

# **Restricted Chemicals Test Results**

# Device - OPA2335AIDGKT

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78033266	Mold Compound	RoHS 10 & Halogens	07/09/2024
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72859121	Die Attach Adhesive	RoHS 10 & Halogens	05/06/2024
67914229	Bond Wire	RoHS 10 & Halogens	01/26/2024
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61849276	Lead Frame Plating	RoHS 10 & Halogens	08/14/2023
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61988978	Lead Frame	RoHS 10 & Halogens	08/14/2023
61988980	Lead Frame	RoHS 10 & Halogens	08/14/2023



TI Report Number: 78033266

Component : Mold Compound

Analysis Type: RoHS 10 & Halogens

Analysis Date: 07/09/2024



Sample Name:

Test Report	No.:	<b>Date:</b> Jul 09, 2024	Page 1 of 16

Client Name: Client Address:

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

SGS Job No.:

Sample Receiving Date: Jul 02, 2024

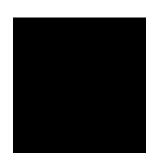
Testing Period: Jul 02, 2024 ~ Jul 09, 2024

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

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

Test Requirement	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	Pass
Element(s)	See Results
Halogen	See Results
Hexabromocyclododecane (HBCDD)	See Results
Phthalates	See Results
TBBP-A	See Results
Perfluorooctane sulfonic acid (PFOS) and its derivatives and Perfluorooctanoic acid (PFOA) and its salts	See Results







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#### Test Result(s):

Test Part Description:

SN ID	Sample No.	SGS Sample ID	Description
SN1	A4	SHA24-0145206-0001.C004	Dark-grey solid

#### Remarks:

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

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

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

IEC 62321-6:2015 and IEC 62321-8:2017, analysis was performed by ICP-OES/AAS, UV-

Vis and GC-MS.

Test Item(s)	Limit	Unit(s)	MDL	A4
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Cadmium (Cd)	100	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Polybromobiphenyl (PBB)	1000	mg/kg		ND
Monobrominated biphenyl (MonoBB)	-	mg/kg	5	ND
Dibrominated biphenyl (DiBB)	-	mg/kg	5	ND
Tribrominated biphenyl (TriBB)	-	mg/kg	5	ND
Tetrabrominated biphenyl (TetraBB)	-	mg/kg	5	ND
Pentabrominated biphenyl (PentaBB)	-	mg/kg	5	ND
Hexabrominated biphenyl (HexaBB)	-	mg/kg	5	ND
Heptabrominated biphenyl (HeptaBB)	-	mg/kg	5	ND
Octabrominated biphenyl (OctaBB)	-	mg/kg	5	ND
Nonabrominated biphenyl (NonaBB)	-	mg/kg	5	ND
Decabrominated biphenyl (DecaBB)	-	mg/kg	5	ND
Polybromodiphenyl ether(PBDE)	1000	mg/kg	•	ND
Monobrominated diphenyl ether (MonoBDE)	-	mg/kg	5	ND
Dibrominated diphenyl ether (DiBDE)	-	mg/kg	5	ND
Tribrominated diphenyl ether (TriBDE)	-	mg/kg	5	ND
Tetrabrominated diphenyl ether (TetraBDE)	-	mg/kg	5	ND
Pentabrominated diphenyl ether (PentaBDE)	-	mg/kg	5	ND
Hexabrominated diphenyl ether (HexaBDE)	-	mg/kg	5	ND
Heptabrominated diphenyl ether (HeptaBDE)	-	mg/kg	5	ND



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Test Item(s)	Limit	Unit(s)	MDL	A4
Octabrominated diphenyl ether (OctaBDE)	-	mg/kg	5	ND
Nonabrominated diphenyl ether (NonaBDE)	-	mg/kg	5	ND
Decabrominated diphenyl ether (DecaBDE)	-	mg/kg	5	ND
Bis(2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	1000	mg/kg	50	ND
Dibutyl phthalate (DBP)	1000	mg/kg	50	ND
Diisobutyl phthalate (DIBP)	1000	mg/kg	50	ND

#### Notes:

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series.
- (3) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

#### Element(s)

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

Test Item(s)	Unit(s)	MDL	A4
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.

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	mg/kg	20	ND
	/25637-99-4			
	/3194-55-6			

#### **Phthalates**

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



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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
Diisopentyl Phthalate(DIPP)	605-50-5	mg/kg	50	ND
n-pentyl Isopentyl Phthalate(nPIPP)	776297-69-9	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	A4
TBBP-A	79-94-7	mg/kg	10	ND

# <u>Perfluorooctane sulfonic acid (PFOS) and its derivatives and Perfluorooctanoic acid (PFOA) and its salts</u>

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

Test Item(s)	CAS No.	Unit(s)	MDL	A4	
PFOS, its salts and related compounds					
Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives	-	mg/kg	-	ND	
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	
PFOA, its salts					
Perfluorooctanoic acid (PFOA), its salts^	335-67-1	mg/kg	0.010	ND	

#### Notes:



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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- $N(C_2H_5)_4$ )	56773-42-3
N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-N( $C_{10}H_{21}$ ) <sub>2</sub> ( $CH_3$ ) <sub>2</sub> )	251099-16-8
$Tetrabutyl Ammonium\ perfluorooctane sulfonate\ (PFOS-N(C_4H_9)_4)$	111873-33-7
Perfluorooctane Sulfonyl fluoride (PFOS-F)	307-35-7
Magnesium bis(heptadecafluorooctanesulphonate) (PFOS-Mg)	91036-71-4
Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
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
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



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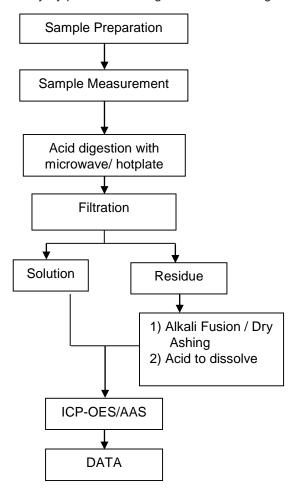
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#### **Elements Testing Flow Chart**

Name of the person who made testing: Meria Jin/Sielina Song Name of the person in charge of testing: John Cheng

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





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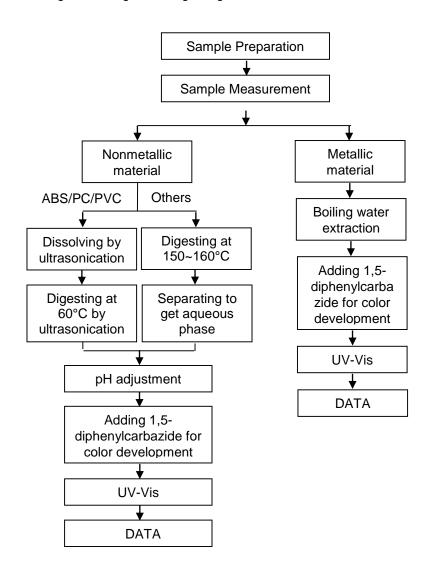


## **Test Report ATTACHMENTS**

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### 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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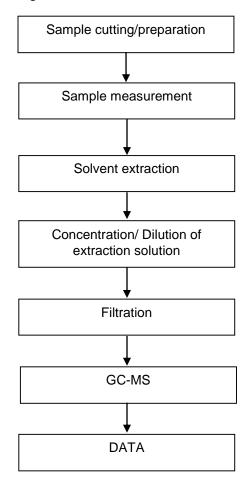


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#### **PBB/PBDE Testing Flow Chart**

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





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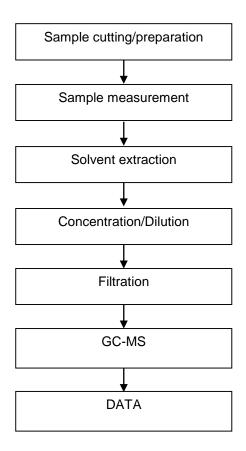


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#### **Test Report** Date: Jul 09, 2024 Page 10 of 16 No.:

#### **Phthalates Testing Flow Chart**

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





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# **Test Report ATTACHMENTS**

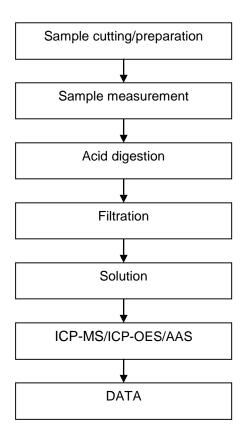
Date: Jul 09, 2024

Page 11 of 16

### **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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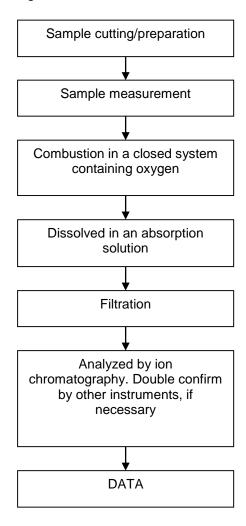


**ATTACHMENTS** 

**Test Report** No.: **Date:** Jul 09, 2024 Page 12 of 16

### **Halogen Testing Flow Chart**

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





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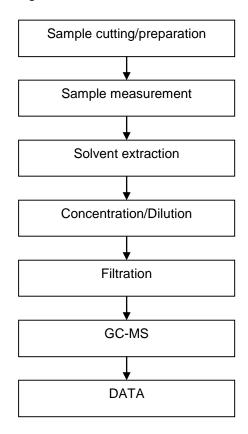


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#### **Test Report Date:** Jul 09, 2024 Page 13 of 16 No.:

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

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





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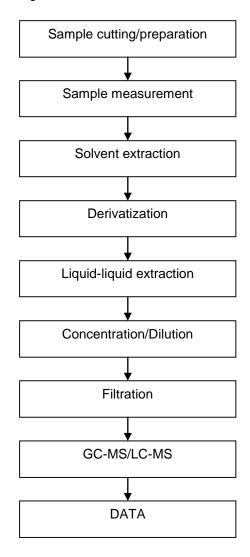
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**Test Report** Page 14 of 16 No.: **Date:** Jul 09, 2024 **ATTACHMENTS** 

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

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





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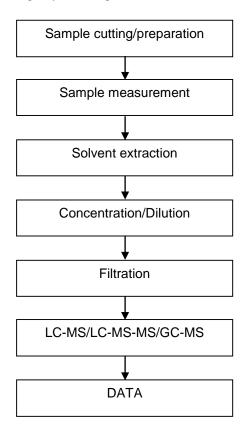
# **Test Report ATTACHMENTS**

#### **Date:** Jul 09, 2024 Page 15 of 16

### 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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Test Report	No.:	<b>Date:</b> Jul 09, 2024	Page 16 of 16
	*** End of Repor	t ***	

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TI Report Number: 73864618

Component : Semiconductor Device

Analysis Type: RoHS 10 & Halogens

Analysis Date: 05/28/2024



Test Report No. Date: May 28, 2024 Page 1 of 10



This report supersedes all previous documents bearing the test report number

The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description: Standard TI Wafer

Sample Received Date: 05/16/2024

Testing Period: **05/16/2024 – 05/28/2024** 

Revision Date : 05/28/2024

Revision Summary : Typo on Testing Period section revised from "06/16/2024 - 05/28/2024"

to "05/16/2024 - 05/28/2024".

Test Requested : Please refer to the result summary.

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

Result Summary :

Test(s	) Requested	Conclusion
1.	RoHS Directive (EU) 2015/863 Amending Annex II to Directive 2011/65/EU	PASS
2.	Halogen Content	See Test Results
3.	Element Content (As Requested by Client)	See Test Results



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**Test Report** Date: May 28, 2024 Page 2 of 10

#### 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	
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 (Determination of DEHP,	ND	50	1000
Butyl Benzyl Phthalate (BBP)	mg/kg	BBP, DBP and DIBP by	ND	50	1000
Dibutyl Phthalate (DBP)	mg/kg	GC-MS)	ND	50	1000
Diisobutyl Phthalate (DIBP)	mg/kg	30 W3)	ND	50	1000
Conclusion	/	/	PASS	/	/

#### Sample Description:

#### 1. Standard TI Wafer

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Note:

- (a) mg/kg = ppm; 0.1wt% = 1000ppm
- (b) ND= not detected
- (c) MDL = Method Detection Limit
- (d) # =
- The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm2. The sample coating is considered to contain CrVI
- The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm2). The b. coating is considered a non-CrVI based coating.
- The result between 0.10 µg/cm2 and 0.13 µg/cm2 is considered to be inconclusive unavoidable coating variations may influence the determination.
- d. For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of
- (e) = not regulated
- \* = 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
- (g) 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:

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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):	Unit	Results (ppm)	Reporting Limit (ppm)
Chlorine (CI)	mg/kg	ND	50
Bromine (Br)	mg/kg	ND	50
Fluorine (F)	mg/kg	ND	50

## Sample Description:

1. Standard TI Wafer

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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**Test Report** Date: May 28, 2024 Page 5 of 10

#### 3. Element Content (As Requested by Client)

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

Test Item		Result (mg/kg)	Reporting
rest item		1	Limit (mg/kg)
Arsenic	(As)	ND	5
Beryllium	(Be)	ND	5
Antimony	(Sb)	ND	5

#### Sample Description:

1. Standard TI Wafer

Note: 1. ppm = parts per million

2. mg/kg = ppm

3. 1% = 10000 ppm (mg/kg)

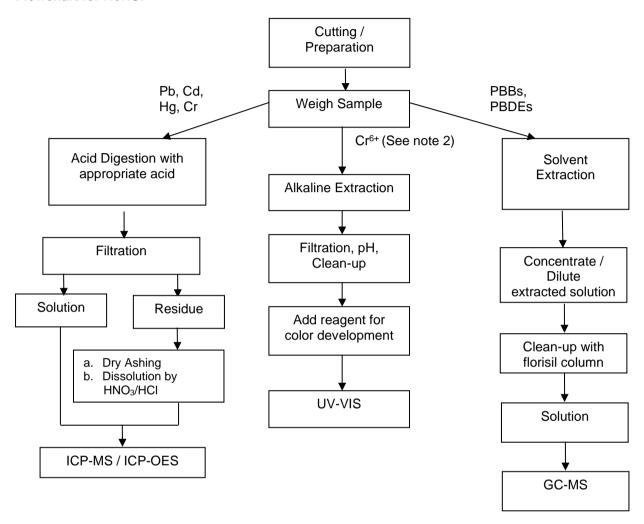
4. ND = Not Detected, reported when the reading is less than the reporting limit value.

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#### 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.

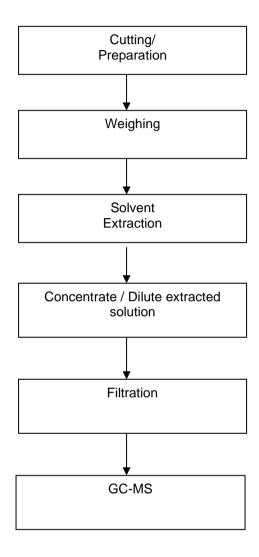
2. Cr<sup>6+</sup> is performed only when total Cr is detected

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#### Flowchart for Phthalates:

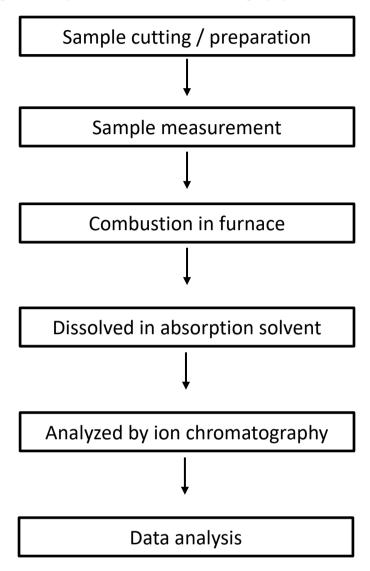


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Flow Chart of Halogen Test by Combustion Ion Chromatography:

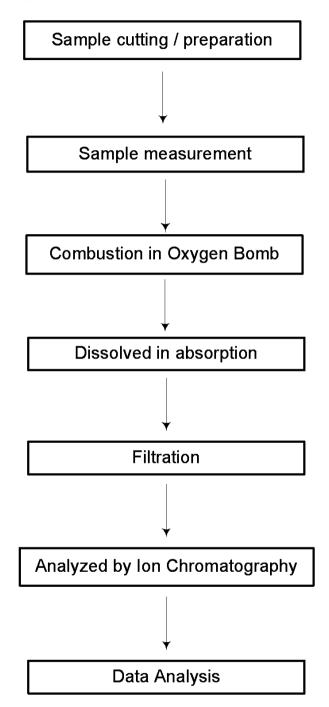


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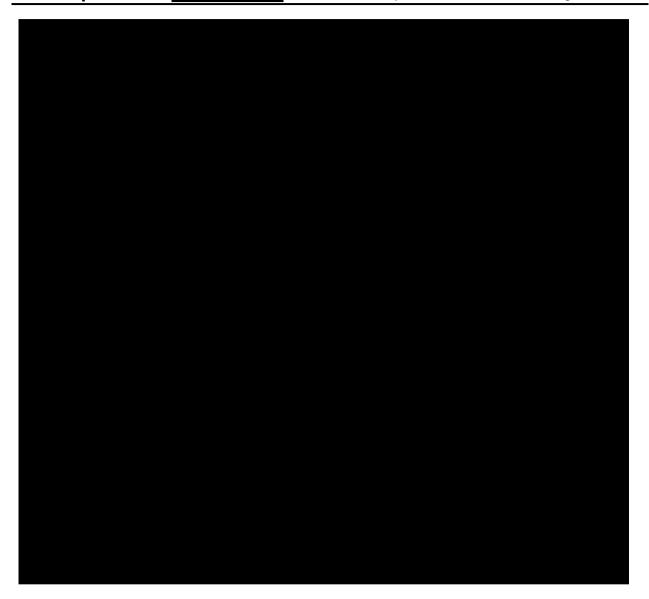
Halogen Testing Flow Chart (EN 14582):



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TI Report Number: 72859121

Component : Die Attach Adhesive

Analysis Type: RoHS 10 & Halogens

Analysis Date: 05/06/2024



Test Rep	ort No.:	Date:	May 06, 2024	Page 1 of 12

Client Name:

Client Address:

Sample Name:

Model No.:

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

SGS Job No.: SHP24-012679 Sample Receiving Date: Apr 25, 2024

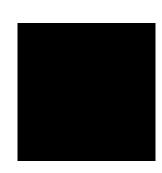
Testing Period: Apr 25, 2024 ~ May 06, 2024

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

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

Test Requirement	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	Pass
Element(s)	See Results
Halogen	See Results
Hexabromocyclododecane (HBCDD)	See Results
Phthalates	See Results







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**Test Report Date:** May 06, 2024 Page 2 of 12 No.:

### Test Result(s):

Test Part Description:

SN ID	Sample No.	SGS Sample ID	Description
SN1	A3	SHA24-0083407-0001.C003	Grey mud

#### Remarks:

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

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

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

IEC 62321-6:2015 and IEC 62321-8:2017, analysis was performed by ICP-OES/AAS, UV-

Vis and GC-MS.

