# Restricted Chemicals Test Results

# Device - ESD321DPYR

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TI Report Number : 92232980

Component : Semiconductor Device

Analysis Type : RoHS 10 & Halogens

Analysis Date : 04/29/2025

[redacted]

The following sample(s) was/were submitted and identified by/on behalf of the client as: **Sample Description: Standard TI Wafer**

Sample Received Date: **04/22/2025**

Testing Period: **04/22/2025 – 04/25/2025**

Test Requested : Please refer to the result summary.

Test Method & Results : Please refer to next page(s).

Result Summary :

| Test(s) Requested | Conclusion |
|---|---|
| **1. RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU** | PASS |
| **2. Halogen Content** | See Test Results |
| **3. Antimony Content** | See Test Results |
| **4. Arsenic Content** | See Test Results |
| **5. Beryllium Content** | See Test Results |

[redacted]

## 1. RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

| Test Item(s): | Unit | Test Method | Result 1 | MDL | Limit |
|---|---|---|---|---|---|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321-5:2013 (Determination of Cd and Pb by ICP-OES and /or ICP-MS) | ND | 2 | 100 |
| Lead (Pb) | mg/kg | | ND | 2 | 1000 |
| Mercury (Hg) | mg/kg | With reference to IEC 62321-4:2013+A1:2017 (Determination of Hg by ICP-OES and/ or ICP-MS) | ND | 2 | 1000 |
| Hexavalent Chromium (CrVI) | mg/kg | With reference to IEC 62321-7-2:2017 (Determination of CrVI by UV-Vis) | ND* | 8 | 1000 |
| **Sum of PBBs** | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBB and PBDE by GC-MS) | ND | - | 1000 |
| Monobromobiphenyl | mg/kg | | ND | 5 | - |
| Dibromobiphenyl | mg/kg | | ND | 5 | - |
| Tribromobiphenyl | mg/kg | | ND | 5 | - |
| Tetrabromobiphenyl | mg/kg | | ND | 5 | - |
| Pentabromobiphenyl | mg/kg | | ND | 5 | - |
| Hexabromobiphenyl | mg/kg | | ND | 5 | - |
| Heptabromobiphenyl | mg/kg | | ND | 5 | - |
| Octabromobiphenyl | mg/kg | | ND | 5 | - |
| Nonabromobiphenyl | mg/kg | | ND | 5 | - |
| Decabromobiphenyl | mg/kg | | ND | 5 | - |
| **Sum of PBDEs** | mg/kg | | ND | - | 1000 |
| Monobromodiphenyl ether | mg/kg | | ND | 5 | - |
| Dibromodiphenyl ether | mg/kg | | ND | 5 | - |
| Tribromodiphenyl ether | mg/kg | | ND | 5 | - |
| Tetrabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Pentabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Hexabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Heptabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Octabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Nonabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Decabromodiphenyl ether | mg/kg | | ND | 5 | - |
| Bis (2-ethylhexyl) Phthalate (DEHP) | mg/kg | IEC 62321-8:2017 (Determination of DEHP, BBP, DBP and DIBP by GC-MS) | ND | 50 | 1000 |
| Butyl Benzyl Phthalate (BBP) | mg/kg | | ND | 50 | 1000 |
| Dibutyl Phthalate (DBP) | mg/kg | | ND | 50 | 1000 |
| Diisobutyl Phthalate (DIBP) | mg/kg | | ND | 50 | 1000 |
| **Conclusion** | / | / | PASS | / | / |

Sample Description:

1. Standard TI Wafer C-4708939-01-D6 / 90TFF021SEC5

Note:

(a) mg/kg = ppm；0.1wt% = 1000ppm
(b) ND= not detected
(c) MDL = Method Detection Limit
(d) - = not regulated
(e) * = Total Chromium analysis by ICP-MS and/or ICP-OES was not detected in submitted sample. Therefore, Hexavalent Chromium determination using UV-Visible Spectroscopy was not performed.
(f) 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. Halogen Content**

Test Method(s): With reference to IEC 62321-3-2:2020 "Determination of certain substances in electrotechnical products – Part 3-2: Screening – Fluorine, bromine and chlorine in polymer and electronics by combustion-ion chromatography (C-IC), and/or with reference to BS EN 14582:2016 – Analysis was performed by ion chromatography.

| Test Item(s): | Result (ppm) | Reporting Limit (ppm) |
|---|---|---|
| | 1 | |
| Fluorine (F) | ND | 50 |
| Chlorine (Cl) | ND | 50 |
| Bromine (Br) | ND | 50 |

Sample Description:

1. Standard TI Wafer C-4708939-01-D6 / 90TFF021SEC5

Note: 1. ppm = parts per million
2. mg/kg = ppm
3. 1% = 10000 ppm (mg/kg)
4. ND = Not Detected, reported when the reading is less than the reporting limit value.

### 3. Antimony Content

Test Method: With reference to US EPA Method 3050B followed by analysis using ICP-MS.

| Test Item | | Result (ppm) | Reporting Limit (ppm) |
|---|---|---|---|
| | | 1 | |
| Antimony | (Sb) | ND | 20 |

Sample Description:

1. Standard TI Wafer C-4708939-01-D6 / 90TFF021SEC5

Note: 1. ppm = parts per million
2. mg/kg = ppm
3. 1% = 10000 ppm (mg/kg)
4. ND = Not Detected, reported when the reading is less than the reporting limit value.

**4. Arsenic Content**

Test Method: With reference to US EPA Method 3050B followed by analysis using ICP-MS.

| Test Item | | Result (ppm) | Reporting Limit (ppm) |
|---|---|---|---|
| | | 1 | |
| Arsenic | (As) | ND | 20 |

Sample Description:

1. Standard TI Wafer C-4708939-01-D6 / 90TFF021SEC5

Note: 1. ppm = parts per million
2. mg/kg = ppm
3. 1% = 10000 ppm (mg/kg)
4. ND = Not Detected, reported when the reading is less than the reporting limit value.

**5. Beryllium Content**

Test Method: With reference to US EPA Method 3050B followed by analysis using ICP-MS.

| Test Item | | Result (ppm) | Reporting Limit (ppm) |
|---|---|---|---|
| | | 1 | |
| Beryllium | (Be) | ND | 20 |

Sample Description:

1. Standard TI Wafer C-4708939-01-D6 / 90TFF021SEC5

Note: 1. ppm = parts per million
2. mg/kg = ppm
3. 1% = 10000 ppm (mg/kg)
4. ND = Not Detected, reported when the reading is less than the reporting limit value.

Decision Rule: When statement of conformity is made, unless the decision rule was mentioned in above specified test items, the decision rule would be based on the non-binary statement with guard band (is equal to the expanded measurement uncertainty with a 95% coverage probability, w = U95) in ILAC-G8:09/2019 Clause 4.2.3.

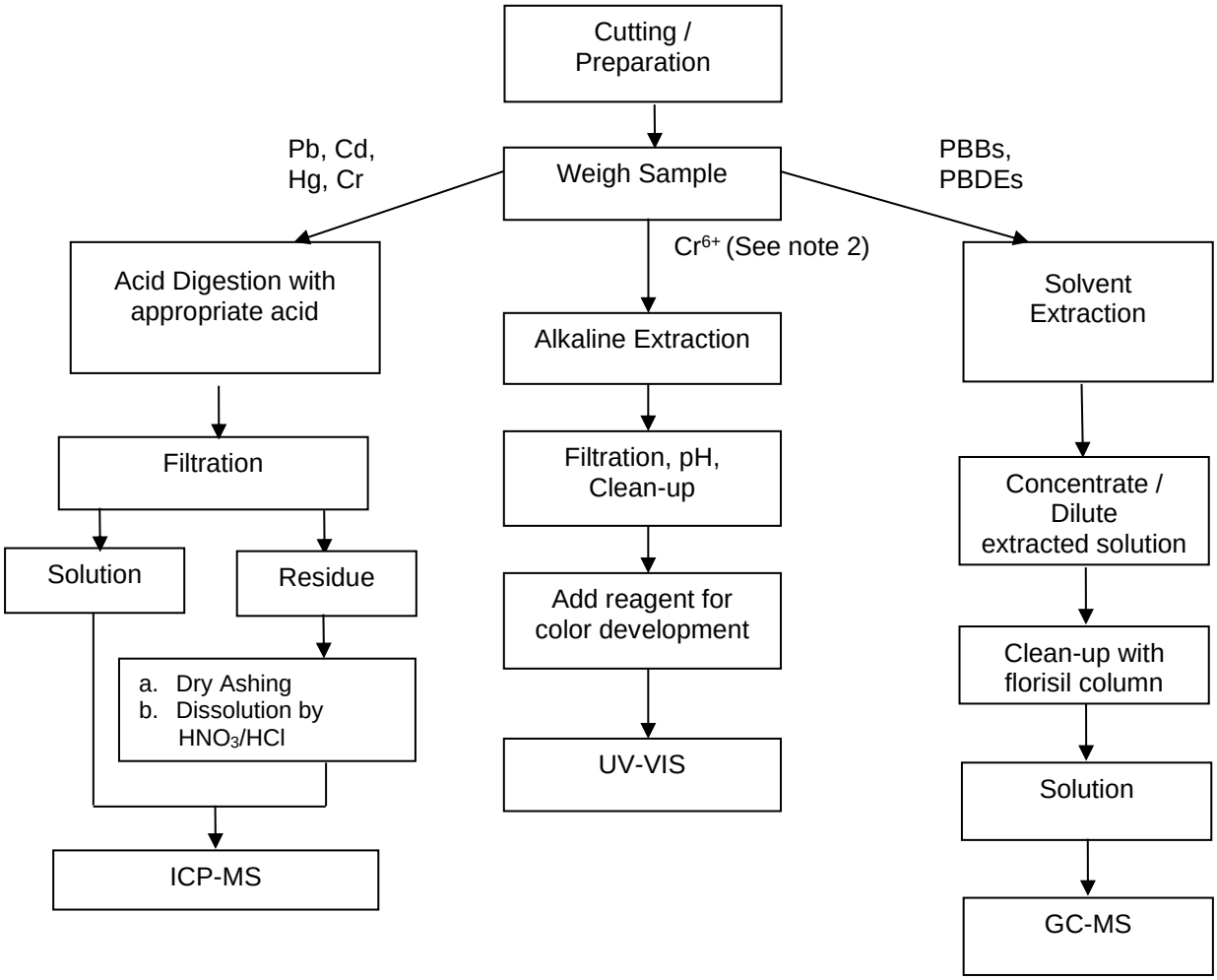
**"Pass** - the measured value is within (or below / above) the acceptance limit, where the acceptance limit is below / above to the guard band." or "Pass - The measured values were observed in tolerance at the points tested. The specific false accept risk is up to 2.5%."

**"Fail** - the measured value is out of (or below / above) the tolerance limit added / subtracted to the guard band." or "Fail - One or more measured values were observed out of tolerance at the points tested." The specific false reject risk is up to 2.5%."

**"Guarded Pass** if the result is within the uncertainty passing band close to the specification."

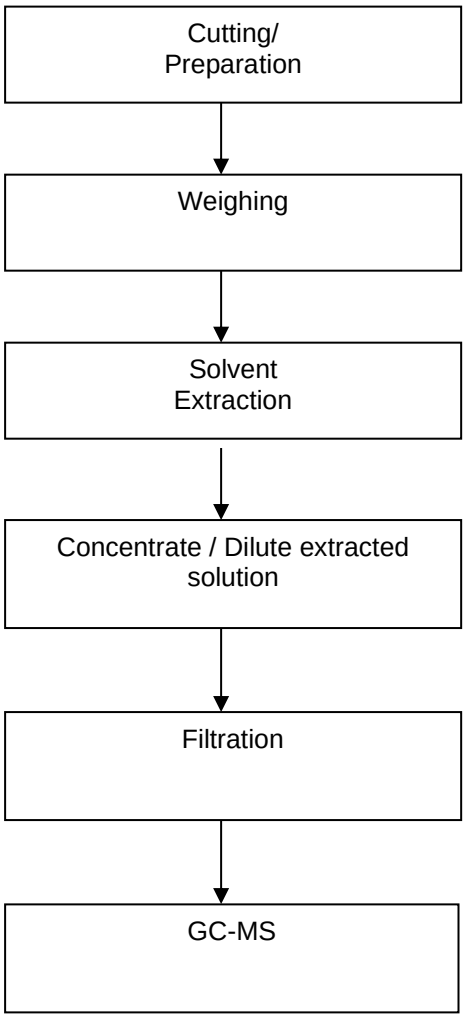
**"Guarded Fail** if the result is within the uncertainty failing band close to the specification."

**Flowchart for RoHS:**

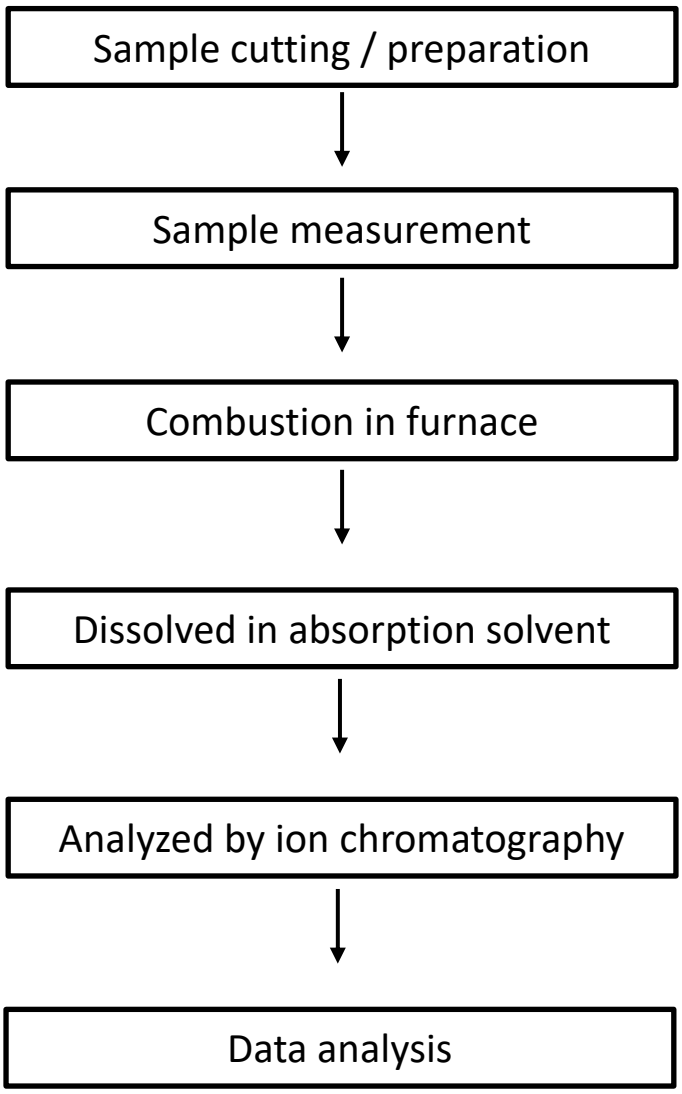



Note : 1. The Cr, Cd, Pb and Hg contents test on polymeric samples were dissolved totally by pre-conditioning method according to above flow chart.
2. $Cr^{6+}$ is performed only when total Cr is detected

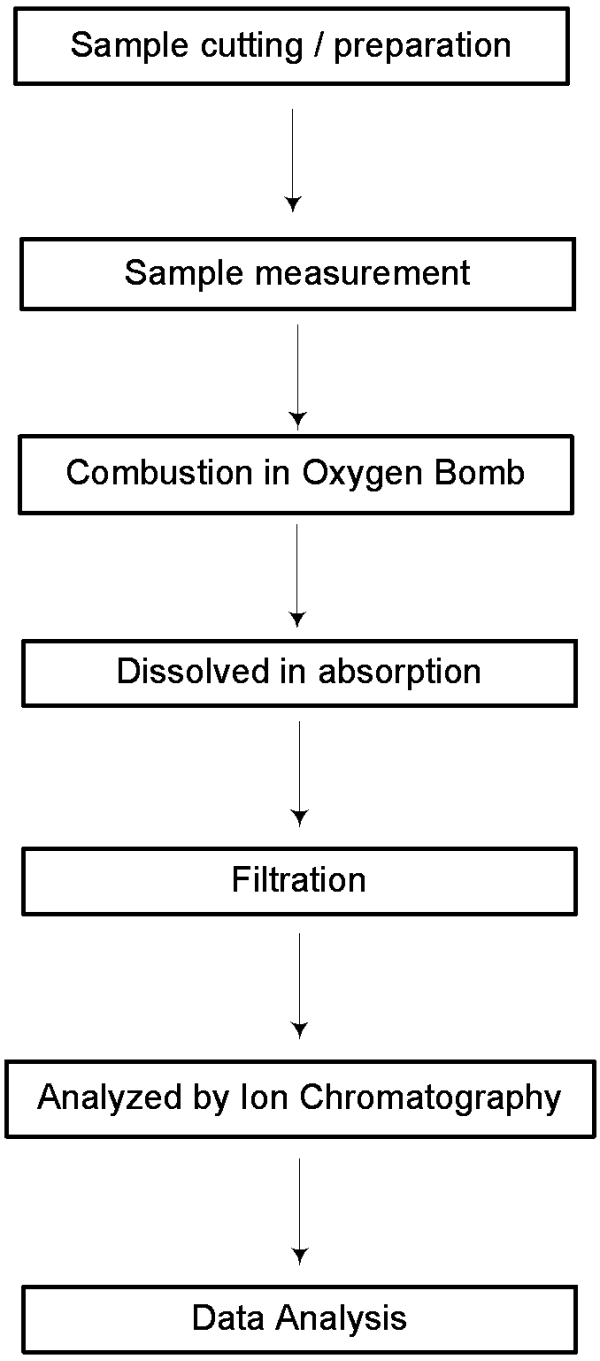
**Flowchart for Phthalates:**



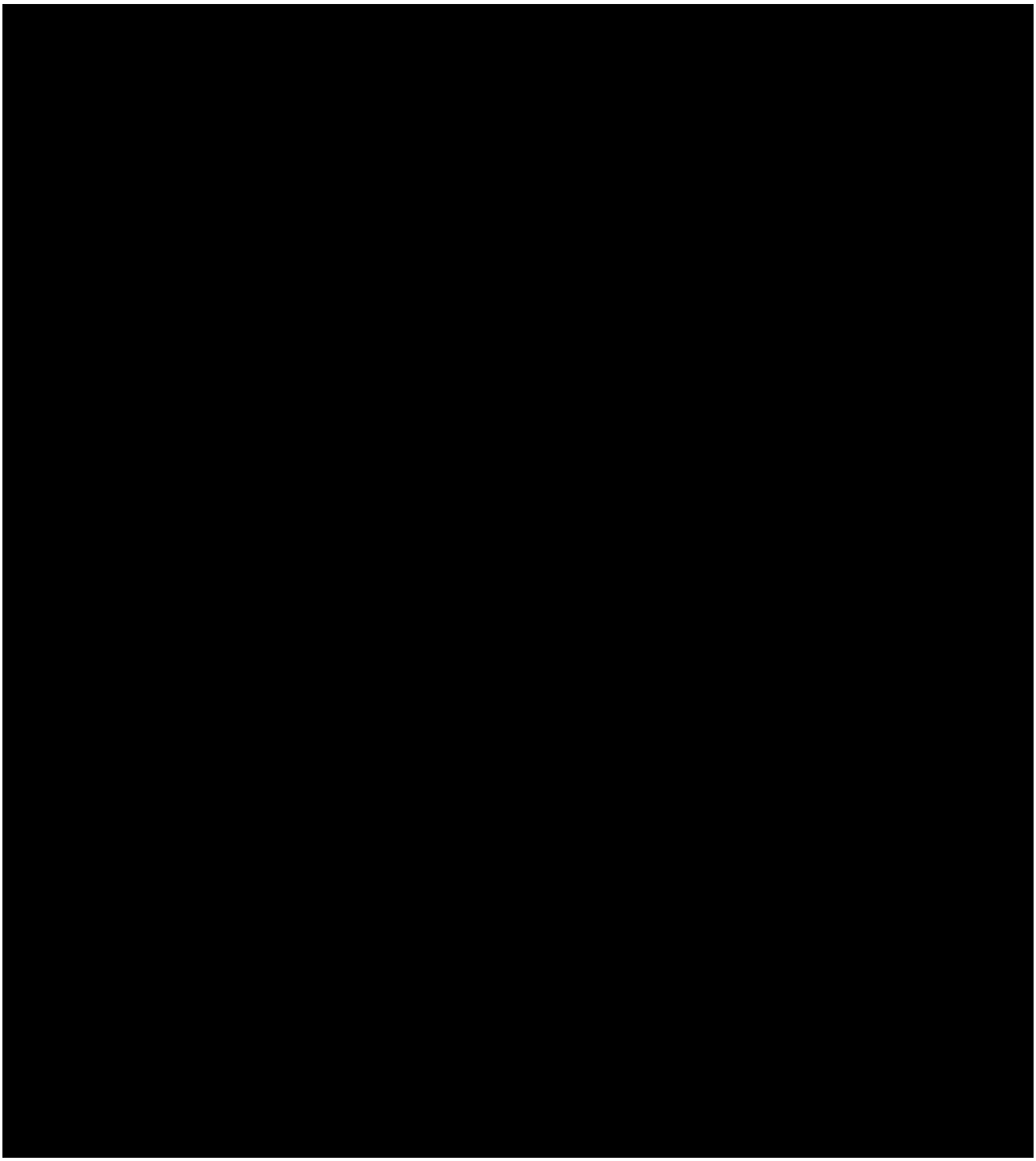
**Flow Chart of Halogen Test by Combustion Ion Chromatography:**



**Halogen Testing Flow Chart (EN 14582):**



**Sample Photo(s):**



*** End of Report ***

TI Report Number : 90996927

Component : Lead Frame Plating

Analysis Type : RoHS 10 & Halogens

Analysis Date : 04/16/2025

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# Test Report

[redacted]

**Report No.** [redacted]

**Company Name shown on Report** [redacted]

**Address**

**The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant**

| | |
|---|---|
| Sample Name | Ni plating |
| Sample Received Date | Apr. 7, 2025 |
| Testing Period | Apr. 7, 2025 to Apr. 16, 2025 |

**Test Requested** As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I), Organotin compounds, Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances, Phthalates, Antimony(Sb), Arsenic(As), Beryllium(Be), Hexabromocyclododecane (HBCDD), Polychlorinated Biphenyls(PCBs), Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polyvinyl Chloride (PVC), Short Chain Chlorinated Paraffins (SCCPs), Red phosphorus in the submitted sample(s).

**Test Method** Please refer to the following page(s).

**Test Result(s)** Please refer to the following page(s).

[redacted]

# Test Report

**Report No.** [redacted]



**Test Method**

| Test Item(s) | Test Method | Measured Equipment(s) |
|---|---|---|
| Lead (Pb) | Refer to IEC 62321-5:2013 | ICP-OES |
| Cadmium (Cd) | Refer to IEC 62321-5:2013 | ICP-OES |
| Mercury (Hg) | Refer to IEC 62321-4:2013+AMD1:2017 CSV | ICP-OES |
| Hexavalent Chromium (Cr(VI)) | IEC 62321-7-1:2015 | UV-Vis |
| Polybrominated Biphenyls (PBBs) | IEC 62321-6:2015 | GC-MS |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015 | GC-MS |
| Phthalates (DBP, BBP, DEHP, DIBP) | IEC 62321-8:2017 | GC-MS |
| Fluorine (F) | EN 14582:2016 | IC |
| Chlorine (Cl) | EN 14582:2016 | IC |
| Bromine (Br) | EN 14582:2016 | IC |
| Iodine (I) | EN 14582:2016 | IC |
| Organotin compounds | Refer to US EPA 3550C:2007 & ISO 17353:2004 | GC-MS |
| Perfluorooctanoic acid (PFOA) and its salts | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Perfluorooctanesulfonic acid (PFOS) and its salts & related substances | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Phthalates | IEC 62321-8:2017 | GC-MS |
| Short Chain Chlorinated Paraffins (SCCPs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS(NCI) |
| Polychlorinated Naphthalenes (PCNs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Biphenyls(PCBs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Terphenyls (PCTs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polyvinyl Chloride (PVC) | Refer to JY/T 001-1996 | FTIR |
| Hexabromocyclododecane (HBCDD) | IEC 62321-9:2021 | GC-MS |
| Beryllium(Be) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Arsenic(As) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Antimony(Sb) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Red phosphorus | GB/T 6040 2019, GB/T 9722 2023, GB/T 17359 2023, EPA 6010D:2018 | ICP OES, PY GC MS, FTIR, EM |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| Lead (Pb) | N.D. | 2 mg/kg |
| Cadmium (Cd) | N.D. | 2 mg/kg |
| Mercury (Hg) | N.D. | 2 mg/kg |
| Hexavalent Chromium (Cr(VI)) | N.D. ▼ | 0.10 μg/cm² (LOQ) |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| **Polybrominated Biphenyls (PBBs)** | | |
| Monobromobiphenyl | N.D. | 5 mg/kg |
| Dibromobiphenyl | N.D. | 5 mg/kg |
| Tribromobiphenyl | N.D. | 5 mg/kg |
| Tetrabromobiphenyl | N.D. | 5 mg/kg |
| Pentabromobiphenyl | N.D. | 5 mg/kg |
| Hexabromobiphenyl | N.D. | 5 mg/kg |
| Heptabromobiphenyl | N.D. | 5 mg/kg |
| Octabromobiphenyl | N.D. | 5 mg/kg |
| Nonabromobiphenyl | N.D. | 5 mg/kg |
| Decabromobiphenyl | N.D. | 5 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| **Polybrominated Diphenyl Ethers (PBDEs)** | | |
| Monobromodiphenyl ether | N.D. | 5 mg/kg |
| Dibromodiphenyl ether | N.D. | 5 mg/kg |
| Tribromodiphenyl ether | N.D. | 5 mg/kg |
| Tetrabromodiphenyl ether | N.D. | 5 mg/kg |
| Pentabromodiphenyl ether | N.D. | 5 mg/kg |
| Hexabromodiphenyl ether | N.D. | 5 mg/kg |
| Heptabromodiphenyl ether | N.D. | 5 mg/kg |
| Octabromodiphenyl ether | N.D. | 5 mg/kg |
| Nonabromodiphenyl ether | N.D. | 5 mg/kg |
| Decabromodiphenyl ether | N.D. | 5 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| **Phthalates (DBP, BBP, DEHP, DIBP)** | | |
| Butyl benzyl phthalate (BBP)<br>CAS#:85-68-7 | N.D. | 50 mg/kg |
| Di-(2-ethylhexyl) phthalate (DEHP)<br>CAS#:117-81-7 | N.D. | 50 mg/kg |
| Dibutyl phthalate (DBP)<br>CAS#:84-74-2 | N.D. | 50 mg/kg |
| Diisobutyl phthalate (DIBP)<br>CAS#:84-69-5 | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Fluorine (F) | N.D. | 50 mg/kg |
| Chlorine (Cl) | N.D. | 50 mg/kg |
| Bromine (Br) | N.D. | 50 mg/kg |
| Iodine (I) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| **Organotin compounds** | | |
| Dibutyltin (DBT) | N.D. | 5 mg/kg |
| Dioctyltin (DOT) | N.D. | 5 mg/kg |
| Tributyltin (TBT) | N.D. | 5 mg/kg |
| Triphenyltin (TPhT) | N.D. | 5 mg/kg |
| Tributyltin oxide (TBTO) *1 | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Red phosphorus #1 | N.D. | 500 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| **Phthalates** | | |
| Bis(2-methoxyethyl) phthalate (DMEP)<br>CAS#:117-82-8 | N.D. | 50 mg/kg |
| Di-n-hexyl phthalate (DNHP/DHEXP)<br>CAS#:84-75-3 | N.D. | 50 mg/kg |
| Di-iso-decyl phthalate (DIDP)<br>CAS#:26761-40-0,68515-49-1 | N.D. | 50 mg/kg |
| Di-isononyl phthalate (DINP)<br>CAS#:28553-12-0,68515-48-0 | N.D. | 50 mg/kg |
| Di-n-octyl phthalate (DNOP)<br>CAS#:117-84-0 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)<br>CAS#:71888-89-6 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-(C7-11)-branched and linear alkyl esters (DHNUP)<br>CAS#:68515-42-4 | N.D. | 50 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| Antimony (Sb) | N.D. | 2 mg/kg |
| Beryllium (Be) | N.D. | 2 mg/kg |
| Arsenic (As) | N.D. | 2 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 002 | |
| **Polychlorinated Biphenyls(PCBs)** | | |
| Monochlorobiphenyl | N.D. | 5 mg/kg |
| Dichlorobiphenyl | N.D. | 5 mg/kg |
| Trichlorobiphenyl | N.D. | 5 mg/kg |
| Tetrachlorobiphenyl | N.D. | 5 mg/kg |
| Pentachlorobiphenyl | N.D. | 5 mg/kg |
| Hexachlorobiphenyl | N.D. | 5 mg/kg |
| Heptachlorobiphenyl | N.D. | 5 mg/kg |
| Octachlorobiphenyl | N.D. | 5 mg/kg |
| Nonachlorobiphenyl | N.D. | 5 mg/kg |
| Decachlorobiphenyl | N.D. | 5 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| **Tested Item(s)** | **Result** | **MDL** |
|---|---|---|
| | 002 | |
| Short Chain Chlorinated Paraffins (SCCPs) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Polyvinyl Chloride (PVC) | Negative | / |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Polychlorinated Triphenyls (PCTs) | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Hexabromocyclododecane (HBCDD) | N.D. | 20 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 002 | |
| Polychlorinated Naphthalenes (PCNs) | N.D. | 5 mg/kg |

| **Tested Item(s)** | **CAS No.** | **Result** | **MDL** |
|---|---|---|---|
| | | 002 | |
| **Perfluorooctanoic acid (PFOA) and its salts** | | | |
| Perfluorooctanoic acid (PFOA) | 335-67-1 | N.D. | 0.01 mg/kg |
| Ammonium pentadecafluorooctanoate (APFO)* | 3825-26-1 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctanoate (PFOA-Na)* | 335-95-5 | N.D. | 0.01 mg/kg |
| Potassium perfluorooctanoate (PFOA-K)* | 2395-00-8 | N.D. | 0.01 mg/kg |
| Silver perfluorooctanoate (PFOA-Ag)* | 335-93-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanoyl fluoride (PFOA-F)* | 335-66-0 | N.D. | 0.01 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | CAS No. | Result | MDL |
|---|---|---|---|
| | | 002 | |
| **Perfluorooctanesulfonic acid (PFOS) and its salts & related substances** | | | |
| Perfluorooctane Sulfonates (PFOS) | 1763-23-1 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, potassium salt (PFOS-K)* | 2795-39-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)* | 29457-72-5 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctane sulfonate (PFOS-Na)* | 4021-47-0 | N.D. | 0.01 mg/kg |
| 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, magnesium salt (2:1) (PFOS-Mg)* | 91036-71-4 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, ammonium salt ($PFOS\text{-}NH_4$)* | 29081-56-9 | N.D. | 0.01 mg/kg |
| Perfluorooctane sulfonate diethanolamine salt ($PFOS\text{-}NH(OH)_2$)* | 70225-14-8 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, tetraethylammonium salt ($PFOS\text{-}N(C_2H_5)_4$)* | 56773-42-3 | N.D. | 0.01 mg/kg |
| Didecyl dimethyl ammonium perfluorooctane sulfonate (PFOS-DDA)* | 251099-16-8 | N.D. | 0.01 mg/kg |
| Perfluoro-1-octanesulfonyl fluoride (PFOSF)* | 307-35-7 | N.D. | 0.01 mg/kg |
| Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate* | 71463-74-6 | N.D. | 0.01 mg/kg |
| N-Ethylperfluoro-1-octanesulfonamide (N-Et-FOSA) | 4151-50-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8 -Methylperfluoro-1-octanesulfonamide (N-Me-FOSA) | 31506-32-8 | N.D. | 0.05 mg/kg |
| 2-(N-Ethylperfluoro-1-octanesulfonamido)-ethanol (N-Et-FOSE) | 1691-99-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8- 2-(N-Methylperfluoro-1-octanesulfonamido)-ethanol (N-Me-FOSE) | 24448-09-7 | N.D. | 0.05 mg/kg |
| Perfluorooctanesulfonamide (PFOSA) | 754-91-6 | N.D. | 0.01 mg/kg |

CTI CENTRE TESTING INTERNATIONAL

# Test Report

**Report No.** [redacted]



**Sample/Part Description**

| No. | CTI Sample ID | Description |
|---|---|---|
| 1 | 002 | Silvery plating |

**Remark:** **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury, Antimony, Beryllium, Arsenic.**

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL or LOQ)

-mg/kg = ppm = parts per million

-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 μg/cm²

-▾The sample is negative for Cr(VI) − The Cr(VI) concentration is below 0.10 μg/cm². The coating is considered a non-Cr(VI) based coating. 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.

