

### **Restricted Chemicals Test Results**

### Device - ESD321DPYR

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92232980	Semiconductor Device	RoHS 10 & Halogens	04/29/2025
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85837546	Mold Compound	RoHS 10 & Halogens	01/10/2025
84030148	Lead Frame	RoHS 10 & Halogens	12/02/2024



TI Report Number: 92232980

Component : Semiconductor Device

Analysis Type: RoHS 10 & Halogens

Analysis Date: 04/29/2025



**Test Report** Date: April 29, 2025 Page 1 of 12



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
<ol> <li>RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU</li> </ol>	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



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

Test Item(s):	Unit	Test Method	Result	MDL	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013	ND	2	100
Lead (Pb)	mg/kg	(Determination of Cd and Pb by ICP-OES and /or ICP-MS)	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		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	With reference to IEC	ND	5	-
Decabromobiphenyl	mg/kg	62321-6:2015	ND	5	-
Sum of PBDEs	mg/kg	(Determination of PBB and	ND	-	1000
Monobromodiphenyl ether	mg/kg	PBDE by GC-MS)	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	ND	50	1000
Butyl Benzyl Phthalate (BBP)	mg/kg	(Determination of DEHP,	ND	50	1000
Dibutyl Phthalate (DBP)	mg/kg	BBP, DBP and DIBP by	ND	50	1000
Diisobutyl Phthalate (DIBP)	mg/kg	GC-MS)	ND	50	1000
Conclusion	/	/	PASS	/	/

#### Sample Description:

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

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#### 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

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#### 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)
Fluorine (F)	ND	50
Chlorine (CI)	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.

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#### 3. Antimony Content

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

Test Item		Result (ppm)	Reporting
rest item		1	Limit (ppm)
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.

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#### 4. Arsenic Content

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

Test Item		Result (ppm)	Reporting
rest item		1	Limit (ppm)
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.

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#### 5. Beryllium Content

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

Test Item		Result (ppm)	Reporting
rest item		1	Limit (ppm)
Beryllium	(Be)	ND	20

#### Sample Description:

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."

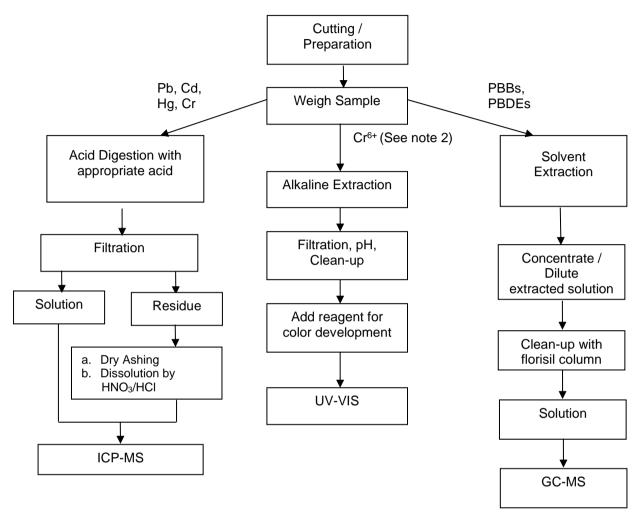
"Guarded Fail if the result is within the uncertainty failing band close to the specification."

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#### Flowchart for RoHS:



Note: 1. The Cr, Cd, Pb and Hg contents test on polymeric samples were dissolved totally by preconditioning method according to above flow chart.

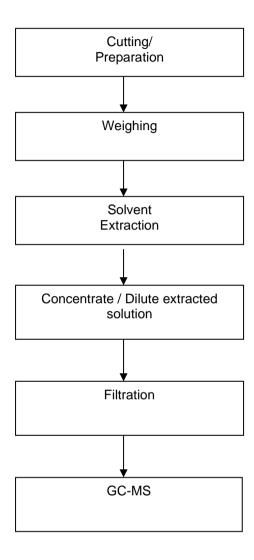
2. Cr<sup>6+</sup> is performed only when total Cr is detected

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#### Flowchart for Phthalates:

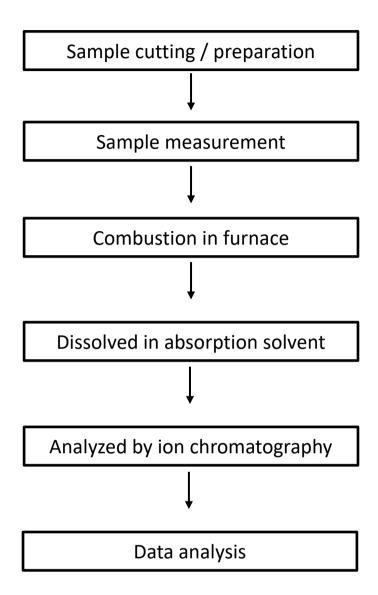


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Flow Chart of Halogen Test by Combustion Ion Chromatography:

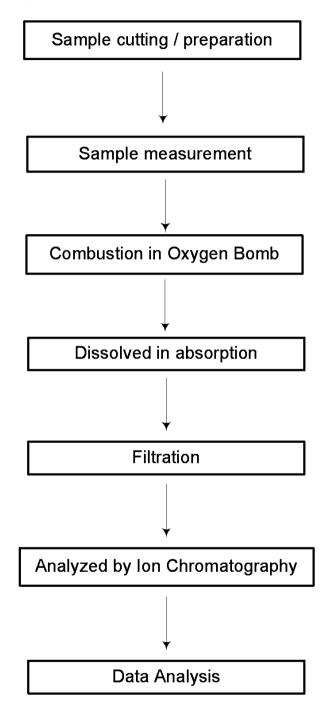


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Halogen Testing Flow Chart (EN 14582):

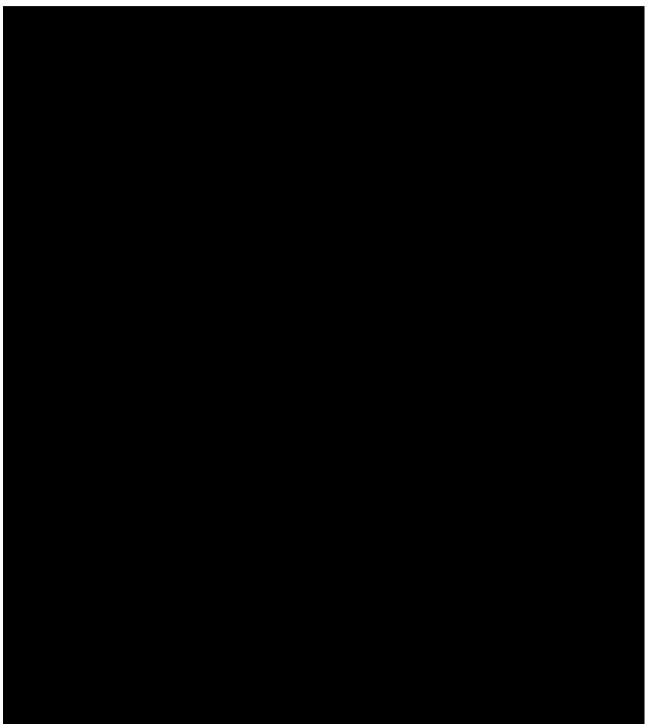


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\*\*\* End of Report \*\*\*

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TI Report Number: 90996927

Component : Lead Frame Plating

Analysis Type: RoHS 10 & Halogens

Analysis Date: 04/16/2025



Report No.

Company Name shown on Report

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).





### Report No.

### **Test Method**

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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



Report No.

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### Test Result(s)

T ( 11 ( )	Result	
Tested Item(s)	002	MDL
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/cm <sup>2</sup> (LOQ)
Tested Item(s)	Result	MDL
rested item(s)	002	MIDL
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	MDI
rested item(s)	002	MDL
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



Report No.

Test Result(s)

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Tested Item(s)	Result	MDI
resteu rielli(s)	002	MDL
Phthalates (DBP, BBP, DEHP, DIBP)		
Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg
Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg
Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg
Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg
Total Henry	Result	
Tested Item(s)	002	MDL
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
Tested Item(s)	002	MIDL
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	1411012
Red phosphorus #1	N.D.	500 mg/kg



Report No.

Test Result(s)

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Tested Item(s)	Result	MDI
rested item(s)	002	MDL
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
resteu item(s)	002	WIDL
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
Tested Tem(s)	002	WIDL
Polychlorinated Biphenyls(PCBs)		l
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



Report No.

Test Result(s)

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Tooked Hem(s)	Result	MDI
Tested Item(s)	002	MDL
Short Chain Chlorinated Paraffins (SCCPs)	N.D.	50 mg/kg
T ( ) I ( )	Result	
Tested Item(s)	002	MDL
Polyvinyl Chloride (PVC)	Negative	/
Total House	Result	MDI
Tested Item(s)	002	MDL
Polychlorinated Triphenyls (PCTs)	N.D.	5 mg/kg
T ( ) I ( )	Result	
Tested Item(s)	002	MDL
Hexabromocyclododecane (HBCDD)	N.D.	20 mg/kg
Tooled Heave(s)	Result	MDI
Tested Item(s)	002	MDL
Polychlorinated Naphthalenes (PCNs)	N.D.	5 mg/kg

Tested Item(s)	CAGN	Result	MDI
	CAS No.	002	MDL
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



Report No.

