acetate (N-Et-FOSAA(anion))   | 909405-49-8  |
| Ammonium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-NH <sub>4</sub> )   | 2991-52-8    |
| Sodium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-Na)   | 3871-50-9    |
| <b>PFOSA, its salts</b>   |              |
| Perfluorooctane Sulfonamide (PFOSA)   | 754-91-6     |
| Perfluorooctanesulfonamide lithium salt (1:1) (PFOSA-Li)  | 76752-79-9   |
| Perfluorooctanesulfonamide Sodium salt (1:1) (PFOSA-Na)   | 76752-78-8   |
| Perfluorooctanesulfonamide Potassium salt (1:1) (PFOSA-K)   | 76752-70-0   |
| Perfluorooctanesulfonamide Ammonium salt (1:1) (PFOSA-NH <sub>4</sub> )   | 76752-72-2   |
| Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-C <sub>6</sub> H <sub>15</sub> N)                                    | 76752-82-4   |
| <b>PFOA, its salts &amp; derivatives</b>  |              |
| 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     |



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| 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+)<br>(PFOA-Cr(3+))                 | 68141-02-6   |
| Pentadecafluorooctanoic acid--piperazine (2/1) (PFOA-NH(C <sub>4</sub> H <sub>10</sub> N))                   | 423-52-9     |
| Pentadecafluorooctanoate (anion)   | 45285-51-6   |
| Perfluorooctanoic Anhydride  | 33496-48-9   |
| N,N,N-Triethylethanaminium perfluorooctanoate  | 98241-25-9   |
| Perfluorooctanoate N,N,N-Trimethylmethanaminium  | 32609-65-7   |
| Tetrapropylammonium perfluorooctanoate   | 277749-00-5  |
| Potassium pentadecafluorooctanoate--water (1/1/2) (PFOA-K(H <sub>2</sub> O) <sub>2</sub> )                   | 98065-31-7   |
| Perfluorooctanoic acid compd. with ethanamine (1:1) (PFOA-C <sub>2</sub> H <sub>7</sub> N)                   | 1376936-03-6 |
| Pentadecafluorooctanoic acid--pyridine (1/1) (PFOA-C <sub>5</sub> H <sub>5</sub> N)                          | 95658-47-2   |
| pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> ) | 1514-68-7    |
| N,N,N-Trimethyloctan-1-aminium pentadecafluorooctanoate (PFOA-C <sub>11</sub> H <sub>26</sub> N)             | 927835-01-6  |

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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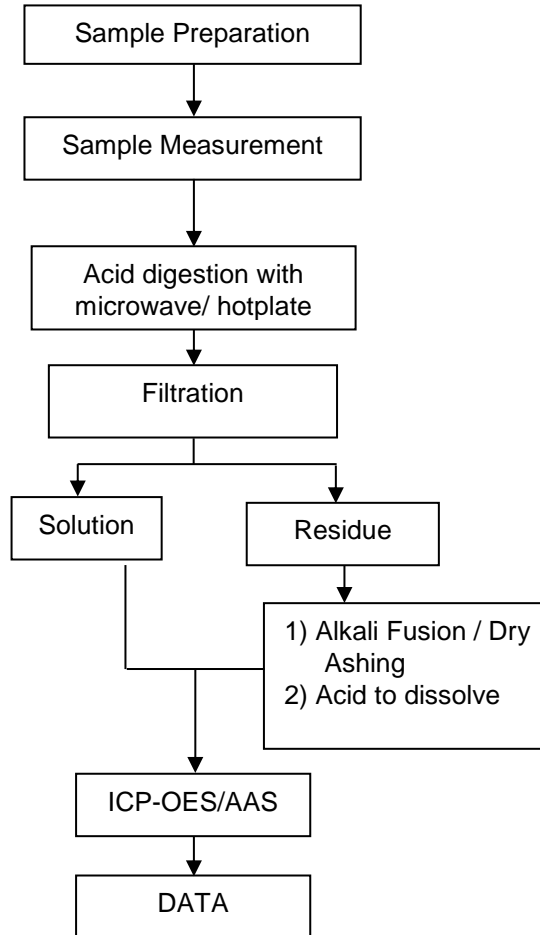
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**Elements Testing Flow Chart**