-Negative = Not contained Polyvinyl Chloride(PVC)

-*=Result(s) shown of the substance(s) is/ are converted from the result(s) of certain compound(s).

-*[1]=Concentration value of Tributyltin oxide by the conversion from the test results of Tributyl Tins.

-The test result(s) of sample is(are) presented in reference to the result(s) that reported in No. [redacted]

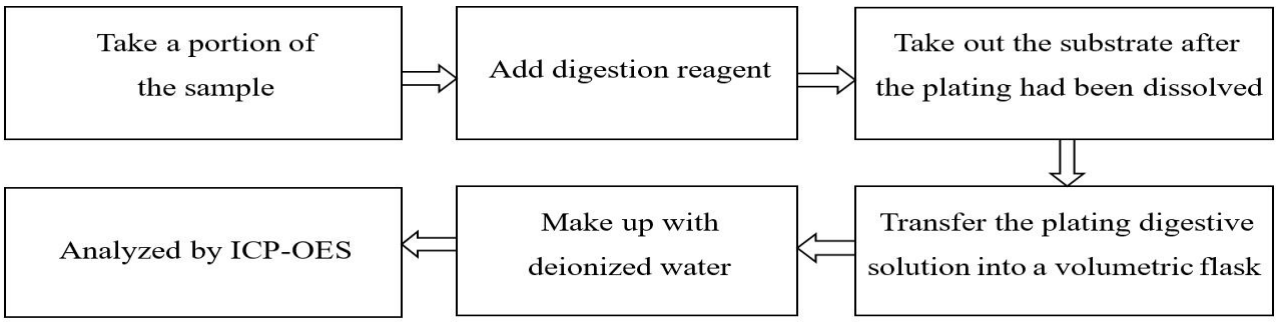
**Note:** **" #1 " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.**

# Test Report

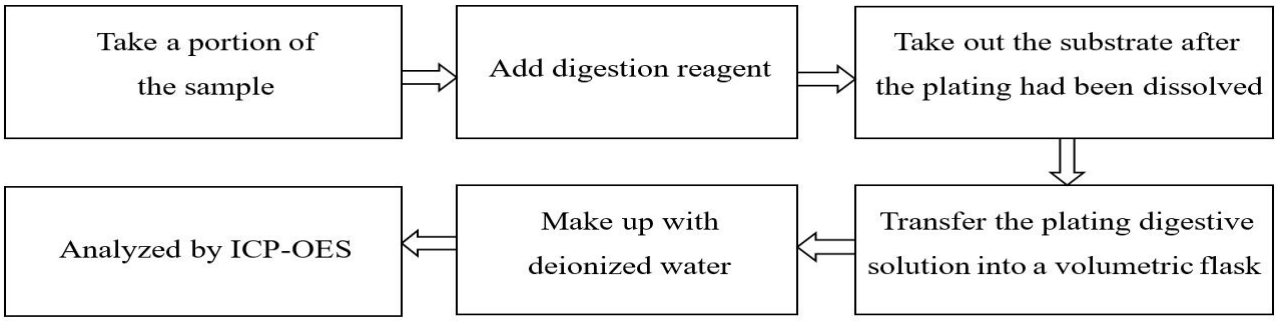


**Test Process**

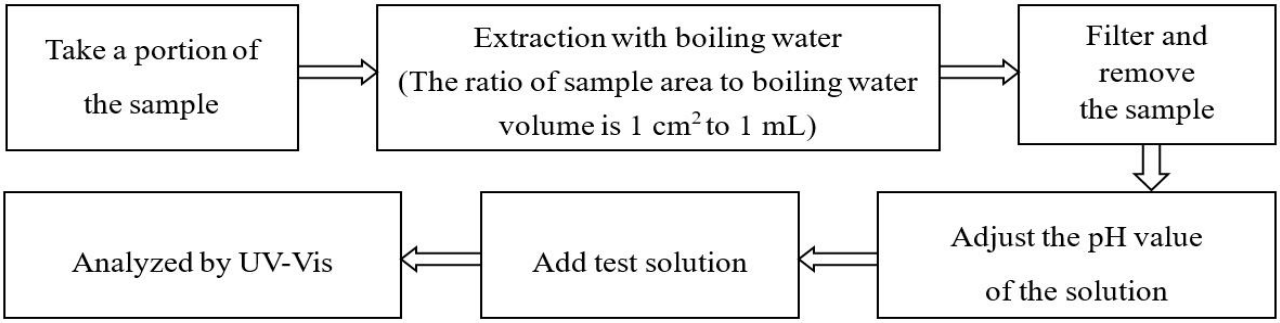
**1. Lead (Pb), Cadmium (Cd)**



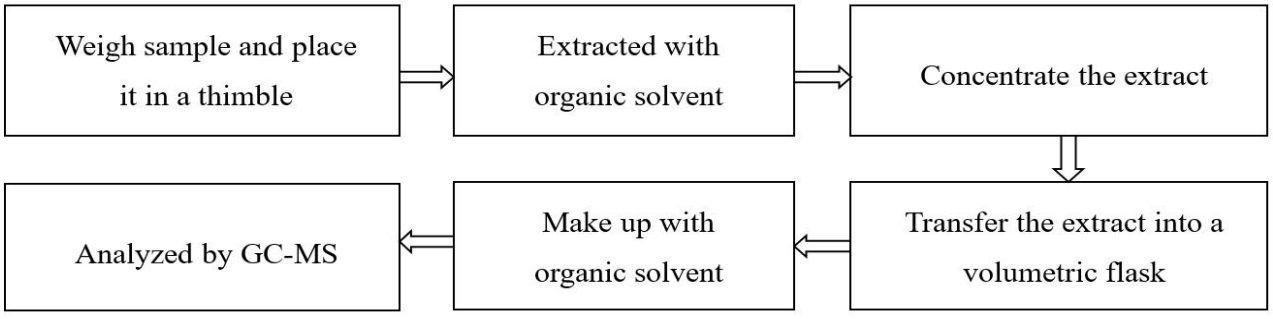

**2. Mercury (Hg)**




**3. Hexavalent Chromium (Cr(VI))**



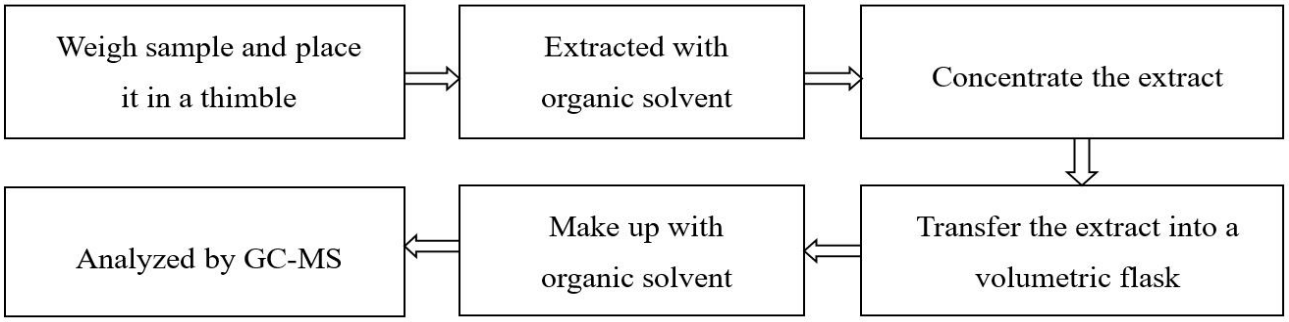

**4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)**



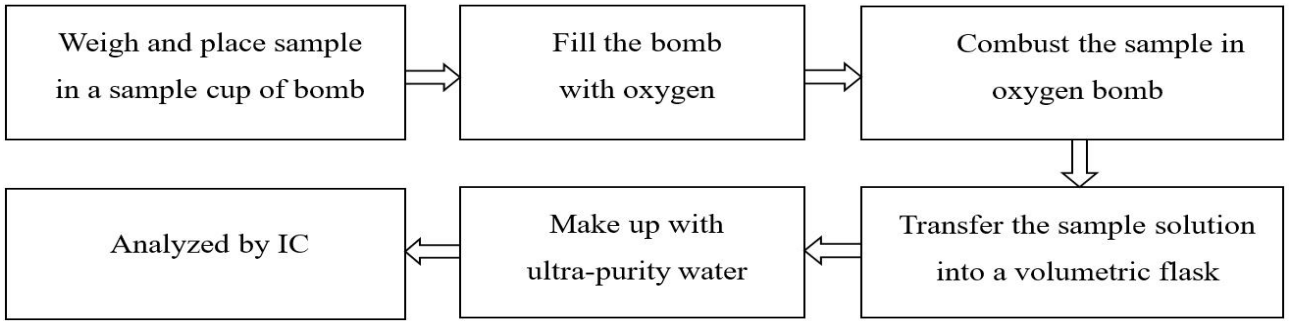
# Test Report



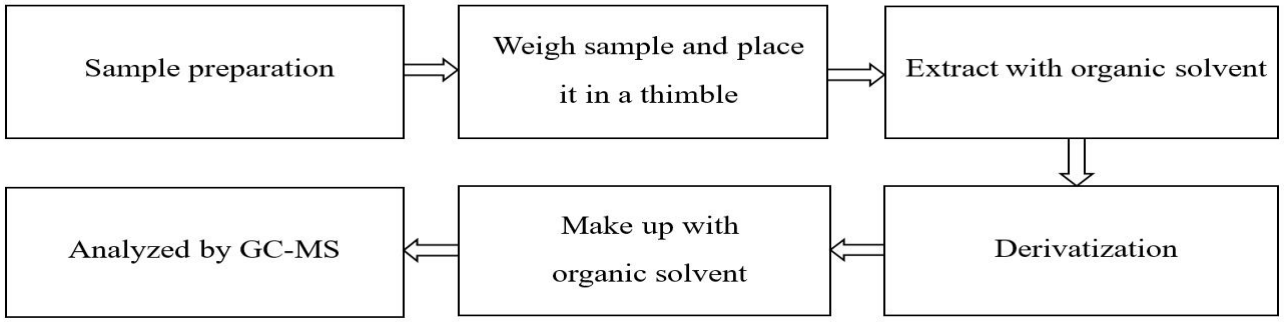
**5. Phthalates (DBP, BBP, DEHP, DIBP), Phthalates**



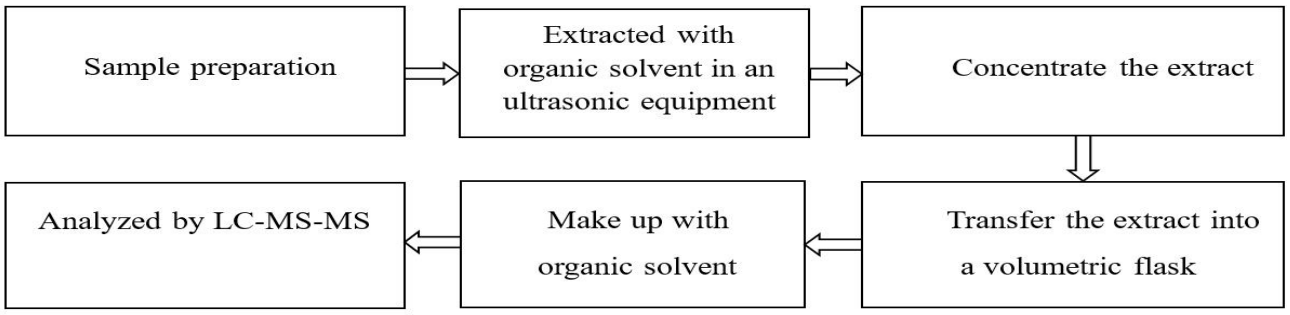

**6. Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I)**



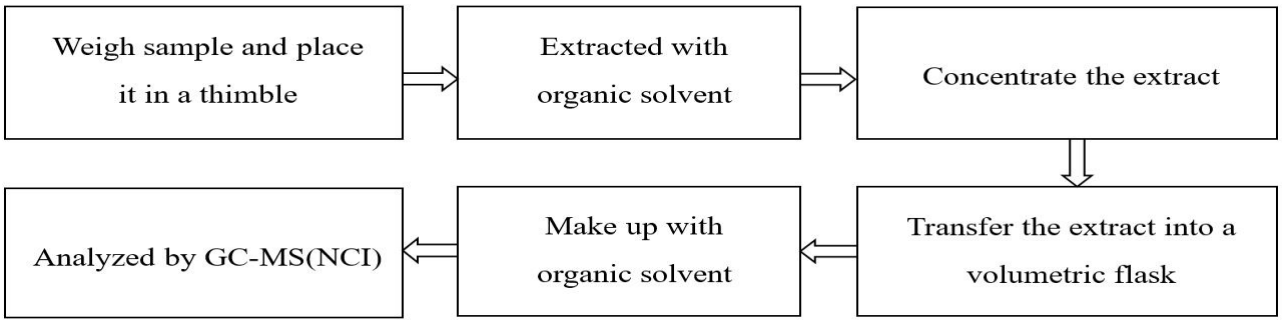

**7. Organotin compounds**



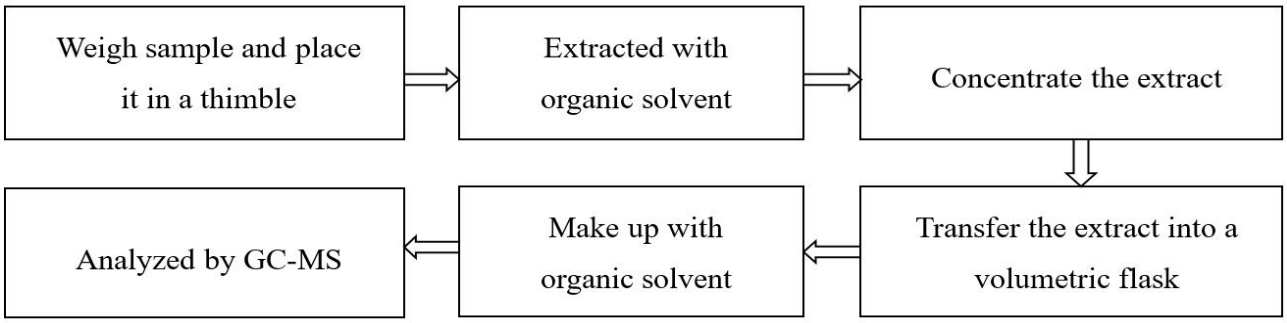

**8. Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances**



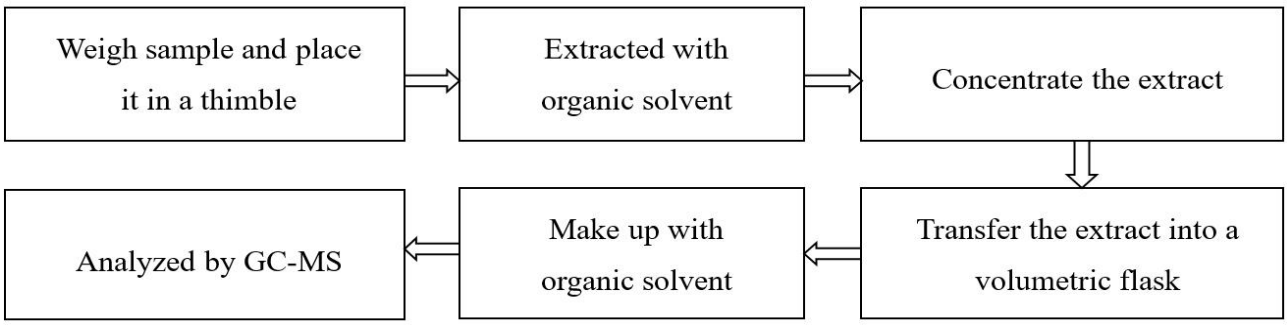
**9. Short Chain Chlorinated Paraffins (SCCPs)**



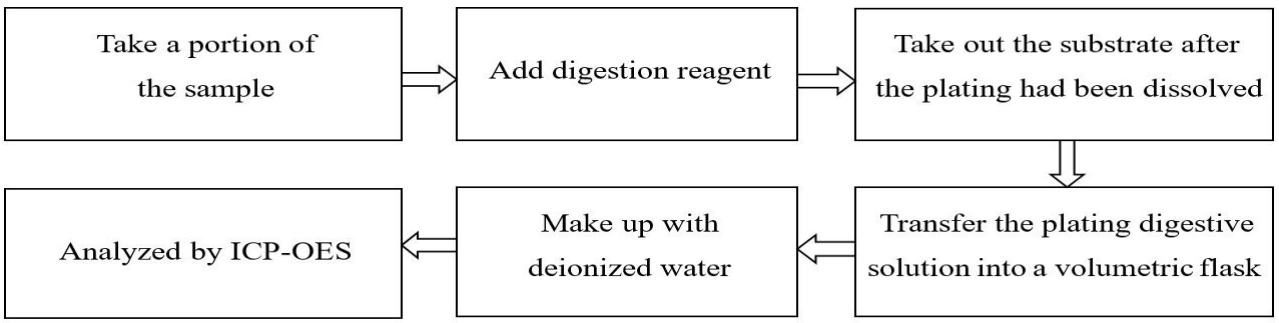

**10. Hexabromocyclododecane (HBCDD)**



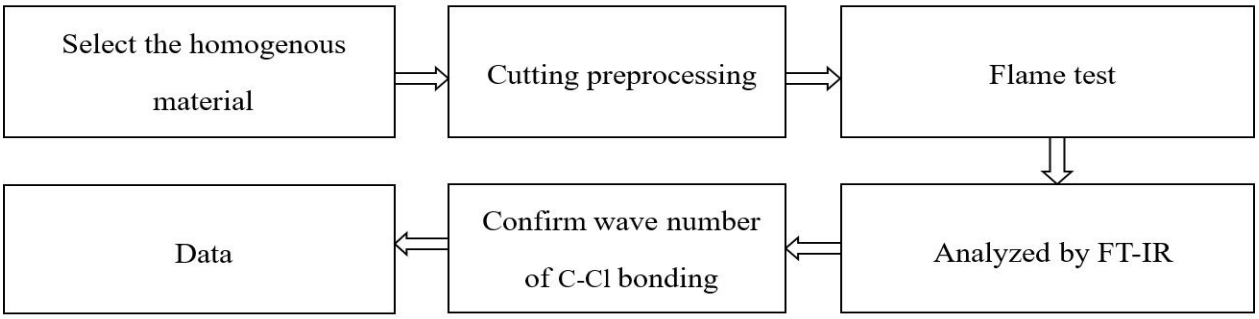

**11. Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polychlorinated Biphenyls(PCBs)**



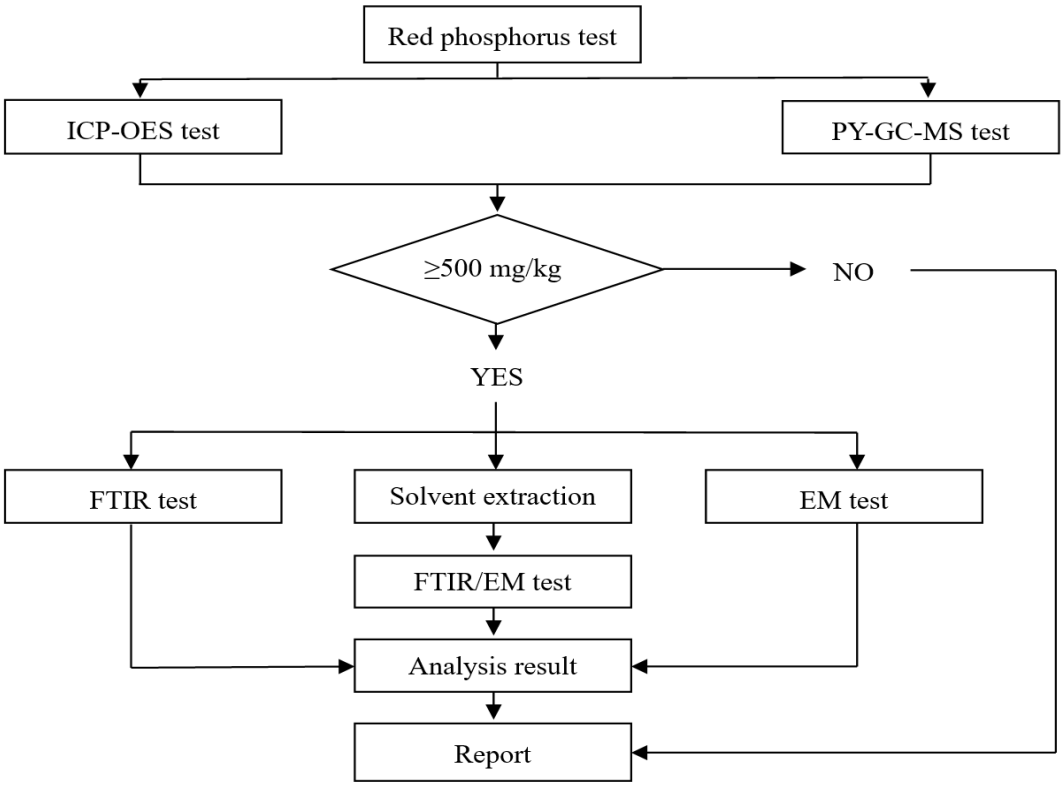

**12. Antimony(Sb), Beryllium(Be), Arsenic(As)**



**13. Polyvinyl Chloride (PVC)**




**14. Red phosphorus**



# Test Report



[redacted]

Statement:

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Without written approval of CTI, this report can't be reproduced except in full;
5. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

*** End of report ***

TI Report Number : 90996925

Component : Lead Frame Plating

Analysis Type : RoHS 10 & Halogens

Analysis Date : 04/16/2025

CTI CENTRE TESTING INTERNATIONAL

# Test Report



**Report No.** A225021114810100101

| | |
|---|---|
| **Company Name shown on Report** | MITSUI HIGH-TEC (SHANGHAI) CO., LTD. |
| **Address** | NO. 2001 XINJIN QIAO ROAD EXPORT PROCESSING ZONE PUDONG SHANGHAI |

**The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant**

| | |
|---|---|
| Sample Name | Au plating |
| Sample Received Date | Apr. 7, 2025 |
| Testing Period | Apr. 7, 2025 to Apr. 16, 2025 |

| | |
|---|---|
| **Test Requested** | As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I), Organotin compounds, Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances, Phthalates, Antimony(Sb), Arsenic(As), Beryllium(Be), Hexabromocyclododecane (HBCDD), Polychlorinated Biphenyls(PCBs), Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polyvinyl Chloride (PVC), Short Chain Chlorinated Paraffins (SCCPs), Red phosphorus in the submitted sample(s). |
| **Test Method** | Please refer to the following page(s). |
| **Test Result(s)** | Please refer to the following page(s). |

Approved by

George Fong

George Fong
Laboratory Manager

Date Apr. 16, 2025

No. R175251373

# Test Report



**Test Method**

| Test Item(s) | Test Method | Measured Equipment(s) |
|---|---|---|
| Lead (Pb) | Refer to IEC 62321-5:2013 | ICP-OES |
| Cadmium (Cd) | Refer to IEC 62321-5:2013 | ICP-OES |
| Mercury (Hg) | Refer to IEC 62321-4:2013+AMD1:2017 CSV | ICP-OES |
| Hexavalent Chromium (Cr(VI)) | IEC 62321-7-1:2015 | UV-Vis |
| Polybrominated Biphenyls (PBBs) | IEC 62321-6:2015 | GC-MS |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015 | GC-MS |
| Phthalates (DBP, BBP, DEHP, DIBP) | IEC 62321-8:2017 | GC-MS |
| Fluorine (F) | EN 14582:2016 | IC |
| Chlorine (Cl) | EN 14582:2016 | IC |
| Bromine (Br) | EN 14582:2016 | IC |
| Iodine (I) | EN 14582:2016 | IC |
| Organotin compounds | Refer to US EPA 3550C:2007 & ISO 17353:2004 | GC-MS |
| Perfluorooctanoic acid (PFOA) and its salts | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Perfluorooctanesulfonic acid (PFOS) and its salts & related substances | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Phthalates | IEC 62321-8:2017 | GC-MS |
| Short Chain Chlorinated Paraffins (SCCPs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS(NCI) |
| Polychlorinated Naphthalenes (PCNs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Biphenyls(PCBs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Terphenyls (PCTs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polyvinyl Chloride (PVC) | Refer to JY/T 001-1996 | FTIR |
| Hexabromocyclododecane (HBCDD) | IEC 62321-9:2021 | GC-MS |
| Beryllium(Be) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Arsenic(As) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Antimony(Sb) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Red phosphorus | GB/T 6040 2019, GB/T 9722 2023, GB/T 17359 2023, EPA 6010D:2018 | ICP OES, PY GC MS, FTIR, EM |

# Test Report

**Report No.** A22502111481010010101



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 001 | |
| Lead (Pb) | N.D. | 2 mg/kg |
| Cadmium (Cd) | N.D. | 2 mg/kg |
| Mercury (Hg) | N.D. | 2 mg/kg |
| Hexavalent Chromium (Cr(VI)) | N.D. ▼ | 0.10 μg/cm² (LOQ) |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| **Polybrominated Biphenyls (PBBs)** | | |
| Monobromobiphenyl | N.D. | 5 mg/kg |
| Dibromobiphenyl | N.D. | 5 mg/kg |
| Tribromobiphenyl | N.D. | 5 mg/kg |
| Tetrabromobiphenyl | N.D. | 5 mg/kg |
| Pentabromobiphenyl | N.D. | 5 mg/kg |
| Hexabromobiphenyl | N.D. | 5 mg/kg |
| Heptabromobiphenyl | N.D. | 5 mg/kg |
| Octabromobiphenyl | N.D. | 5 mg/kg |
| Nonabromobiphenyl | N.D. | 5 mg/kg |
| Decabromobiphenyl | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| **Polybrominated Diphenyl Ethers (PBDEs)** | | |
| Monobromodiphenyl ether | N.D. | 5 mg/kg |
| Dibromodiphenyl ether | N.D. | 5 mg/kg |
| Tribromodiphenyl ether | N.D. | 5 mg/kg |
| Tetrabromodiphenyl ether | N.D. | 5 mg/kg |
| Pentabromodiphenyl ether | N.D. | 5 mg/kg |
| Hexabromodiphenyl ether | N.D. | 5 mg/kg |
| Heptabromodiphenyl ether | N.D. | 5 mg/kg |
| Octabromodiphenyl ether | N.D. | 5 mg/kg |
| Nonabromodiphenyl ether | N.D. | 5 mg/kg |
| Decabromodiphenyl ether | N.D. | 5 mg/kg |