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Test Result(s)

CAS No	Result	MDL
	002	MIDL
ted substances		
1763-23-1	N.D.	0.01 mg/kg
2795-39-3	N.D.	0.01 mg/kg
29457-72-5	N.D.	0.01 mg/kg
4021-47-0	N.D.	0.01 mg/kg
91036-71-4	N.D.	0.01 mg/kg
29081-56-9	N.D.	0.01 mg/kg
70225-14-8	N.D.	0.01 mg/kg
56773-42-3	N.D.	0.01 mg/kg
251099-16-8	N.D.	0.01 mg/kg
307-35-7	N.D.	0.01 mg/kg
71463-74-6	N.D.	0.01 mg/kg
4151-50-2	N.D.	0.05 mg/kg
31506-32-8	N.D.	0.05 mg/kg
1691-99-2	N.D.	0.05 mg/kg
24448-09-7	N.D.	0.05 mg/kg
754-91-6	N.D.	0.01 mg/kg
	2795-39-3 29457-72-5 4021-47-0 91036-71-4 29081-56-9 70225-14-8 56773-42-3 251099-16-8 307-35-7 71463-74-6 4151-50-2 31506-32-8 1691-99-2 24448-09-7	CAS No.         1763-23-1       N.D.         2795-39-3       N.D.         29457-72-5       N.D.         4021-47-0       N.D.         91036-71-4       N.D.         29081-56-9       N.D.         70225-14-8       N.D.         56773-42-3       N.D.         251099-16-8       N.D.         307-35-7       N.D.         71463-74-6       N.D.         4151-50-2       N.D.         31506-32-8       N.D.         1691-99-2       N.D.         24448-09-7       N.D.



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#### 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/cm<sup>2</sup>
- -The sample is negative for Cr(VI) The Cr(VI) concentration is below 0.10  $\mu g/cm^2$ . 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

Note:

"  $^{\sharp 1}$ " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.



Report No.

### **Test Report**

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**Test Process** 1. Lead (Pb), Cadmium (Cd) Take a portion of Take out the substrate after Add digestion reagent the sample the plating had been dissolved Transfer the plating digestive Make up with Analyzed by ICP-OES deionized water solution into a volumetric flask 2. Mercury (Hg) Take a portion of Take out the substrate after Add digestion reagent the sample the plating had been dissolved Make up with Transfer the plating digestive Analyzed by ICP-OES solution into a volumetric flask deionized water 3. Hexavalent Chromium (Cr(VI)) Filter and Extraction with boiling water Take a portion of remove (The ratio of sample area to boiling water the sample the sample volume is 1 cm<sup>2</sup> to 1 mL) Adjust the pH value Analyzed by UV-Vis Add test solution of the solution 4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS volumetric flask organic solvent



Page 10 of 13 Report No. Phthalates (DBP, BBP, DEHP, DIBP), Phthalates Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS volumetric flask organic solvent Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) Weigh and place sample Fill the bomb Combust the sample in in a sample cup of bomb with oxygen oxygen bomb Make up with Transfer the sample solution Analyzed by IC ultra-purity water into a volumetric flask Organotin compounds Weigh sample and place Sample preparation Extract with organic solvent it in a thimble Make up with Analyzed by GC-MS Derivatization organic solvent Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances Extracted with Sample preparation Concentrate the extract organic solvent in an ultrasonic equipment Analyzed by LC-MS-MS Make up with Transfer the extract into a volumetric flask organic solvent



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Report No. **Short Chain Chlorinated Paraffins (SCCPs)** Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS(NCI) organic solvent volumetric flask 10. Hexabromocyclododecane (HBCDD) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS organic solvent volumetric flask 11. Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polychlorinated Biphenyls(PCBs) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS organic solvent volumetric flask 12. Antimony(Sb), Beryllium(Be), Arsenic(As) Take out the substrate after Take a portion of Add digestion reagent the plating had been dissolved the sample Make up with Transfer the plating digestive Analyzed by ICP-OES deionized water solution into a volumetric flask

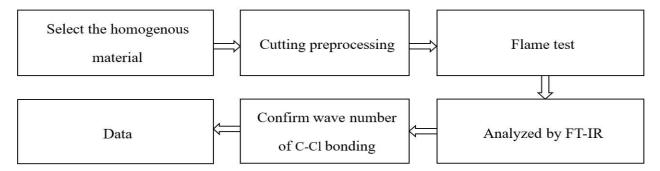


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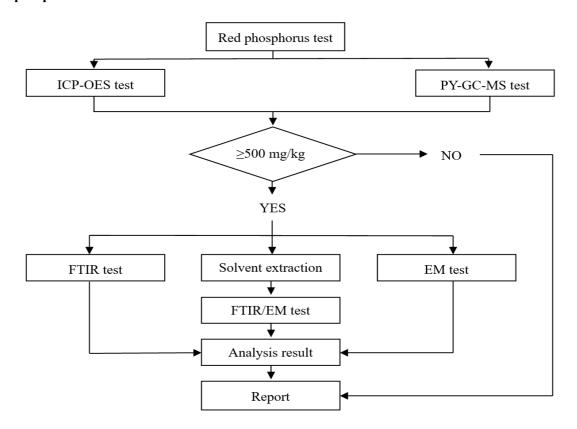
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### 13. Polyvinyl Chloride (PVC)

Report No.



### 14. Red phosphorus





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#### 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





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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

As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent **Test Requested** 

> 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).

ting Center, Centre Testing International (Taiwan) Co., Ltd.

George Fong George Fong

Laboratory Manager

Date

Apr. 16, 2025

No. R175251373

5F-6, No.9, Sec.2, Nankan Rd, Luzhu Dist., Taoyuan, Taiwan



## **Report No.** A225021114810100101 **Test Method**

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Test Item(s)	Test Method	
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



**Report No.** A22502111481010010101

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Test Result(s)

Tootad Hamis	Result	MDI
Tested Item(s)	001	MDL
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/cm <sup>2</sup> (LOQ)
Tested Item(s)	Result	MDL
rested tem(s)	001	WIDL
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
1 05100 110111(0)	001	MDL
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



**Report No.** A22502111481010010101 **Test Result(s)** 

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Tested Item(s)	Result	N.O.Y	
	001	MDL	
Phthalates (DBP, BBP, DEHP, DIBP)			
Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg	
Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg	
Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg	
Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg	
To a life (1)	Result	1-0-	
Tested Item(s)	001	MDL	
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	
Tested Item(s)	001	MIDL	
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	
residu reim(s)	001	MIDL	
Red phosphorus #1	N.D.	500 mg/kg	



# **Report No.** A22502111481010010101 **Test Result(s)**

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Tested Item(s)	Result	MDL
rested rem(s)	001	WIDL
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
rested rem(s)	001	WIDL
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	MIDL
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



# **Report No.** A22502111481010010101 **Test Result(s)**

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Tested Item(s)	Result	MDI	
	001	MDL	
Short Chain Chlorinated Paraffins (SCCPs)	N.D.	50 mg/kg	
Tosted Item(s)	Result	MDI	
Tested Item(s)	001	MDL	
Polyvinyl Chloride (PVC)	Negative	/	
Total House	Result	MDI	
Tested Item(s)	001	MDL	
Polychlorinated Triphenyls (PCTs)	N.D.	5 mg/kg	
Tostad Itam(s)	Result	NE.	
Tested Item(s)	001	MDL	
Hexabromocyclododecane (HBCDD)	N.D.	20 mg/kg	
Tostad Itam(s)	Result	MDI	
Tested Item(s)	001	MDL	
Polychlorinated Naphthalenes (PCNs)	N.D.	5 mg/kg	

Tested Item(s)	CAS No.	Result	MDI
		001	MDL
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



# **Report No.** A22502111481010010101

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Test Result(s)

Tosted Item(s)	CAS No.	Result	MDL			
Tested Item(s)		001	NIDL			
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-NH <sub>4</sub> )*	29081-56-9	N.D.	0.01 mg/kg			
Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) <sub>2</sub> )*	70225-14-8	N.D.	0.01 mg/kg			
Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )*	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			



Report No. A225021114810100101

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### 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,

- -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/cm<sup>2</sup>
- -▼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:

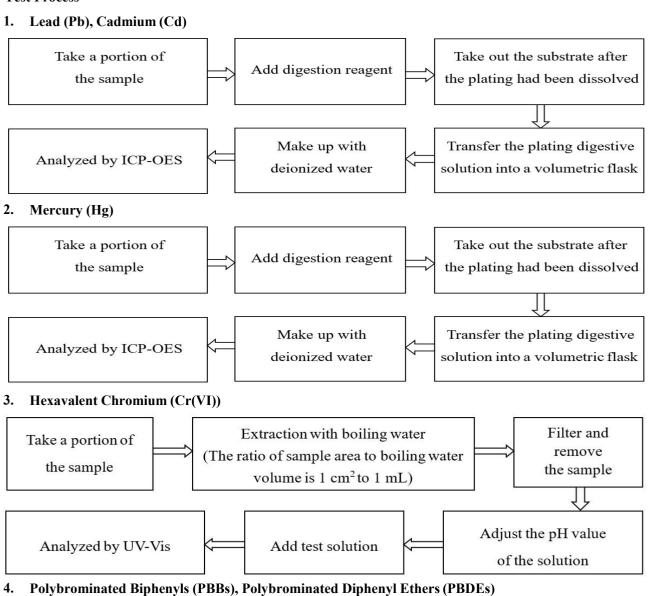
" $^{\#1}$ " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.