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

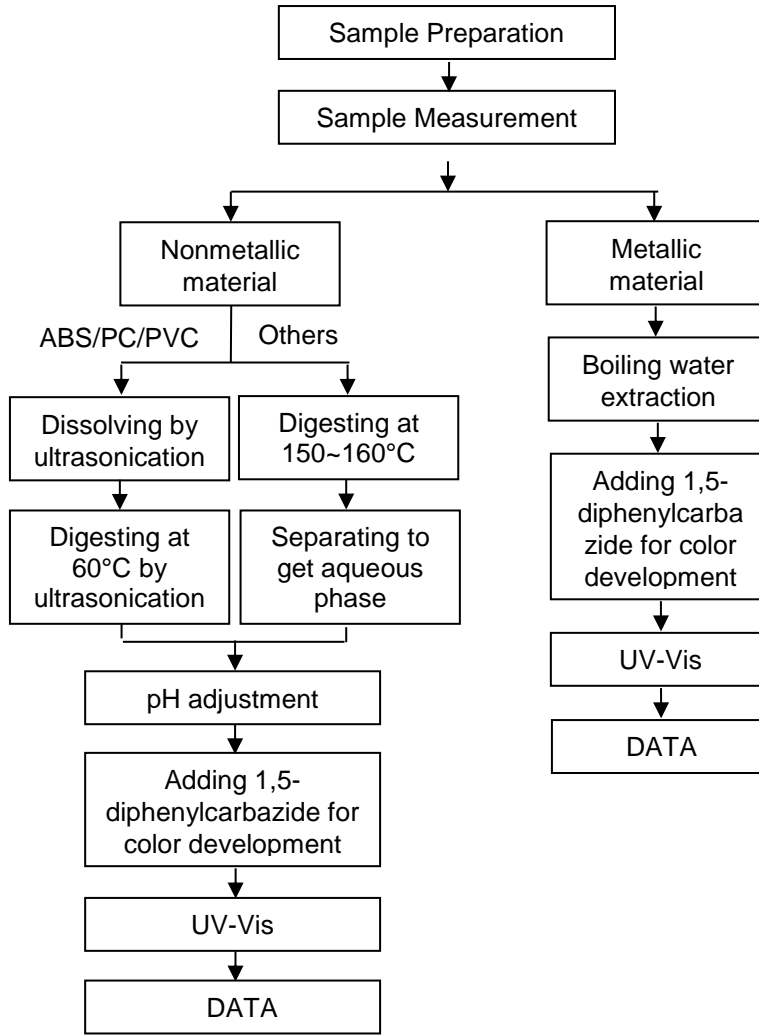


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**Hexavalent Chromium (Cr(VI)) Testing Flow Chart**