# Test Report

**Report No.** A22502111481010010101 

**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 001 | |
| **Phthalates (DBP, BBP, DEHP, DIBP)** | | |
| Butyl benzyl phthalate (BBP)<br>CAS#:85-68-7 | N.D. | 50 mg/kg |
| Di-(2-ethylhexyl) phthalate (DEHP)<br>CAS#:117-81-7 | N.D. | 50 mg/kg |
| Dibutyl phthalate (DBP)<br>CAS#:84-74-2 | N.D. | 50 mg/kg |
| Diisobutyl phthalate (DIBP)<br>CAS#:84-69-5 | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Fluorine (F) | N.D. | 50 mg/kg |
| Chlorine (Cl) | N.D. | 50 mg/kg |
| Bromine (Br) | N.D. | 50 mg/kg |
| Iodine (I) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| **Organotin compounds** | | |
| Dibutyltin (DBT) | N.D. | 5 mg/kg |
| Dioctyltin (DOT) | N.D. | 5 mg/kg |
| Tributyltin (TBT) | N.D. | 5 mg/kg |
| Triphenyltin (TPhT) | N.D. | 5 mg/kg |
| Tributyltin oxide (TBTO) *1 | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Red phosphorus **#1** | N.D. | 500 mg/kg |

# Test Report

**Report No.** A22502111481010010101



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 001 | |
| **Phthalates** | | |
| Bis(2-methoxyethyl) phthalate (DMEP)<br>CAS#:117-82-8 | N.D. | 50 mg/kg |
| Di-n-hexyl phthalate (DNHP/DHEXP)<br>CAS#:84-75-3 | N.D. | 50 mg/kg |
| Di-iso-decyl phthalate (DIDP)<br>CAS#:26761-40-0,68515-49-1 | N.D. | 50 mg/kg |
| Di-isononyl phthalate (DINP)<br>CAS#:28553-12-0,68515-48-0 | N.D. | 50 mg/kg |
| Di-n-octyl phthalate (DNOP)<br>CAS#:117-84-0 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)<br>CAS#:71888-89-6 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-(C7-11)-branched and linear alkyl esters (DHNUP)<br>CAS#:68515-42-4 | N.D. | 50 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 001 | |
| Antimony (Sb) | N.D. | 2 mg/kg |
| Beryllium (Be) | N.D. | 2 mg/kg |
| Arsenic (As) | N.D. | 2 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 001 | |
| **Polychlorinated Biphenyls(PCBs)** | | |
| Monochlorobiphenyl | N.D. | 5 mg/kg |
| Dichlorobiphenyl | N.D. | 5 mg/kg |
| Trichlorobiphenyl | N.D. | 5 mg/kg |
| Tetrachlorobiphenyl | N.D. | 5 mg/kg |
| Pentachlorobiphenyl | N.D. | 5 mg/kg |
| Hexachlorobiphenyl | N.D. | 5 mg/kg |
| Heptachlorobiphenyl | N.D. | 5 mg/kg |
| Octachlorobiphenyl | N.D. | 5 mg/kg |
| Nonachlorobiphenyl | N.D. | 5 mg/kg |
| Decachlorobiphenyl | N.D. | 5 mg/kg |

# Test Report

**Report No.** A22502111481010010101 

**Test Result(s)**

| **Tested Item(s)** | **Result** | **MDL** |
|---|---|---|
| | 001 | |
| Short Chain Chlorinated Paraffins (SCCPs) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Polyvinyl Chloride (PVC) | Negative | / |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Polychlorinated Triphenyls (PCTs) | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Hexabromocyclododecane (HBCDD) | N.D. | 20 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 001 | |
| Polychlorinated Naphthalenes (PCNs) | N.D. | 5 mg/kg |

| **Tested Item(s)** | **CAS No.** | **Result** | **MDL** |
|---|---|---|---|
| | | 001 | |
| **Perfluorooctanoic acid (PFOA) and its salts** | | | |
| Perfluorooctanoic acid (PFOA) | 335-67-1 | N.D. | 0.01 mg/kg |
| Ammonium pentadecafluorooctanoate (APFO)* | 3825-26-1 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctanoate (PFOA-Na)* | 335-95-5 | N.D. | 0.01 mg/kg |
| Potassium perfluorooctanoate (PFOA-K)* | 2395-00-8 | N.D. | 0.01 mg/kg |
| Silver perfluorooctanoate (PFOA-Ag)* | 335-93-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanoyl fluoride (PFOA-F)* | 335-66-0 | N.D. | 0.01 mg/kg |

# Test Report

**Report No.** A22502111481010010101 

**Test Result(s)**

| Tested Item(s) | CAS No. | Result | MDL |
|---|---|---|---|
| | | 001 | |
| **Perfluorooctanesulfonic acid (PFOS) and its salts & related substances** | | | |
| Perfluorooctane Sulfonates (PFOS) | 1763-23-1 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, potassium salt (PFOS-K)* | 2795-39-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)* | 29457-72-5 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctane sulfonate (PFOS-Na)* | 4021-47-0 | N.D. | 0.01 mg/kg |
| 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, magnesium salt (2:1) (PFOS-Mg)* | 91036-71-4 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, ammonium salt ($PFOS\text{-}NH_4$)* | 29081-56-9 | N.D. | 0.01 mg/kg |
| Perfluorooctane sulfonate diethanolamine salt ($PFOS\text{-}NH(OH)_2$)* | 70225-14-8 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, tetraethylammonium salt ($PFOS\text{-}N(C_2H_5)_4$)* | 56773-42-3 | N.D. | 0.01 mg/kg |
| Didecyl dimethyl ammonium perfluorooctane sulfonate (PFOS-DDA)* | 251099-16-8 | N.D. | 0.01 mg/kg |
| Perfluoro-1-octanesulfonyl fluoride (PFOSF)* | 307-35-7 | N.D. | 0.01 mg/kg |
| Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate* | 71463-74-6 | N.D. | 0.01 mg/kg |
| N-Ethylperfluoro-1-octanesulfonamide (N-Et-FOSA) | 4151-50-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8 -Methylperfluoro-1-octanesulfonamide (N-Me-FOSA) | 31506-32-8 | N.D. | 0.05 mg/kg |
| 2-(N-Ethylperfluoro-1-octanesulfonamido)-ethanol (N-Et-FOSE) | 1691-99-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8- 2-(N-Methylperfluoro-1-octanesulfonamido)-ethanol (N-Me-FOSE) | 24448-09-7 | N.D. | 0.05 mg/kg |
| Perfluorooctanesulfonamide (PFOSA) | 754-91-6 | N.D. | 0.01 mg/kg |

# Test Report

**Report No.** A225021114810100101 

**Sample/Part Description**

| No. | CTI Sample ID | Description |
|---|---|---|
| 1 | 001 | Golden plating |

**Remark:** **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury, Antimony, Beryllium, Arsenic.**

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL or LOQ)

-mg/kg = ppm = parts per million

-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 μg/cm²

-▾The sample is negative for Cr(VI) − The Cr(VI) concentration is below 0.10 μg/cm². The coating is considered a non-Cr(VI) based coating. 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.

-Negative = Not contained Polyvinyl Chloride(PVC)

-*=Result(s) shown of the substance(s) is/ are converted from the result(s) of certain compound(s).

-*[1]=Concentration value of Tributyltin oxide by the conversion from the test results of Tributyl Tins.

-The test result(s) of sample is(are) presented in reference to the result(s) that reported in No. A2250211148101001.

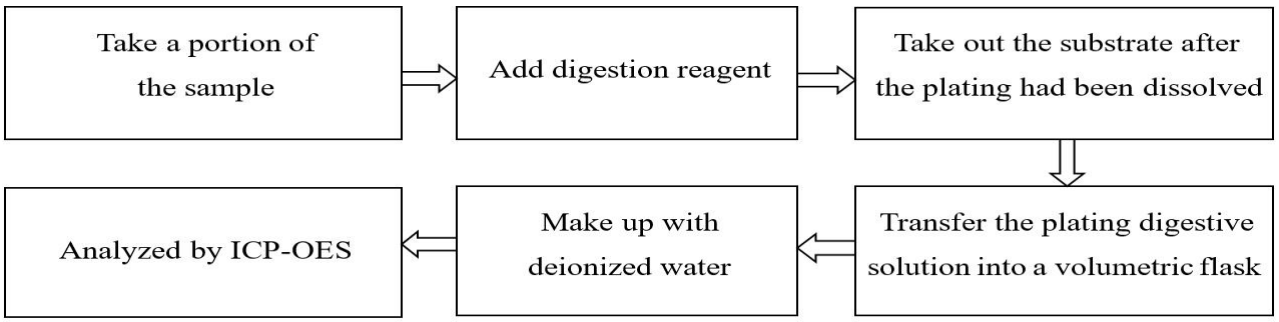
**Note:** **" #1 " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.**

# Test Report

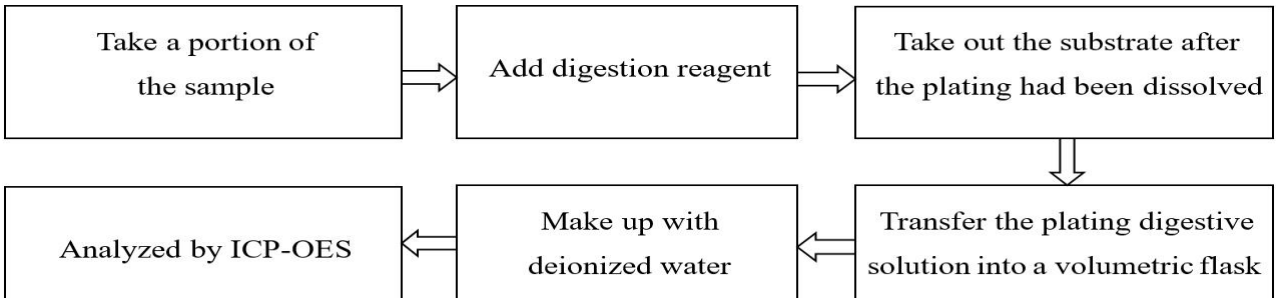


**Test Process**

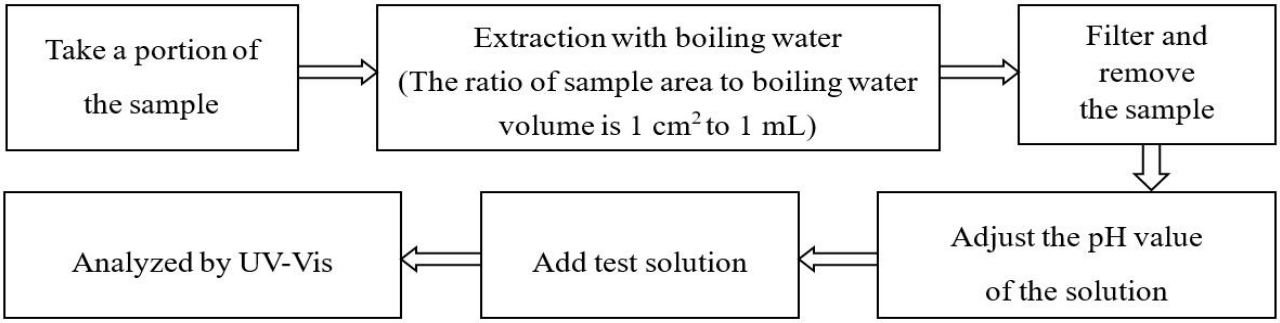
1. **Lead (Pb), Cadmium (Cd)**



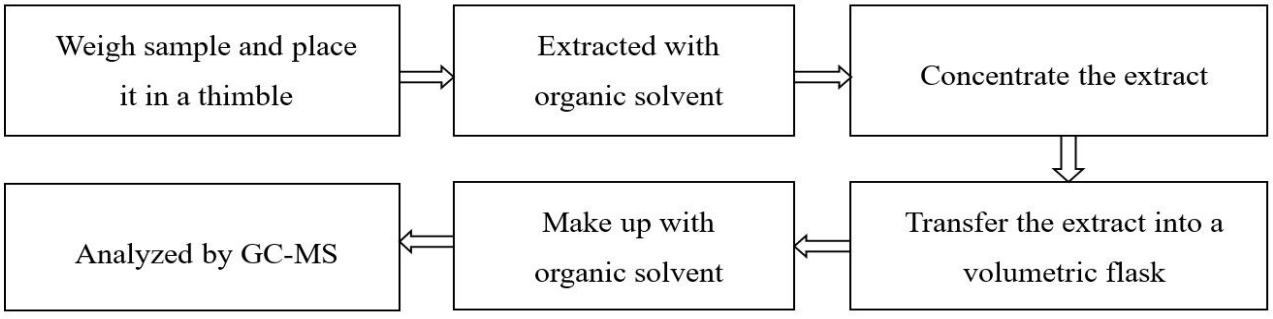

2. **Mercury (Hg)**



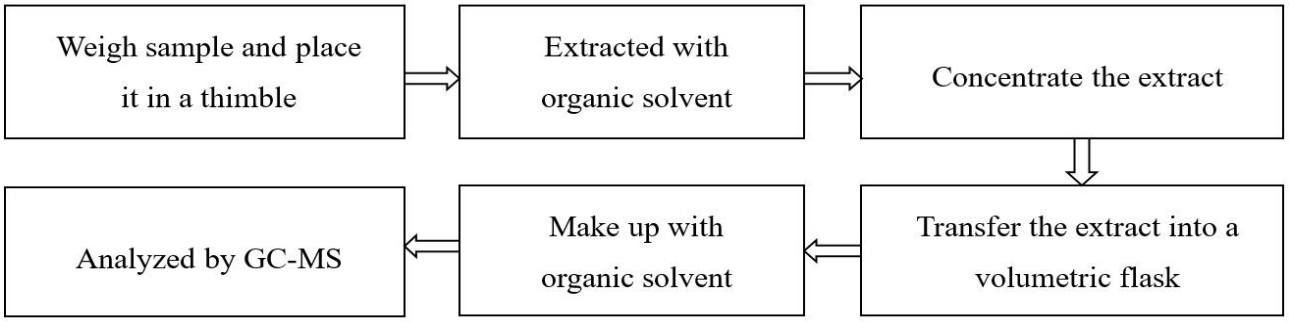

3. **Hexavalent Chromium (Cr(VI))**



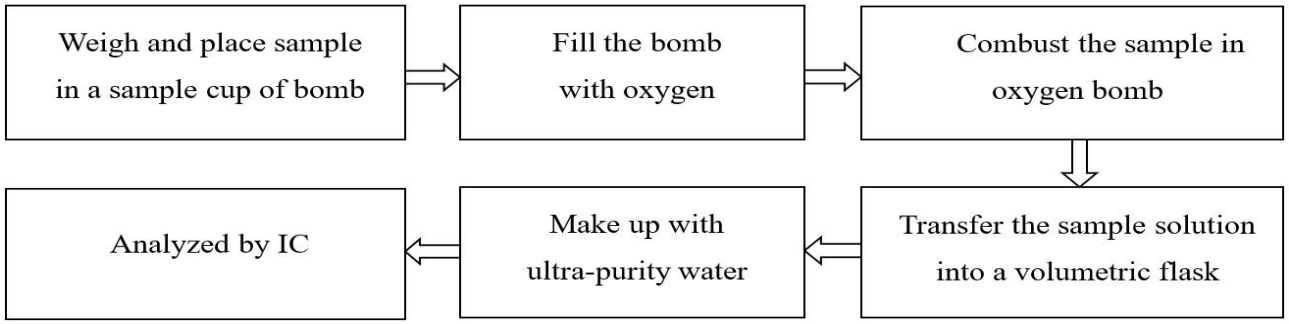

4. **Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)**



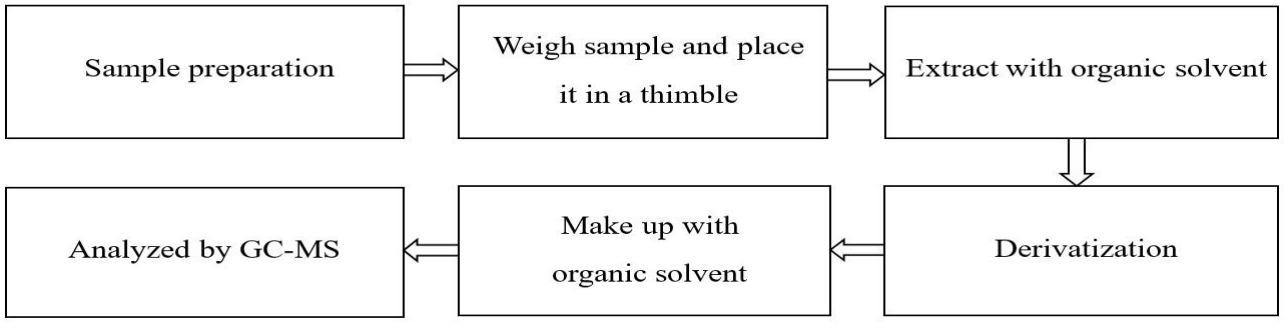
**5. Phthalates (DBP, BBP, DEHP, DIBP), Phthalates**



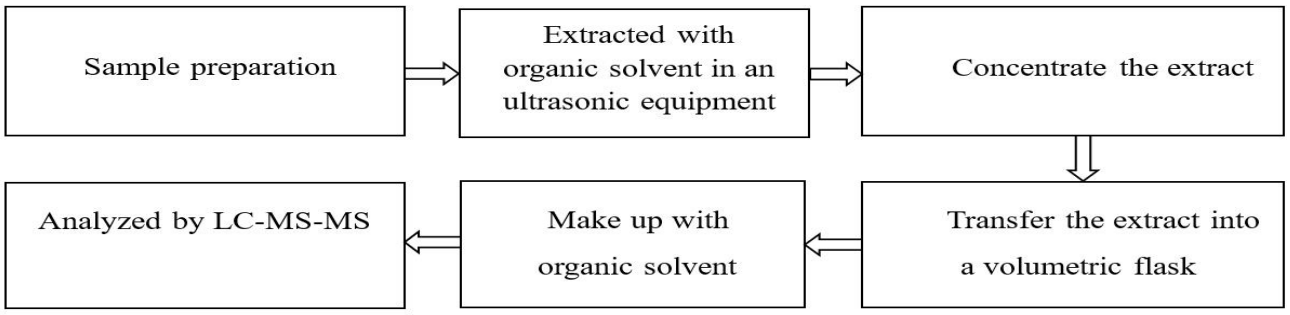

**6. Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I)**



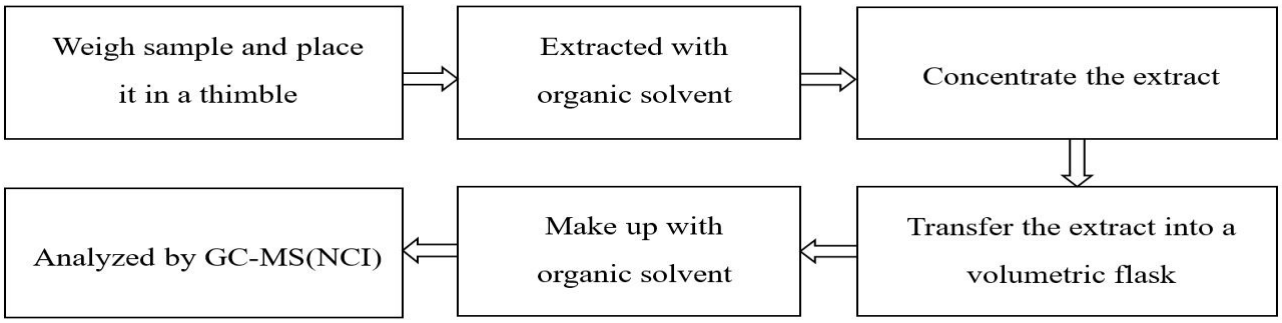

**7. Organotin compounds**



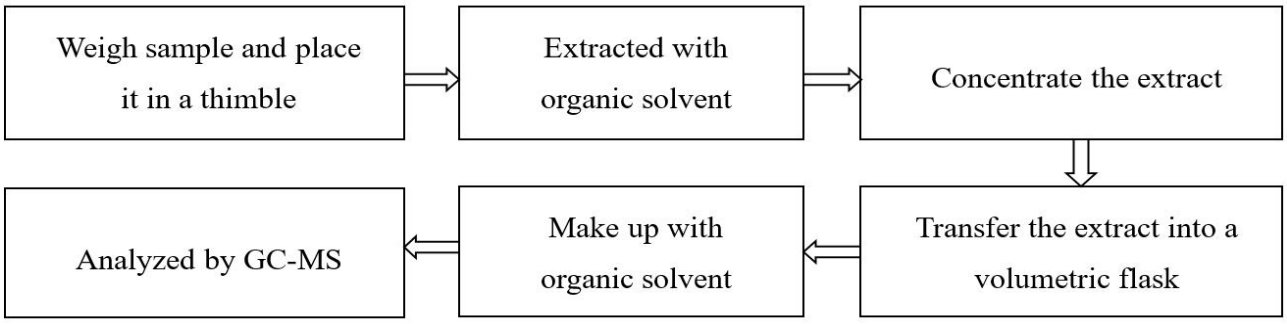

**8. Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances**



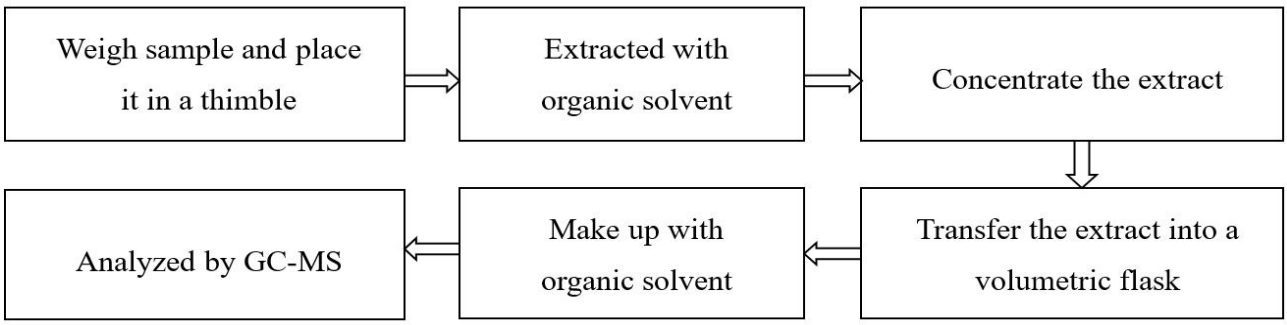
**9. Short Chain Chlorinated Paraffins (SCCPs)**



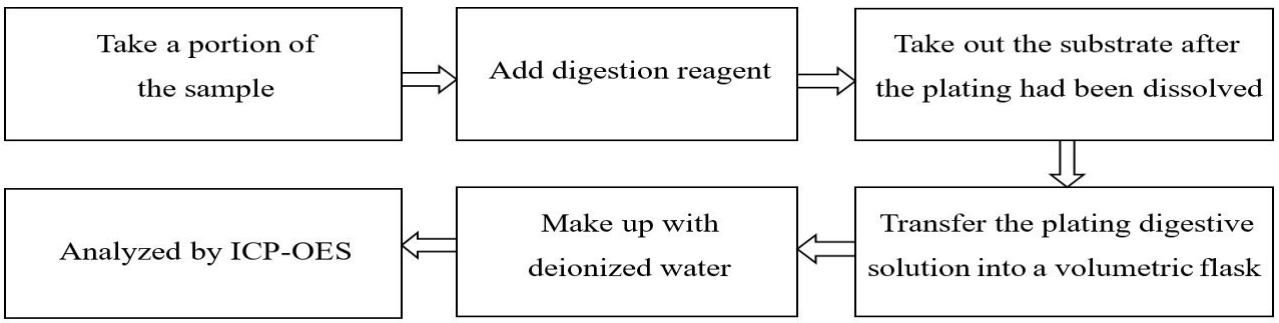

**10. Hexabromocyclododecane (HBCDD)**



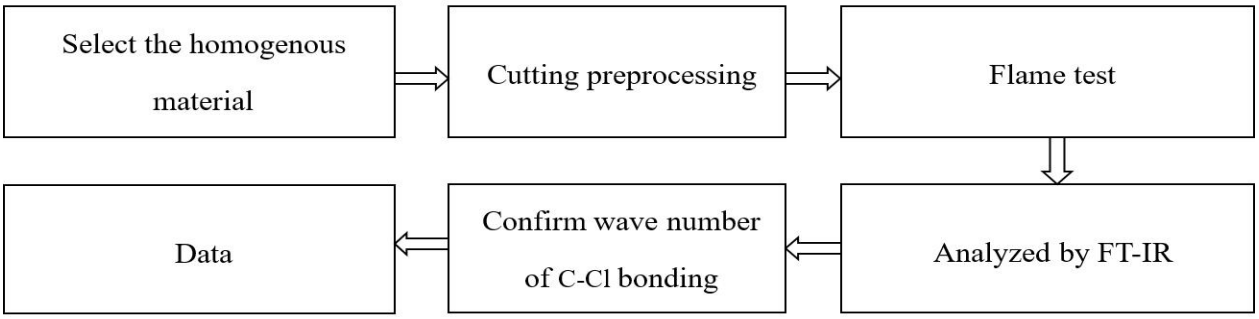

**11. Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polychlorinated Biphenyls(PCBs)**



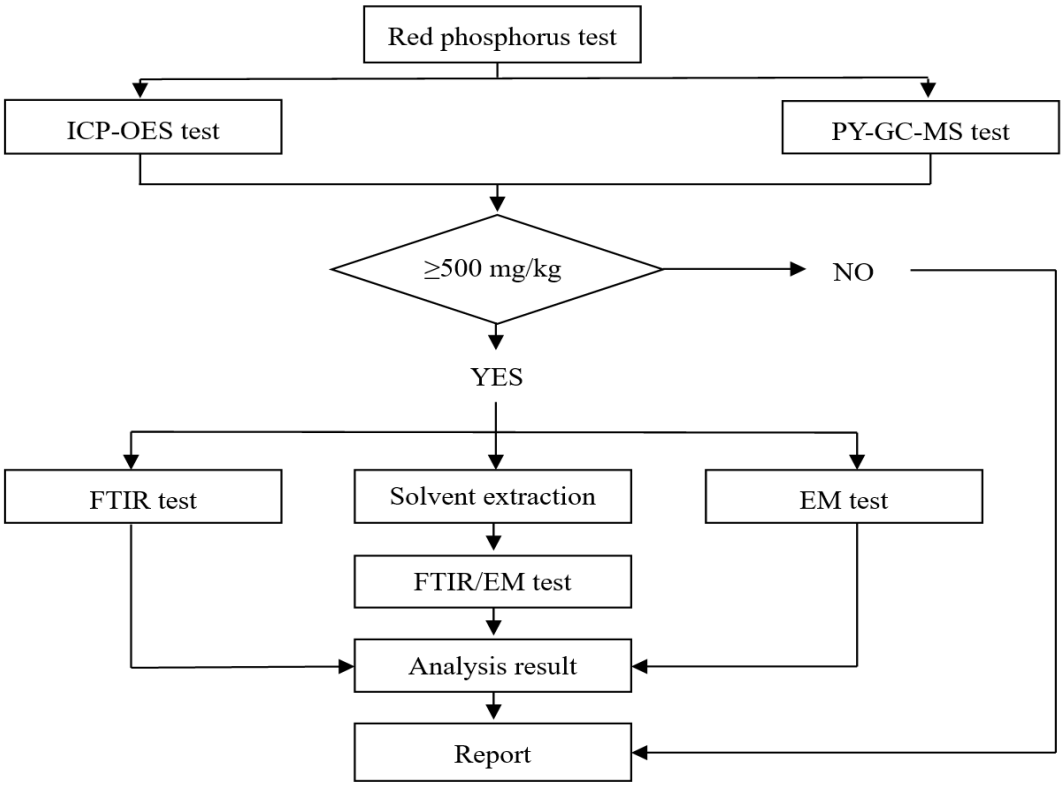

**12. Antimony(Sb), Beryllium(Be), Arsenic(As)**



**13. Polyvinyl Chloride (PVC)**



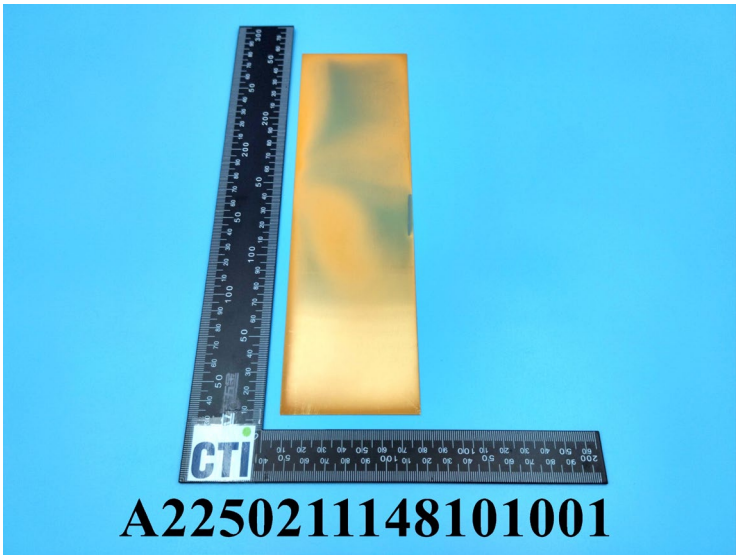

**14. Red phosphorus**



# Test Report



## Photo(s) of the sample(s)




Statement:

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Without written approval of CTI, this report can't be reproduced except in full;
5. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

*** End of report ***

TI Report Number : 90996923

Component : Lead Frame Plating

Analysis Type : RoHS 10 & Halogens

Analysis Date : 04/16/2025

CTI CENTRE TESTING INTERNATIONAL

# Test Report

[redacted]

**Report No.** [redacted]

**Company Name shown on Report** [redacted]

**Address**

**The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant**

| | |
|---|---|
| Sample Name | Pd plating |
| Sample Received Date | Apr. 7, 2025 |
| Testing Period | Apr. 7, 2025 to Apr. 16, 2025 |

**Test Requested** As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP), Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I), Organotin compounds, Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances, Phthalates, Antimony(Sb), Arsenic(As), Beryllium(Be), Hexabromocyclododecane (HBCDD), Polychlorinated Biphenyls(PCBs), Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polyvinyl Chloride (PVC), Short Chain Chlorinated Paraffins (SCCPs), Red phosphorus in the submitted sample(s).