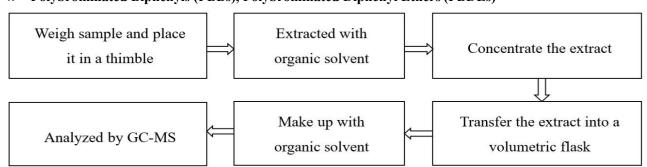


Report No. A225021114810100101

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#### **Test Process**



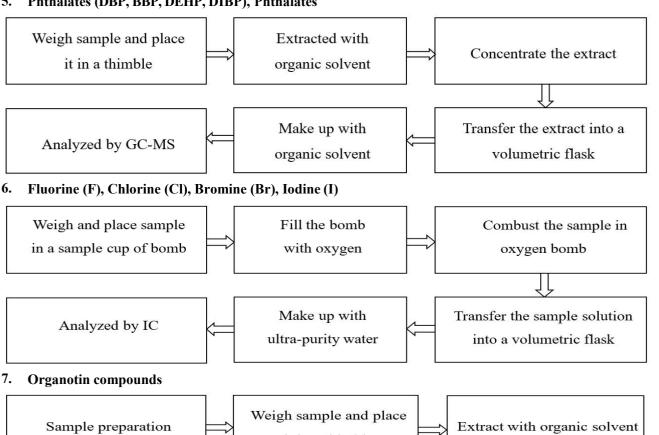


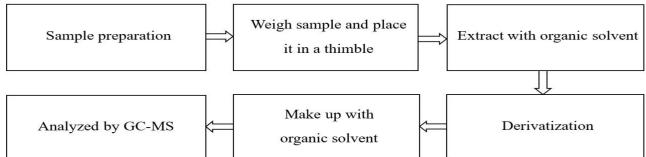


Report No. A225021114810100101

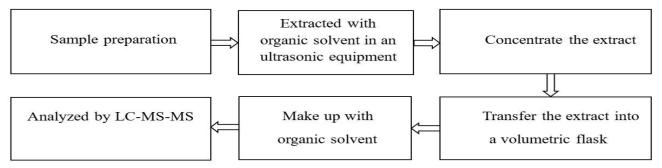
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## Phthalates (DBP, BBP, DEHP, DIBP), Phthalates





## Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances

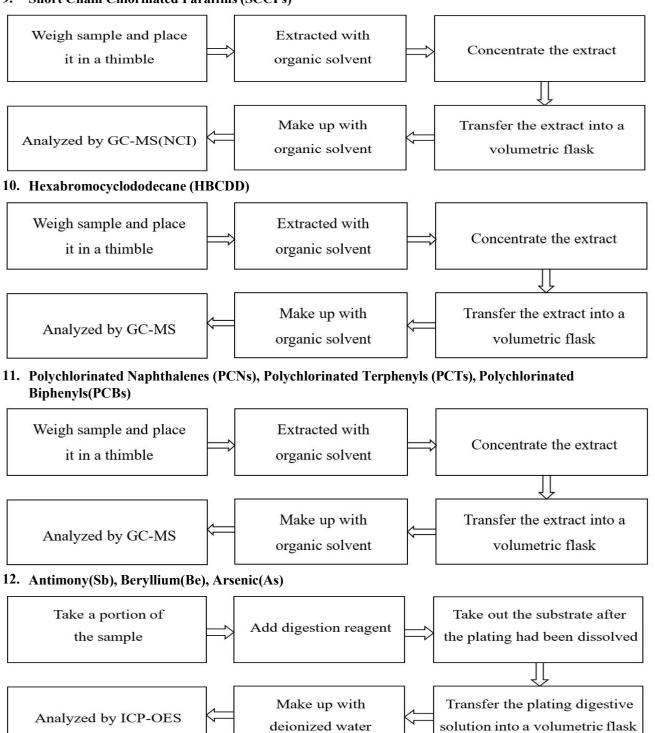




## **Report No.** A225021114810100101

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## 9. Short Chain Chlorinated Paraffins (SCCPs)

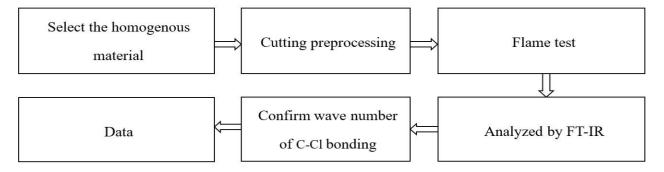




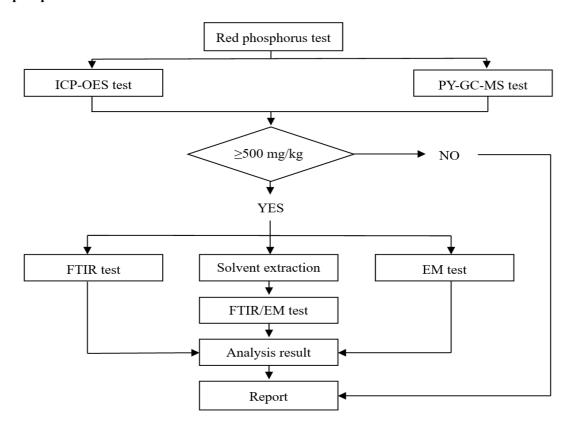
**Report No.** A225021114810100101

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# 13. Polyvinyl Chloride (PVC)



## 14. Red phosphorus

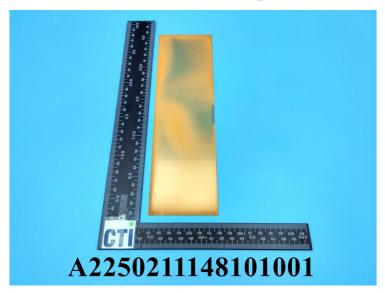




Report No. A225021114810100101

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# 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



Report No.

**Company Name shown on Report** 

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).



Report No.

**Test Method** 

Page 2 of 13

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	



Report No.

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# Test Result(s)

T ( III ( )	Result	
Tested Item(s)	003	MDL
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/cm <sup>2</sup> (LOQ)
Tested Item(s)	Result	MDL
rested rem(s)	003	WIDL
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	MDI
resteu item(s)	003	MDL
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



Report No.

Test Result(s)

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Tested Item(s)	Result	MDI	
Tested Hem(s)	003	MDL	
Phthalates (DBP, BBP, DEHP, DIBP)		·	
Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg	
Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg	
Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg	
Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg	
T ( III ( )	Result		
Tested Item(s)	003	MDL	
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	
Tested Item(s)	003	MIDL	
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	
20000 20011(0)	003	MIDL	
Red phosphorus #1	N.D.	500 mg/kg	



Report No.

Test Result(s)

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Tested Item(s)	Result	MDI
Tested Item(s)	003	MDL
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
resteu item(s)	003	WIDL
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
Tested Tem(s)	003	WIDL
Polychlorinated Biphenyls(PCBs)		l
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



Report No.

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# Test Result(s)

Tested Item(s)	Result 003	MDL	
Short Chain Chlorinated Paraffins (SCCPs)	N.D.	50 mg/kg	
Tested Item(s)	Result	MDI	
rested item(s)	003	MDL	
Polyvinyl Chloride (PVC)	Negative	/	
Total Kon(c)	Result	MDI	
Tested Item(s)	003	MDL	
Polychlorinated Triphenyls (PCTs)	N.D.	5 mg/kg	
Tooled Heavy(s)	Result	MDI	
Tested Item(s)	003	MDL	
Hexabromocyclododecane (HBCDD)	N.D.	20 mg/kg	
Tosted Item(s)	Result	MDI	
Tested Item(s)	003	MDL	
Polychlorinated Naphthalenes (PCNs)	N.D.	5 mg/kg	

T. 4.114(2)	CACN	Result	MDI
Tested Item(s)	CAS No.	003	MDL
Perfluorooctanoic acid (PFOA) and its salts	•		
Perfluorooctanoic acid (PFOA)			
Territoroccianole acia (TTOM)	335-67-1	N.D.	0.01 mg/kg
Ammonium pentadecafluorooctanoate (APFO)*	3825-26-1	N.D.	0.01 mg/kg
		1,12,	*****
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
	2372 00 0	11.15.	oror mg ng
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



Report No.

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**Test Result(s)** 

CAS No	Result	MDL
	003	MIDL
ted substances		
1763-23-1	N.D.	0.01 mg/kg
2795-39-3	N.D.	0.01 mg/kg
29457-72-5	N.D.	0.01 mg/kg
4021-47-0	N.D.	0.01 mg/kg
91036-71-4	N.D.	0.01 mg/kg
29081-56-9	N.D.	0.01 mg/kg
70225-14-8	N.D.	0.01 mg/kg
56773-42-3	N.D.	0.01 mg/kg
251099-16-8	N.D.	0.01 mg/kg
307-35-7	N.D.	0.01 mg/kg
71463-74-6	N.D.	0.01 mg/kg
4151-50-2	N.D.	0.05 mg/kg
31506-32-8	N.D.	0.05 mg/kg
1691-99-2	N.D.	0.05 mg/kg
24448-09-7	N.D.	0.05 mg/kg
754-91-6	N.D.	0.01 mg/kg
	2795-39-3 29457-72-5 4021-47-0 91036-71-4 29081-56-9 70225-14-8 56773-42-3 251099-16-8 307-35-7 71463-74-6 4151-50-2 31506-32-8 1691-99-2 24448-09-7	CAS No.         1763-23-1       N.D.         2795-39-3       N.D.         29457-72-5       N.D.         4021-47-0       N.D.         91036-71-4       N.D.         29081-56-9       N.D.         70225-14-8       N.D.         56773-42-3       N.D.         251099-16-8       N.D.         307-35-7       N.D.         71463-74-6       N.D.         4151-50-2       N.D.         31506-32-8       N.D.         1691-99-2       N.D.         24448-09-7       N.D.