Test Item(s)	Limit	Unit(s)	MDL	A3
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Cadmium (Cd)	100	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Polybromobiphenyl (PBB)	1000	mg/kg	-	ND
Monobrominated biphenyl (MonoBB)	-	mg/kg	5	ND
Dibrominated biphenyl (DiBB)	-	mg/kg	5	ND
Tribrominated biphenyl (TriBB)	-	mg/kg	5	ND
Tetrabrominated biphenyl (TetraBB)	-	mg/kg	5	ND
Pentabrominated biphenyl (PentaBB)	-	mg/kg	5	ND
Hexabrominated biphenyl (HexaBB)	-	mg/kg	5	ND
Heptabrominated biphenyl (HeptaBB)	-	mg/kg	5	ND
Octabrominated biphenyl (OctaBB)	-	mg/kg	5	ND
Nonabrominated biphenyl (NonaBB)	-	mg/kg	5	ND
Decabrominated biphenyl (DecaBB)	-	mg/kg	5	ND
Polybromodiphenyl ether(PBDE)	1000	mg/kg	-	ND
Monobrominated diphenyl ether (MonoBDE)	-	mg/kg	5	ND
Dibrominated diphenyl ether (DiBDE)	-	mg/kg	5	ND
Tribrominated diphenyl ether (TriBDE)	-	mg/kg	5	ND
Tetrabrominated diphenyl ether (TetraBDE)	-	mg/kg	5	ND
Pentabrominated diphenyl ether (PentaBDE)	-	mg/kg	5	ND
Hexabrominated diphenyl ether (HexaBDE)	-	mg/kg	5	ND
Heptabrominated diphenyl ether (HeptaBDE)	-	mg/kg	5	ND



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Test Item(s)	Limit	Unit(s)	MDL	A3
Octabrominated diphenyl ether (OctaBDE)	-	mg/kg	5	ND
Nonabrominated diphenyl ether (NonaBDE)	-	mg/kg	5	ND
Decabrominated diphenyl ether (DecaBDE)	-	mg/kg	5	ND
Bis(2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	1000	mg/kg	50	ND
Dibutyl phthalate (DBP)	1000	mg/kg	50	ND
Diisobutyl phthalate (DIBP)	1000	mg/kg	50	ND

#### Notes:

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series.
- (3) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

#### Element(s)

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

Test Item(s)	Unit(s)	MDL	A3
Antimony(Sb)	mg/kg	10	ND

#### **Halogen**

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

Test Item(s)	Unit(s)	MDL	A3
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	A3
Hexabromocyclododecane (HBCDD)	134237-50-6 /134237-51-7 /134237-52-8 /25637-99-4 /3194-55-6	mg/kg	20	ND

#### **Phthalates**

Test Method: With reference to EN 14372:2004, analysis was performed by GC-MS.



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-		•		ŭ
Test Item(s)	CAS No.	Unit(s)	MDL	A3
Dibutyl Phthalate(DBP)	84-74-2	%	0.003	ND
Benzyl Butyl Phthalate(BBP)	85-68-7	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate(DEHP)	117-81-7	%	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0 /68515-48-0	%	0.010	ND
Di-n-Octyl Phthalate(DNOP)	117-84-0	%	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 /68515-49-1	%	0.010	ND
Dimethyl Phthalate(DMP)	131-11-3	%	0.003	ND
Diethyl Phthalate(DEP)	84-66-2	%	0.003	ND
Diisobutyl Phthalate(DIBP)	84-69-5	%	0.003	ND
Dipentyl Phthalate (DnPP)	131-18-0	%	0.003	ND
Dicyclohexyl Phthalate(DCHP)	84-61-7	%	0.003	ND
Diphenyl Phthalate(DPhP)	84-62-8	%	0.003	ND
Dibenzyl Phthalate(DBzP)	523-31-9	%	0.003	ND
Diisooctyl Phthalate(DIOP)	27554-26-3	%	0.010	ND
Dipropyl Phthalate(DPrP)	131-16-8	%	0.003	ND
Dinonyl Phthalate(DNP)	84-76-4	%	0.003	ND
Di-n-Hexyl Phthalate(DnHP)	84-75-3	%	0.003	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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## **Test Report ATTACHMENTS**

**Date:** May 06, 2024

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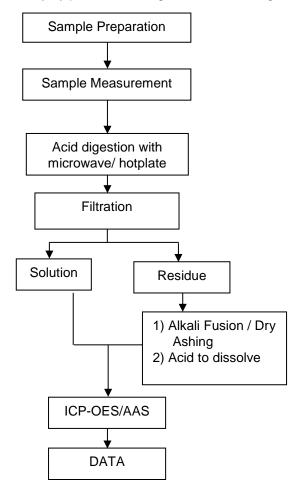
## **Elements Testing Flow Chart**

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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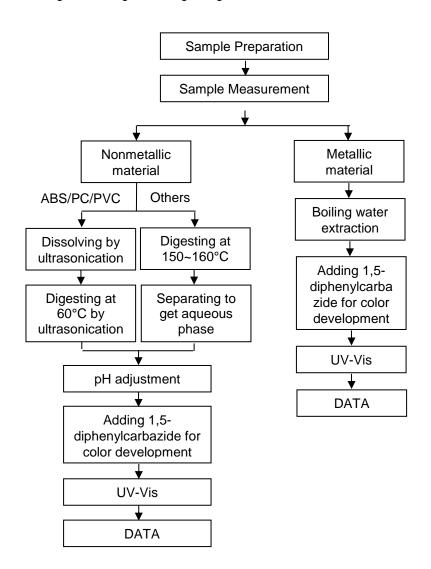
# Test Report ATTACHMENTS

**No.:** Date: May 06, 2024

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#### 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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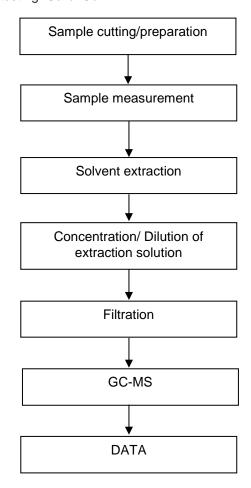


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**Test Report** Date: May 06, 2024 Page 7 of 12 No.:

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

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





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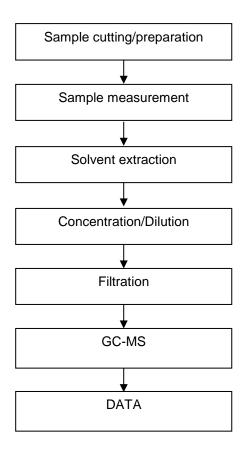


**ATTACHMENTS** 

#### **Test Report** Date: May 06, 2024 Page 8 of 12 No.:

#### **Phthalates Testing Flow Chart**

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





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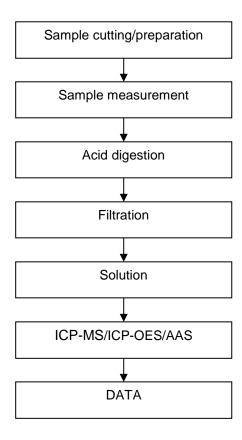
**Date:** May 06, 2024

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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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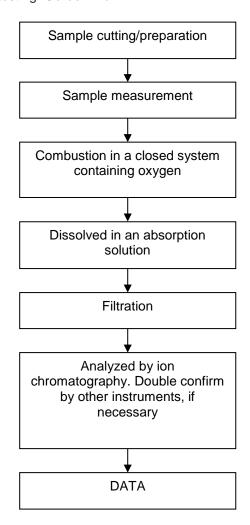


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#### **Test Report** No.: Date: May 06, 2024 Page 10 of 12

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

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





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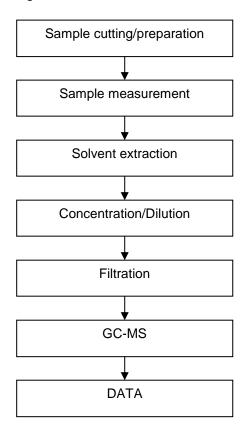


**Test Report Date:** May 06, 2024 Page 11 of 12 No.:

### **ATTACHMENTS**

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

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





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**Test Report** No.: Page 12 of 12 **Date:** May 06, 2024



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TI Report Number: 67914229

Component: Bond Wire

Analysis Type: RoHS 10 & Halogens

Analysis Date: 01/26/2024



Date: 26-Jan-2024

Page: 1 of 19

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

Sample Name : NIPPON COPPER WIRE

Style/Item No. :

Tel :

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

Sample Receiving Date

: 18-Jan-2024

**Testing Period** 

: 18-Jan-2024 to 25-Jan-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).

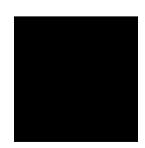
**Test Results** 

Please refer to following pages.