**Test Method** Please refer to the following page(s).

**Test Result(s)** Please refer to the following page(s).

[redacted]

# Test Report



**Report No.** [redacted]

**Test Method**

| Test Item(s) | Test Method | Measured Equipment(s) |
|---|---|---|
| Lead (Pb) | Refer to IEC 62321-5:2013 | ICP-OES |
| Cadmium (Cd) | Refer to IEC 62321-5:2013 | ICP-OES |
| Mercury (Hg) | Refer to IEC 62321-4:2013+AMD1:2017 CSV | ICP-OES |
| Hexavalent Chromium (Cr(VI)) | IEC 62321-7-1:2015 | UV-Vis |
| Polybrominated Biphenyls (PBBs) | IEC 62321-6:2015 | GC-MS |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015 | GC-MS |
| Phthalates (DBP, BBP, DEHP, DIBP) | IEC 62321-8:2017 | GC-MS |
| Fluorine (F) | EN 14582:2016 | IC |
| Chlorine (Cl) | EN 14582:2016 | IC |
| Bromine (Br) | EN 14582:2016 | IC |
| Iodine (I) | EN 14582:2016 | IC |
| Organotin compounds | Refer to US EPA 3550C:2007 & ISO 17353:2004 | GC-MS |
| Perfluorooctanoic acid (PFOA) and its salts | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Perfluorooctanesulfonic acid (PFOS) and its salts & related substances | Refer to DIN CEN/TS 15968:2010 | LC-MS-MS |
| Phthalates | IEC 62321-8:2017 | GC-MS |
| Short Chain Chlorinated Paraffins (SCCPs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS(NCI) |
| Polychlorinated Naphthalenes (PCNs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Biphenyls(PCBs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polychlorinated Terphenyls (PCTs) | Refer to US EPA 3550C:2007 & US EPA 8270E:2018 | GC-MS |
| Polyvinyl Chloride (PVC) | Refer to JY/T 001-1996 | FTIR |
| Hexabromocyclododecane (HBCDD) | IEC 62321-9:2021 | GC-MS |
| Beryllium(Be) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Arsenic(As) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Antimony(Sb) | Refer to US EPA 3050B:1996 & US EPA 6010D:2018 | ICP-OES |
| Red phosphorus | GB/T 6040 2019, GB/T 9722 2023, GB/T 17359 2023, EPA 6010D:2018 | ICP OES, PY GC MS, FTIR, EM |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| Lead (Pb) | N.D. | 2 mg/kg |
| Cadmium (Cd) | N.D. | 2 mg/kg |
| Mercury (Hg) | N.D. | 2 mg/kg |
| Hexavalent Chromium (Cr(VI)) | N.D. ▼ | 0.10 μg/cm² (LOQ) |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| **Polybrominated Biphenyls (PBBs)** | | |
| Monobromobiphenyl | N.D. | 5 mg/kg |
| Dibromobiphenyl | N.D. | 5 mg/kg |
| Tribromobiphenyl | N.D. | 5 mg/kg |
| Tetrabromobiphenyl | N.D. | 5 mg/kg |
| Pentabromobiphenyl | N.D. | 5 mg/kg |
| Hexabromobiphenyl | N.D. | 5 mg/kg |
| Heptabromobiphenyl | N.D. | 5 mg/kg |
| Octabromobiphenyl | N.D. | 5 mg/kg |
| Nonabromobiphenyl | N.D. | 5 mg/kg |
| Decabromobiphenyl | N.D. | 5 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| **Polybrominated Diphenyl Ethers (PBDEs)** | | |
| Monobromodiphenyl ether | N.D. | 5 mg/kg |
| Dibromodiphenyl ether | N.D. | 5 mg/kg |
| Tribromodiphenyl ether | N.D. | 5 mg/kg |
| Tetrabromodiphenyl ether | N.D. | 5 mg/kg |
| Pentabromodiphenyl ether | N.D. | 5 mg/kg |
| Hexabromodiphenyl ether | N.D. | 5 mg/kg |
| Heptabromodiphenyl ether | N.D. | 5 mg/kg |
| Octabromodiphenyl ether | N.D. | 5 mg/kg |
| Nonabromodiphenyl ether | N.D. | 5 mg/kg |
| Decabromodiphenyl ether | N.D. | 5 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| **Phthalates (DBP, BBP, DEHP, DIBP)** | | |
| Butyl benzyl phthalate (BBP)<br>CAS#:85-68-7 | N.D. | 50 mg/kg |
| Di-(2-ethylhexyl) phthalate (DEHP)<br>CAS#:117-81-7 | N.D. | 50 mg/kg |
| Dibutyl phthalate (DBP)<br>CAS#:84-74-2 | N.D. | 50 mg/kg |
| Diisobutyl phthalate (DIBP)<br>CAS#:84-69-5 | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Fluorine (F) | N.D. | 50 mg/kg |
| Chlorine (Cl) | N.D. | 50 mg/kg |
| Bromine (Br) | N.D. | 50 mg/kg |
| Iodine (I) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| **Organotin compounds** | | |
| Dibutyltin (DBT) | N.D. | 5 mg/kg |
| Dioctyltin (DOT) | N.D. | 5 mg/kg |
| Tributyltin (TBT) | N.D. | 5 mg/kg |
| Triphenyltin (TPhT) | N.D. | 5 mg/kg |
| Tributyltin oxide (TBTO) *1 | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Red phosphorus #1 | N.D. | 500 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| **Phthalates** | | |
| Bis(2-methoxyethyl) phthalate (DMEP) CAS#:117-82-8 | N.D. | 50 mg/kg |
| Di-n-hexyl phthalate (DNHP/DHEXP) CAS#:84-75-3 | N.D. | 50 mg/kg |
| Di-iso-decyl phthalate (DIDP) CAS#:26761-40-0,68515-49-1 | N.D. | 50 mg/kg |
| Di-isononyl phthalate (DINP) CAS#:28553-12-0,68515-48-0 | N.D. | 50 mg/kg |
| Di-n-octyl phthalate (DNOP) CAS#:117-84-0 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP) CAS#:71888-89-6 | N.D. | 50 mg/kg |
| 1,2-Benzenedicarboxylic acid, di-(C7-11)-branched and linear alkyl esters (DHNUP) CAS#:68515-42-4 | N.D. | 50 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| Antimony (Sb) | N.D. | 2 mg/kg |
| Beryllium (Be) | N.D. | 2 mg/kg |
| Arsenic (As) | N.D. | 2 mg/kg |

| Tested Item(s) | Result | MDL |
|---|---|---|
| | 003 | |
| **Polychlorinated Biphenyls(PCBs)** | | |
| Monochlorobiphenyl | N.D. | 5 mg/kg |
| Dichlorobiphenyl | N.D. | 5 mg/kg |
| Trichlorobiphenyl | N.D. | 5 mg/kg |
| Tetrachlorobiphenyl | N.D. | 5 mg/kg |
| Pentachlorobiphenyl | N.D. | 5 mg/kg |
| Hexachlorobiphenyl | N.D. | 5 mg/kg |
| Heptachlorobiphenyl | N.D. | 5 mg/kg |
| Octachlorobiphenyl | N.D. | 5 mg/kg |
| Nonachlorobiphenyl | N.D. | 5 mg/kg |
| Decachlorobiphenyl | N.D. | 5 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| **Tested Item(s)** | **Result** | **MDL** |
|---|---|---|
| | 003 | |
| Short Chain Chlorinated Paraffins (SCCPs) | N.D. | 50 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Polyvinyl Chloride (PVC) | Negative | / |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Polychlorinated Triphenyls (PCTs) | N.D. | 5 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Hexabromocyclododecane (HBCDD) | N.D. | 20 mg/kg |
| **Tested Item(s)** | **Result** | **MDL** |
| | 003 | |
| Polychlorinated Naphthalenes (PCNs) | N.D. | 5 mg/kg |

| **Tested Item(s)** | **CAS No.** | **Result** | **MDL** |
|---|---|---|---|
| | | 003 | |
| **Perfluorooctanoic acid (PFOA) and its salts** | | | |
| Perfluorooctanoic acid (PFOA) | 335-67-1 | N.D. | 0.01 mg/kg |
| Ammonium pentadecafluorooctanoate (APFO)* | 3825-26-1 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctanoate (PFOA-Na)* | 335-95-5 | N.D. | 0.01 mg/kg |
| Potassium perfluorooctanoate (PFOA-K)* | 2395-00-8 | N.D. | 0.01 mg/kg |
| Silver perfluorooctanoate (PFOA-Ag)* | 335-93-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanoyl fluoride (PFOA-F)* | 335-66-0 | N.D. | 0.01 mg/kg |

# Test Report

**Report No.** [redacted]



**Test Result(s)**

| Tested Item(s) | CAS No. | Result | MDL |
|---|---|---|---|
| | | 003 | |
| **Perfluorooctanesulfonic acid (PFOS) and its salts & related substances** | | | |
| Perfluorooctane Sulfonates (PFOS) | 1763-23-1 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, potassium salt (PFOS-K)* | 2795-39-3 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)* | 29457-72-5 | N.D. | 0.01 mg/kg |
| Sodium perfluorooctane sulfonate (PFOS-Na)* | 4021-47-0 | N.D. | 0.01 mg/kg |
| 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, magnesium salt (2:1) (PFOS-Mg)* | 91036-71-4 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, ammonium salt ($PFOS\text{-}NH_4$)* | 29081-56-9 | N.D. | 0.01 mg/kg |
| Perfluorooctane sulfonate diethanolamine salt ($PFOS\text{-}NH(OH)_2$)* | 70225-14-8 | N.D. | 0.01 mg/kg |
| Perfluorooctanesulfonic acid, tetraethylammonium salt ($PFOS\text{-}N(C_2H_5)_4$)* | 56773-42-3 | N.D. | 0.01 mg/kg |
| Didecyl dimethyl ammonium perfluorooctane sulfonate (PFOS-DDA)* | 251099-16-8 | N.D. | 0.01 mg/kg |
| Perfluoro-1-octanesulfonyl fluoride (PFOSF)* | 307-35-7 | N.D. | 0.01 mg/kg |
| Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate* | 71463-74-6 | N.D. | 0.01 mg/kg |
| N-Ethylperfluoro-1-octanesulfonamide (N-Et-FOSA) | 4151-50-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8 -Methylperfluoro-1-octanesulfonamide (N-Me-FOSA) | 31506-32-8 | N.D. | 0.05 mg/kg |
| 2-(N-Ethylperfluoro-1-octanesulfonamido)-ethanol (N-Et-FOSE) | 1691-99-2 | N.D. | 0.05 mg/kg |
| 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8- 2-(N-Methylperfluoro-1-octanesulfonamido)-ethanol (N-Me-FOSE) | 24448-09-7 | N.D. | 0.05 mg/kg |
| Perfluorooctanesulfonamide (PFOSA) | 754-91-6 | N.D. | 0.01 mg/kg |

CTI CENTRE TESTING INTERNATIONAL

# Test Report

**Report No.** [redacted]



**Sample/Part Description**

| No. | CTI Sample ID | Description |
|---|---|---|
| 1 | 003 | Gray plating |

**Remark:** **The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury, Antimony, Beryllium, Arsenic.**

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL or LOQ)

-mg/kg = ppm = parts per million

-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 μg/cm²

-▾The sample is negative for Cr(VI) − The Cr(VI) concentration is below 0.10 μg/cm². The coating is considered a non-Cr(VI) based coating. 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.

-Negative = Not contained Polyvinyl Chloride(PVC)

-*=Result(s) shown of the substance(s) is/ are converted from the result(s) of certain compound(s).

-*[1]=Concentration value of Tributyltin oxide by the conversion from the test results of Tributyl Tins.

-The test result(s) of sample is(are) presented in reference to the result(s) that reported in No. [redacted]

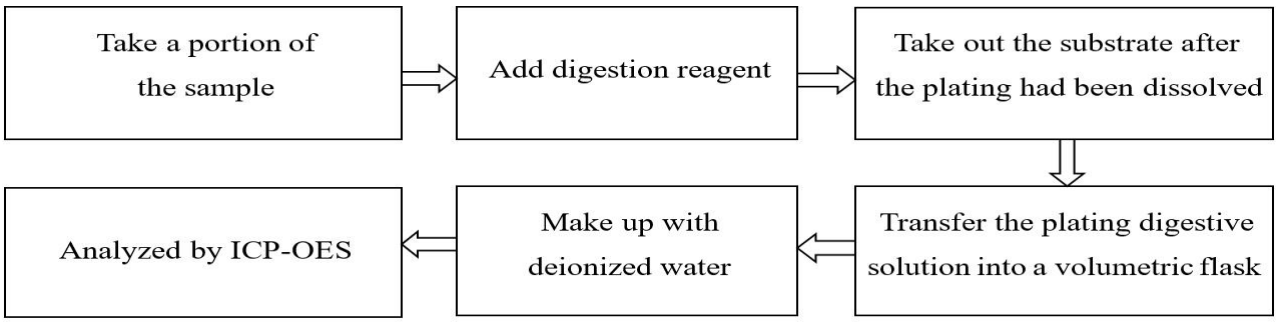
**Note:** **" #1 " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.**

# Test Report

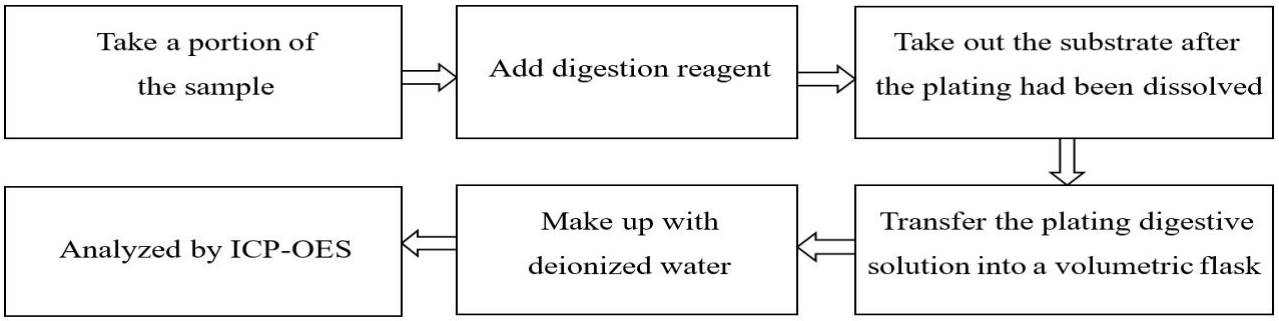


**Test Process**

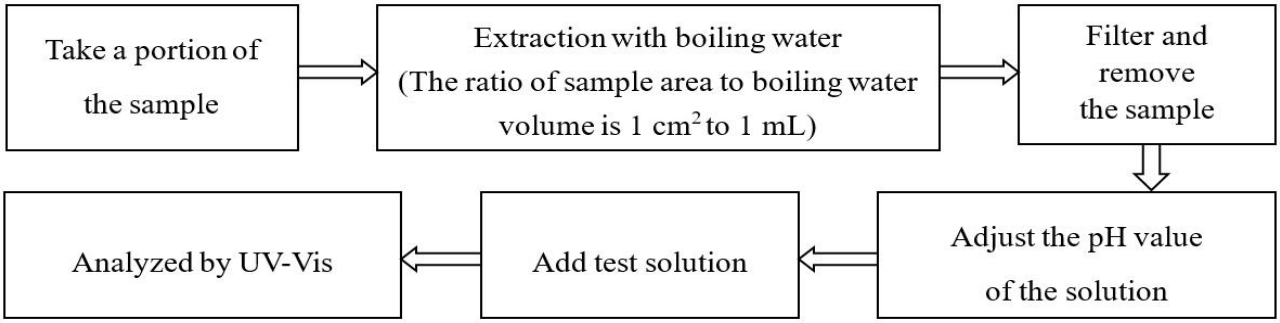
**1. Lead (Pb), Cadmium (Cd)**



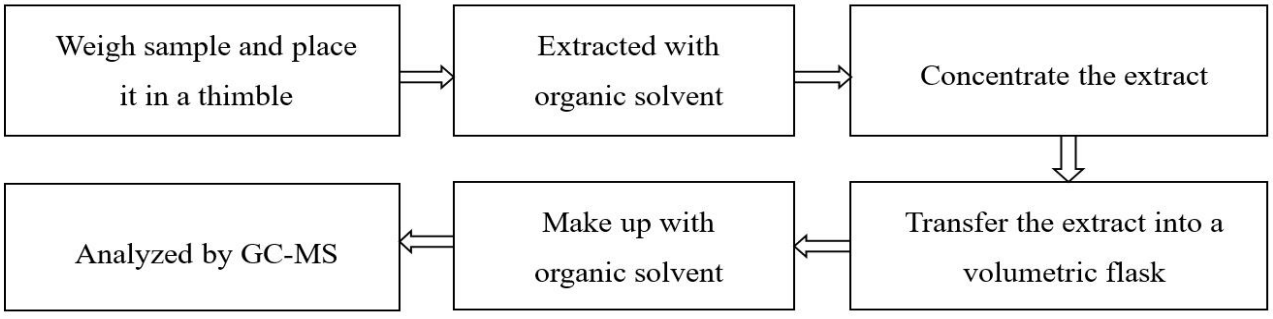

**2. Mercury (Hg)**




**3. Hexavalent Chromium (Cr(VI))**



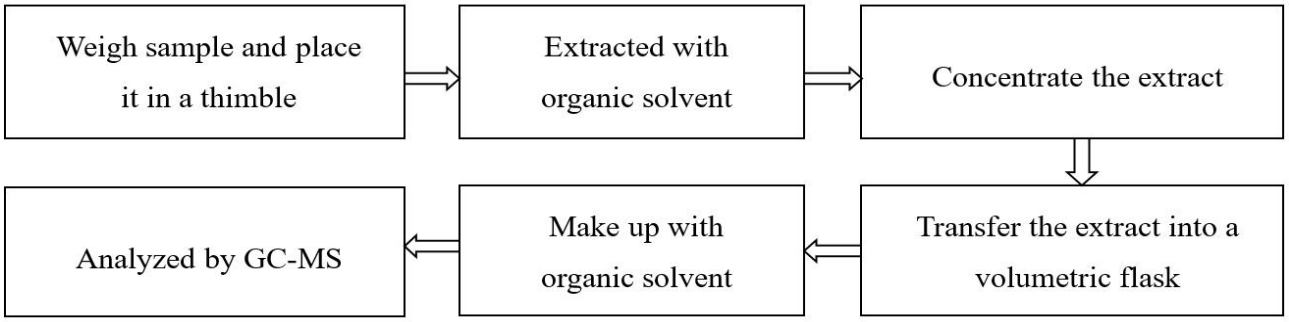

**4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)**



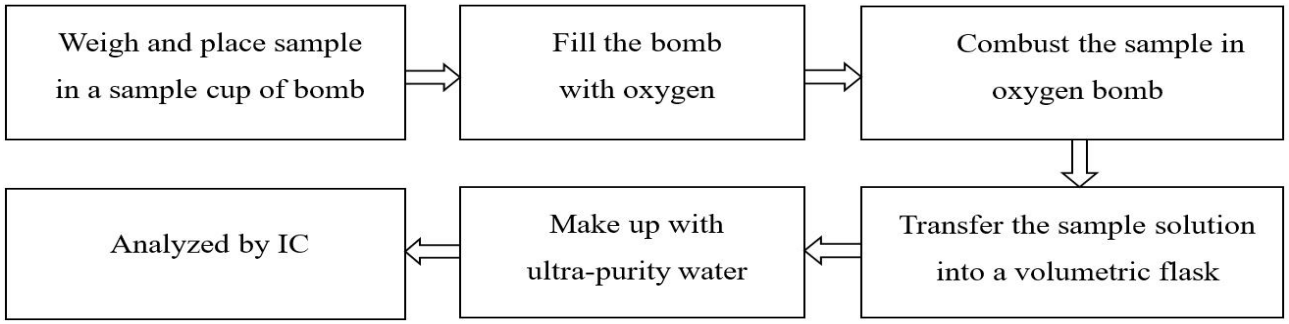
# Test Report



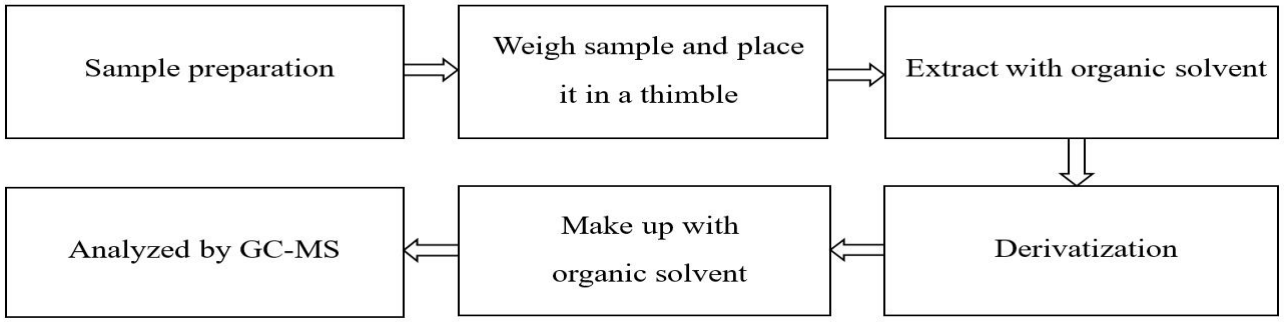
**5. Phthalates (DBP, BBP, DEHP, DIBP), Phthalates**



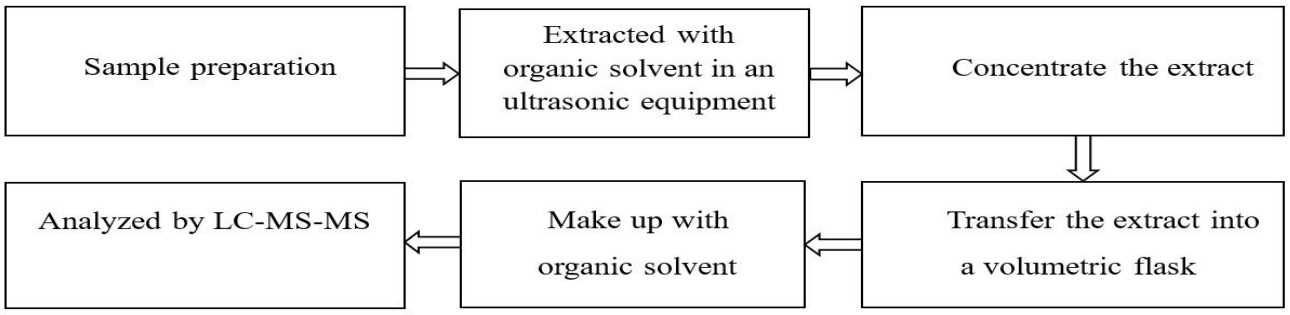

**6. Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I)**



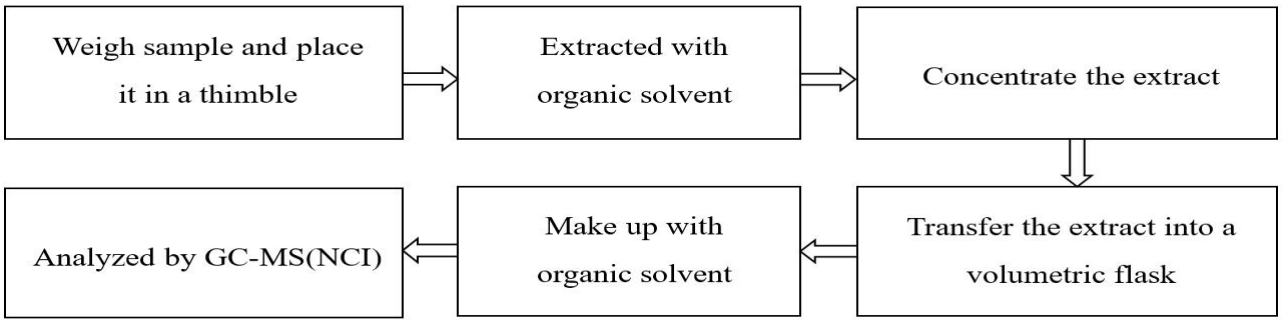

**7. Organotin compounds**



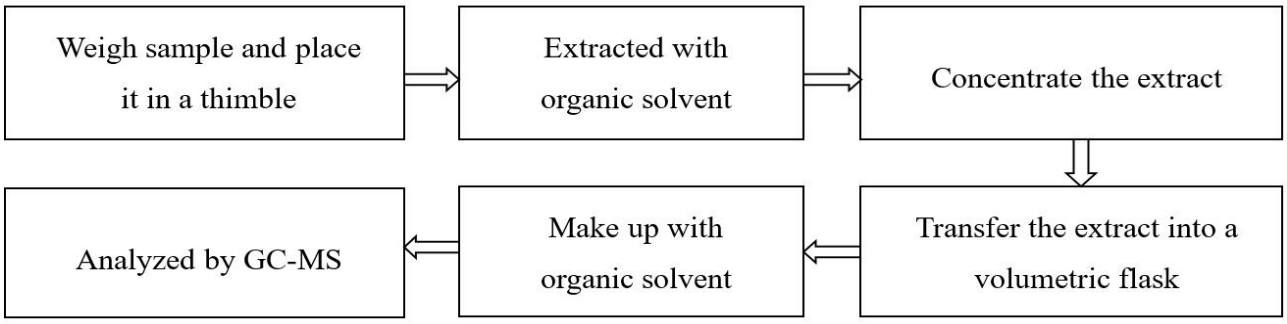

**8. Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances**



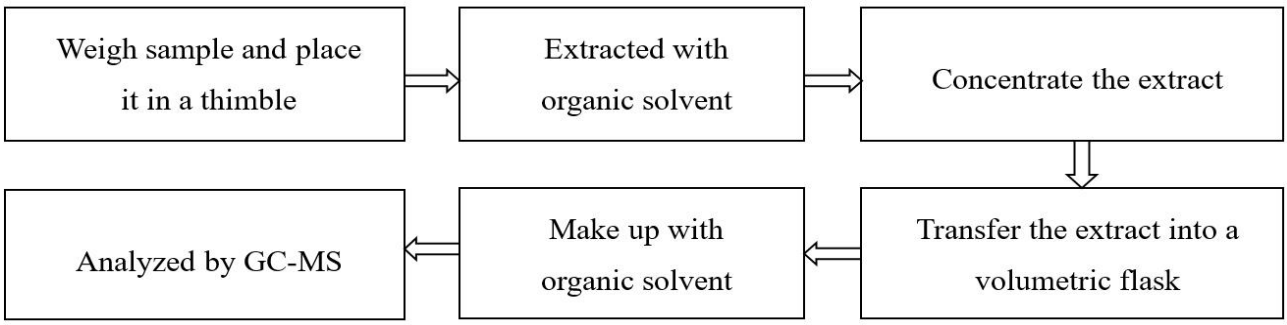
**9. Short Chain Chlorinated Paraffins (SCCPs)**