Report No. Page 8 of 13

### 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/cm<sup>2</sup>
- -▼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

#### Note:

" $^{#1}$ " indicates the testing item(s) was (were) fulfilled by Centre Testing International (Suzhou) Co.,Ltd.



Report No.

# **Test Report**

Page 9 of 13

**Test Process** 1. Lead (Pb), Cadmium (Cd) Take a portion of Take out the substrate after Add digestion reagent the sample the plating had been dissolved Transfer the plating digestive Make up with Analyzed by ICP-OES deionized water solution into a volumetric flask 2. Mercury (Hg) Take a portion of Take out the substrate after Add digestion reagent the sample the plating had been dissolved Make up with Transfer the plating digestive Analyzed by ICP-OES solution into a volumetric flask deionized water 3. Hexavalent Chromium (Cr(VI)) Filter and Extraction with boiling water Take a portion of remove (The ratio of sample area to boiling water the sample the sample volume is 1 cm<sup>2</sup> to 1 mL) Adjust the pH value Analyzed by UV-Vis Add test solution of the solution 4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS volumetric flask organic solvent



Page 10 of 13 Report No. Phthalates (DBP, BBP, DEHP, DIBP), Phthalates Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS volumetric flask organic solvent Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) Weigh and place sample Fill the bomb Combust the sample in in a sample cup of bomb with oxygen oxygen bomb Make up with Transfer the sample solution Analyzed by IC ultra-purity water into a volumetric flask Organotin compounds Weigh sample and place Sample preparation Extract with organic solvent it in a thimble Make up with Analyzed by GC-MS Derivatization organic solvent Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctanesulfonic acid (PFOS) and its salts & related substances Extracted with Sample preparation Concentrate the extract organic solvent in an ultrasonic equipment Analyzed by LC-MS-MS Make up with Transfer the extract into a volumetric flask organic solvent



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Report No. **Short Chain Chlorinated Paraffins (SCCPs)** Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS(NCI) organic solvent volumetric flask 10. Hexabromocyclododecane (HBCDD) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS organic solvent volumetric flask 11. Polychlorinated Naphthalenes (PCNs), Polychlorinated Terphenyls (PCTs), Polychlorinated Biphenyls(PCBs) Weigh sample and place Extracted with Concentrate the extract it in a thimble organic solvent Make up with Transfer the extract into a Analyzed by GC-MS organic solvent volumetric flask 12. Antimony(Sb), Beryllium(Be), Arsenic(As) Take out the substrate after Take a portion of Add digestion reagent the plating had been dissolved the sample Make up with Transfer the plating digestive Analyzed by ICP-OES deionized water solution into a volumetric flask

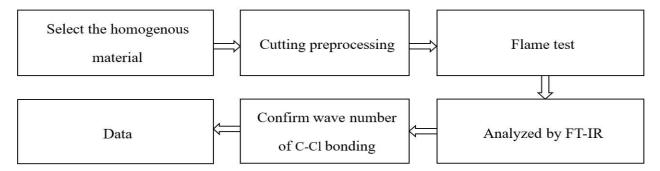


- **333 - 13 p** 3 -

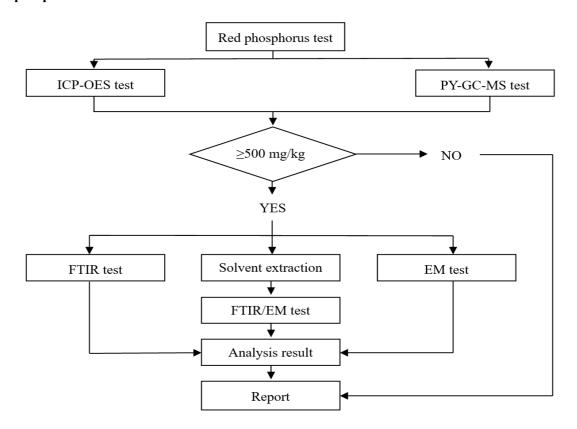
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# 13. Polyvinyl Chloride (PVC)

Report No.



## 14. Red phosphorus





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## 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.: Date: Apr 03, 2025 Page 1 of 29

Client Name:

Client Address:

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.:

Sample Receiving Date: Mar 25, 2025

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

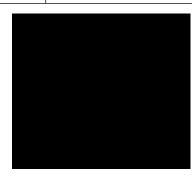
Test Requested: Select test(s) as requested by the client.

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







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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.
- a. The sample is positive for Cr(VI) if the Cr(VI)concentration is greater than 0.13 µg/cm<sup>2</sup>. 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/cm²). The coating is considered a non-Cr(VI) based coating.
  - c. The result between 0.10 μg/cm<sup>2</sup> and 0.13 μg/cm<sup>2</sup> is considered to be inconclusive-unavoidable coating variations may influence the determination.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

#### **Chlorinated Paraffins**

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



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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 <sub>2</sub> O <sub>3</sub> ) ◆	mg/kg	12	ND
Tin(Sn)	mg/kg	5	ND
Arsenic(As)	mg/kg	10	ND
Diarsenic Trioxide(As <sub>2</sub> O <sub>3</sub> ) ◆	mg/kg	10	ND
Diarsenic Pentaoxide(As <sub>2</sub> O <sub>5</sub> ) ◆	mg/kg	10	ND

#### Notes:

(1) ◆Sb<sub>2</sub>O<sub>3</sub>: Calculate from Antimony content.

(2) ◆As<sub>2</sub>O<sub>3</sub>, As<sub>2</sub>O<sub>5</sub>: 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	mg/kg	50	ND
	/68515-48-0	ilig/kg	30	ND
Di-n-Octyl Phthalate(DNOP)	117-84-0	mg/kg	50	ND
Diisodecyl Phthalate (DIDP)	26761-40-0	ma/ka	50	ND
Disodecyi Philialate (DIDP)	/68515-49-1	mg/kg	30	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-	74000 00 6	120 m // cm	F0	ND
branched alkyl esters,C7-rich(DIHP)	71888-89-6	mg/kg	50	ND
1,2-Benzenedicarboxylic Acid,Di-C7-11-				
Branched and Linear Alkyl	68515-42-4	mg/kg	50	ND
Esters(DHNUP)				



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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(CI)	mg/kg	50	ND
Bromine(Br)	mg/kg	50	ND
lodine(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 <sub>4</sub> )	29081-56-9
Perfluorooctane sulfonate diethanolamine salt (PFOS-NH <sub>2</sub> (C <sub>2</sub> H <sub>4</sub> OH) <sub>2</sub> )	70225-14-8
Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )	56773-42-3
N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-N( $C_{10}H_{21}$ ) <sub>2</sub> ( $CH_3$ ) <sub>2</sub> )	251099-16-8
TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )	111873-33-7
Perfluorooctane Sulfonyl fluoride (PFOS-F)	307-35-7
Magnesium bis(heptadecafluorooctanesulphonate) (PFOS-Mg)	91036-71-4
Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
Perfluorooctanesulfonate	45298-90-6
Triethylammonium perfluorooctane sulfonate (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> )	54439-46-2
Tetramethylammonium perfluorooctane sulfonate (PFOS-N(CH <sub>3</sub> ) <sub>4</sub> )	56773-44-5
N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N( $C_3H_7$ ) <sub>3</sub> ( $C_5H_{11}$ ))	56773-56-9
N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N( $C_4H_9$ ) <sub>3</sub> ( $CH_3$ ))	124472-68-0
lodonium, 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 <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> ))	2185049-59-4
Perfluorooctanesulfonic acid diethylamine salt (PFOS-C <sub>4</sub> H <sub>11</sub> N)	2205029-08-7
heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-C <sub>15</sub> H <sub>30</sub> NO <sub>2</sub> )	1203998-97-3
Perfluorooctane sulfonic anhydride (PFOSAN)	423-92-7
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 <sub>4</sub> )	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 <sub>4</sub> )	76752-72-2
Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-C <sub>6</sub> H <sub>15</sub> N)	76752-82-4
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 acidpiperazine (2/1) (PFOA-NH(C <sub>4</sub> H <sub>10</sub> N))	423-52-9
Pentadecafluorooctanoate (anion)	45285-51-6
Perfluorooctanoic Anhydride	33496-48-9
N,N,N-Triethylethanaminium perfluorooctanoate	98241-25-9
Perfluorooctanoate N,N,N-Trimethylmethanaminium	32609-65-7
Tetrapropylammonium perfluorooctanoate	277749-00-5
Potassium pentadecafluorooctanoatewater (1/1/2) (PFOA-K(H <sub>2</sub> O) <sub>2</sub> )	98065-31-7
Perfluorooctanoic acid compd. with ethanamine (1:1) (PFOA-C <sub>2</sub> H <sub>7</sub> N)	1376936-03-6
Pentadecafluorooctanoic acidpyridine (1/1) (PFOA-C <sub>5</sub> H <sub>5</sub> N)	95658-47-2
pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> )	1514-68-7
N,N,N-Trimethyloctan-1-aminium pentadecafluorooctanoate (PFOA- $C_{11}H_{26}N)$	927835-01-6