Conclusion

(1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Troy Chang / Department Manager
Signed for and on behalf of Alwah
SGS TAIWAN LTD.
Chemical Laboratory - Taipei





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**Test Part Description** 

No.1 : SILVER COLORED METAL WIRE (INCLUDING THE PLATING LAYER)

#### Test Result(s)

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Cadmium (Cd)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	100
Lead (Pb)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Mercury (Hg)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Hexavalent Chromium Cr(VI) (#2)	With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.	μg/cm²	0.1	n.d.	-
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.	1
Nonabromobiphenyl		mg/kg	5	n.d.	1
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.	П
Dibromodiphenyl ether		mg/kg	5	n.d.	П
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

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Date: 26-Jan-2024

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Polychlorinated biphenyls (PCBs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	0.5	n.d.	-
Polychlorinated naphthalene (PCNs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	5	n.d.	-
Polychlorinated terphenyls (PCTs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	0.5	n.d.	-
Short Chain Chlorinated Paraffins(C10-C13) (SCCP) (CAS No.: 85535-84-8)	With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Triphenyl tin (TPT)		mg/kg	0.03	n.d.	-
Tributyl tin (TBT)	With reference to ISO 17353: 2004,	mg/kg	0.03	n.d.	-
Dioctyl tin (DOT)	analysis was performed by GC/FPD.	mg/kg	0.03	n.d.	-
Dibutyl tin (DBT)		mg/kg	0.03	n.d.	-
Bis(tributyltin) oxide (TBTO) (CAS No.: 56-35-9)	Calculated from the result of Tributyl Tin (TBT).	mg/kg	0.03▲	n.d.	-
Fluorine (F) (CAS No.: 14762-94-8)		mg/kg	50	n.d.	-
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016,	mg/kg	50	n.d.	-
Bromine (Br) (CAS No.: 10097-32-2)	analysis was performed by IC.	mg/kg	50	n.d.	-
lodine (I) (CAS No.: 14362-44-8)		mg/kg	50	n.d.	-
Antimony (Sb) (CAS No.: 7440-36-0)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.	-
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.	-
Arsenic (As) (CAS No.: 7440-38-2)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.	-
PFOS and its salts (CAS No.: 1763- 23-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.	-
PFOA and its salts (CAS No.: 335-67-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.	-
Polyvinyl chloride (PVC)	With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.	**	-	Negative	-

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Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ -	With reference to IEC 62321: 2008, analysis was performed by GC/MS.	mg/kg	5	n.d.	1
HBCDD) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237- 50-6, 134237-52-8))					
Butyl benzyl phthalate (BBP)		mg/kg	50	n.d.	1000
Dibutyl phthalate (DBP)		mg/kg	50	n.d.	1000
Di-(2-ethylhexyl) phthalate (DEHP)		mg/kg	50	n.d.	1000
Diisobutyl phthalate (DIBP)		mg/kg	50	n.d.	1000
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)		mg/kg	50	n.d.	-
Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)		mg/kg	50	n.d.	-
Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0)		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)		mg/kg	50	n.d.	-
Diisopentyl phthalate (DIPP) (CAS No.: 605-50-5)		mg/kg	50	n.d.	-
N-pentyl iso-pentyl phthalate (NPIPP) (CAS No.: 776297-69-9)		mg/kg	50	n.d.	-
1,2-Benzenedicarboxylic acid, di-C6- 8-branched alkyl esters, C7-rich (DIHP) (CAS No.: 71888-89-6)		mg/kg	50	n.d.	-
1,2-Benzenedicarboxylic acid, di-C7- 11-branched and linear alkyl esters (DHNUP) (CAS No.: 68515-42-4)		mg/kg	50	n.d.	-
Red Phosphorus	Analysis was performed by Pyrolyzer-GC/MS.	**	-	Negative	-
Decabromodiphenylethane (CAS No.: 84852-53-9)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	5	n.d.	-

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#### 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/cm²). The coating is considered a non-Cr(VI) based coating
  - c. The result between 0.10  $\mu$ g/cm<sup>2</sup> and 0.13  $\mu$ g/cm<sup>2</sup> 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

9. 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.

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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
DEOC its solts 9, derivetives	Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOS- $N(C_2H_5)_4$ )	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
	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
	Perfluorooctanoic acid (PFOA)	335-67-1
	Sodium perfluorooctanoate (PFOA-Na)	335-95-5
PFOA, its salts & derivatives	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



No.:

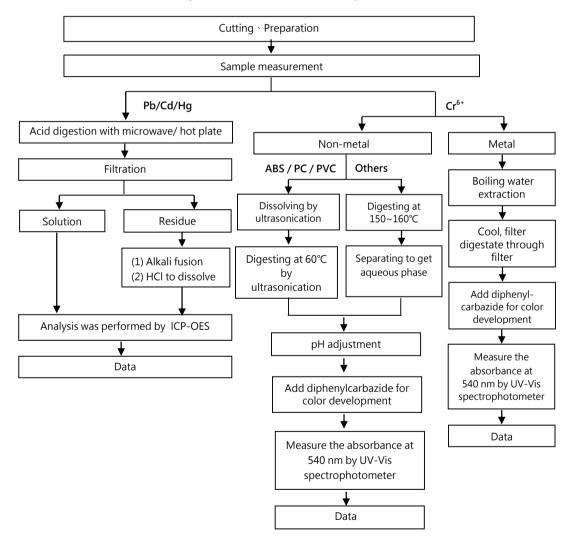
### **Test Report**

Date: 26-Jan-2024

#### 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 )



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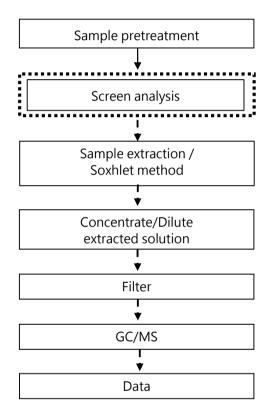
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#### Analytical flow chart - PBBs / PBDEs

First testing process

Optional screen process

Confirmation process



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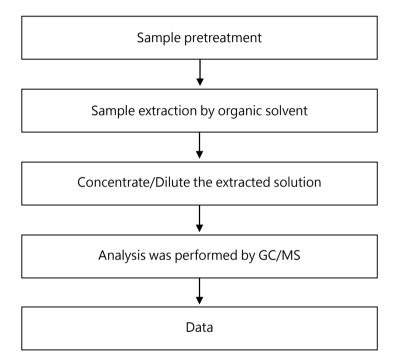
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#### Analytical flow chart

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



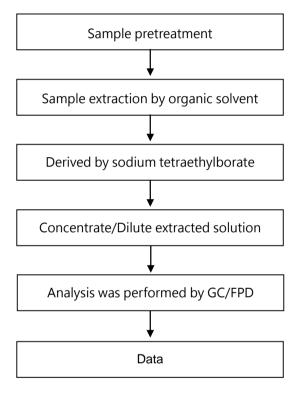
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#### Analytical flow chart - Organic-Tin



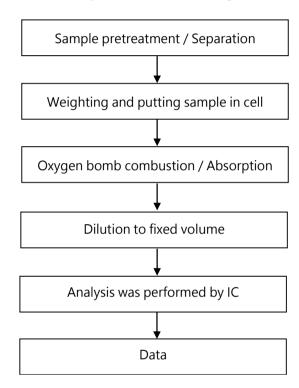
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#### Analytical flow chart - Halogen



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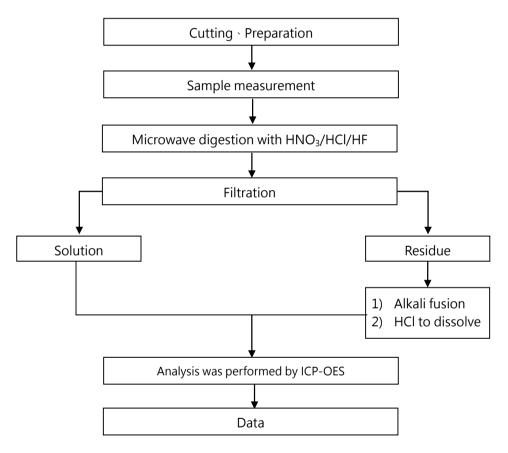


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#### Analytical flow chart of elements (Heavy metal included)

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

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



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

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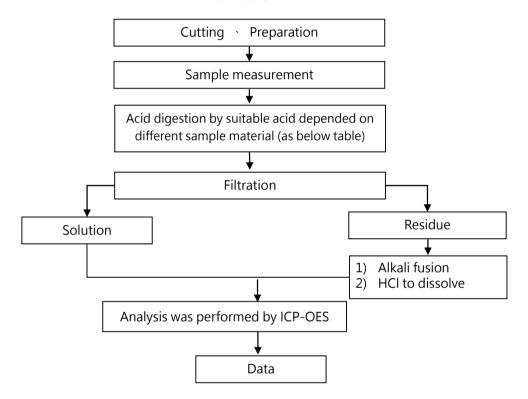
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#### Flow chart of digestion for the elements analysis performed by ICP-OES

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

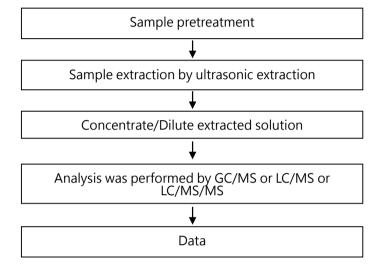
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#### Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)



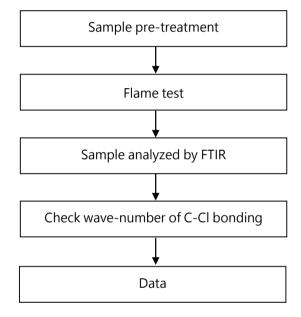
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#### Analysis flow chart - PVC



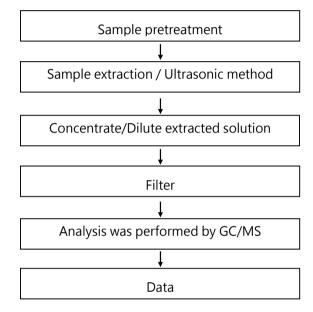
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#### Analytical flow chart - HBCDD



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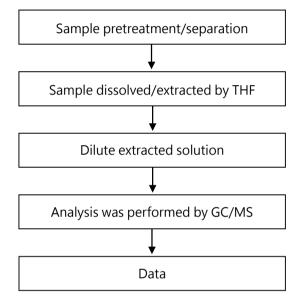
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#### Analytical flow chart - Phthalate

[Test method: IEC 62321-8]



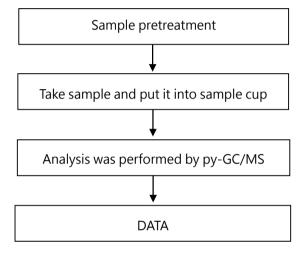
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#### Analytical flow chart - Red phosphorus



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



\*\* End of Report \*\*

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TI Report Number: 61988976

Component: Lead Frame

Analysis Type: RoHS 10 & Halogens

Analysis Date: 08/14/2023



### 測試報告

### **Test Report**

日期(Date): 14-Aug-2023 頁數(Page): 1 of 20

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant as):

送樣廠商(Sample Submitted By)

樣品名稱(Sample Name) : Ni PLATING LAYER

製造日期(Manufacturing Date) : 07/10/2023

收件日(Sample Receiving Date)

: 04-Aug-2023

測試期間(Testing Period)

04-Aug-2023 to 11-Aug-2023

測試需求(Test Requested) :

(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

測試結果(Test Results)

結 論(Conclusion)

請參閱下一頁 (Please refer to following pages.)
(1) 根據客戶所選擇的部位測試,其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP,

BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU)

2015/863 amending Annex II to Directive 2011/65/EU.)