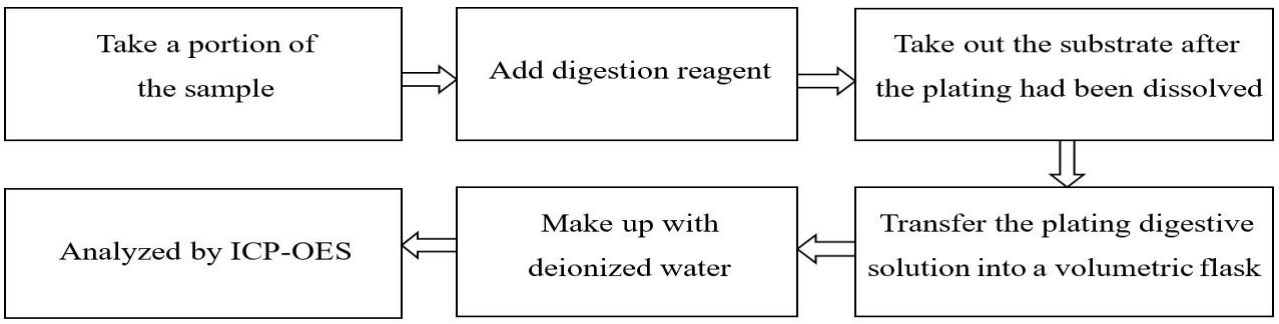

**10. Hexabromocyclododecane (HBCDD)**



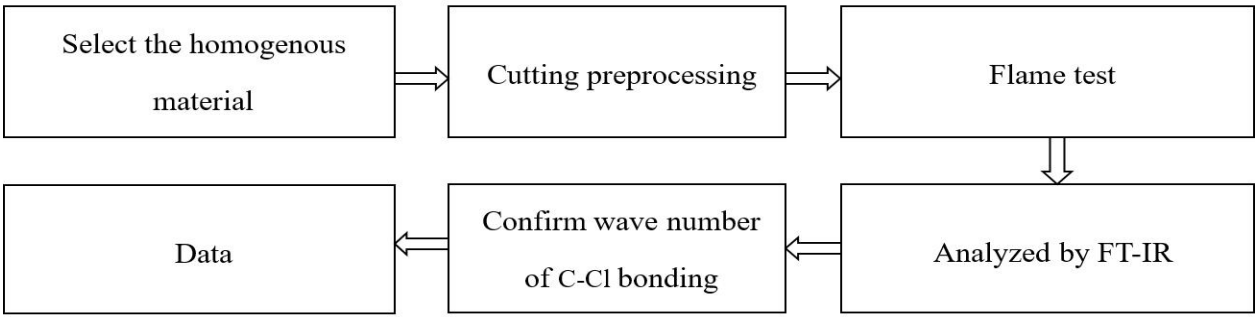

**11. Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polychlorinated Biphenyls(PCBs)**



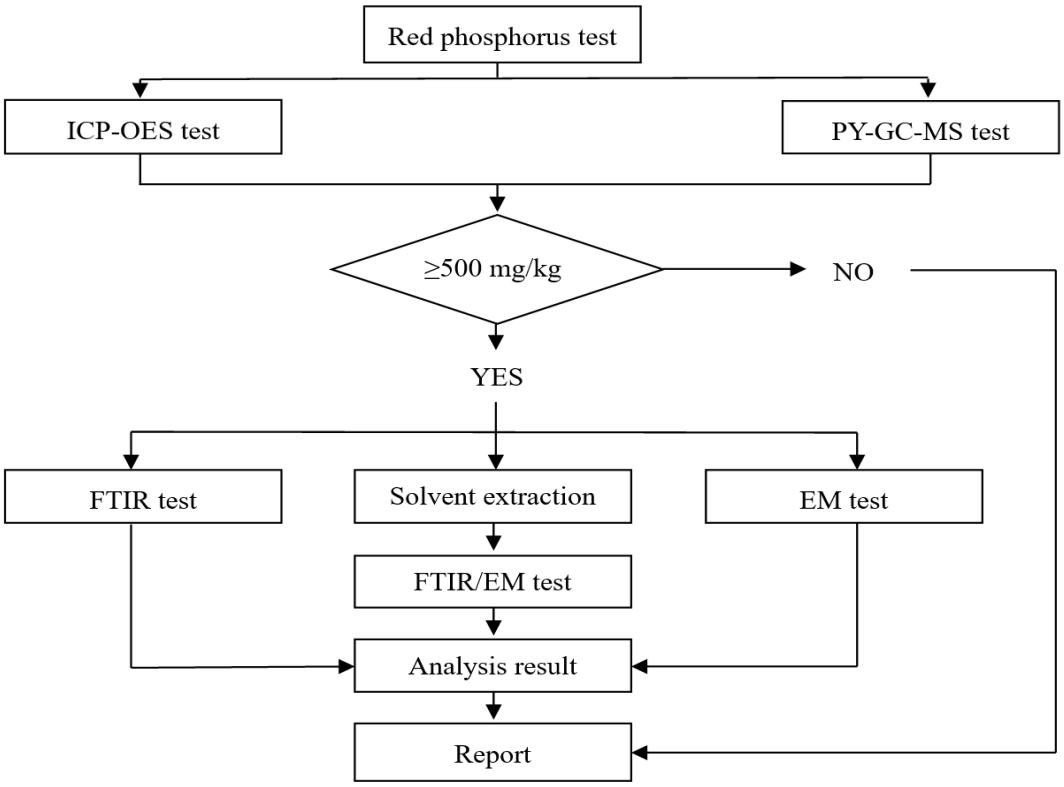

**12. Antimony(Sb), Beryllium(Be), Arsenic(As)**



**13. Polyvinyl Chloride (PVC)**




**14. Red phosphorus**



# Test Report



[redacted]

Statement:

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Without written approval of CTI, this report can't be reproduced except in full;
5. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

*** End of report ***

TI Report Number : 99577306

Component : Bond Wire

Analysis Type : RoHS 10 & Halogens

Analysis Date : 04/03/2025

# Test Report

**No.:** [redacted] **Date:** Apr 03, 2025 

Client Name: [redacted]

Client Address: [redacted]

Sample Name: Au Bonding Wire

Client Ref. Information: Y;FA;C;M2;M3;GHA-2;GMB-2;GMG;GMH;GMH-2;GL-2;
GLD;GLF;GBE;GSA;GSB;GFB;GFC;GFD;
MGM4;MGM7;MGM16;MGAM3;MGAH2;
MGHL1;MGFL1;MGFL5;MGQ20;MGQ29;

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

---

SGS Job No.: [redacted]

Sample Receiving Date: Mar 25, 2025

Testing Period: Mar 25, 2025 ~ Apr 03, 2025

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 |
| Chlorinated Paraffins | See Results |
| Dimethyl fumarate (DMFu) | See Results |
| Element(s) | See Results |
| Phthalates | See Results |
| Polyvinyl chloride (PVC) | See Results |
| Red Phosphorus | See Results |

[redacted]

[redacted]



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| Test Requirement | Conclusion |
|---|---|
| Sulfur (S) | See Results |
| TBBP-A | See Results |
| Bisphenol A | See Results |
| Halogen | See Results |
| Hexabromocyclododecane (HBCDD) | See Results |
| Organic-tin compounds | See Results |
| Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid (PFOS) and its derivatives | See Results |
| Polychlorinated Biphenyls (PCBs) | See Results |
| Polychlorinated Naphthalenes (PCNs) | See Results |
| Polychlorinated Terphenyls (PCTs) | See Results |

**Test Result(s):**

Test Part Description：

| SN ID | Sample No. | SGS Sample ID | Description |
|---|---|---|---|
| SN1 | A1 | SHA25-0063116-0001.C001 | Golden metal |

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 62321-7-1:2015 and IEC 62321-12:2023, analysis was performed by ICP-OES/AAS, UV-Vis and GC-MS.

| Test Item(s) | Limit | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Lead (Pb) | 1000 | mg/kg | 2 | ND |
| Mercury (Hg) | 1000 | mg/kg | 2 | ND |
| Cadmium (Cd) | 100 | mg/kg | 2 | ND |
| Hexavalent Chromium (Cr(VI))▼ | - | μg/cm² | 0.10 | ND |
| Polybrominated biphenyls (PBB) | 1000 | mg/kg | - | ND |
| Monobrominated biphenyl (MonoBB) | - | mg/kg | 25 | ND |
| Dibrominated biphenyl (DiBB) | - | mg/kg | 25 | ND |
| Tribrominated biphenyl (TriBB) | - | mg/kg | 25 | ND |
| Tetrabrominated biphenyl (TetraBB) | - | mg/kg | 25 | ND |



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| Test Item(s) | Limit | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Pentabrominated biphenyl (PentaBB) | - | mg/kg | 25 | ND |
| Hexabrominated biphenyl (HexaBB) | - | mg/kg | 25 | ND |
| Heptabrominated biphenyl (HeptaBB) | - | mg/kg | 25 | ND |
| Octabrominated biphenyl (OctaBB) | - | mg/kg | 25 | ND |
| Nonabrominated biphenyl (NonaBB) | - | mg/kg | 25 | ND |
| Decabrominated biphenyl (DecaBB) | - | mg/kg | 25 | ND |
| Polybrominated diphenyl ethers (PBDE) | 1000 | mg/kg | - | ND |
| Monobrominated diphenyl ether (MonoBDE) | - | mg/kg | 25 | ND |
| Dibrominated diphenyl ether (DiBDE) | - | mg/kg | 25 | ND |
| Tribrominated diphenyl ether (TriBDE) | - | mg/kg | 25 | ND |
| Tetrabrominated diphenyl ether (TetraBDE) | - | mg/kg | 25 | ND |
| Pentabrominated diphenyl ether (PentaBDE) | - | mg/kg | 25 | ND |
| Hexabrominated diphenyl ether (HexaBDE) | - | mg/kg | 25 | ND |
| Heptabrominated diphenyl ether (HeptaBDE) | - | mg/kg | 25 | ND |
| Octabrominated diphenyl ether (OctaBDE) | - | mg/kg | 25 | ND |
| Nonabrominated diphenyl ether (NonaBDE) | - | mg/kg | 25 | ND |
| Decabrominated diphenyl ether (DecaBDE) | - | mg/kg | 25 | 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) ▼ =
a. The sample is positive for Cr(VI) if the Cr(VI)concentration is greater than 0.13 μg/cm$^2$. The sample coating is considered to contain Cr(VI).
b. The sample is negative for Cr(VI) if Cr(VI) is ND (concentration less than 0.10 μg/cm$^2$). The coating is considered a non-Cr(VI) based coating.
c. The result between 0.10 μg/cm$^2$ and 0.13 μg/cm$^2$ 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.

## Chlorinated Paraffins

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

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Middle Chain Chlorinated Paraffins(MCCP)(C14-C17) | 85535-85-9 | mg/kg | 50 | ND |
| Short Chain Chlorinate Paraffins(SCCP)(C10-C13) | 85535-84-8 | mg/kg | 50 | ND |

**Dimethyl fumarate (DMFu)**

**Test Method:** Solvent extraction, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Dimethyl Fumarate (DMFu) | 624-49-7 | mg/kg | 0.1 | ND |

**Element(s)**

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

| Test Item(s) | Unit(s) | MDL | A1 |
|---|---|---|---|
| Antimony(Sb) | mg/kg | 10 | ND |
| Antimony Trioxide($Sb_2O_3$) ◆ | mg/kg | 12 | ND |
| Tin(Sn) | mg/kg | 5 | ND |
| Arsenic(As) | mg/kg | 10 | ND |
| Diarsenic Trioxide($As_2O_3$) ◆ | mg/kg | 10 | ND |
| Diarsenic Pentaoxide($As_2O_5$) ◆ | mg/kg | 10 | ND |

**Notes:**

(1) ◆$Sb_2O_3$ : Calculate from Antimony content.

(2) ◆$As_2O_3$, $As_2O_5$ : Calculate from Arsenic content.

**Phthalates**

**Test Method:** With reference to IEC 62321-8:2017, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Diisononyl Phthalate (DINP) | 28553-12-0 /68515-48-0 | mg/kg | 50 | ND |
| Di-n-Octyl Phthalate(DNOP) | 117-84-0 | mg/kg | 50 | ND |
| Diisodecyl Phthalate (DIDP) | 26761-40-0 /68515-49-1 | mg/kg | 50 | ND |
| Bis(2-methoxyethyl)phthalate(DMEP) | 117-82-8 | mg/kg | 50 | ND |
| Di-n-Hexyl Phthalate(DnHP) | 84-75-3 | mg/kg | 50 | ND |
| Dipentyl Phthalate (DPENP/DnPP) | 131-18-0 | mg/kg | 50 | ND |
| 1,2-Benzenedicarboxylic Acid,di-C6-8-branched alkyl esters,C7-rich(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 |



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**Polyvinyl chloride (PVC)**

**Test Method:** With reference to SGS in house method, analysis was performed by FTIR/HATR.

| Test Item(s) | A1 |
|---|---|
| Polyvinyl chloride (PVC) | Negative |

**Notes:**
(1) Negative=Undetectable, Positive=Detectable

**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 | A1 |
|---|---|---|---|---|
| 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.

**Sulfur (S)**

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

| Test Item(s) | Unit(s) | MDL | A1 |
|---|---|---|---|
| Sulfur(S) | mg/kg | 50 | ND |

**TBBP-A**

**Test Method:** With reference to US EPA 3540C:1996, analysis was performed by GC-MS/LC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| TBBP-A | 79-94-7 | mg/kg | 10 | ND |

**Bisphenol A**

**Test Method:** Solvent extraction, analysis was performed by LC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Bisphenol A(BPA) | 80-05-7 | mg/kg | 1.0 | ND |

**Halogen**

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

| Test Item(s) | Unit(s) | MDL | A1 |
|---|---|---|---|
| Fluorine(F) | mg/kg | 20 | ND |



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| Test Item(s) | Unit(s) | MDL | A1 |
|---|---|---|---|
| Chlorine(Cl) | mg/kg | 50 | ND |
| Bromine(Br) | mg/kg | 50 | ND |
| Iodine(I) | mg/kg | 50 | ND |

**Hexabromocyclododecane (HBCDD)**

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

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Hexabromocyclododecane (HBCDD) | 134237-50-6 /134237-51-7 /134237-52-8 /25637-99-4 /3194-55-6 | mg/kg | 10 | ND |

**Organic-tin compounds**

**Test Method:** With reference to ISO 17353:2004, analysis was performed by GC-MS.

| Test Item(s) | Unit(s) | MDL | A1 |
|---|---|---|---|
| Dibutyl tin(DBT) | mg/kg | 0.02 | ND |
| Tributyl tin(TBT) | mg/kg | 0.02 | ND |
| Dioctyl tin(DOT) | mg/kg | 0.02 | ND |
| Tri-n-propyltin(TPT) | mg/kg | 0.02 | ND |
| Bis(tributyltin) oxide (TBTO) ◆ | mg/kg | 0.02 | ND |

**Notes:**
(1) ◆ TBTO is back calculated based on the worst-case scenario of TBT.

**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 | A1 |
|---|---|---|---|---|
| **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 |



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| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Perfluorooctane sulfonamidoacetic Acid (FOSAA), its salts^ | 2806-24-8 | mg/kg | 0.010 | ND |
| N-Methylperfluoro-1-octanesulfonamidoacetic Acid (N-MeFOSAA), its salts^ | 2355-31-9 | mg/kg | 0.010 | ND |
| N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA), its salts^ | 2991-50-6 | mg/kg | 0.010 | ND |
| Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives | - | mg/kg | - | ND |
| **PFOA, its salts** | | | | |
| Perfluorooctanoic acid (PFOA), its salts^ | 335-67-1 | mg/kg | 0.010 | ND |

**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-$NH_2(C_2H_4OH)_2$) | 70225-14-8 |
| Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-$N(C_2H_5)_4$) | 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-$N(C_{10}H_{21})_2(CH_3)_2$) | 251099-16-8 |
| TetrabutylAmmonium perfluorooctanesulfonate (PFOS-$N(C_4H_9)_4$) | 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 |
| Perfluorooctanesulfonate | 45298-90-6 |
| Triethylammonium perfluorooctane sulfonate (PFOS-$N(C_2H_5)_3$) | 54439-46-2 |
| Tetramethylammonium perfluorooctane sulfonate (PFOS-$N(CH_3)_4$) | 56773-44-5 |
| N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-$N(C_3H_7)_3(C_5H_{11})$) | 56773-56-9 |
| N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-$N(C_4H_9)_3(CH_3)$) | 124472-68-0 |
| 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 |



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| | |
|---|---|
| N,N,N-Triethyldecan-1-aminium heptadecafluorooctane-1-sulfonate | 773895-92-4 |
| Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P ($C_4H_9)_4$)) | 2185049-59-4 |
| Perfluorooctanesulfonic acid diethylamine salt (PFOS-$C_4H_{11}N$) | 2205029-08-7 |
| heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-$C_{15}H_{30}NO_2$) | 1203998-97-3 |
| Perfluorooctane sulfonic anhydride (PFOSAN) | 423-92-7 |
| **FOSAA, its salts** | |
| 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 |
| **N-MeFOSAA, its salts** | |
| 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 |
| **N-EtFOSAA, its salts** | |
| 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-$NH_4$) | 2991-52-8 |
| Sodium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-Na) | 3871-50-9 |
| **PFOSA, its salts** | |
| 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-$NH_4$) | 76752-72-2 |
| Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-$C_6H_{15}N$) | 76752-82-4 |
| **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 perfluorooctanote (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 |



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| | |
|---|---|
| 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($C_4H_{10}N$)) | 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($H_2O$)$_2$) | 98065-31-7 |
| Perfluorooctanoic acid compd. with ethanamine (1:1) (PFOA-$C_2H_7N$) | 1376936-03-6 |
| Pentadecafluorooctanoic acid--pyridine (1/1) (PFOA-$C_5H_5N$) | 95658-47-2 |
| pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-$C_{10}H_{14}N_2$) | 1514-68-7 |
| N,N,N-Trimethyloctan-1-aminium pentadecafluorooctanoate (PFOA-$C_{11}H_{26}N$) | 927835-01-6 |

## Polychlorinated Biphenyls (PCBs)

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

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| 2,4,4'-Trichlorobiphenyl (PCB28) | 7012-37-5 | mg/kg | 0.5 | ND |
| 2,2',5,5'-Tetrachlorobiphenyl (PCB52) | 35693-99-3 | mg/kg | 0.5 | ND |
| 2,2',4,5,5'-Pentachlorobiphenyl (PCB101) | 37680-73-2 | mg/kg | 0.5 | ND |
| 2,3',4,4',5-Pentachlorobiphenyl (PCB118) | 31508-00-6 | mg/kg | 0.5 | ND |
| 2,2',3,4,4',5'-Hexachlorobiphenyl (PCB138) | 35065-28-2 | mg/kg | 0.5 | ND |
| 2,2',4,4',5,5'-Hexachlorobiphenyl (PCB153) | 35065-27-1 | mg/kg | 0.5 | ND |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB180) | 35065-29-3 | mg/kg | 0.5 | ND |
| Sum of PCBs | - | mg/kg | - | ND |

## Polychlorinated Naphthalenes (PCNs)

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

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| 1-Chlorinated Naphthalene | 90-13-1 | mg/kg | 5 | ND |
| 2-Chlorinated Naphthalene | 91-58-7 | mg/kg | 5 | ND |
| 1,4- Dichlorinated Naphthalene | 1825-31-6 | mg/kg | 5 | ND |
| 1,5-Dichlorinated Naphthalene | 1825-30-5 | mg/kg | 5 | ND |
| 1,2-Dichlorinated Naphthalene | 2050-69-3 | mg/kg | 5 | ND |



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| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| 1,8-Dichlorinated Naphthalene | 2050-74-0 | mg/kg | 5 | ND |
| 1,2,3-Trichlorinated Naphthalene | 50402-52-3 | mg/kg | 5 | ND |
| 1,2,3,4-Tetrachlorinated Naphthalene | 20020-02-4 | mg/kg | 5 | ND |
| 1,2,3,4,6-Pentachlorinated Naphthalene | 67922-26-3 | mg/kg | 5 | ND |
| Octa-chlorinated Naphthalene | 2234-13-1 | mg/kg | 5 | ND |

**Polychlorinated Terphenyls (PCTs)**

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

| Test Item(s) | CAS No. | Unit(s) | MDL | A1 |
|---|---|---|---|---|
| Aroclor 5432 | 63496-31-1 | mg/kg | 5 | ND |
| Aroclor 5442 | 12642-23-8 | mg/kg | 5 | ND |
| Aroclor 5460 | 11126-42-4 | mg/kg | 5 | ND |

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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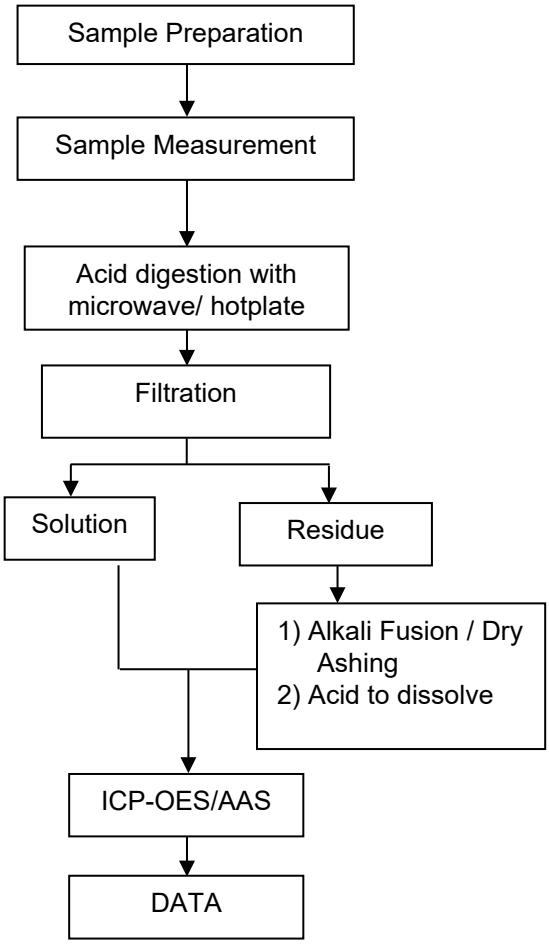
## Elements Testing Flow Chart

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



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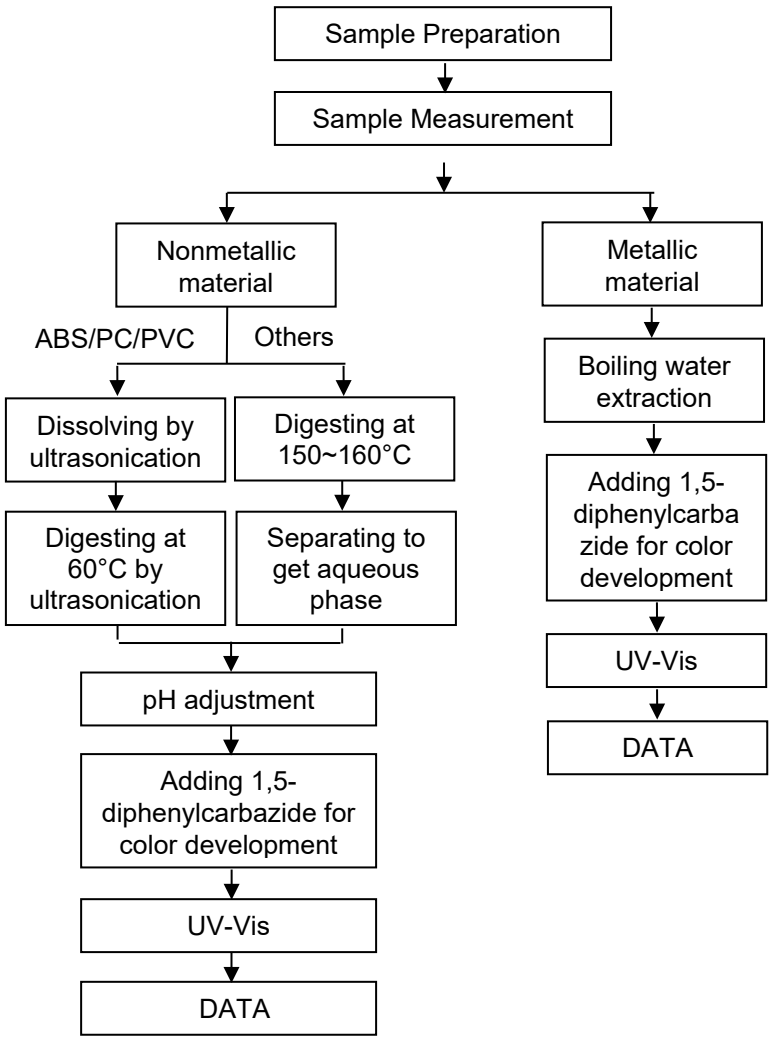
## Hexavalent Chromium (Cr(VI)) Testing Flow Chart



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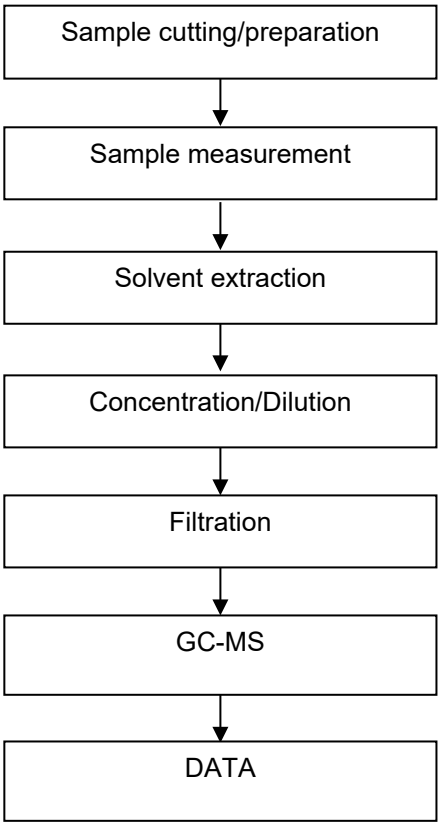
## PBB/PBDE/Phthalates Testing Flow Chart



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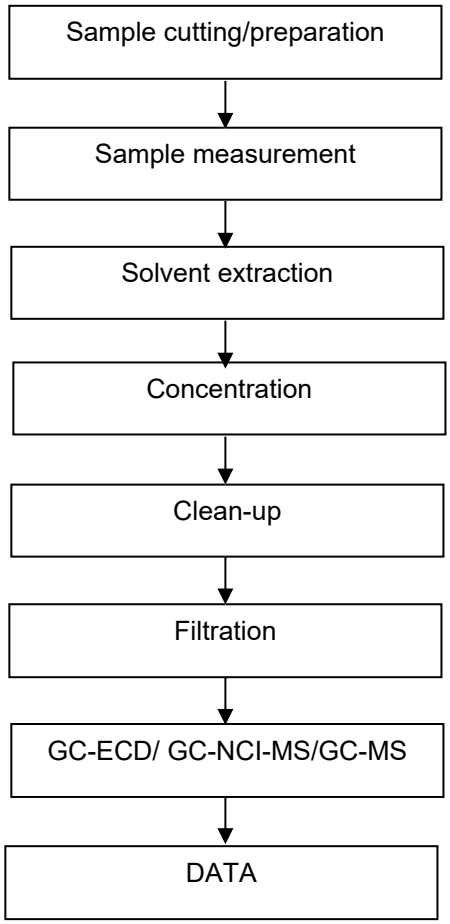
## Chlorinated Paraffin Testing Flow Chart



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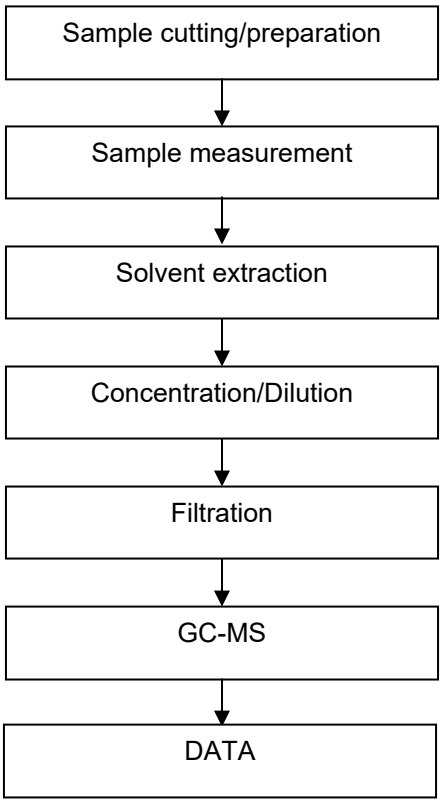
## DMF (Dimethyl fumarate) Testing Flow Chart



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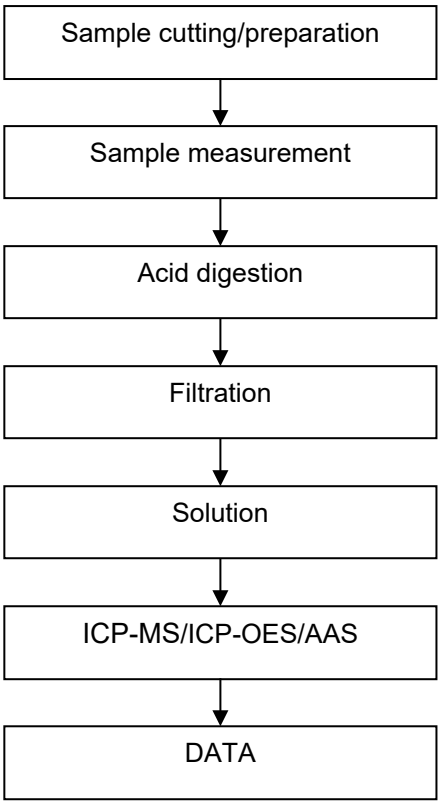
## Elements Testing Flow Chart