## **Polychlorinated Biphenyls (PCBs)**

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

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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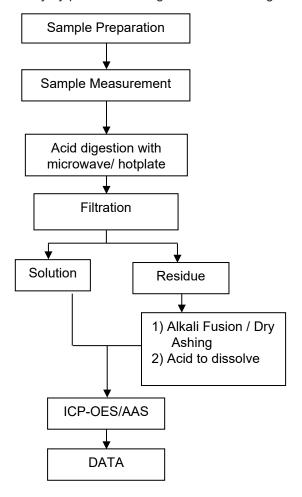
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### **Elements Testing Flow Chart**

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





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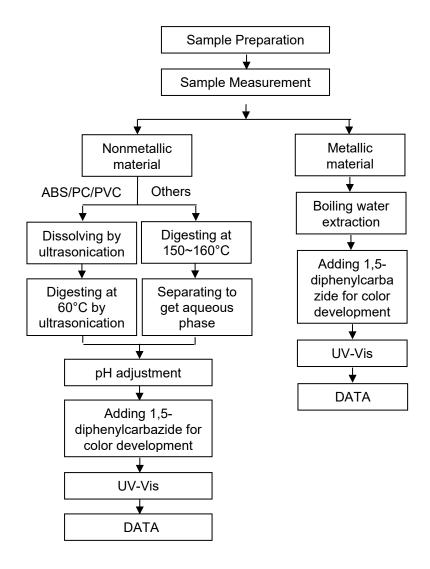
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## Hexavalent Chromium (Cr(VI)) Testing Flow Chart





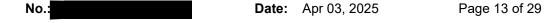
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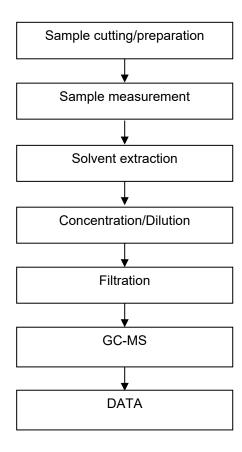
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## PBB/PBDE/Phthalates Testing Flow Chart





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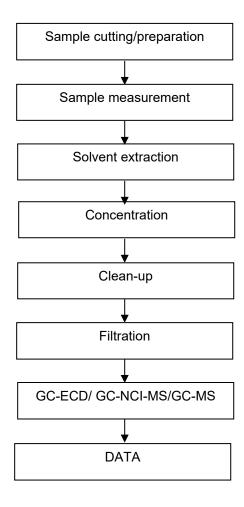
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# **Chlorinated Paraffin Testing Flow Chart**





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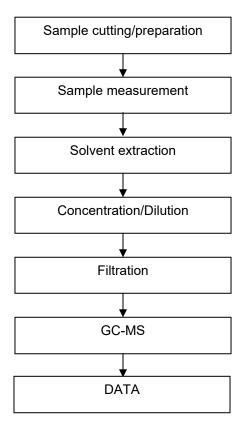
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## **DMF (Dimethyl fumarate) Testing Flow Chart**





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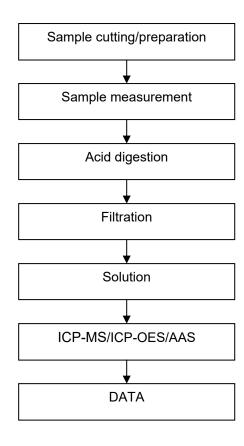


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## **Elements Testing Flow Chart**





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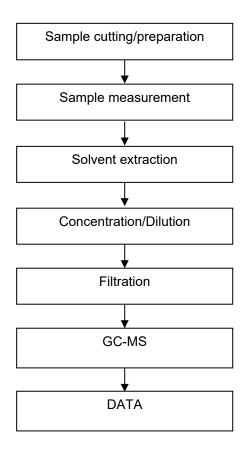


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## **Phthalates Testing Flow Chart**





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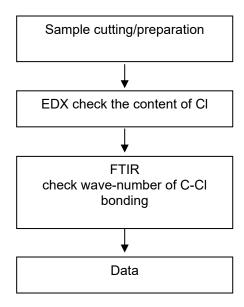
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## **PVC Testing Flow Chart**





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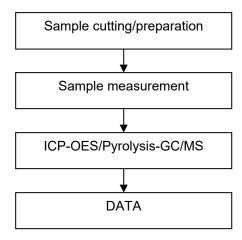
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## **Red Phosphorus Testing Flow Chart**





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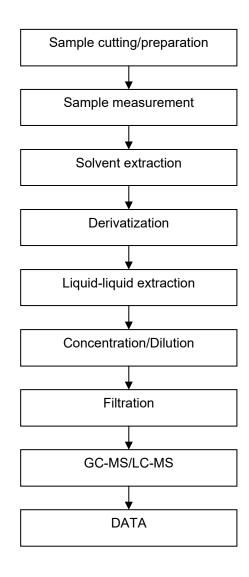


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## **TBBP-A Testing Flow Chart**





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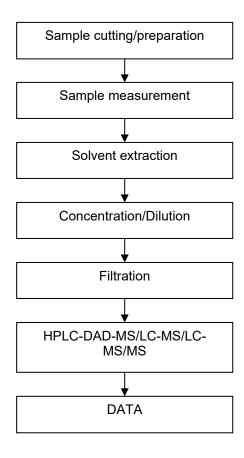
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## **Bisphenols Testing Flow Chart**





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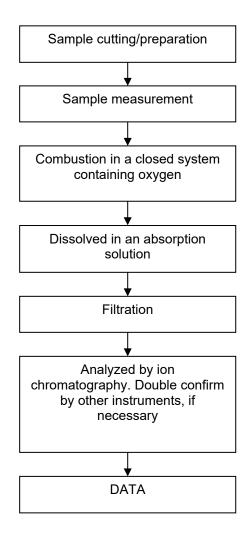
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## **Halogen Testing Flow Chart**





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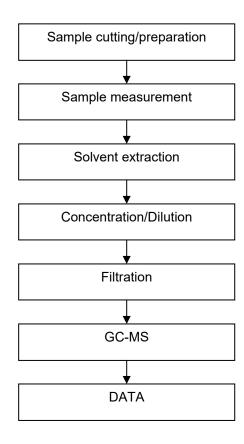


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## **HBCDD Testing Flow Chart**





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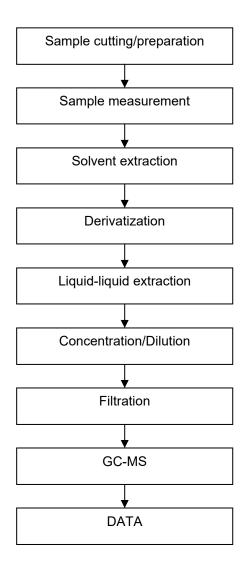


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## **Organotin Testing Flow Chart**





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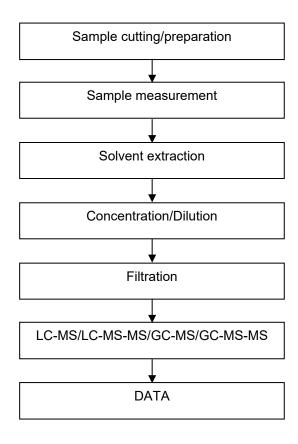
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## PFASs/ PFOS/PFOA Testing Flow Chart





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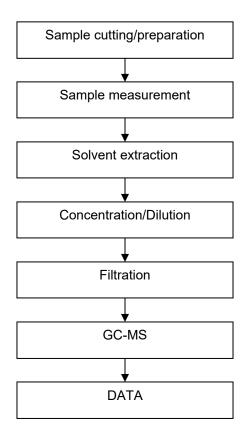


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## **PCB Testing Flow Chart**





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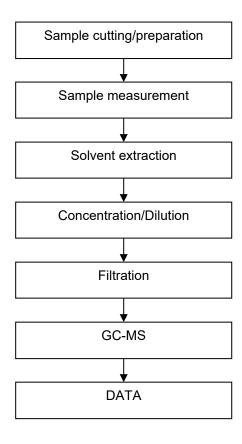
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## **PCN Testing Flow Chart**





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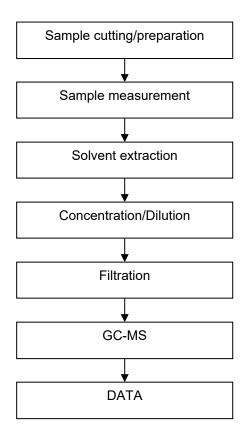
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## **PCT Testing Flow Chart**





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TI Report Number: 92789204

Component : Die Attach Adhesive

Analysis Type: Other-Halogen

Analysis Date: 02/20/2025



Date: 20-Feb-2025 Page: 1 of 4

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

Sample Submitted By :

Sample Name : ADHESIVE Style/Item No. : ADHESIVE

Sample Receiving Date : 13-Feb-2025

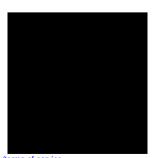
Testing Period : 13-Feb-2025 to 20-Feb-2025

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

the submitted sample.