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#### 測試部位敘述 (Test Part Description)

No.1 : 銀色鍍層 (SILVER COLORED METAL PLATING LAYER)

No.2 : 銀色金屬片(含鍍層) (SILVER COLORED METAL SHEET(INCLUDING THE PLATING LAYER))

#### 測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層,參考IEC 62321-5: 2013.以感應耦合電漿發射光譜儀 分析。(IEC 62321-5: 2013	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439- 92-1)	application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	5.10		1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層·參考IEC 62321-4: 2013+ AMD1: 2017·以感應耦合 電漿發射光譜儀分析。(IEC 62321- 4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015 · 以紫外 光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)		`	sult)	(Limit)
				No.1	No.2	
一溴聯苯 (Monobromobiphenyl)		mg/kg	5		n.d.	-
二溴聯苯 (Dibromobiphenyl)		mg/kg	5		n.d.	-
三溴聯苯 (Tribromobiphenyl)		mg/kg	5		n.d.	-
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5		n.d.	-
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5		n.d.	-
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5		n.d.	-
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5		n.d.	-
八溴聯苯 (Octabromobiphenyl)		mg/kg	5		n.d.	-
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5		n.d.	-
十溴聯苯 (Decabromobiphenyl)	參考IEC 62321-6: 2015 · 以氣相層	mg/kg	5		n.d.	-
多溴聯苯總和 (Sum of PBBs)	析儀/質譜儀分析。(With reference to IEC 62321-6: 2015, analysis	mg/kg	-		n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether)		mg/kg	5		n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5		n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5		n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5		n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5		n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5		n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5		n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5		n.d.	-
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5		n.d.	-
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5		n.d.	-
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-		n.d.	1000
銻 (Sb) (Antimony (Sb)) (CAS No.:	參考US EPA 3052: 1996,以感應	mg/kg	2		n.d.	-
7440-36-0)	耦合電漿發射光譜儀分析。(With					
	reference to US EPA 3052: 1996,					
	analysis was performed by ICP-					
	OES.)					
三氧化二銻(Sb₂O₃) (Antimony	由銻結果計算得之。(Calculated	mg/kg	2▲		n.d.	-
trioxide (Sb <sub>2</sub> O <sub>3</sub> )) (CAS No.: 1309-64-	from the result of Antimony.)	-				
4)						



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)			sult)	(Limit)
				No.1	No.2	
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
多氯奈 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10- C13) (SCCP)) (CAS No.: 85535-84-8)	參考ISO 18219-1: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
(	(anomos,	(01113)		No.1	No.2	, ,
中鏈氯化石蠟(C14-C17) (MCCP) (Medium Chain Chlorinated Paraffins(C14-C17) (MCCP)) (CAS No.: 85535-85-9)	參考ISO 18219-2: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-2: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - HBCDD) (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))	to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2021 · 以傅立 葉轉換紅外線光譜儀及焰色法分 析。(With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.)	**	-		Negative	-
四溴雙酚 A (TBBP-A) (Tetrabromobisphenol A (TBBP-A)) (CAS No.: 79-94-7)	參考RSTS-E&E-121 · 以液相層析 儀/質譜儀分析。(With reference to RSTS-E&E-121, analysis was performed by LC/MS.)	mg/kg	10		n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010 · 以液相 層析串聯質譜儀分析。(With	mg/kg	0.01		n.d.	-
全氟辛酸 (PFOA)及其鹽類 (Perfluorooctanoic acid (PFOA) and it's salt) (CAS No.: 335-67-1 and its salts)	reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01		n.d.	-



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測試項目	測試方法	單位	MDL	結果		限值
(Test Items)	(Method)	(Unit)		(Result)		(Limit)
氟 (F) (Fluorine (F)) (CAS No.: 14762-		ma/ka	50	No.1	No.2 n.d.	_
94-8)		mg/kg	30		n.a.	-
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)	參考BS EN 14582: 2016 · 以離子 層析儀分析。(With reference to BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50		n.d.	-
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)		mg/kg	50		n.d.	-
碘 (I) (Iodine (I)) (CAS No.: 14362-44- 8)		mg/kg	50		n.d.	-
三丁基錫 (TBT) (Tributyl tin (TBT))	參考ISO 17353: 2004·以氣相層析 儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03		n.d.	-
三苯基錫 (TPT) (Triphenyl tin (TPT))		mg/kg	0.03		n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))		mg/kg	0.03		n.d.	-
二辛基錫 (DOT) (Dioctyl tin (DOT))		mg/kg	0.03		n.d.	-
氧化雙三丁基錫 (TBTO) (Bis(tributyltin) oxide (TBTO)) (CAS No.: 56-35-9)	由三丁基錫測試結果計算得之。 (Calculated from the result of Tributyl Tin (TBT).)	mg/kg	0.03 🛦		n.d.	-
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP))		mg/kg	50		n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP))		mg/kg	50		n.d.	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP))	参考IEC 62321-8: 2017·以氣相層	mg/kg	50		n.d.	1000
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP))	析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.)	mg/kg	50		n.d.	1000
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl phthalate (DIDP)) (CAS No.: 26761-40-0, 68515-49-1)		mg/kg	50		n.d.	-
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl phthalate (DINP)) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)		限值 (Limit)
, ,	,	, ,		No.1	No.2	
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl phthalate (DNOP)) (CAS No.: 117-84-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50		n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 (DMEP) (Bis-(2-methoxyethyl) phthalate (DMEP)) (CAS No.: 117-82-8)		mg/kg	50		n.d.	-
鄰苯二甲酸正戊異戊酯 (NPIPP) (N-pentyl iso-pentyl phthalate (NPIPP)) (CAS No.: 776297-69-9)	參考IEC 62321-8: 2017,以氣相層 析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis	mg/kg	50		n.d.	-
鄰苯二甲酸二異戊酯 (DIPP) (Diisopentyl phthalate (DIPP)) (CAS No.: 605-50-5)	was performed by GC/MS.)	mg/kg	50		n.d.	-
鄰苯二甲酸二(C7-11支鏈與直鏈)烷基 酯 (DHNUP) (1,2- Benzenedicarboxylic acid, di-C7-11- branched and linear alkyl esters (DHNUP)) (CAS No.: 68515-42-4)		mg/kg	50		n.d.	-
1,2-苯二酸-二(C6-8支鏈)烷基酯(富C7) (DIHP) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)) (CAS No.: 71888-89- 6)		mg/kg	50		n.d.	-



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 7. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 8. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including):
  CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7,
  - CAS No.: 1763-23-1, 2795-39-3, 29457-72-3, 29061-36-9, 70225-14-8, 36773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.
- 9. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):
  - CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.
- 10. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²,表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).)
  - b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²) · 表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating)
  - c. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive unavoidable coating variations may influence the determination.)
- 11. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.)

換算公式 (Conversion Formula): AX = A × F

AX	Α	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276
三氧化二銻 (Antimony trioxide) (Sb <sub>2</sub> O <sub>3</sub> )	銻 (Antimony)	1.1971

參數換算表 (Parameter Conversion Table):

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

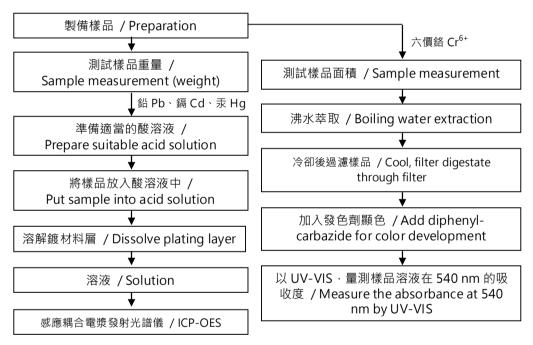
12. 除非另有說明,參照ILAC-G8:09/2019,採用簡單二元(w=0)允收規則進行符合性判定;根據此規則,符合性結果之判定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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#### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

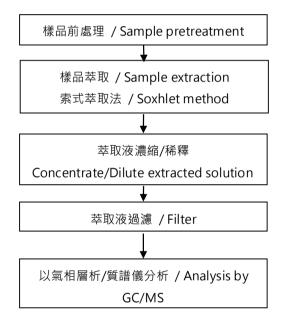
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。( 六價鉻測試方法除外 ) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (  $Cr^{6+}$  test method excluded )





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### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART





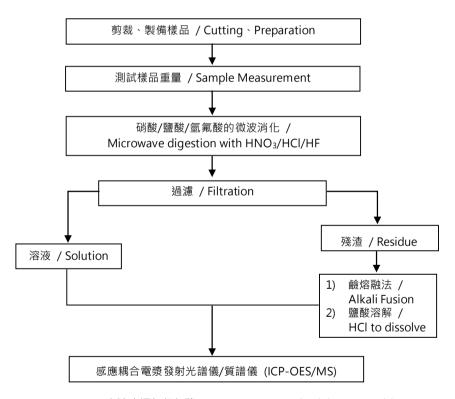
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### 元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

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

【參考方法/Reference method: US EPA 3051、US EPA 3052】



\* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.