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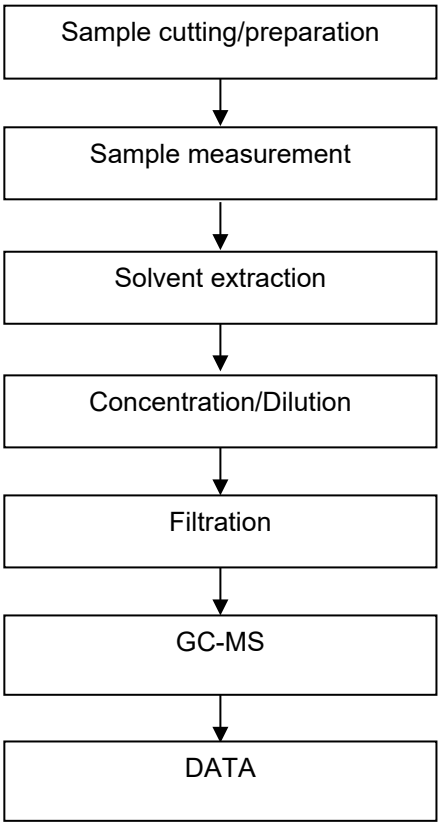
## Phthalates Testing Flow Chart



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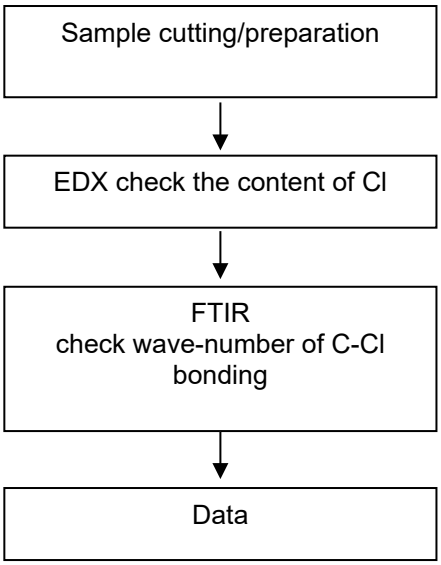
## PVC Testing Flow Chart



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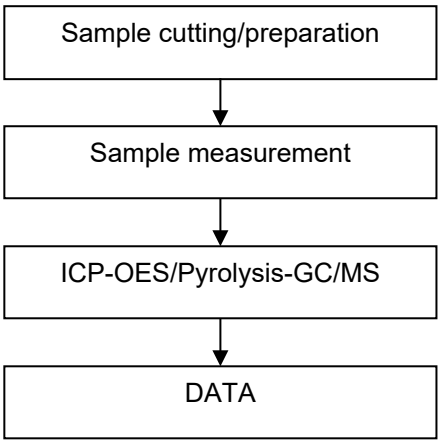
## Red Phosphorus Testing Flow Chart



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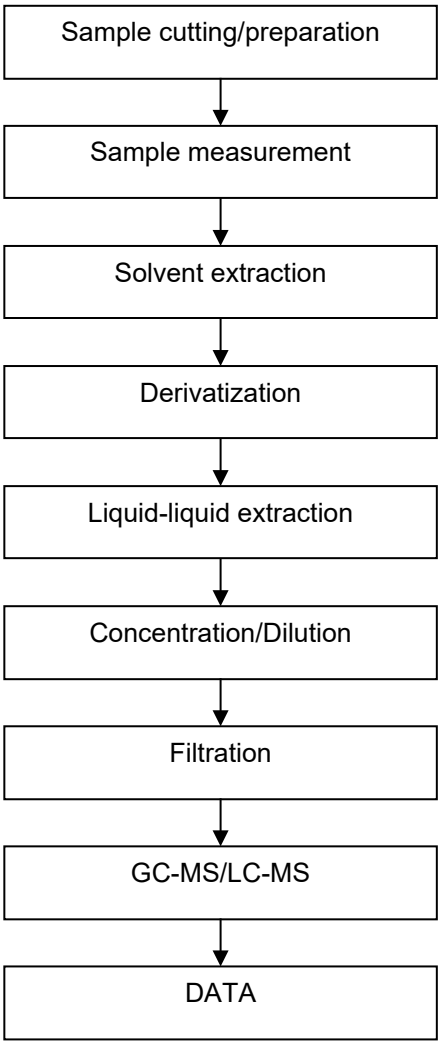
## TBBP-A Testing Flow Chart



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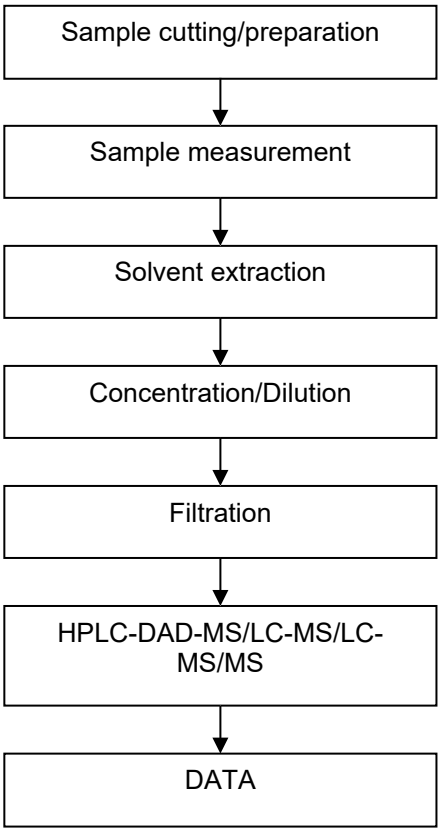
## Bisphenols Testing Flow Chart



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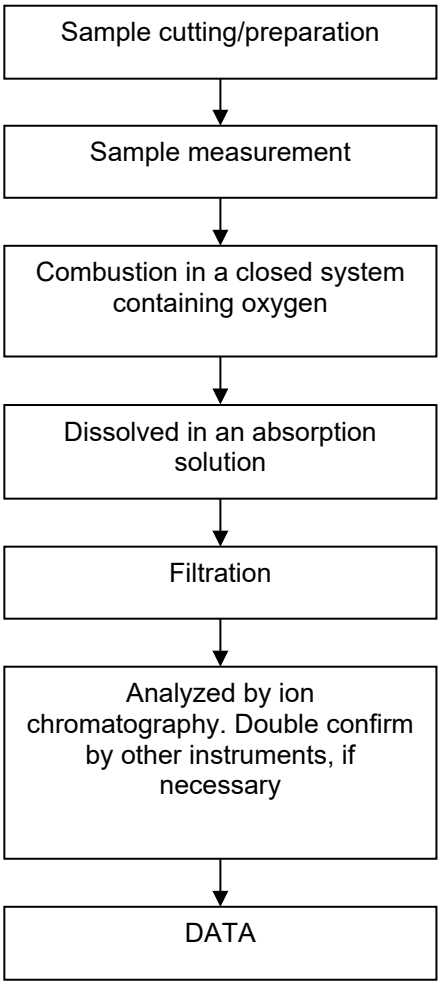
## Halogen Testing Flow Chart



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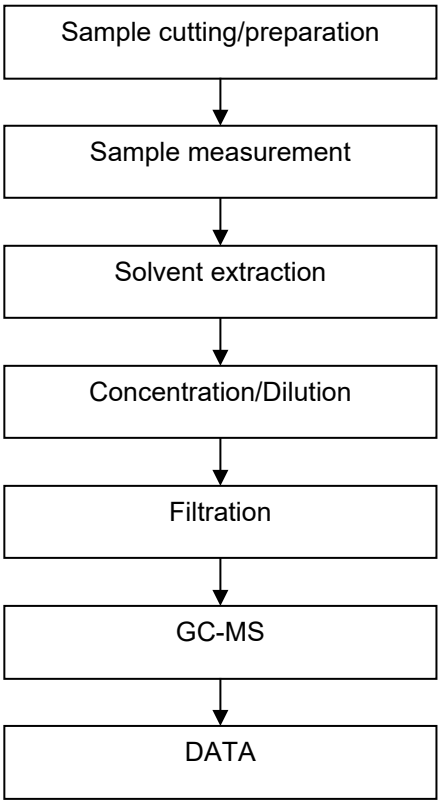
## HBCDD Testing Flow Chart



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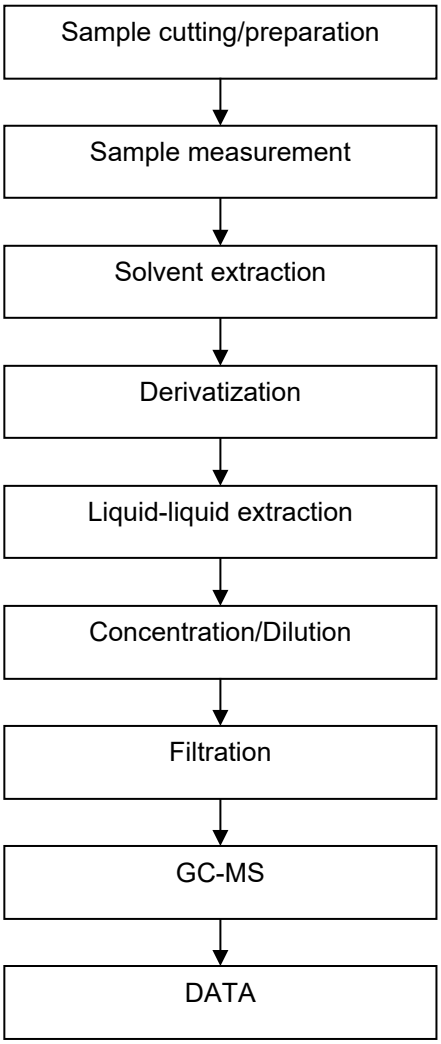
## Organotin Testing Flow Chart



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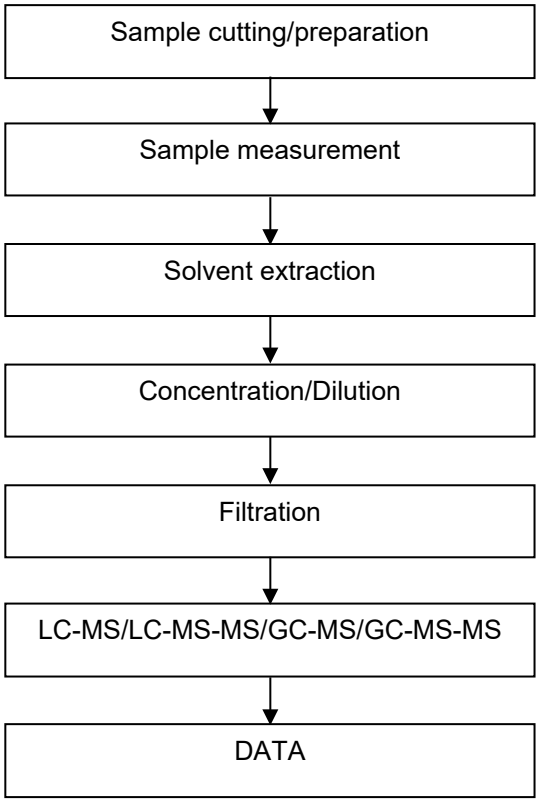
## PFASs/ PFOS/PFOA Testing Flow Chart



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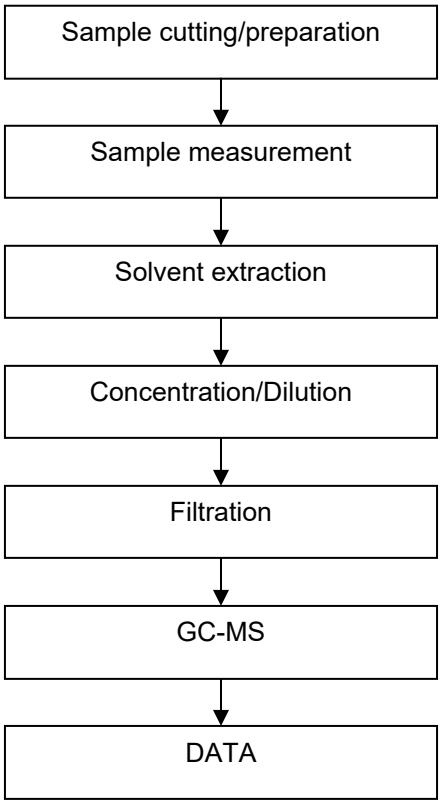
## PCB Testing Flow Chart



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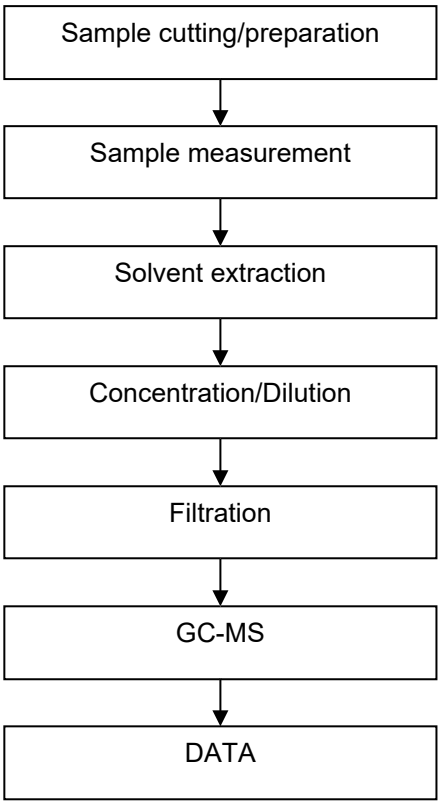
## PCN Testing Flow Chart



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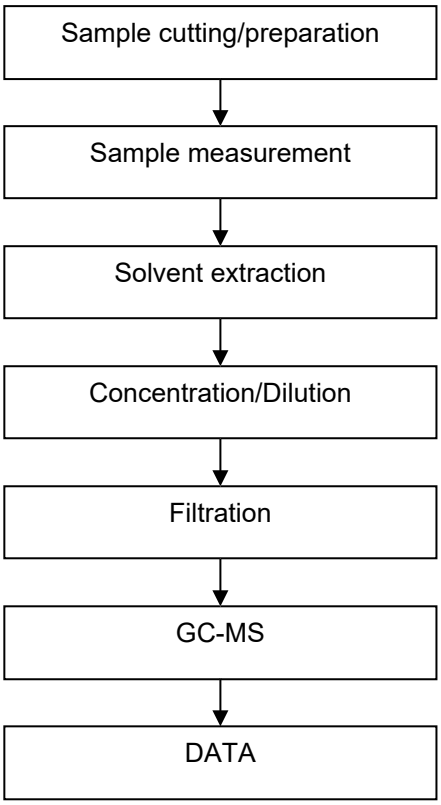
## PCT Testing Flow Chart



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TI Report Number : 92789204

Component : Die Attach Adhesive

Analysis Type : Other-Halogen

Analysis Date : 02/20/2025

[redacted]

# Test Report [redacted]



[redacted]

**The following sample(s) was/were submitted and identified by the applicant as:**

Sample Submitted By : [redacted]
Sample Name : ADHESIVE
Style/Item No. : [redacted]

==========

Sample Receiving Date : 13-Feb-2025
Testing Period : 13-Feb-2025 to 20-Feb-2025

**Test Requested** : As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine in the submitted sample.

**Test Results** : Please refer to following pages.

[redacted]

[redacted]

[redacted]

**Test Part Description**

No.1 : GRAY PASTE

**Test Result(s)**

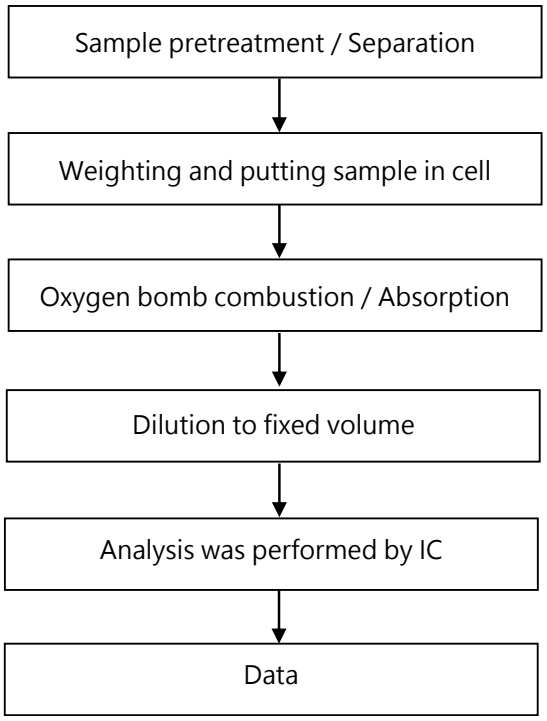
| Test Item(s) | Method | Unit | MDL | Result |
|---|---|---|---|---|
| | | | | No.1 |
| Fluorine (F) (CAS No.: 14762-94-8) | With reference to EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Chlorine (Cl) (CAS No.: 22537-15-1) | With reference to EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Bromine (Br) (CAS No.: 10097-32-2) | With reference to EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Iodine (I) (CAS No.: 14362-44-8) | With reference to EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |

**Note：**

1. mg/kg = ppm；0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected ( Less than MDL)

[redacted]

**Analytical flow chart - Halogen**



[redacted]

* The tested sample / part is marked by an arrow if it's shown on the photo. *

[redacted]


** End of Report **

TI Report Number : 92789202

Component : Die Attach Adhesive

Analysis Type : RoHS 10

Analysis Date : 02/20/2025

[redacted]

# Test Report [redacted] Date: 20-Feb-2025 

[redacted]

**The following sample(s) was/were submitted and identified by the applicant as:**

Sample Submitted By : [redacted]
Sample Name : ADHESIVE
Style/Item No. : [redacted]

==========

Sample Receiving Date : 13-Feb-2025
Testing Period : 13-Feb-2025 to 20-Feb-2025

**Test Results** : Please refer to following pages.

| Test Requested | Conclusion |
|---|---|
| RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU | PASS |
| Other items :<br>- Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)<br>- Beryllium (Be)<br>- Phthalates (DIDP, DINP, DNOP) | See Results |

[redacted]

[redacted]

[redacted]

**Test Part Description**

No.1 : GRAY PASTE

**Test Result(s)**

| Test Item(s) | Method | Unit | MDL | Result No.1 | Limit |
|---|---|---|---|---|---|
| Cadmium (Cd) | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. | 100 |
| Lead (Pb) | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. | 1000 |
| Mercury (Hg) | With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. | 1000 |
| Hexavalent Chromium Cr(VI) | With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS. | mg/kg | 8 | n.d. | 1000 |
| Monobromobiphenyl | With reference to IEC 62321-6: 2015, analysis was performed by GC/MS. | mg/kg | 5 | n.d. | - |
| Dibromobiphenyl | | mg/kg | 5 | n.d. | - |
| Tribromobiphenyl | | mg/kg | 5 | n.d. | - |
| Tetrabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Pentabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Hexabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Heptabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Octabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Nonabromobiphenyl | | mg/kg | 5 | n.d. | - |
| Decabromobiphenyl | | mg/kg | 5 | n.d. | - |
| **Sum of PBBs** | | mg/kg | - | n.d. | 1000 |
| Monobromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Dibromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Tribromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Tetrabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Pentabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Hexabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Heptabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Octabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Nonabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| Decabromodiphenyl ether | | mg/kg | 5 | n.d. | - |
| **Sum of PBDEs** | | mg/kg | - | n.d. | 1000 |

[redacted]

| Test Item(s) | Method | Unit | MDL | Result No.1 | Limit |
|---|---|---|---|---|---|
| Butyl benzyl phthalate (BBP) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. | 1000 |
| Dibutyl phthalate (DBP) | | mg/kg | 50 | n.d. | 1000 |
| Di-(2-ethylhexyl) phthalate (DEHP) | | mg/kg | 50 | n.d. | 1000 |
| Diisobutyl phthalate (DIBP) | | mg/kg | 50 | n.d. | 1000 |

| Test Item(s) | Method | Unit | MDL | Result No.1 | Limit |
|---|---|---|---|---|---|
| Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. | - |
| Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0) | | mg/kg | 50 | n.d. | - |
| Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0) | | mg/kg | 50 | n.d. | - |
| Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) | With reference to IEC 62321-9: 2021, analysis was performed by GC/MS. | mg/kg | 20 | n.d. | - |
| Beryllium (Be) (CAS No.: 7440-41-7) | With reference to US EPA 3050B: 1996, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. | - |

**Note：**

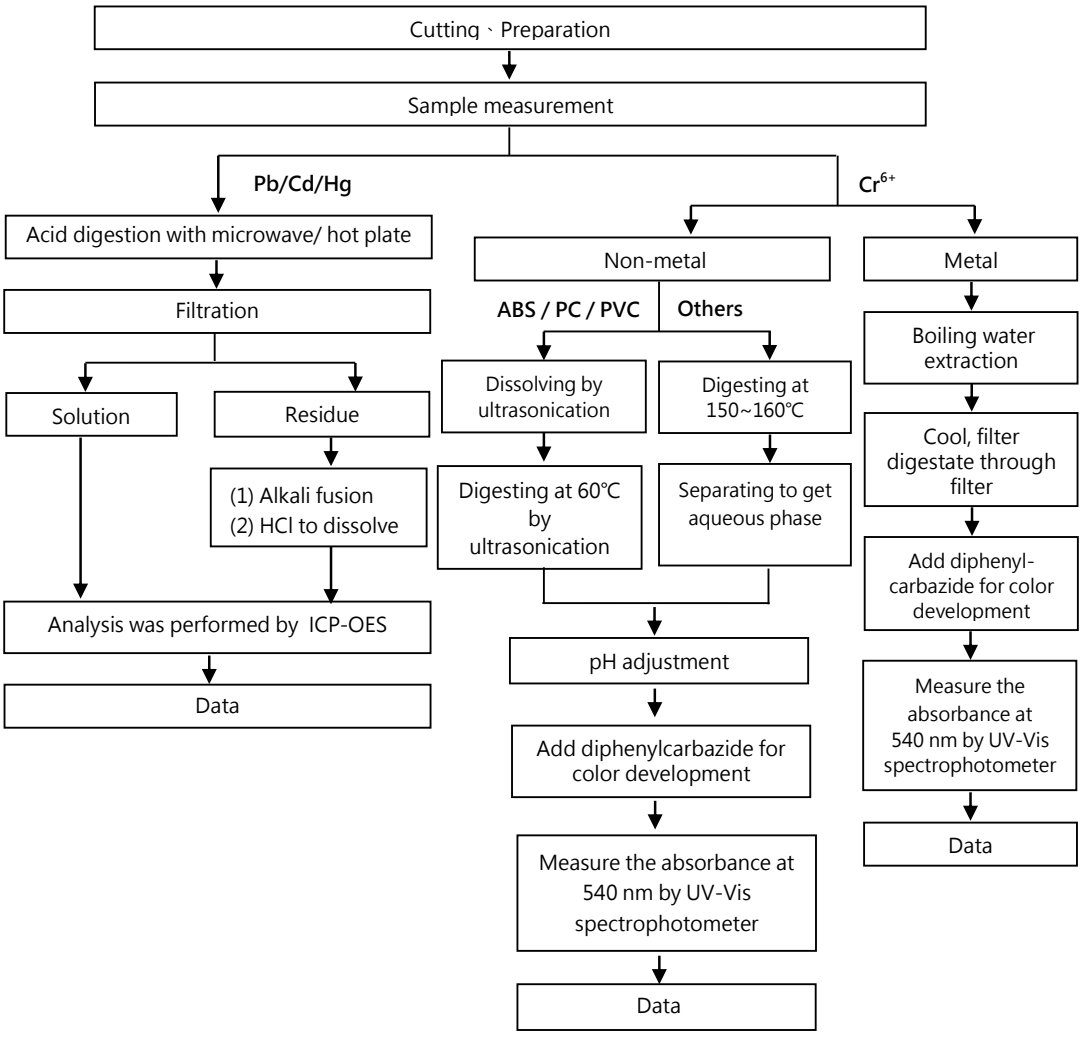
1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected ( Less than MDL)
4. "-" = Not Regulated
5. Unless otherwise stated , the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

[redacted]

## Analytical flow chart of heavy metal

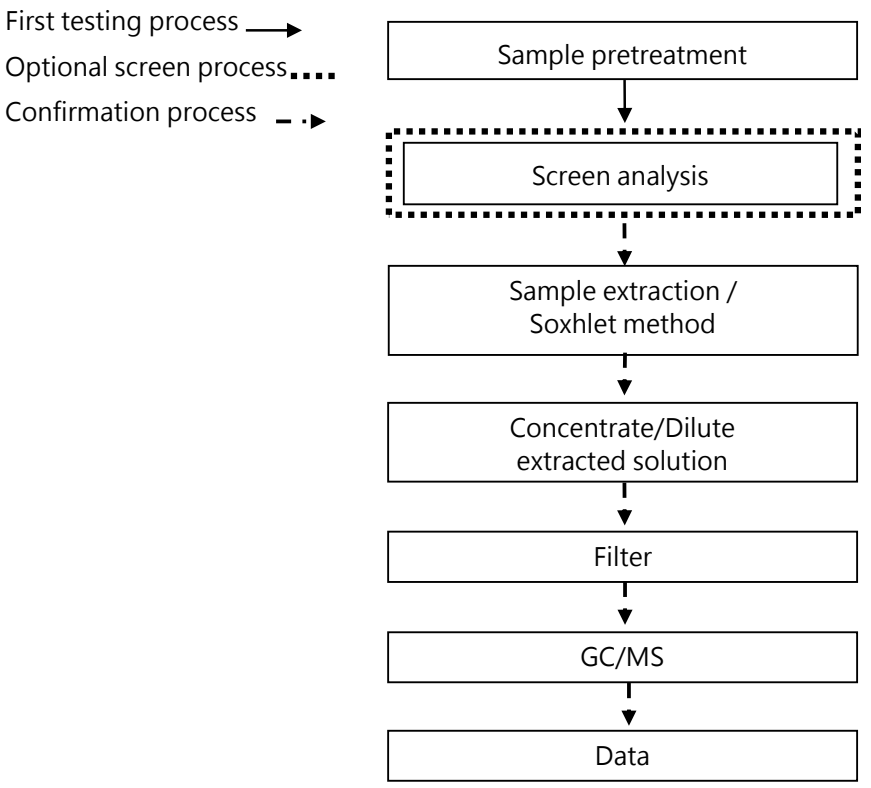
These samples were dissolved totally by pre-conditioning method according to below flow chart.

( $Cr^{6+}$ test method excluded )



[redacted]

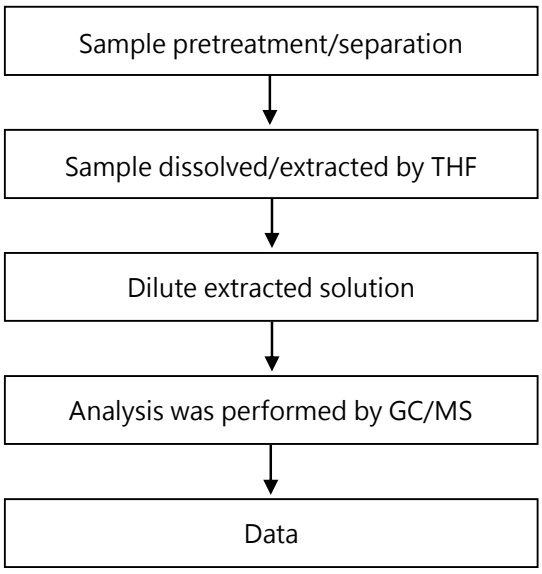
**Analytical flow chart – PBBs / PBDEs**



[redacted]

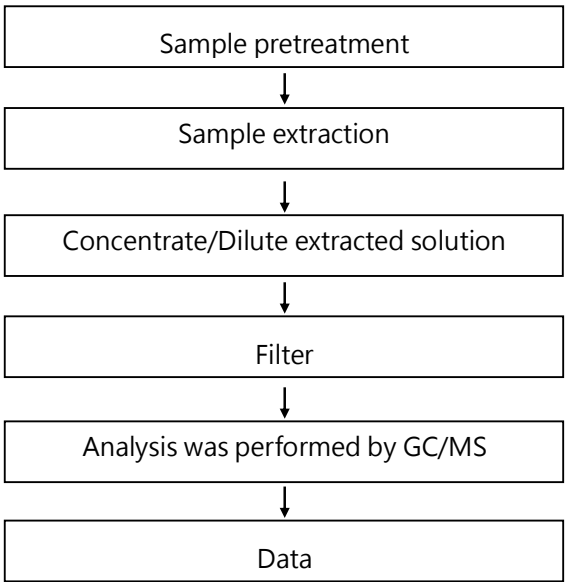
## Analytical flow chart - Phthalate

【Test method: IEC 62321-8】



[redacted]

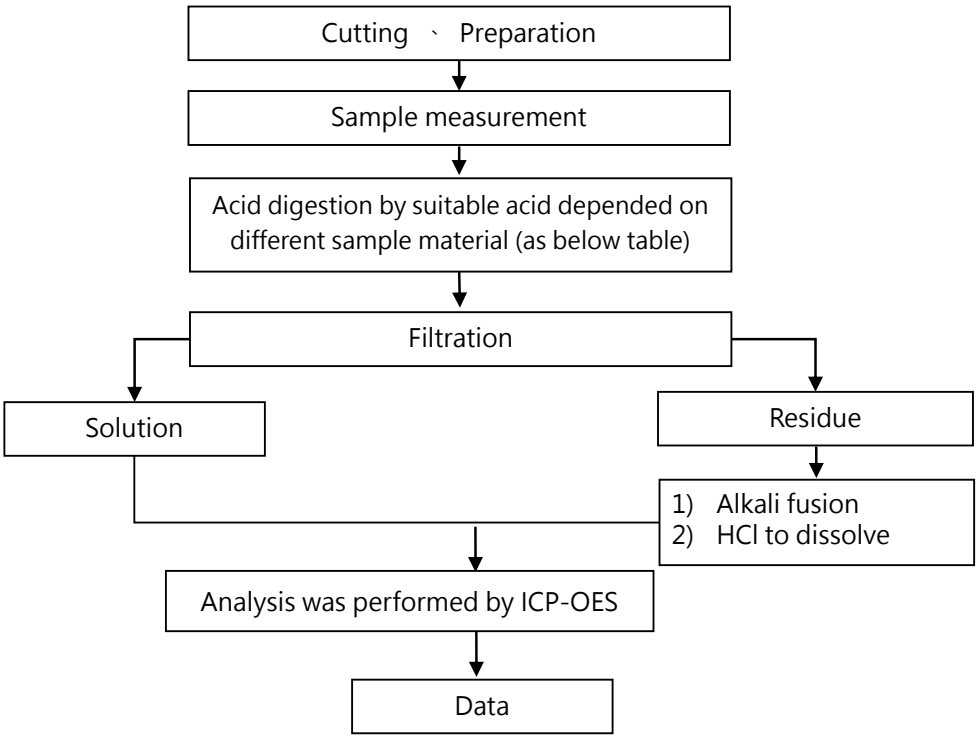
## Analytical flow chart - HBCDD



[redacted]

**Flow chart of digestion for the elements analysis performed by ICP-OES**

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




| | |
|---|---|
| Steel, copper, aluminum, solder | Aqua regia, $HNO_3$, HCl, HF, $H_2O_2$ |
| Glass | $HNO_3$/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | $HNO_3$ |
| Plastic | $H_2SO_4$, $H_2O_2$, $HNO_3$, HCl |
| Others | Added appropriate reagent to total digestion |

[redacted]

* The tested sample / part is marked by an arrow if it's shown on the photo. *

[redacted]


** End of Report **

TI Report Number : 85837546

Component : Mold Compound

Analysis Type : RoHS 10 & Halogens

Analysis Date : 01/10/2025

# Test Report

**No.:** [redacted] **Date:** Jan 10, 2025 

Client Name: [redacted]

Client Address: [redacted]

Sample Name: [redacted]

Client Ref. Information: Production Date：2024.11

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

---

SGS Job No.: [redacted]

Sample Receiving Date: Dec 26, 2024

Testing Period: Dec 26, 2024 ~ Jan 10, 2025

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 |
| Chlorinated Paraffins | See Results |
| Element(s) | See Results |
| Halogen | See Results |
| Hexabromocyclododecane (HBCDD) | See Results |
| Phthalates | See Results |
| Polychlorinated Biphenyls(PCBs) | See Results |
| Polychlorinated Naphthalenes (PCNs) | See Results |

[redacted]



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| Test Requirement | Conclusion |
|---|---|
| Polychlorinated Terphenyls (PCTs) | See Results |
| Polyvinyl chloride (PVC) | See Results |
| Organic-tin compounds | See Results |
| Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid (PFOS) and its derivatives | See Results |

**Test Result(s):**

Test Part Description：

| SN ID | Sample No. | SGS Sample ID | Description |
|---|---|---|---|
| SN1 | A4 | SHA24-0297041-0001.C004 | Dark-grey solid |

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 | A4 |
|---|---|---|---|---|
| Lead (Pb) | 1000 | mg/kg | 2 | ND |
| 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 |


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| Test Item(s) | Limit | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| 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 |
| 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.