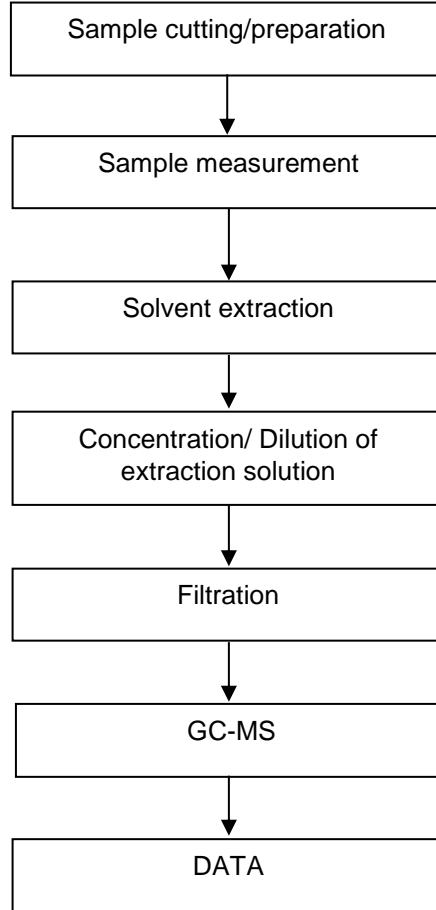
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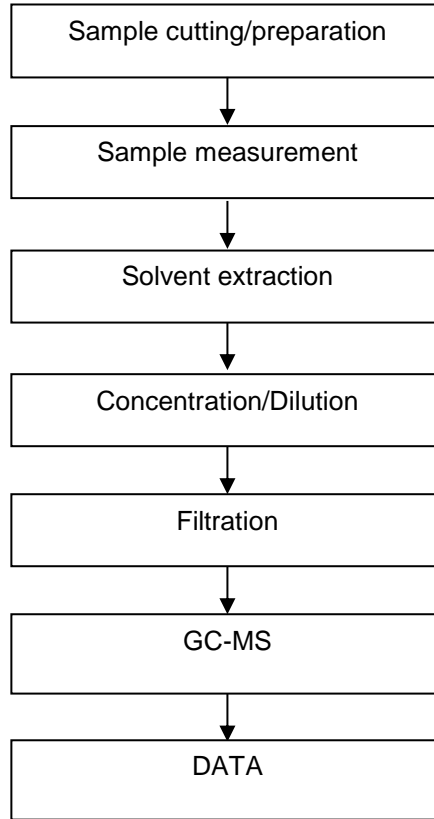
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### PBB/PBDE Testing Flow Chart



### Phthalates Testing Flow Chart



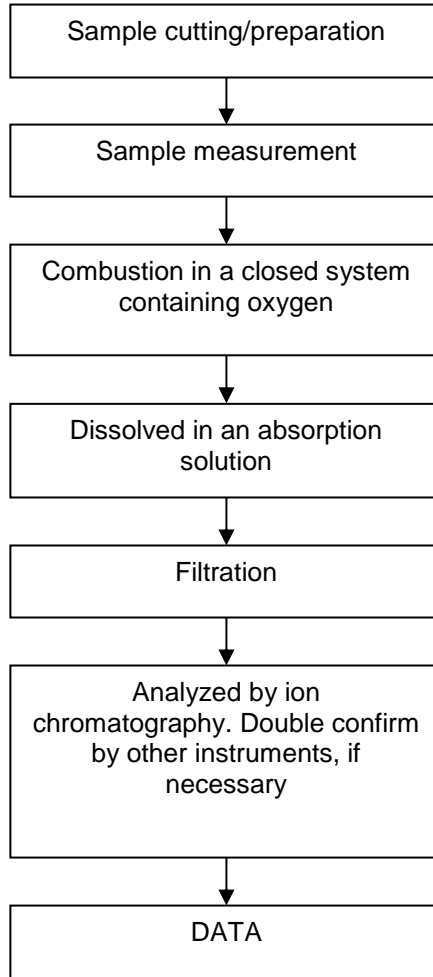
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### Halogen Testing Flow Chart



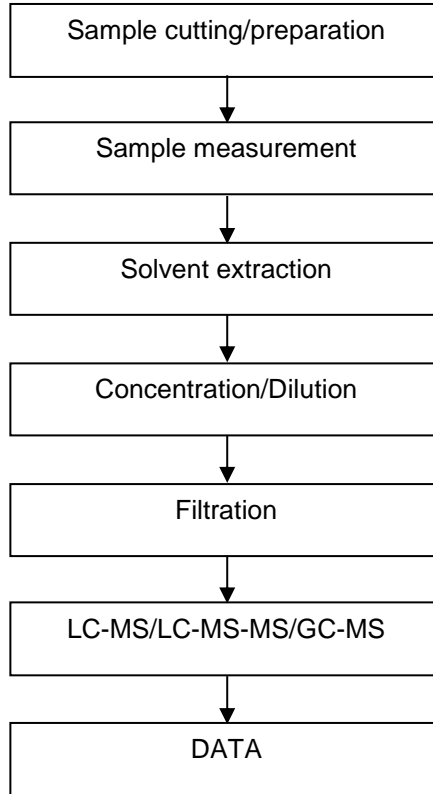
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**PFASs/ PFOS/PFOA Testing Flow Chart**



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