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







Date: 20-Feb-2025 Page: 2 of 4

**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,	mg/kg	50	n.d.
	analysis was performed by IC.			
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			
Bromine (Br) (CAS No.: 10097-32-2)	With reference to EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			
lodine (I) (CAS No.: 14362-44-8)	With reference to EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			

### Note:

1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm

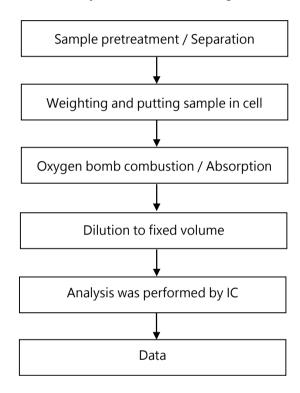
2. MDL = Method Detection Limit

3. n.d. = Not Detected (Less than MDL)



Date: 20-Feb-2025 Page: 3 of 4

## Analytical flow chart - Halogen





Date: 20-Feb-2025 Page: 4 of 4

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



\*\* End of Report \*\*



TI Report Number: 92789202

Component : Die Attach Adhesive

Analysis Type: RoHS 10

Analysis Date: 02/20/2025



Date: 20-Feb-2025 Page: 1 of 9

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

Sample Submitted By :

Sample Name : ADHESIVE Style/Item No. : Management : ADHESIVE

\_\_\_\_\_\_

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 :  - Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD)  - Beryllium (Be)  - Phthalates (DIDP, DINP, DNOP)	See Results







Date: 20-Feb-2025 Page: 2 of 9

**Test Part Description** 

No.1 : GRAY PASTE

## Test Result(s)

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Cadmium (Cd)	With reference to IEC 62321-5: 2013,	mg/kg	2	n.d.	100
	analysis was performed by ICP-OES.				
Lead (Pb)	With reference to IEC 62321-5: 2013,	mg/kg	2	n.d.	1000
	analysis was performed by ICP-OES.				
Mercury (Hg)	With reference to IEC 62321-4: 2013+	mg/kg	2	n.d.	1000
	AMD1: 2017, analysis was performed				
	by ICP-OES.				
Hexavalent Chromium Cr(VI)	With reference to IEC 62321-7-2: 2017,	mg/kg	8	n.d.	1000
	analysis was performed by UV-VIS.				
Monobromobiphenyl		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	With reference to IEC 62321-6: 2015,	mg/kg	-	n.d.	1000
Monobromodiphenyl ether	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.	1000



Date: 20-Feb-2025

Page: 3 of 9

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

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)		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)		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.



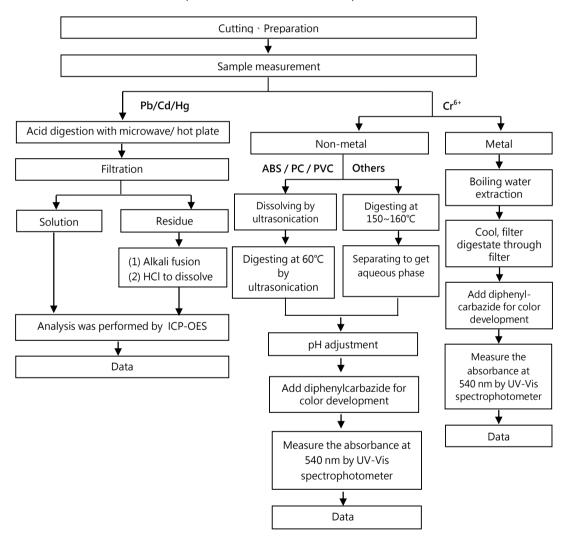
Date: 20-Feb-2025

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## Analytical flow chart of heavy metal

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

( Cr<sup>6+</sup> test method excluded )



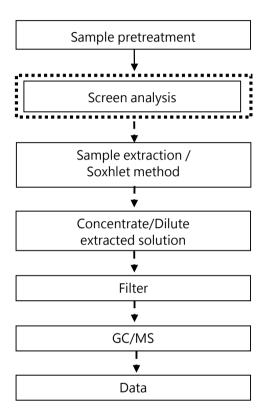


Date: 20-Feb-2025

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## Analytical flow chart - PBBs / PBDEs

First testing process \_\_\_\_
Optional screen process \_\_\_\_
Confirmation process \_\_\_\_



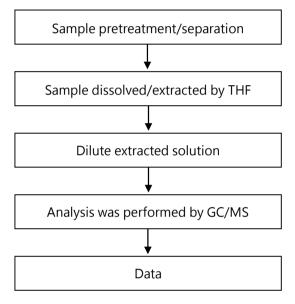


Date: 20-Feb-2025

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## Analytical flow chart - Phthalate

[Test method: IEC 62321-8]

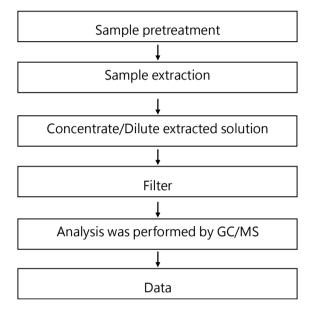




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## Analytical flow chart - HBCDD



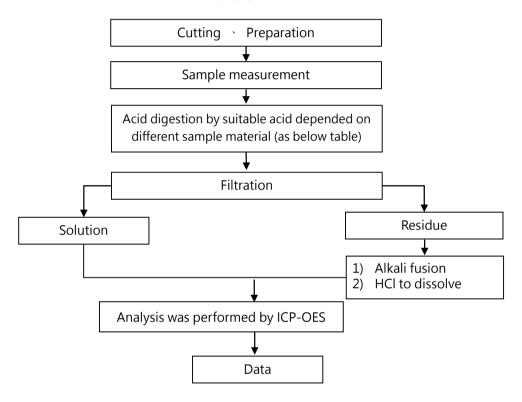


Date: 20-Feb-2025

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## 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 <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Added appropriate reagent to total digestion



Date: 20-Feb-2025 Page: 9 of 9

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



\*\* End of Report \*\*



TI Report Number: 85837546

Component : Mold Compound

Analysis Type: RoHS 10 & Halogens

Analysis Date: 01/10/2025



Test Report	No.:	<b>Date:</b> Jan 10, 2025	Page 1 of 20

Client Name:

Client Address:

Sample Name:

Client Ref. Information: Production Date: 2024.11

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

SGS Job No.:

Sample Receiving Date: Dec 26, 2024

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

Select test(s) as requested by the client. Test Requested:

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



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**Test Report** No.: **Date:** Jan 10, 2025 Page 2 of 20

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)

With reference to IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, **Test Method:** 

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	ı	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	ı	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 <sub>10</sub> -C <sub>13</sub> )	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

## <u>Halogen</u>

**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(CI)	mg/kg	50	ND
Bromine(Br)	mg/kg	50	ND
lodine(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	mg/kg	20	ND
	/3194-55-6			

### **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)

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

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

(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	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



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date. Jan 1	0, 2025
Potassium Perfluorooctanesulfonate (PFOS-K)	2795-39-3
Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
Sodium perfluorooctanesulfonate (PFOS-Na)	4021-47-0
Ammonium perfluorooctanesulfonate (PFOS-NH <sub>4</sub> )	29081-56-9
Perfluorooctane sulfonate diethanolamine salt (PFOS-NH <sub>2</sub> (C <sub>2</sub> H <sub>4</sub> OH) <sub>2</sub> )	70225-14-8
Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )	56773-42-3
N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-N(C <sub>10</sub> H <sub>21</sub> ) <sub>2</sub> (CH <sub>3</sub> ) <sub>2</sub> )	251099-16-8
TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )	111873-33-7
Perfluorooctane Sulfonyl fluoride (PFOS-F)	307-35-7
Magnesium bis(heptadecafluorooctanesulphonate) (PFOS-Mg)	91036-71-4
Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
Perfluorooctanesulfonate	45298-90-6
Triethylammonium perfluorooctane sulfonate (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> )	54439-46-2
Tetramethylammonium perfluorooctane sulfonate (PFOS-N(CH <sub>3</sub> ) <sub>4</sub> )	56773-44-5
N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N(C <sub>3</sub> H <sub>7</sub> ) <sub>3</sub> (C <sub>5</sub> H <sub>11</sub> ))	56773-56-9
N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N( $C_4H_9$ ) <sub>3</sub> ( $CH_3$ ))	124472-68-0
lodonium, bis[4-(1,1-dimethylethyl)phenyl]-, salt with perfluoro-1-octanesulfonic acid (1:1)	213740-80-8
Diphenyl(2,4,6-trimethylphenyl)sulfonium perfluoro-1-octanesulfonate	258341-99-0
1-Hexadecylpyridinium perfluoro-1-octanesulfonate	334529-63-4
N,N,N-Triethyldecan-1-aminium heptadecafluorooctane-1-sulfonate	773895-92-4
Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P (C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> ))	2185049-59-4
Perfluorooctanesulfonic acid diethylamine salt (PFOS-C <sub>4</sub> H <sub>11</sub> N)	2205029-08-7
heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-C <sub>15</sub> H <sub>30</sub> NO <sub>2</sub> )	1203998-97-3
Perfluorooctane sulfonic anhydride (PFOSAN)	423-92-7
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	