**Chlorinated Paraffins**

**Test Method:** With reference to US EPA 3540C: 1996, analysis was performed by GC-ECD / GC-NCI-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| Short Chain Chlorinate Paraffins(SCCP)($C_{10}$-$C_{13}$) | 85535-84-8 | mg/kg | 50 | ND |

**Element(s)**

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

| Test Item(s) | Unit(s) | MDL | A4 |
|---|---|---|---|
| Arsenic(As) | mg/kg | 10 | ND |
| Beryllium(Be) | mg/kg | 5 | ND |
| Antimony(Sb) | mg/kg | 10 | ND |

**Halogen**

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


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| Test Item(s) | Unit(s) | MDL | A4 |
|---|---|---|---|
| Fluorine(F) | mg/kg | 20 | ND |
| Chlorine(Cl) | mg/kg | 50 | ND |
| Bromine(Br) | mg/kg | 50 | ND |
| Iodine(I) | mg/kg | 50 | ND |

**Hexabromocyclododecane (HBCDD)**

**Test Method:** With reference to IEC 62321-9:2021, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| Hexabromocyclododecane (HBCDD) | 134237-50-6 /134237-51-7 /134237-52-8 /25637-99-4 /3194-55-6 | mg/kg | 20 | ND |

**Phthalates**

**Test Method:** With reference to IEC 62321-8:2017, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| Dibutyl Phthalate(DBP) | 84-74-2 | mg/kg | 50 | ND |
| Benzyl Butyl Phthalate(BBP) | 85-68-7 | mg/kg | 50 | ND |
| Bis-(2-ethylhexyl) Phthalate(DEHP) | 117-81-7 | mg/kg | 50 | ND |
| Diisononyl Phthalate (DINP) | 28553-12-0 /68515-48-0 | mg/kg | 50 | ND |
| Di-n-Octyl Phthalate(DNOP) | 117-84-0 | mg/kg | 50 | ND |
| Diisodecyl Phthalate (DIDP) | 26761-40-0 /68515-49-1 | mg/kg | 50 | ND |
| Diisobutyl Phthalate(DIBP) | 84-69-5 | mg/kg | 50 | ND |
| Bis(2-methoxyethyl)phthalate(DMEP) | 117-82-8 | mg/kg | 50 | ND |
| Di-n-Hexyl Phthalate(DnHP) | 84-75-3 | mg/kg | 50 | ND |
| Dipentyl Phthalate (DPENP/DnPP) | 131-18-0 | mg/kg | 50 | ND |
| Diphenyl Phthalate(DPhP) | 84-62-8 | mg/kg | 50 | ND |
| Diethyl Phthalate(DEP) | 84-66-2 | mg/kg | 50 | ND |
| Diisopentyl Phthalate(DIPP) | 605-50-5 | mg/kg | 50 | ND |
| n-pentyl Isopentyl Phthalate(nPIPP) | 776297-69-9 | mg/kg | 50 | ND |
| 1,2-Benzenedicarboxylic Acid,di-C6-8-branched alkyl esters,C7-rich(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 |

**Polychlorinated Biphenyls(PCBs)**

**Test Method:** With reference to US EPA 3540C:1996, analysis was performed by GC-MS

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| 2,4,4'-Trichlorobiphenyl(PCB28) | 7012-37-5 | mg/kg | 0.5 | ND |



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| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| 2,2',5,5'-Tetrachlorobiphenyl(PCB52) | 35693-99-3 | mg/kg | 0.5 | ND |
| 2,2',4,5,5'-Pentachlorobiphenyl(PCB101) | 37680-73-2 | mg/kg | 0.5 | ND |
| 2,3',4,4',5-Pentachlorobiphenyl(PCB118) | 31508-00-6 | mg/kg | 0.5 | ND |
| 2,2',3,4,4',5'-Hexachlorobiphenyl(PCB138) | 35065-28-2 | mg/kg | 0.5 | ND |
| 2,2',4,4',5,5'-Hexachlorobiphenyl(PCB153) | 35065-27-1 | mg/kg | 0.5 | ND |
| 2,2',3,4,4',5,5'-Heptachlorobiphenyl(PCB180) | 35065-29-3 | mg/kg | 0.5 | ND |

**Polychlorinated Naphthalenes (PCNs)**

**Test Method:** With reference to US EPA 3540C:1996, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| 1-Chlorinated Naphthalene | 90-13-1 | mg/kg | 5 | ND |
| 2-Chlorinated Naphthalene | 91-58-7 | mg/kg | 5 | ND |
| 1,4-Dichlorinated Naphthalene | 1825-31-6 | mg/kg | 5 | ND |
| 1,5-Dichlorinated Naphthalene | 1825-30-5 | mg/kg | 5 | ND |
| 1,2-Dichlorinated Naphthalene | 2050-69-3 | mg/kg | 5 | ND |
| 1,8-Dichlorinated Naphthalene | 2050-74-0 | mg/kg | 5 | ND |
| 1,2,3-Trichlorinated Naphthalene | 50402-52-3 | mg/kg | 5 | ND |
| 1,2,3,4-Tetrachlorinated Naphthalene | 20020-02-4 | mg/kg | 5 | ND |
| 1,2,3,4,6-Pentachlorinated Naphthalene | 67922-26-3 | mg/kg | 5 | ND |
| Octa-Chlorinaed Naphthalene | 2234-13-1 | mg/kg | 5 | ND |

**Polychlorinated Terphenyls (PCTs)**

**Test Method:** With reference to US EPA 3540C:1996, analysis was performed by GC-MS.

| Test Item(s) | CAS No. | Unit(s) | MDL | A4 |
|---|---|---|---|---|
| Aroclor 5432 | 63496-31-1 | mg/kg | 5 | ND |
| Aroclor 5442 | 12642-23-8 | mg/kg | 5 | ND |
| Aroclor 5460 | 11126-42-4 | mg/kg | 5 | ND |

**Polyvinyl chloride (PVC)**

**Test Method:** With reference to SGS in house method, analysis was performed by FTIR/HATR.

| Test Item(s) | A4 |
|---|---|
| Polyvinyl chloride (PVC) | Negative |

**Notes:**
(1) Negative=Undetectable, Positive=Detectable

**Organic-tin compounds**

**Test Method:** With reference to ISO 17353:2004, analysis was performed by GC-MS.


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| Test Item(s) | Unit(s) | MDL | A4 |
|---|---|---|---|
| Dibutyl tin(DBT) | mg/kg | 0.02 | ND |
| Tributyl tin(TBT) | mg/kg | 0.02 | ND |
| Dioctyl tin(DOT) | mg/kg | 0.02 | ND |
| Tri-n-propyltin(TPT) | mg/kg | 0.02 | ND |
| Bis(tributyltin) oxide (TBTO) ◆ | mg/kg | 0.02 | ND |

**Notes:**
(1) ◆ TBTO is back calculated based on the worst-case scenario of TBT.

**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 | A4 |
|---|---|---|---|---|
| **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 |
| Perfluorooctane sulfonamidoacetic Acid (FOSAA), its salts^ | 2806-24-8 | mg/kg | 0.010 | ND |
| N-Methylperfluoro-1-octanesulfonamidoacetic Acid (N-MeFOSAA), its salts^ | 2355-31-9 | mg/kg | 0.010 | ND |
| N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA), its salts^ | 2991-50-6 | mg/kg | 0.010 | ND |
| Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives | - | mg/kg | - | ND |
| **PFOA, its salts** | | | | |
| Perfluorooctanoic acid (PFOA), its salts^ | 335-67-1 | mg/kg | 0.010 | ND |

**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-$NH_2(C_2H_4OH)_2$) | 70225-14-8 |
| Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-$N(C_2H_5)_4$) | 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-$N(C_{10}H_{21})_2(CH_3)_2$) | 251099-16-8 |
| TetrabutylAmmonium perfluorooctanesulfonate (PFOS-$N(C_4H_9)_4$) | 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 |
| Perfluorooctanesulfonate | 45298-90-6 |
| Triethylammonium perfluorooctane sulfonate (PFOS-$N(C_2H_5)_3$) | 54439-46-2 |
| Tetramethylammonium perfluorooctane sulfonate (PFOS-$N(CH_3)_4$) | 56773-44-5 |
| N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-$N(C_3H_7)_3(C_5H_{11})$) | 56773-56-9 |
| N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-$N(C_4H_9)_3(CH_3)$) | 124472-68-0 |
| 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 ($C_4H_9)_4$)) | 2185049-59-4 |
| Perfluorooctanesulfonic acid diethylamine salt (PFOS-$C_4H_{11}N$) | 2205029-08-7 |
| heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-$C_{15}H_{30}NO_2$) | 1203998-97-3 |
| Perfluorooctane sulfonic anhydride (PFOSAN) | 423-92-7 |
| **FOSAA, its salts** | |
| 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 |
| **N-MeFOSAA, its salts** | |
| 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 |
| **N-EtFOSAA, its salts** | |

| | |
|---|---|
| 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-$NH_4$) | 2991-52-8 |
| Sodium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-Na) | 3871-50-9 |
| **PFOSA, its salts** | |
| 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-$NH_4$) | 76752-72-2 |
| Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-$C_6H_{15}N$) | 76752-82-4 |
| **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 perfluorooctanote (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($C_4H_{10}N$)) | 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($H_2O$)$_2$) | 98065-31-7 |
| Perfluorooctanoic acid compd. with ethanamine (1:1) (PFOA-$C_2H_7N$) | 1376936-03-6 |
| Pentadecafluorooctanoic acid--pyridine (1/1) (PFOA-$C_5H_5N$) | 95658-47-2 |
| pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-$C_{10}H_{14}N_2$) | 1514-68-7 |
| N,N,N-Trimethyloctan-1-aminium pentadecafluorooctanoate (PFOA-$C_{11}H_{26}N$) | 927835-01-6 |


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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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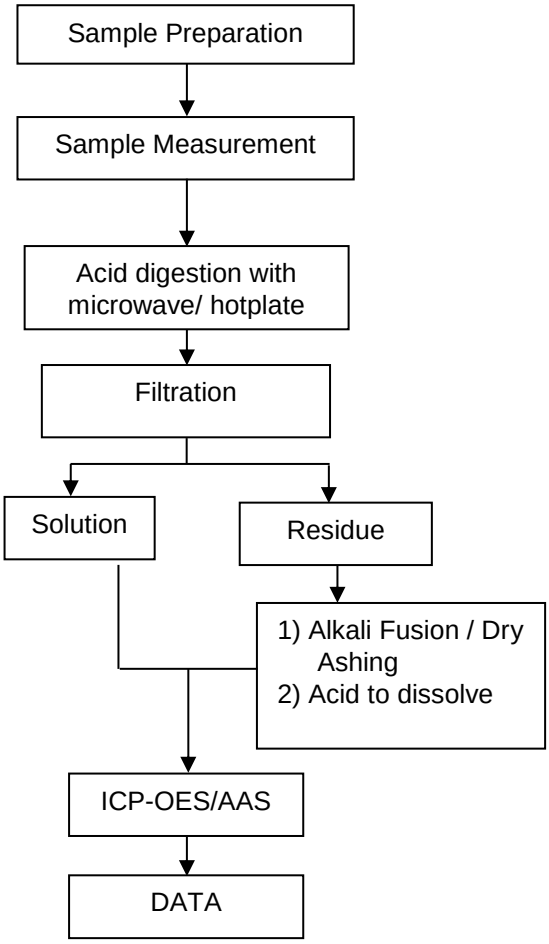
**ATTACHMENTS**

**Elements Testing Flow Chart**

Name of the person who made testing: Meria Jin/Sielina Song
Name of the person in charge of testing: John Cheng
These samples were dissolved totally by pre-conditioning method according to below flow chart.



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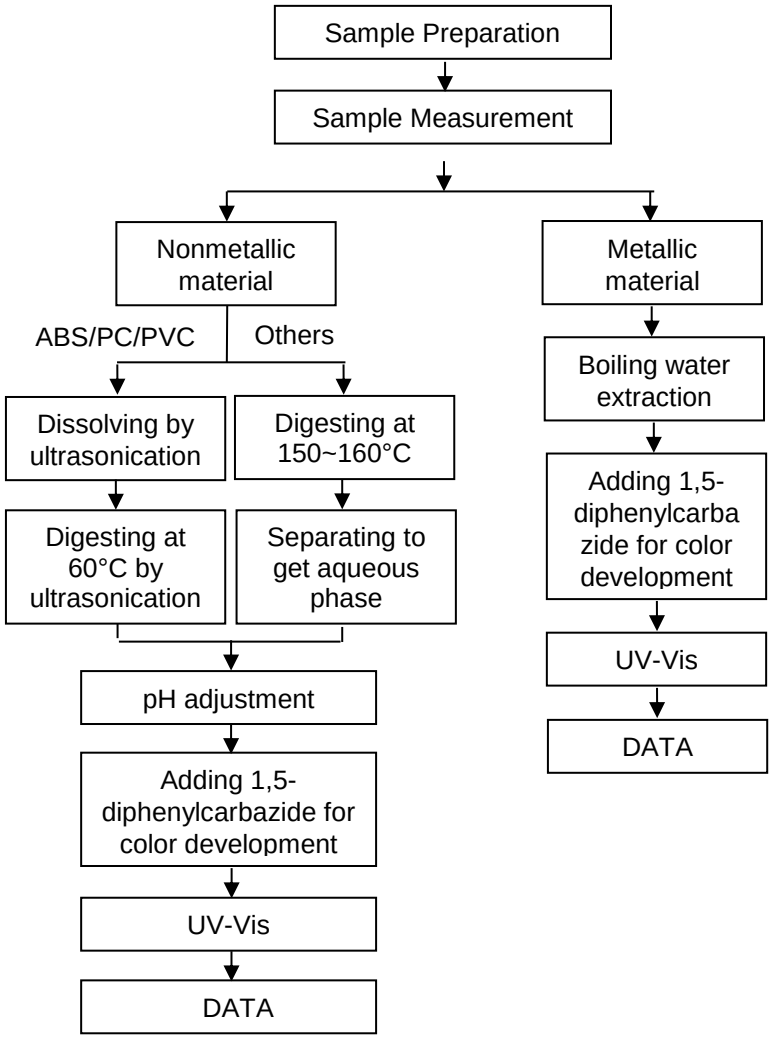
**ATTACHMENTS**

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

Name of the person who made testing: Alex Wang
Name of the person in charge of testing: Xiaolong Yang



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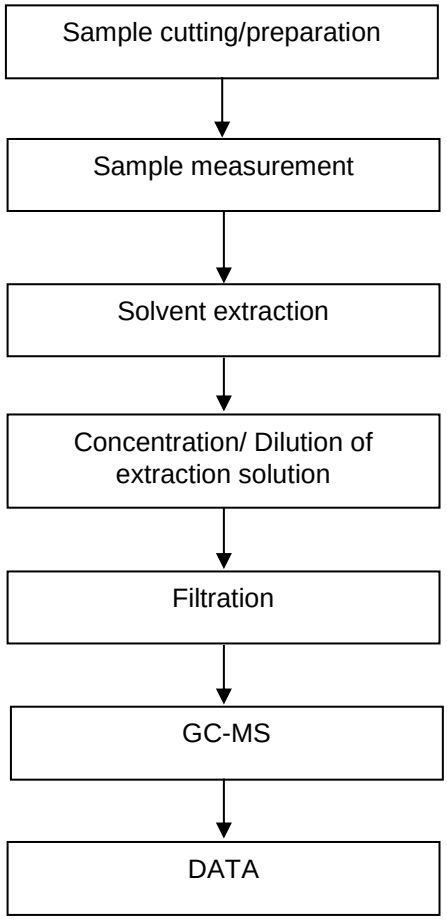
**ATTACHMENTS**

**PBB/PBDE Testing Flow Chart**

Name of the person who made testing: Gary Xu
Name of the person in charge of testing: Carol Cui



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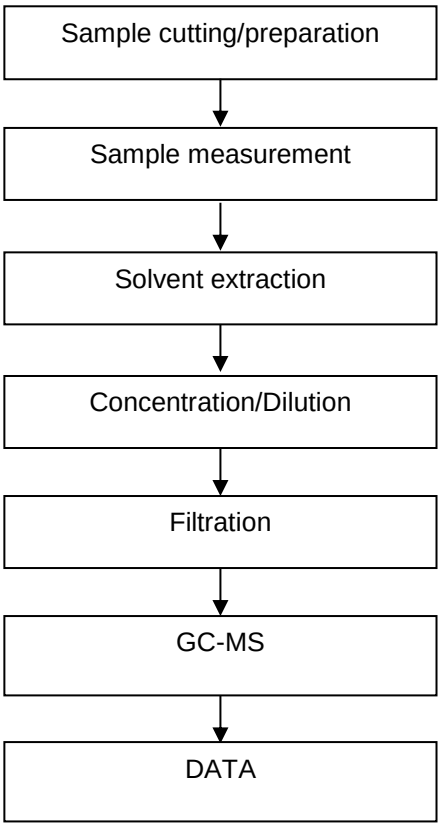
**ATTACHMENTS**

**Phthalates Testing Flow Chart**

Name of the person who made testing: Sherry Shi
Name of the person in charge of testing: Carol Cui



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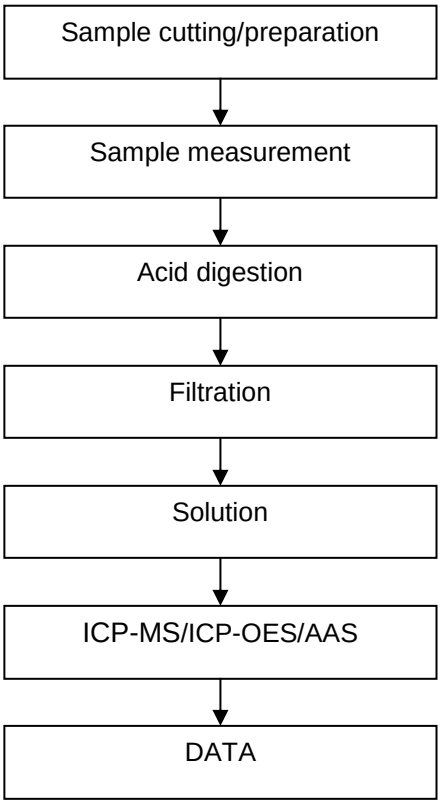
## ATTACHMENTS

### Elements Testing Flow Chart

Name of the person who made testing: Meria Jin/Sielina Song
Name of the person in charge of testing: Carey Shan



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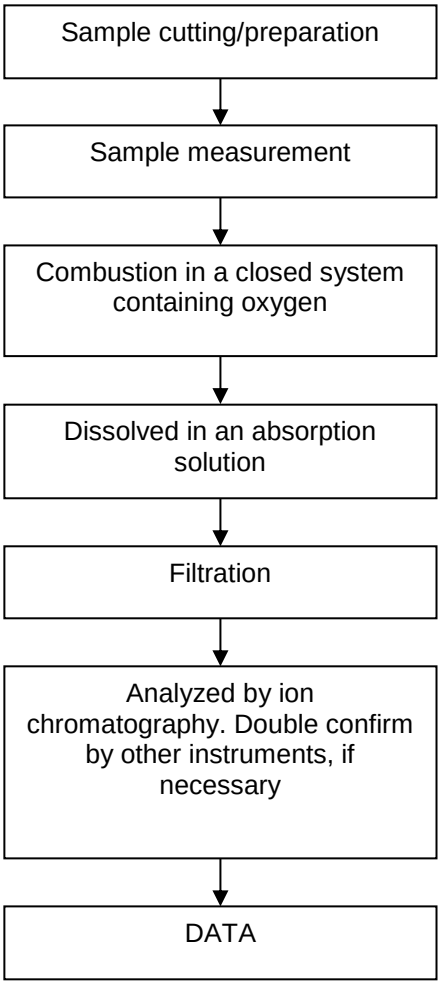
**ATTACHMENTS**

**Halogen Testing Flow Chart**

Name of the person who made testing: Andy Zhang
Name of the person in charge of testing: Gordon Mu



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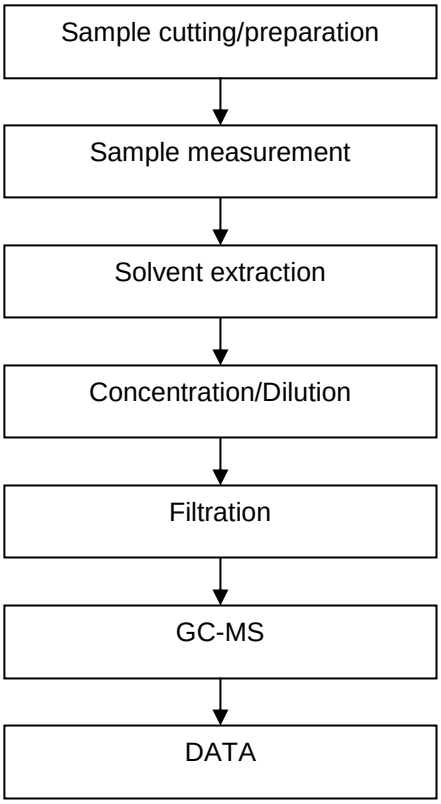
**ATTACHMENTS**

**HBCDD Testing Flow Chart**

Name of the person who made testing: Gary Xu
Name of the person in charge of testing: Carol Cui



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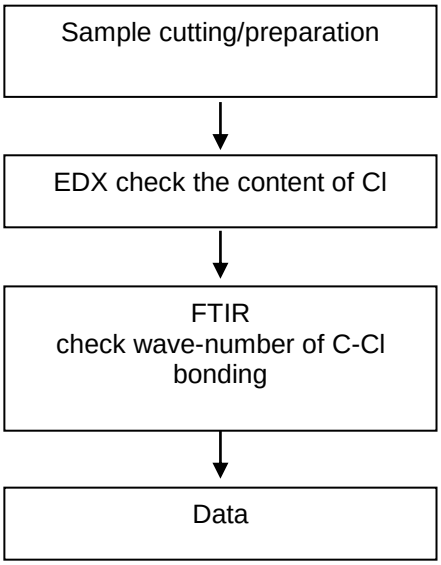
### PVC Testing Flow Chart

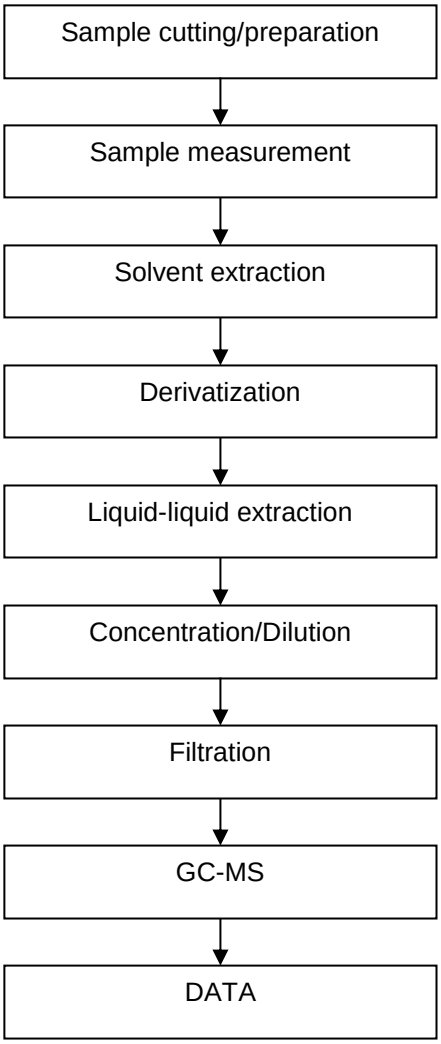
Name of the person who made testing: Mina Mi
Name of the person in charge of testing: Janice Zhang



**ATTACHMENTS**

**Organotin Testing Flow Chart**

Name of the person who made testing: Zhi Shi
Name of the person in charge of testing: Liyas Wang



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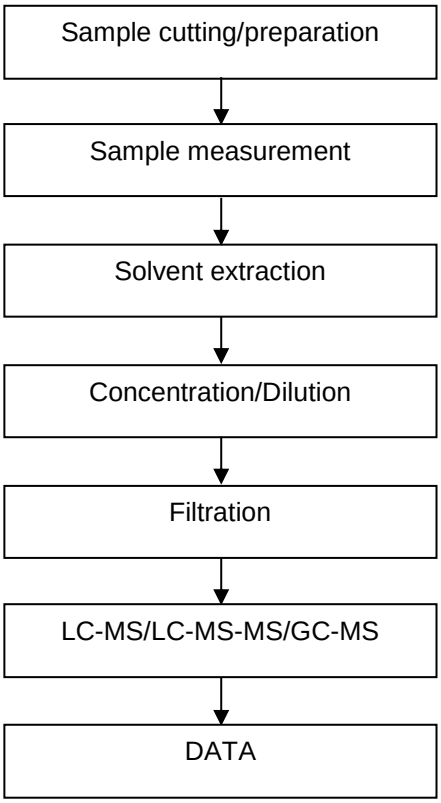
**ATTACHMENTS**

## PFASs/ PFOS/PFOA Testing Flow Chart

Name of the person who made testing: Ance Chen
Name of the person in charge of testing: Liyas Wang



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[redacted]



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TI Report Number : 84030148

Component : Lead Frame

Analysis Type : RoHS 10 & Halogens

Analysis Date : 12/02/2024

[redacted]

# Test Report

No.: [redacted] Date: 02-Dec-2024 

[redacted]

**The following sample(s) was/were submitted and identified by the applicant as:**

| | | |
|---|---|---|
| Sample Submitted By | : | [redacted] |
| Sample Name | : | LEAD FRAME |
| Style/Item No. | : | C7025-UPG RT |
| Sample Material | : | METAL ALLOY |
| SGS File No. | : | AYGU24-09286 |

==========

| | | |
|---|---|---|
| Sample Receiving Date | : | 20-Nov-2024 |
| Testing Period | : | 20-Nov-2024 to 02-Dec-2024 |

**Test Requested** :

(1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

(2) Please refer to next pages for the other item(s).