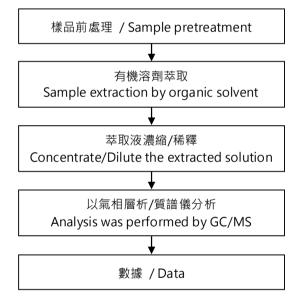


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### 分析流程圖 / Analytical flow chart

【適用於:多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

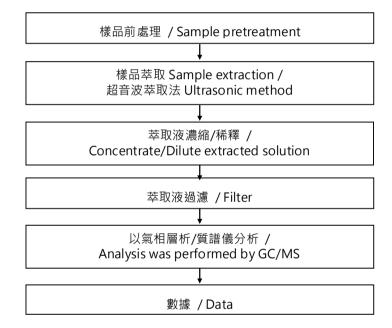
\*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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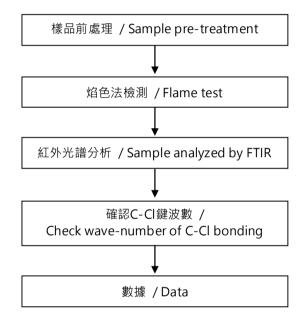
### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD





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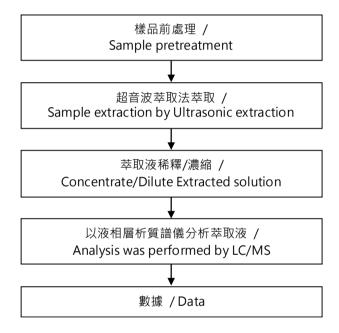
### 聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





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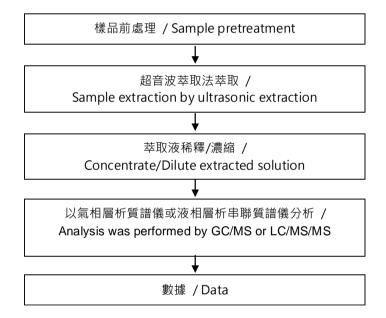
#### 四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart





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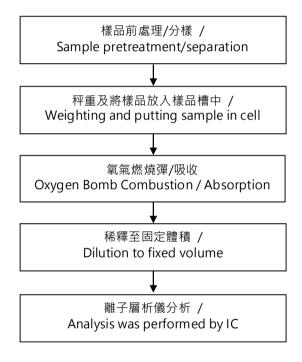
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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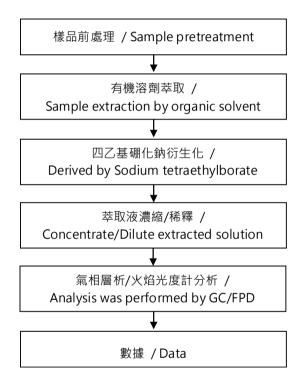
### 鹵素分析流程圖 / Analytical flow chart of Halogen





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#### 有機錫分析流程圖 / Analytical flow chart - Organic-Tin

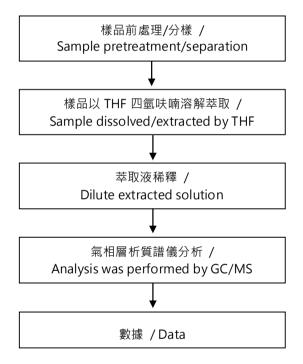




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### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

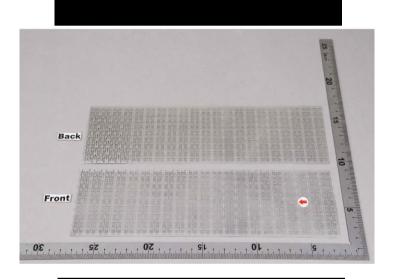
【測試方法/Test method: IEC 62321-8】

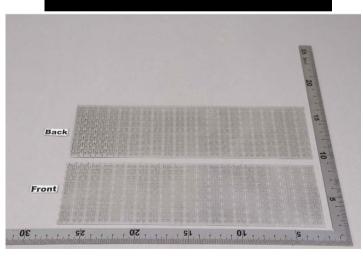




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\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)





\*\* 報告結尾 (End of Report) \*\*



TI Report Number: 61849276

Component : Lead Frame Plating

Analysis Type: RoHS 10 & Halogens

Analysis Date: 08/14/2023



## 測試報告

### **Test Report**

頁數(Page): 1 of 20 日期(Date): 14-Aug-2023

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant

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

送樣廠商(Sample Submitted By)

樣品名稱(Sample Name) Ag PLATING LAYER

製造日期(Manufacturing Date) 07/29/2023

收件日(Sample Receiving Date) 04-Aug-2023

測試期間(Testing Period) 04-Aug-2023 to 11-Aug-2023

測試需求(Test Requested) (1) 依據客戶指定·參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試

> 鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (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) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

請參閱下一頁 (Please refer to following pages.) 測試結果(Test Results)

(1) 根據客戶所選擇的部位測試,其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, 論(Conclusion)

> BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU)

2015/863 amending Annex II to Directive 2011/65/EU.)

報告簽署人/張伯睿 博士/部區理 Ray Chang, Ph.D./ Department Manage Signed for and on behalf SĞS TAIWAN LTD.

化學實驗室-高雄/Chemical Laboratory-Kaohsiung





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### 測試部位敘述 (Test Part Description)

No.1 : 銀色鍍層 (SILVER COLORED METAL PLATING LAYER)

No.2 : 銀色金屬片(含鍍層) (SILVER COLORED METAL SHEET(INCLUDING THE PLATING LAYER))

### 測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層,參考IEC 62321-5: 2013.以感應耦合電漿發射光譜儀 分析。(IEC 62321-5: 2013	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439- 92-1)	application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	9.32		1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層·參考IEC 62321-4: 2013+ AMD1: 2017·以感應耦合 電漿發射光譜儀分析。(IEC 62321- 4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015 · 以紫外 光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	(Res	果 sult)	限值 (Limit)
N 766 11				No.1	No.2	
一溴聯苯 (Monobromobiphenyl)		mg/kg	5		n.d.	-
二溴聯苯 (Dibromobiphenyl)		mg/kg	5		n.d.	-
三溴聯苯 (Tribromobiphenyl)		mg/kg	5		n.d.	-
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5		n.d.	-
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5		n.d.	-
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5		n.d.	-
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5		n.d.	-
八溴聯苯 (Octabromobiphenyl)		mg/kg	5		n.d.	-
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5	-	n.d.	-
十溴聯苯 (Decabromobiphenyl)	參考IEC 62321-6: 2015 · 以氣相層	mg/kg	5		n.d.	-
多溴聯苯總和 (Sum of PBBs)	析儀/質譜儀分析。(With reference	mg/kg	-		n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether)	to IEC 62321-6: 2015, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether)		mg/kg	5		n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5		n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5		n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5		n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5		n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5		n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5		n.d.	-
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5		n.d.	-
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5		n.d.	-
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-		n.d.	1000
銻 (Sb) (Antimony (Sb)) (CAS No.:	參考US EPA 3052: 1996,以感應	mg/kg	2		n.d.	-
7440-36-0)	耦合電漿發射光譜儀分析。(With	J. J				
,	reference to US EPA 3052: 1996,					
	analysis was performed by ICP-					
	OES.)					
三氧化二銻(Sb₂O₃) (Antimony	由銻結果計算得之。(Calculated	mg/kg	2▲		n.d.	-
trioxide (Sb <sub>2</sub> O <sub>3</sub> )) (CAS No.: 1309-64-	from the result of Antimony.)	<i>J</i> , <i>J</i>				
4)	,					



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
(rest items)	(iviethod)	(Onit)		No.1	No.2	(Lillill)
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996·以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996·以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
多氯奈 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10- C13) (SCCP)) (CAS No.: 85535-84-8)	參考ISO 18219-1: 2021 · 以氣相層析儀/質譜儀分析。(With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結果 (Result)		限值 (Limit)
(Test items)	(Method)	(OIIII)		No.1	No.2	(LIIIIII)
中鏈氯化石蠟(C14-C17) (MCCP) (Medium Chain Chlorinated Paraffins(C14-C17) (MCCP)) (CAS No.: 85535-85-9)	參考ISO 18219-2: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-2: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) ( $\alpha$ - HBCDD, $\beta$ - HBCDD) (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))	to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2021·以傅立 葉轉換紅外線光譜儀及焰色法分 析。(With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.)	**	1		Negative	1
四溴雙酚 A (TBBP-A) (Tetrabromobisphenol A (TBBP-A)) (CAS No.: 79-94-7)	參考RSTS-E&E-121 · 以液相層析 儀/質譜儀分析。(With reference to RSTS-E&E-121, analysis was performed by LC/MS.)	mg/kg	10		n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010 · 以液相 層析串聯質譜儀分析。(With	mg/kg	0.01		n.d.	-
全氟辛酸 (PFOA)及其鹽類 (Perfluorooctanoic acid (PFOA) and it's salt) (CAS No.: 335-67-1 and its salts)	reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01		n.d.	-