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N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA)	2991-50-6
Glycine, N-ethyl-N-[(heptadecafluorooctyl)sulfonyl]-, potassium salt (N-Et-FOSAA-K)	2991-51-7
2-(N-Ethyl-perfluorooctanesulfonamido)acetate (N-Et-FOSAA(anion))	909405-49-8
Ammonium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-NH <sub>4</sub> )	2991-52-8
Sodium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-Na)	3871-50-9
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 <sub>4</sub> )	76752-72-2
Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-C <sub>6</sub> H <sub>15</sub> N)	76752-82-4
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 acidpiperazine (2/1) (PFOA-NH(C <sub>4</sub> H <sub>10</sub> N))	423-52-9
Pentadecafluorooctanoate (anion)	45285-51-6
Perfluorooctanoic Anhydride	33496-48-9
N,N,N-Triethylethanaminium perfluorooctanoate	98241-25-9
Perfluorooctanoate N,N,N-Trimethylmethanaminium	32609-65-7
Tetrapropylammonium perfluorooctanoate	277749-00-5
Potassium pentadecafluorooctanoatewater (1/1/2) (PFOA-K(H <sub>2</sub> O) <sub>2</sub> )	98065-31-7
Perfluorooctanoic acid compd. with ethanamine (1:1) (PFOA-C <sub>2</sub> H <sub>7</sub> N)	1376936-03-6
Pentadecafluorooctanoic acidpyridine (1/1) (PFOA-C₅H₅N)	95658-47-2
pentadecafluorooctanoic acid- 1-phenylpiperazine(1:1) (PFOA-C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> )	1514-68-7
N,N,N-Trimethyloctan-1-aminium pentadecafluorooctanoate (PFOA- $C_{11}H_{26}N$ )	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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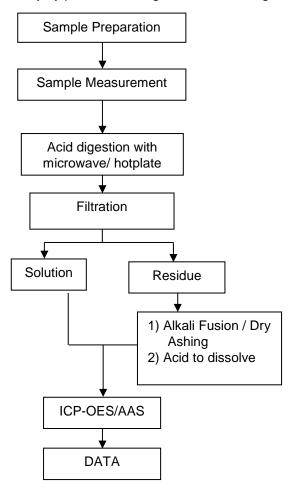
#### **Elements Testing Flow Chart**

Name of the person who made testing: Meria Jin/Sielina Song

No.:

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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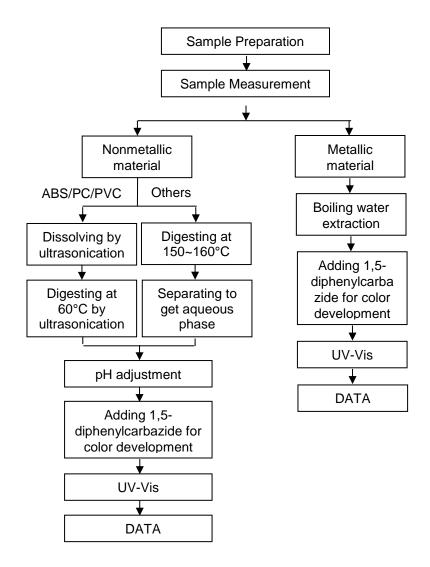
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**No.:** Date: Jan 10, 2025

#### 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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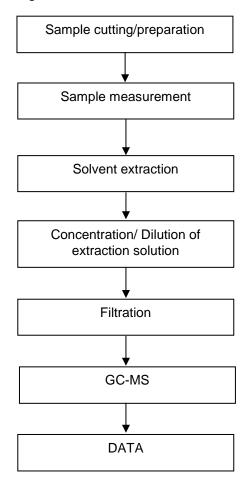
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#### **PBB/PBDE Testing Flow Chart**

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

No.:





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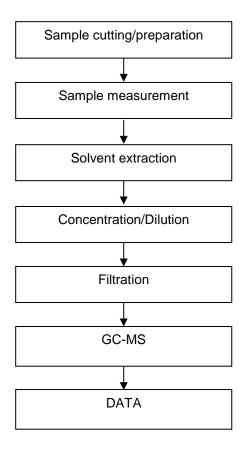
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### **Phthalates Testing Flow Chart**

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

No.:





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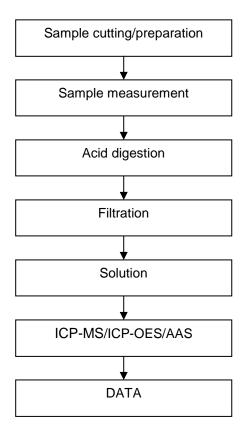
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### **Elements Testing Flow Chart**

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

No.:





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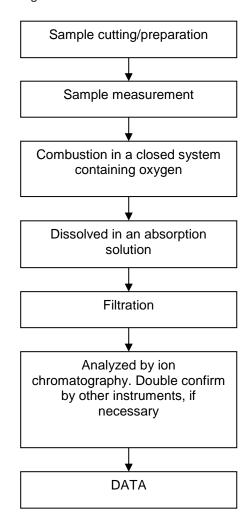
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#### **Halogen Testing Flow Chart**

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

No.:





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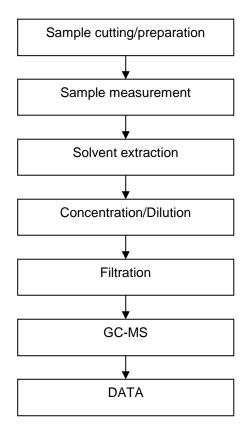
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#### **HBCDD Testing Flow Chart**

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

No.:





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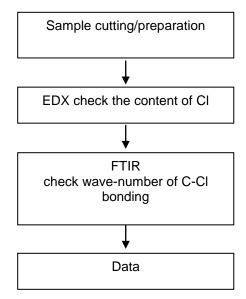
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ATTACHMENTS

### **PVC Testing Flow Chart**

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





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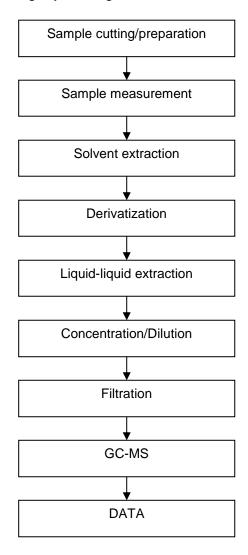
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### **Organotin Testing Flow Chart**

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





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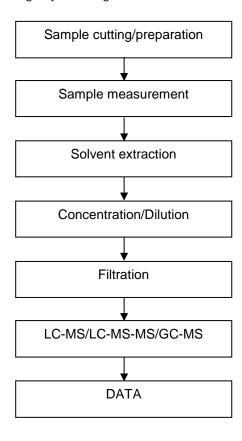
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### PFASs/ PFOS/PFOA Testing Flow Chart

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

No.:





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TI Report Number: 84030148

Component: Lead Frame

Analysis Type: RoHS 10 & Halogens

Analysis Date: 12/02/2024



Date: 02-Dec-2024 Page: 1 of 19

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

No.:

Sample Submitted By :

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.





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### **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,	mg/kg	2	n.d.
	analysis was performed by ICP-OES.			
Lead (Pb)	With reference to IEC 62321-5: 2013,	mg/kg	2	5.00
	analysis was performed by ICP-OES.			
Mercury (Hg)	With reference to IEC 62321-4: 2013+	mg/kg	2	n.d.
	AMD1: 2017, analysis was performed			
	by ICP-OES.			
Hexavalent Chromium Cr(VI) (#2)	With reference to IEC 62321-7-1: 2015,	μg/cm²	0.1	n.d.
	analysis was performed by UV-VIS.			
Monobromobiphenyl		mg/kg	5	n.d.
Dibromobiphenyl		mg/kg	5	n.d.
Tribromobiphenyl		mg/kg	5	n.d.
Tetrabromobiphenyl		mg/kg	5	n.d.
Pentabromobiphenyl	With reference to IEC 62321-6: 2015,	mg/kg	5	n.d.
Hexabromobiphenyl	analysis was performed by GC/MS.	mg/kg	5	n.d.
Heptabromobiphenyl	dilalysis was periorified by Ge/1015.	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		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	With reference to IEC 62321-6: 2015,	mg/kg	5	n.d.
Hexabromodiphenyl ether	analysis was performed by GC/MS.	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.



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Test Item(s)	Method	Unit	MDL	Result
				No.1
Polychlorinated biphenyls (PCBs)	With reference to US EPA 3550C: 2007,	mg/kg	0.5	n.d.
	analysis was performed by GC/MS.			
Polychlorinated naphthalene (PCNs)	With reference to US EPA 3550C: 2007,	mg/kg	5	n.d.
	analysis was performed by GC/MS.			
Polychlorinated terphenyls (PCTs)	With reference to US EPA 3550C: 2007,	mg/kg	0.5	n.d.
	analysis was performed by GC/MS.			
Short Chain Chlorinated	With reference to ISO 18219-1: 2021,	mg/kg	50	n.d.
Paraffins(C10-C13) (SCCP) (CAS No.:	analysis was performed by GC/MS.			
85535-84-8)				
Triphenyl tin (TPT)	With reference to ISO 17353: 2004,	mg/kg	0.03	n.d.
	analysis was performed by GC/FPD.	3 3		
Tributyl tin (TBT)	With reference to ISO 17353: 2004,	mg/kg	0.03	n.d.
-	analysis was performed by GC/FPD.			
Dioctyl tin (DOT)	With reference to ISO 17353: 2004,	mg/kg	0.03	n.d.
-	analysis was performed by GC/FPD.			
Dibutyl tin (DBT)	With reference to ISO 17353: 2004,	mg/kg	0.03	n.d.
	analysis was performed by GC/FPD.	3 3		
Bis(tributyltin) oxide (TBTO) (CAS	Calculated from the result of Tributyl	mg/kg	0.03 🛦	n.d.
No.: 56-35-9)	Tin (TBT).			
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.			
Iodine (I) (CAS No.: 14362-44-8)	With reference to BS EN 14582: 2016,	mg/kg	50	n.d.
	analysis was performed by IC.	3 3		
Arsenic (As) (CAS No.: 7440-38-2)	With reference to US EPA 3052: 1996,	mg/kg	2	n.d.
,	analysis was performed by ICP-OES.			
Beryllium (Be) (CAS No.: 7440-41-7)	With reference to US EPA 3052: 1996,	mg/kg	2	n.d.
	analysis was performed by ICP-OES.	3 3		
Antimony (Sb) (CAS No.: 7440-36-0)	With reference to US EPA 3052: 1996,	mg/kg	2	n.d.
	analysis was performed by ICP-OES.			