**Test Results** : Please refer to following pages.

[redacted]

[redacted]

**Test Part Description**

No.1 : GOLDEN/SILVER COLORED METAL SHEET

**Test Result(s)**

| Test Item(s) | Method | Unit | MDL | Result |
|---|---|---|---|---|
| | | | | No.1 |
| Cadmium (Cd) | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. |
| Lead (Pb) | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES. | mg/kg | 2 | 5.00 |
| Mercury (Hg) | With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. |
| Hexavalent Chromium Cr(VI) (#2) | With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS. | μg/cm² | 0.1 | n.d. |
| Monobromobiphenyl | With reference to IEC 62321-6: 2015, analysis was performed by GC/MS. | mg/kg | 5 | n.d. |
| Dibromobiphenyl | | mg/kg | 5 | n.d. |
| Tribromobiphenyl | | mg/kg | 5 | n.d. |
| Tetrabromobiphenyl | | mg/kg | 5 | n.d. |
| Pentabromobiphenyl | | mg/kg | 5 | n.d. |
| Hexabromobiphenyl | | mg/kg | 5 | n.d. |
| Heptabromobiphenyl | | mg/kg | 5 | n.d. |
| Octabromobiphenyl | | mg/kg | 5 | n.d. |
| Nonabromobiphenyl | | mg/kg | 5 | n.d. |
| Decabromobiphenyl | | mg/kg | 5 | n.d. |
| **Sum of PBBs** | | mg/kg | - | n.d. |
| Monobromodiphenyl ether | With reference to IEC 62321-6: 2015, analysis was performed by GC/MS. | mg/kg | 5 | n.d. |
| Dibromodiphenyl ether | | mg/kg | 5 | n.d. |
| Tribromodiphenyl ether | | mg/kg | 5 | n.d. |
| Tetrabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Pentabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Hexabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Heptabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Octabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Nonabromodiphenyl ether | | mg/kg | 5 | n.d. |
| Decabromodiphenyl ether | | mg/kg | 5 | n.d. |
| **Sum of PBDEs** | | mg/kg | - | n.d. |

[redacted]

| Test Item(s) | Method | Unit | MDL | Result |
|---|---|---|---|---|
| | | | | No.1 |
| Polychlorinated biphenyls (PCBs) | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 0.5 | n.d. |
| Polychlorinated naphthalene (PCNs) | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 5 | n.d. |
| Polychlorinated terphenyls (PCTs) | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 0.5 | n.d. |
| Short Chain Chlorinated Paraffins(C10-C13) (SCCP) (CAS No.: 85535-84-8) | With reference to ISO 18219-1: 2021, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Triphenyl tin (TPT) | With reference to ISO 17353: 2004, analysis was performed by GC/FPD. | mg/kg | 0.03 | n.d. |
| Tributyl tin (TBT) | With reference to ISO 17353: 2004, analysis was performed by GC/FPD. | mg/kg | 0.03 | n.d. |
| Dioctyl tin (DOT) | With reference to ISO 17353: 2004, analysis was performed by GC/FPD. | mg/kg | 0.03 | n.d. |
| Dibutyl tin (DBT) | With reference to ISO 17353: 2004, analysis was performed by GC/FPD. | mg/kg | 0.03 | n.d. |
| Bis(tributyltin) oxide (TBTO) (CAS No.: 56-35-9) | Calculated from the result of Tributyl Tin (TBT). | mg/kg | 0.03▲ | n.d. |
| Fluorine (F) (CAS No.: 14762-94-8) | With reference to BS EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Chlorine (Cl) (CAS No.: 22537-15-1) | With reference to BS EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Bromine (Br) (CAS No.: 10097-32-2) | With reference to BS EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Iodine (I) (CAS No.: 14362-44-8) | With reference to BS EN 14582: 2016, analysis was performed by IC. | mg/kg | 50 | n.d. |
| Arsenic (As) (CAS No.: 7440-38-2) | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. |
| Beryllium (Be) (CAS No.: 7440-41-7) | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. |
| Antimony (Sb) (CAS No.: 7440-36-0) | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2 | n.d. |

[redacted]

| Test Item(s) | Method | Unit | MDL | Result |
|---|---|---|---|---|
| | | | | No.1 |
| Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ-HBCDD) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) | With reference to IEC 62321: 2008, analysis was performed by GC/MS. | mg/kg | 5 | n.d. |
| Polyvinyl chloride (PVC) | With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test. | ** | - | Negative |
| Dibutyl phthalate (DBP) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Butyl benzyl phthalate (BBP) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Di-(2-ethylhexyl) phthalate (DEHP) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Diisobutyl phthalate (DIBP) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Di-n-hexyl phthalate (DNHP) (CAS No.: 84-75-3) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Bis(2-methoxyethyl) phthalate (DMEP) (CAS No.: 117-82-8) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| 1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP) (CAS No.: 68515-42-4) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |

[redacted]

| Test Item(s) | Method | Unit | MDL | Result |
|---|---|---|---|---|
| | | | | No.1 |
| 1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP) (CAS No.: 71888-89-6) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Diisopentyl phthalate (DIPP) (CAS No.: 605-50-5) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| N-pentyl iso-pentyl phthalate (NPIPP) (CAS No.: 776297-69-9) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | n.d. |
| Perfluorooctane sulfonates and its salts (PFOS and its salts) (CAS No.: 1763-23-1 and its salts) | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d. |
| Perfluorooctanoic acid and its salts (PFOA and its salts) (CAS No.: 335-67-1 and its salts) | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d. |

**Note：**

1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected ( Less than MDL)
4. "-" = Not Regulated
5. **= Qualitative analysis (No Unit)
6. Negative = Undetectable ; Positive = Detectable
7. (#2) =
   a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).
   b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating
   c. The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.
8. ▲：The MDL was evaluated for element / tested substance.
   Conversion Formula：AX = A × F

| AX | A | F |
|---|---|---|
| Bis(tributyltin)oxide (TBTO) | Tributyl Tin (TBT) | 1.0276 |

Parameter Conversion Table： https://eecloud.sgs.com/Region_TW/DocDownload.aspx?name=Others

[redacted]

**PFAS Remark：**

The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it do not include all PFAS salts with the same carbon number group.)

| Group Name | Substance Name | CAS No. |
|---|---|---|
| PFOS, its salts & derivatives | Perfluorooctane sulfonates (PFOS) | 1763-23-1 |
| | Potassium perfluorooctanesulfonate (PFOS-K) | 2795-39-3 |
| | Perfluorooctanesulfonic acid, lithium salt (PFOS-Li) | 29457-72-5 |
| | Perfluorooctanesulfonic acid, ammonium salt (PFOS-$NH_4$) | 29081-56-9 |
| | Perfluorooctane sulfonate diethanolamine salt (PFOS-$NH(OH)_2$) | 70225-14-8 |
| | Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-$N(C_2H_5)_4$) | 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-DDA) | 251099-16-8 |
| | TetrabutylAmmonium perfluorooctanesulfonate (PFOS-$N(C_4H_9)_4$) | 111873-33-7 |
| | Perfluorooctane sulfonyl fluoride (POSF) | 307-35-7 |
| | Perfluorooctanesulfonic acid, magnesium salt (PFOS-Mg) | 91036-71-4 |
| | Perfluorooctanesulfonic acid, sodium salt (PFOS-Na) | 4021-47-0 |
| | Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate | 71463-74-6 |
| | Perfluorooctanesulfonate (anion) | 45298-90-6 |

[redacted]

| Group Name | Substance Name | CAS No. |
|---|---|---|
| PFOS, its salts & derivatives | 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, compd. with N,N-diethylethanamine (1:1) (PFOS-N($C_2H_5$)$_3$) | 54439-46-2 |
| | Methanaminium, N,N,N-trimethyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N($CH_3$)$_4$) | 56773-44-5 |
| | 1-Pentanaminium, N,N,N-tripropyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N($C_3H_7$)$_3$($C_5H_{11}$)) | 56773-56-9 |
| | 1-Butanaminium, N,N-dibutyl-N-methyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) (PFOS-N($C_4H_9$)$_3$($CH_3$)) | 124472-68-0 |
| | Iodonium, bis[4-(1,1-dimethylethyl)phenyl]-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) | 213740-80-8 |
| | Sulfonium, diphenyl(2,4,6-trimethylphenyl)-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) | 258341-99-0 |
| | Pyridinium, 1-hexadecyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) | 334529-63-4 |
| | 1-Decanaminium, N,N,N-triethyl-, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-1-octanesulfonate (1:1) | 773895-92-4 |
| | Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P($C_4H_9$)$_4$)) | 2185049-59-4 |
| | Perfluorooctanesulfonic acid diethylamine salt (PFOS-$C_4H_{11}N$) | 2205029-08-7 |
| | Heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium perfluorooctanesulfonate (PFOS-$C_{15}H_{30}NO_2$) | 1203998-97-3 |
| | 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, 1,1'-anhydride (PFOSAN) | 423-92-7 |

[redacted]

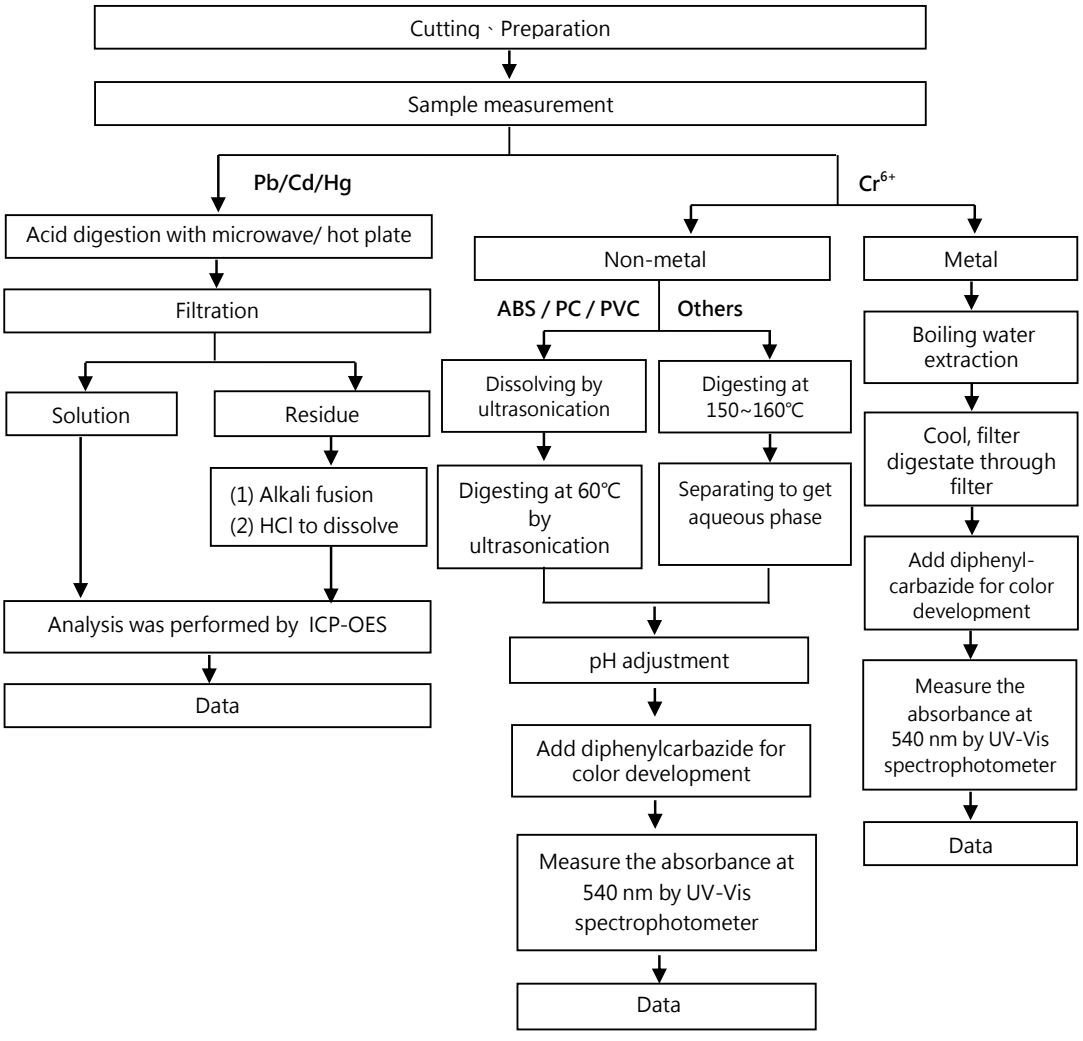
| Group Name | Substance Name | CAS No. |
|---|---|---|
| PFOA, its salts & derivatives | Perfluorooctanoic acid (PFOA) | 335-67-1 |
| | Sodium perfluorooctanoate (PFOA-Na) | 335-95-5 |
| | Potassium perfluorooctanoate (PFOA-K) | 2395-00-8 |
| | Silver perfluorooctanote (PFOA-Ag) | 335-93-3 |
| | Perfluorooctanoyl 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($C_4H_{10}N$) | 423-52-9 |
| | Pentadecafluorooctanoate (anion) | 45285-51-6 |
| | Perfluorooctanoic Anhydride | 33496-48-9 |
| | Ethanaminium, N,N,N-triethyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) | 98241-25-9 |
| | Tetramethylammoniumperfluoroctanoat | 32609-65-7 |
| | 1-Propanaminium, N,N,N-tripropyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) | 277749-00-5 |
| | Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, potassium salt, hydrate (1:1:2) (PFOA-K($H_2O$)$_2$) | 98065-31-7 |
| | Octanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluoro-, compd. with ethanamine (1:1) (PFOA-$C_2H_7N$) | 1376936-03-6 |
| | Octanoic acid, pentadecafluoro-, compd. with pyridine (1:1) (9CI) (PFOA-$C_5H_5N$) | 95658-47-2 |
| | Pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-$C_{10}H_{14}N_2$) | 1514-68-7 |
| | 1-Octanaminium, N,N,N-trimethyl-, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctanoate (1:1) (PFOA- $C_{11}H_{26}N$) | 927835-01-6 |

[redacted]

**Analytical flow chart of heavy metal**

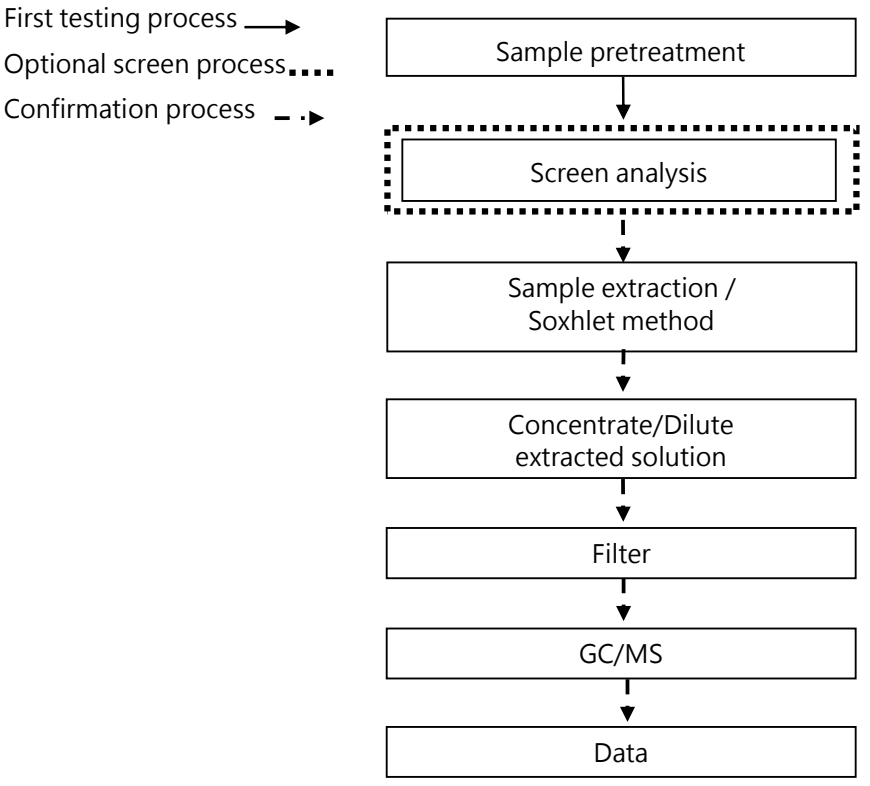
These samples were dissolved totally by pre-conditioning method according to below flow chart.

( $Cr^{6+}$ test method excluded )



[redacted]

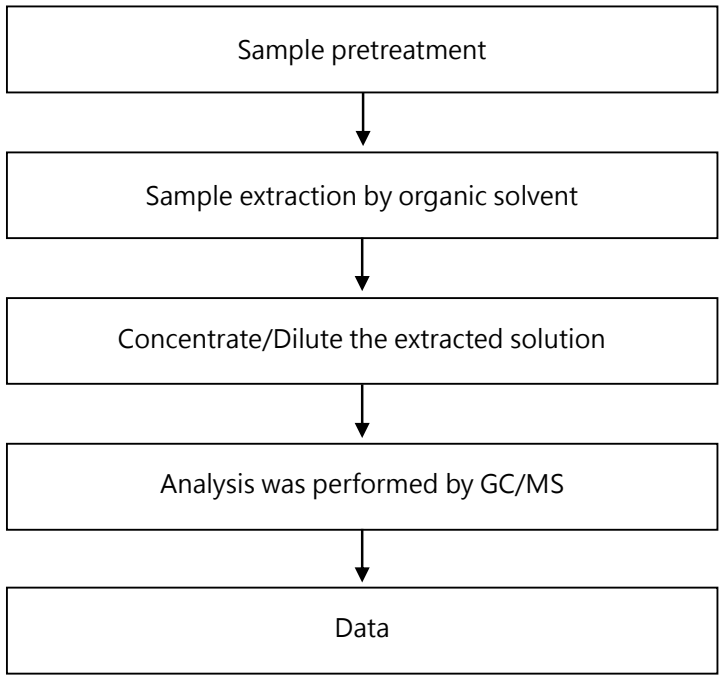
**Analytical flow chart – PBBs / PBDEs**



[redacted]

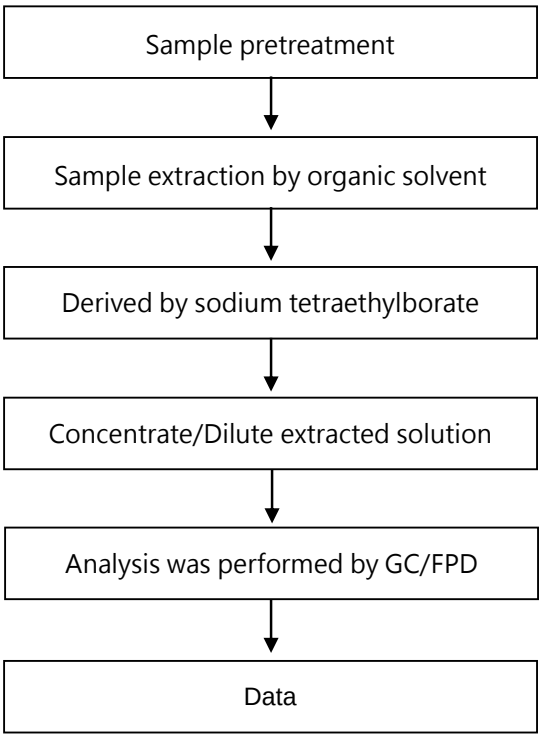
**Analytical flow chart**

* Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT



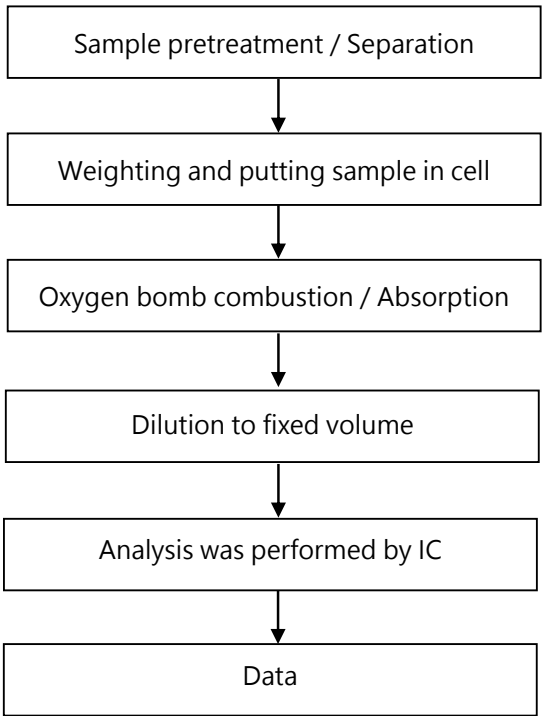
[redacted]

**Analytical flow chart - Organic-Tin**



[redacted]

**Analytical flow chart - Halogen**

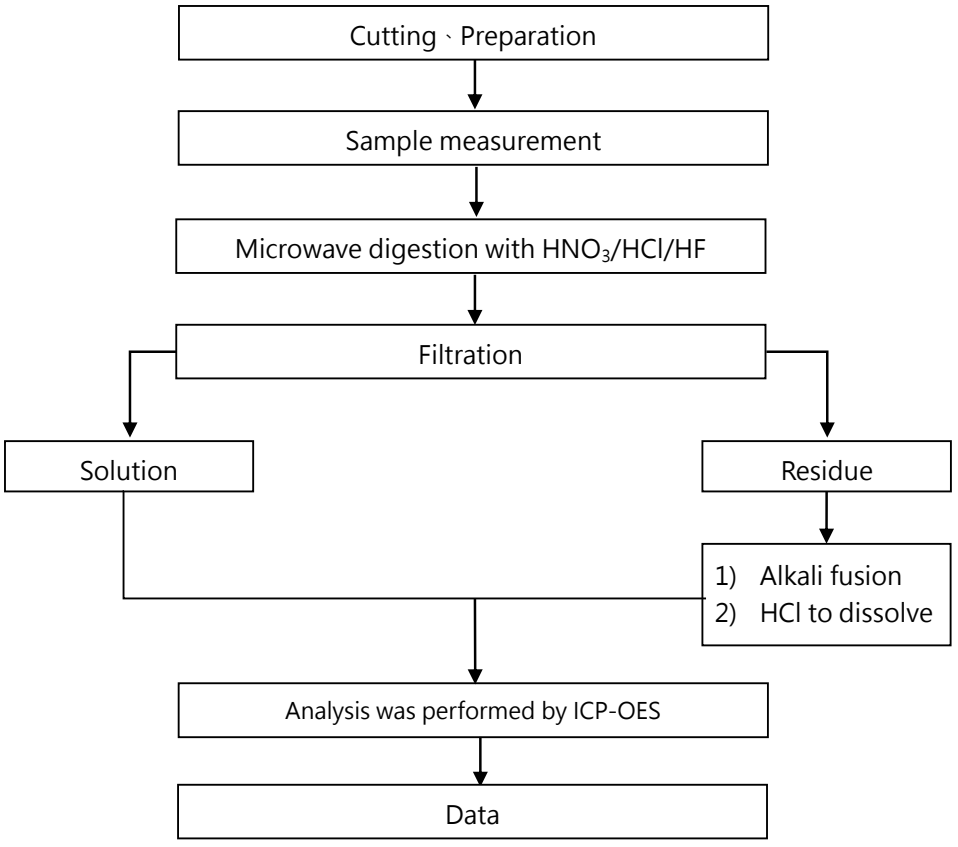


[redacted]

**Analytical flow chart of elements (Heavy metal included)**

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

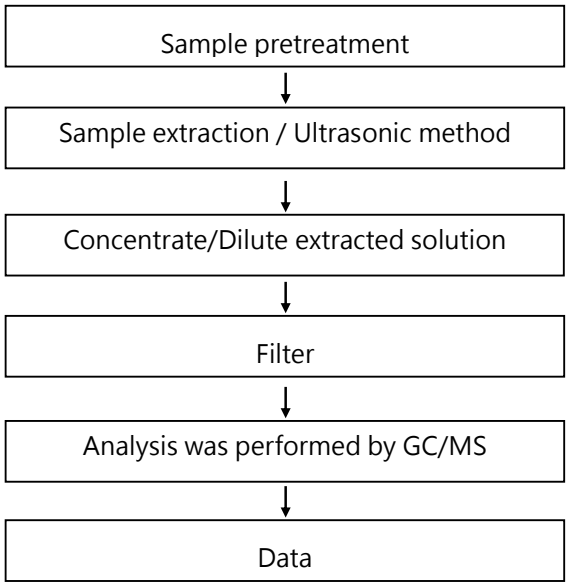
【Reference method：US EPA 3051A、US EPA 3052】




* US EPA 3051A method does not add HF.

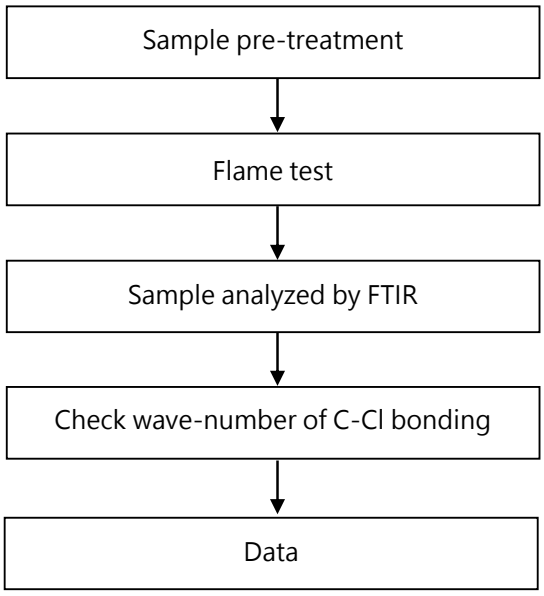
[redacted]

**Analytical flow chart - HBCDD**



[redacted]

**Analysis flow chart - PVC**



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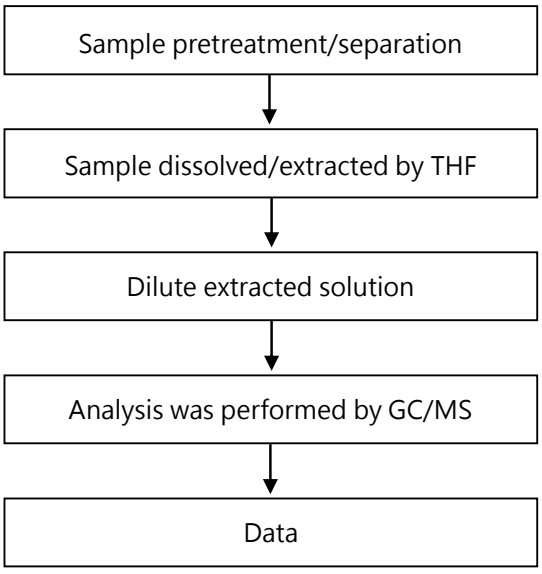
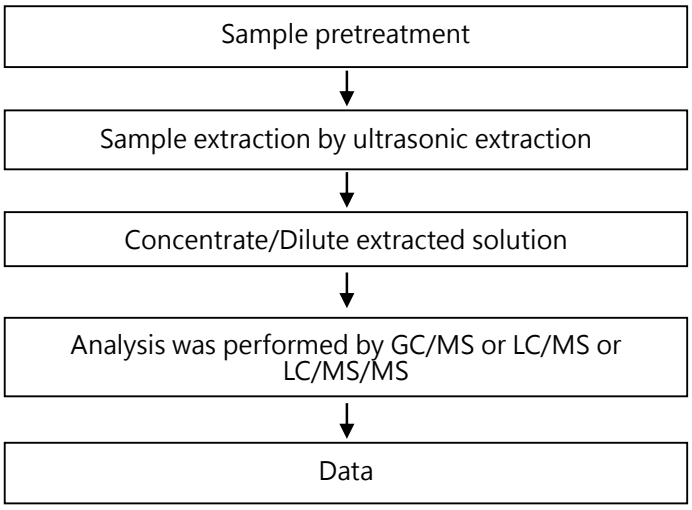
**Analytical flow chart - Phthalate**

**【Test method: IEC 62321-8】**



[redacted]

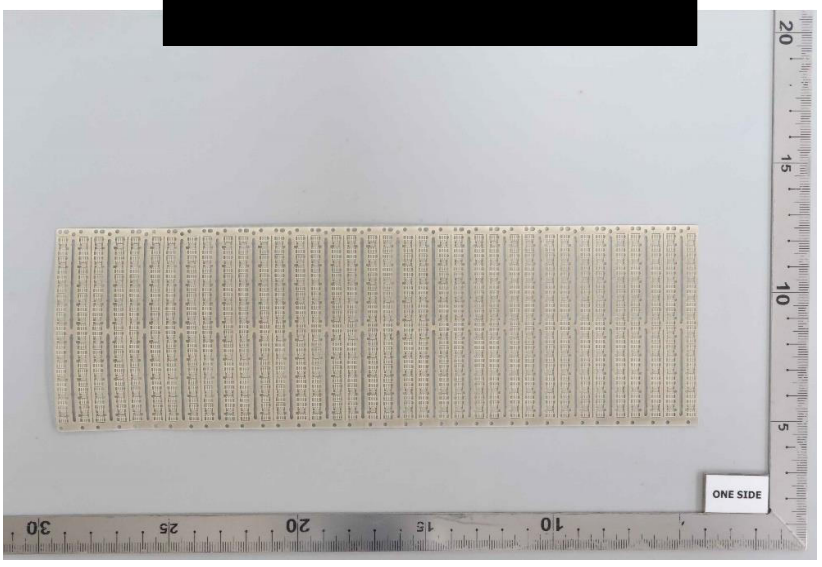
**Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)**



[redacted]

* The tested sam[redacted]e / part is marked by an arrow if it's shown on the photo. *

[redacted]




[redacted]


** End of Report **