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測試項目	測試方法	單位	MDL	結	果	限值
(Test Items)	(Method)	(Unit)		(Res	sult)	(Limit)
				No.1	No.2	
氟 (F) (Fluorine (F)) (CAS No.: 14762-		mg/kg	50		n.d.	-
94-8)						
氯 (CI) (Chlorine (CI)) (CAS No.:	參考BS EN 14582: 2016·以離子	mg/kg	50		n.d.	-
22537-15-1)	層析儀分析。(With reference to					
溴 (Br) (Bromine (Br)) (CAS No.:	BS EN 14582: 2016, analysis was	mg/kg	50		n.d.	-
10097-32-2)	performed by IC.)					
碘 (I) (Iodine (I)) (CAS No.: 14362-44-		mg/kg	50		n.d.	-
8)						
三丁基錫 (TBT) (Tributyl tin (TBT))	參考ISO 17353: 2004 · 以氣相層析	mg/kg	0.03		n.d.	-
三苯基錫 (TPT) (Triphenyl tin (TPT))	儀/火焰光度偵測器分析。(With	mg/kg	0.03		n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))	reference to ISO 17353: 2004, analysis was performed by	mg/kg	0.03		n.d.	-
二辛基錫 (DOT) (Dioctyl tin (DOT))		mg/kg	0.03		n.d.	-
氧化雙三丁基錫 (TBTO)	由三丁基錫測試結果計算得之。	mg/kg	0.03 🛦		n.d.	-
(Bis(tributyltin) oxide (TBTO)) (CAS	(Calculated from the result of					
No.: 56-35-9)	Tributyl Tin (TBT).)					
鄰苯二甲酸二丁酯 (DBP) (Dibutyl		mg/kg	50		n.d.	1000
phthalate (DBP))						
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl		mg/kg	50		n.d.	1000
benzyl phthalate (BBP))						
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl		mg/kg	50		n.d.	1000
phthalate (DIBP))	參考IEC 62321-8: 2017,以氣相層					
鄰苯二甲酸二(2-乙基己基)酯 (DEHP)	析儀/質譜儀分析。(With reference	mg/kg	50		n.d.	1000
(Di-(2-ethylhexyl) phthalate (DEHP))	to IEC 62321-8: 2017, analysis					
鄰苯二甲酸二異癸酯 (DIDP)	was performed by GC/MS.)	mg/kg	50		n.d.	-
(Diisodecyl phthalate (DIDP)) (CAS						
No.: 26761-40-0, 68515-49-1)						
鄰苯二甲酸二異壬酯 (DINP)		mg/kg	50		n.d.	-
(Diisononyl phthalate (DINP)) (CAS						
No.: 28553-12-0, 68515-48-0)						



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
, ,	, ,	, ,		No.1	No.2	
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl phthalate (DNOP)) (CAS No.: 117-84-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50		n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 (DMEP) (Bis-(2-methoxyethyl) phthalate (DMEP)) (CAS No.: 117-82-8)		mg/kg	50		n.d.	-
鄰苯二甲酸正戊異戊酯 (NPIPP) (N-pentyl iso-pentyl phthalate (NPIPP)) (CAS No.: 776297-69-9)		mg/kg	50		n.d.	-
鄰苯二甲酸二異戊酯 (DIPP) (Diisopentyl phthalate (DIPP)) (CAS No.: 605-50-5)		mg/kg	50		n.d.	-
鄰苯二甲酸二(C7-11支鏈與直鏈)烷基 酯 (DHNUP) (1,2- Benzenedicarboxylic acid, di-C7-11- branched and linear alkyl esters (DHNUP)) (CAS No.: 68515-42-4)		mg/kg	50		n.d.	-
1,2-苯二酸-二(C6-8支鏈)烷基酯(富C7) (DIHP) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)) (CAS No.: 71888-89- 6)		mg/kg	50		n.d.	-



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 7. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 8. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including):

CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.

9. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):

CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.

- 10. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²,表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).)
  - b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²) · 表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating)
  - c. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive unavoidable coating variations may influence the determination.)
- 11. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.)

換算公式 (Conversion Formula): AX = A × F

AX	Α	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276
三氧化二銻 (Antimony trioxide) (Sb2O3)	銻 (Antimony)	1.1971

參數換算表 (Parameter Conversion Table):

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

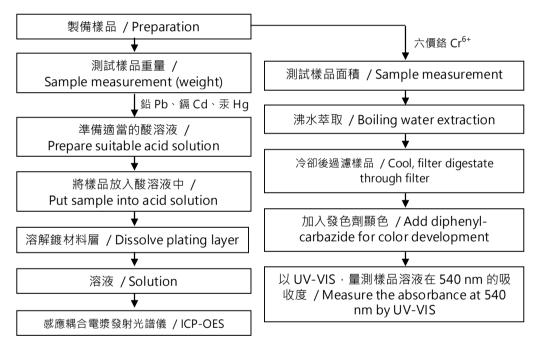
12. 除非另有說明,參照ILAC-G8:09/2019,採用簡單二元(w=0)允收規則進行符合性判定;根據此規則,符合性結果之判定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

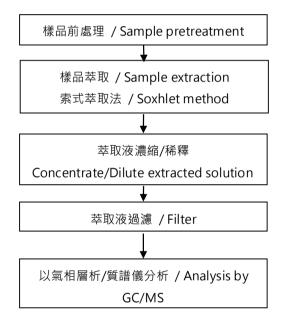
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。( 六價鉻測試方法除外 ) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (  $Cr^{6+}$  test method excluded )





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#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART





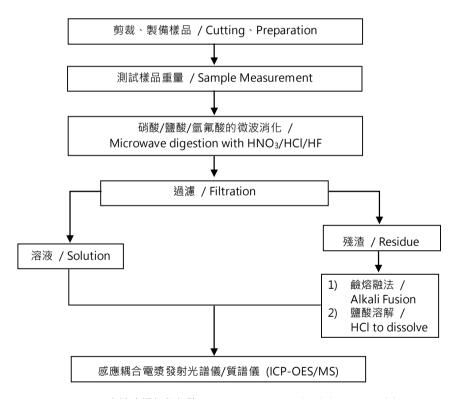
虎碼(No.): 日期(Date): 14-Aug-2023 真數	頁數(Page): 11 c	ot 20
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#### 元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

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

【參考方法/Reference method: US EPA 3051、US EPA 3052】



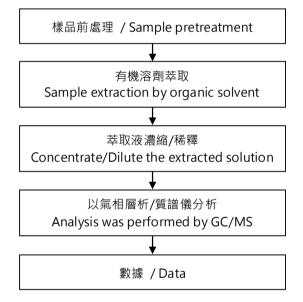
\* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.



### 分析流程圖 / Analytical flow chart

【適用於:多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

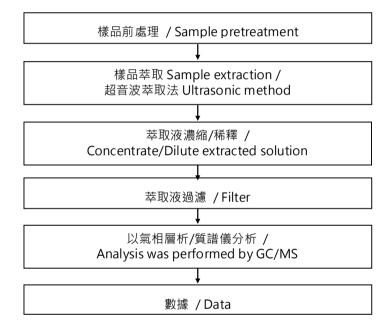
\*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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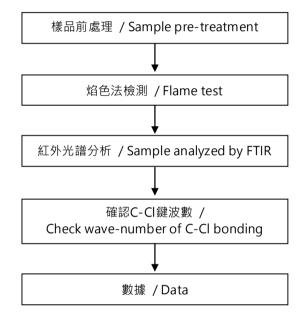
### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD





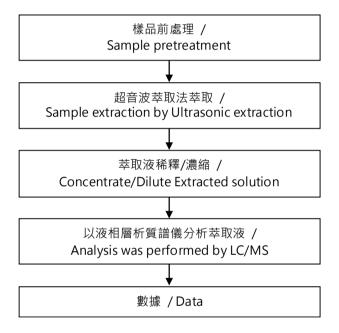
淲碼(No.):	日期(Date): 14-Aug-2023	頁數(Page): 14 of 20
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### 聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





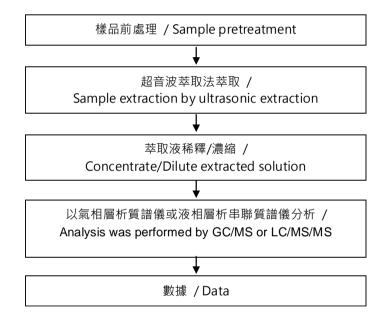
#### 四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart





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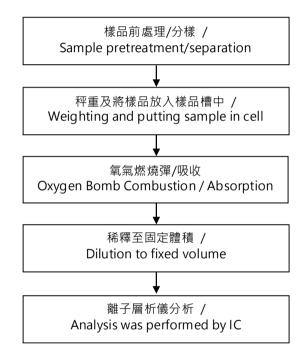
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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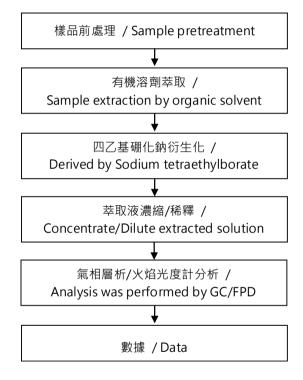
### 鹵素分析流程圖 / Analytical flow chart of Halogen





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#### 有機錫分析流程圖 / Analytical flow chart - Organic-Tin