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Test Item(s)	Method	Unit	MDL	Result
				No.1
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - 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.



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

#### 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  $\mu$ g/cm<sup>2</sup>. 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  $\mu g/cm^2$ ). The coating is considered a non-Cr(VI) based coating
  - c. The result between  $0.10~\mu g/cm^2$  and  $0.13~\mu g/cm^2$  is considered to be inconclusive unavoidable coating variations may influence the determination.
- 8. ▲ : The MDL was evaluated for element / tested substance.

Conversion Formula :  $AX = A \times F$ 

AX	Α	F
Bis(tributyltin)oxide (TBTO)	Tributyl Tin (TBT)	1.0276

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



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#### 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.
	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 <sub>4</sub> )	29081-56-9
	Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) <sub>2</sub> )	70225-14-8
	Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOSN( $C_2H_5$ ) <sub>4</sub> )	56773-42-3
PFOS, its salts & derivatives	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 <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> )	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



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Group Name	Substance Name	CAS No.
	$ \begin{array}{l} \hbox{1-Octane sulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-} \\ \hbox{heptade cafluoro-, compd. with N,N-diethyle than a mine (1:1)} \\ \hbox{(PFOS-N(C$_2$H$_5)$_3)} \end{array} $	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 <sub>3</sub> ) <sub>4</sub> )	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
PFOS, its salts & derivatives	lodonium, 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 <sub>4</sub> H <sub>11</sub> N)	2205029-08-7
	$\label{lem:heptyldimethyl} Heptyldimethyl \{2-[(2-methylprop-2-enoyl)oxy]ethyl\} azanium perfluorooctanesulfonate (PFOS-C _{15}H_{30}NO_2)$	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



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Group Name	Substance Name	CAS No.
	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 <sup>+</sup> ))	68141-02-6
	Pentadecafluorooctanoic acidpiperazine (2/1)PFOA- NH(C <sub>4</sub> H <sub>10</sub> N)	423-52-9
	Pentadecafluorooctanoate (anion)	45285-51-6
	Perfluorooctanoic Anhydride	33496-48-9
PFOA, its salts & derivatives	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 <sub>2</sub> O) <sub>2</sub> )	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 <sub>2</sub> H <sub>7</sub> N)	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 <sub>11</sub> H <sub>26</sub> N)	927835-01-6



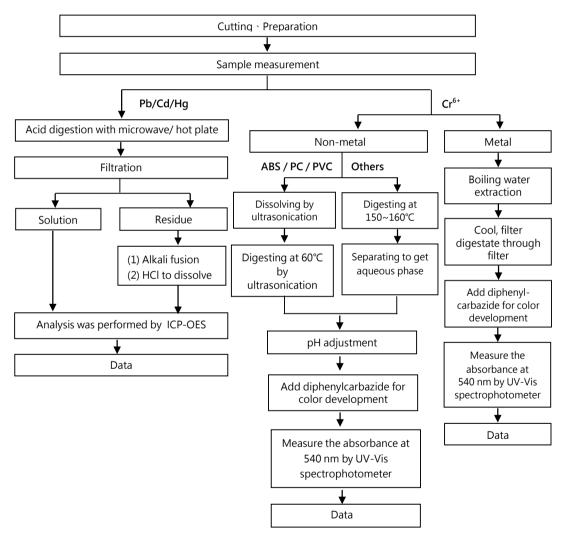
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### Analytical flow chart of heavy metal

No.:

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

( Cr<sup>6+</sup> test method excluded )



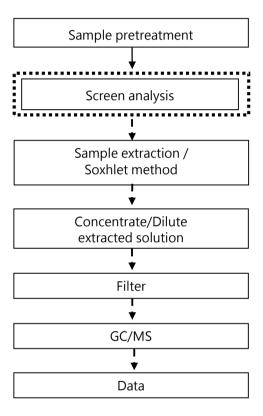


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### Analytical flow chart - PBBs / PBDEs

First testing process \_\_\_\_
Optional screen process \_\_\_\_
Confirmation process \_\_\_\_

No.:



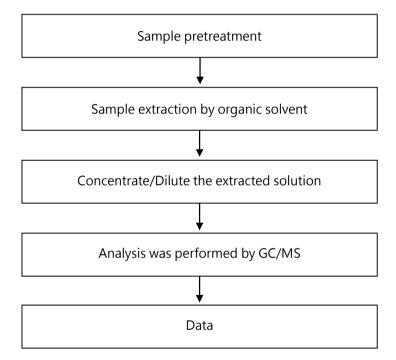


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### Analytical flow chart

No.:

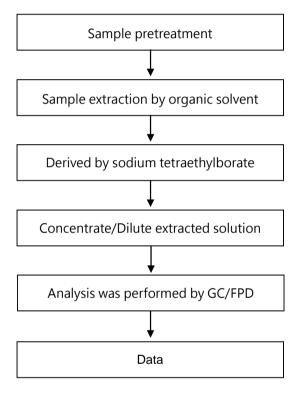
\* Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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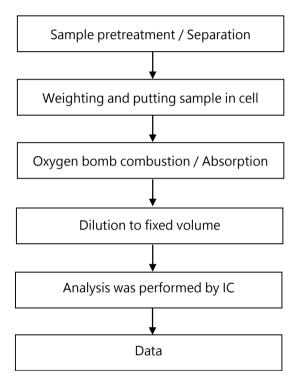
### Analytical flow chart - Organic-Tin





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#### Analytical flow chart - Halogen





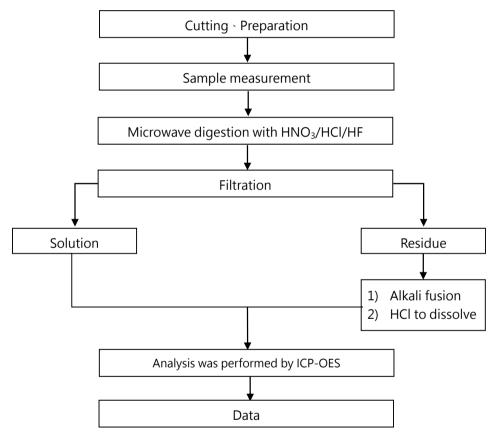
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### Analytical flow chart of elements (Heavy metal included)

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

No.:

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

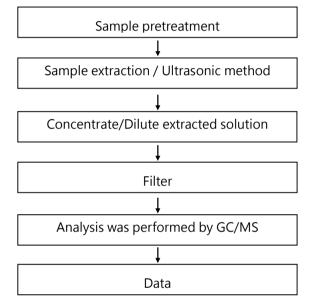


<sup>\*</sup> US EPA 3051A method does not add HF.



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### Analytical flow chart - HBCDD

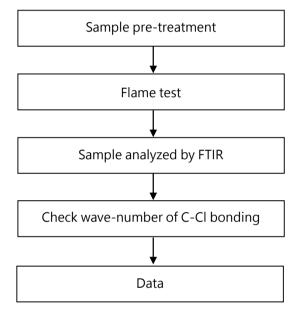




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### Analysis flow chart - PVC

No.:

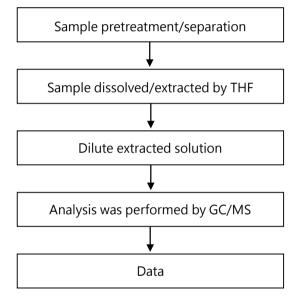




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### Analytical flow chart - Phthalate

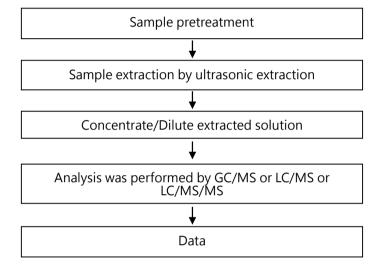
【Test method: IEC 62321-8】





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

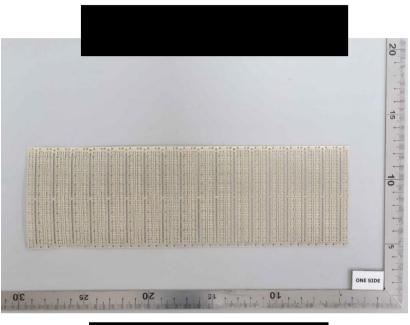




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\* The tested same / part is marked by an arrow if it's shown on the photo. \*

No.:





\*\* End of Report \*\*