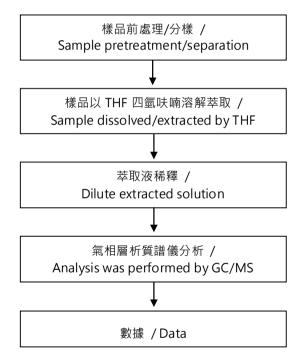




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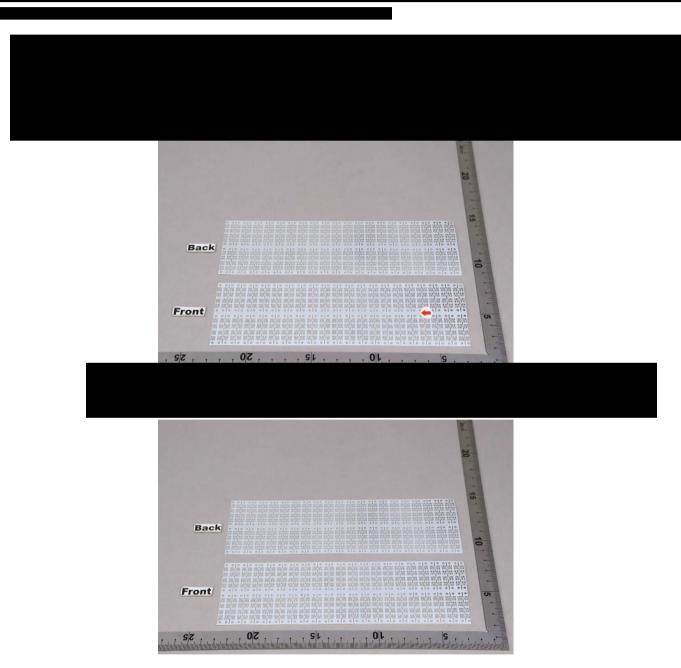
### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

【測試方法/Test method: IEC 62321-8】





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\*\* 報告結尾 (End of Report) \*\*



TI Report Number: 61988982

Component: Lead Frame

Analysis Type: RoHS 10 & Halogens

Analysis Date: 08/14/2023



### 測試報告

### **Test Report**

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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant

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

送樣廠商(Sample Submitted By)

樣品名稱(Sample Name) Pd PLATING LAYER

製造日期(Manufacturing Date) 07/20/2023

收件日(Sample Receiving Date) 04-Aug-2023

測試期間(Testing Period) 04-Aug-2023 to 11-Aug-2023

測試需求(Test Requested)

(1) 依據客戶指定·參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試 鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (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).)

測試結果(Test Results)

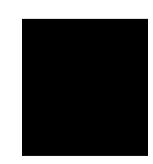
論(Conclusion)

(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).) 請參閱下一頁 (Please refer to following pages.)

(1) 根據客戶所選擇的部位測試,其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU)

2015/863 amending Annex II to Directive 2011/65/EU.)

報告簽署人/張伯睿 博士/部區理 Ray Chang, Ph.D./ Department Manage Signed for and on behalf SĞS TAIWAN LTD. 化學實驗室-高雄/Chemical Laboratory-Kaohsiung





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### 測試部位敘述 (Test Part Description)

No.1 : 銀色鍍層 (SILVER COLORED METAL PLATING LAYER)

No.2 : 銀色金屬片(含鍍層) (SILVER COLORED METAL SHEET(INCLUDING THE PLATING LAYER))

### 測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層,參考IEC 62321-5: 2013.以感應耦合電漿發射光譜儀 分析。(IEC 62321-5: 2013	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439- 92-1)	application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層·參考IEC 62321-4: 2013+ AMD1: 2017·以感應耦合 電漿發射光譜儀分析。(IEC 62321- 4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015 · 以紫外 光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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No.1   No.2     一溴聯苯 (Monobromobiphenyl)   mg/kg 5 n.d.     三溴聯苯 (Dibromobiphenyl)   mg/kg 5 n.d.     三溴聯苯 (Tribromobiphenyl)   mg/kg 5 n.d.     四溴聯苯 (Tetrabromobiphenyl)   mg/kg 5 n.d.     五溴聯苯 (Pentabromobiphenyl)   mg/kg 5 n.d.     六溴聯苯 (Hexabromobiphenyl)   mg/kg 5 n.d.	- - - - - - -
一溴聯苯 (Monobromobiphenyl)mg/kg5n.d.二溴聯苯 (Dibromobiphenyl)mg/kg5n.d.三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	- - - -
二溴聯苯 (Dibromobiphenyl)mg/kg5n.d.三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	- - - -
三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
六溴聯苯 (Hexabromobiphenyl) mg/kg 5 n.d.	-
3, 3	
十海畯芸 (Hantahramahinhanyi)	-
七溴聯苯 (Heptabromobiphenyl) mg/kg 5 n.d.	
八溴聯苯 (Octabromobiphenyl) mg/kg 5 n.d.	
九溴聯苯 (Nonabromobiphenyl) mg/kg 5 n.d.	-
十溴聯苯 (Decabromobiphenyl)        參考IEC 62321-6: 2015,以氣相層 mg/kg 5 n.d.	-
多溴聯苯總和 (Sum of PBBs)析儀/質譜儀分析。(With reference mg/kg n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether) to IEC 62321-6: 2015, analysis mg/kg 5 n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether) was performed by GC/MS.) mg/kg 5 n.d.	
三溴聯苯醚 (Tribromodiphenyl ether) mg/kg 5 n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)	=.
五溴聯苯醚 (Pentabromodiphenyl ether)	-
六溴聯苯醚 (Hexabromodiphenyl ether)	-
七溴聯苯醚 (Heptabromodiphenyl ether)	-
八溴聯苯醚 (Octabromodiphenyl ether)	-
九溴聯苯醚 (Nonabromodiphenyl ether)	-
十溴聯苯醚 (Decabromodiphenyl ether)	-
多溴聯苯醚總和 (Sum of PBDEs) mg/kg n.d.	1000
銻 (Sb) (Antimony (Sb)) (CAS No.: 参考US EPA 3052: 1996、以感應 mg/kg 2 n.d.	-
7440-36-0) 耦合電漿發射光譜儀分析。(With	
reference to US EPA 3052: 1996,	
analysis was performed by ICP-	
OES.)	
三氧化二銻(Sb₂O₃) (Antimony 由銻結果計算得之。(Calculated mg/kg 2▲ n.d.	
trioxide (Sb <sub>2</sub> O <sub>3</sub> )) (CAS No.: 1309-64- from the result of Antimony.)	
4)	



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
	, ,	, ,		No.1	No.2	
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996·以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2	-	n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
多氯奈 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10- C13) (SCCP)) (CAS No.: 85535-84-8)	參考ISO 18219-1: 2021 · 以氣相層析儀/質譜儀分析。(With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)			sult)	(Limit)
				No.1	No.2	
中鏈氯化石蠟(C14-C17) (MCCP)	參考ISO 18219-2: 2021,以氣相層	mg/kg	50		n.d.	-
(Medium Chain Chlorinated	析儀/質譜儀分析。(With reference					
Paraffins(C14-C17) (MCCP)) (CAS	to ISO 18219-2: 2021, analysis					
No.: 85535-85-9)	was performed by GC/MS.)					
六溴環十二烷及所有主要被辨別出的異	參考IEC 62321: 2008 · 以氣相層析	mg/kg	5		n.d.	-
構物(HBCDD) (α- HBCDD, β- HBCDD,	· ·					
γ- HBCDD)	to IEC 62321: 2008, analysis was					
(Hexabromocyclododecane (HBCDD)	performed by GC/MS.)					
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))	(A ± ( ) = (	**				
聚氯乙烯 (Polyvinyl chloride) (PVC)	参考ASTM E1252: 2021・以傅立	**	-		Negative	-
	葉轉換紅外線光譜儀及焰色法分					
	析。(With reference to ASTM					
	E1252: 2021, analysis was					
	performed by FT-IR and Flame					
TII \	Test.)		10			
四溴雙酚 A (TBBP-A)	參考RSTS-E&E-121,以液相層析	mg/kg	10		n.d.	-
(Tetrabromobisphenol A (TBBP-A))	儀/質譜儀分析。(With reference					
(CAS No.: 79-94-7)	to RSTS-E&E-121, analysis was performed by LC/MS.)					
○与文字符册工甘陈哲 (DEOC and its	performed by EC/MS.)	100 m /l cm	0.01		ıs al	
全氟辛烷磺酸及其鹽類 (PFOS and its	# # CENUTE 150C0 2010	mg/kg	0.01		n.d.	-
salts) (CAS No.: 1763-23-1 and its salts)	參考CEN/TS 15968: 2010 · 以液相					
,	層析串聯質譜儀分析。(With		0.01			
全氟辛酸 (PFOA)及其鹽類	reference to CEN/TS 15968:	mg/kg	0.01		n.d.	-
(Perfluorooctanoic acid (PFOA) and	2010, analysis was performed by					
it's salt) (CAS No.: 335-67-1 and its	LC/MS/MS.)					
salts)						



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)		`	sult)	(Limit)
氟 (F) (Fluorine (F)) (CAS No.: 14762-		ma/ka	50	No.1	No.2 n.d.	_
94-8)		mg/kg	30		n.a.	-
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)	参考BS EN 14582: 2016,以離子 層析儀分析。(With reference to	mg/kg	50		n.d.	-
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)	BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50		n.d.	-
碘 (I) (Iodine (I)) (CAS No.: 14362-44- 8)		mg/kg	50		n.d.	-
三丁基錫 (TBT) (Tributyl tin (TBT))	儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by	mg/kg	0.03		n.d.	-
三苯基錫 (TPT) (Triphenyl tin (TPT))		mg/kg	0.03		n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))		mg/kg	0.03		n.d.	-
二辛基錫 (DOT) (Dioctyl tin (DOT))		mg/kg	0.03		n.d.	-
氧化雙三丁基錫 (TBTO) (Bis(tributyltin) oxide (TBTO)) (CAS No.: 56-35-9)	由三丁基錫測試結果計算得之。 (Calculated from the result of Tributyl Tin (TBT).)	mg/kg	0.03 🛦		n.d.	-
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP))		mg/kg	50		n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP))		mg/kg	50		n.d.	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP))	参考IEC 62321-8: 2017·以氣相層	mg/kg	50		n.d.	1000
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP))	析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis	mg/kg	50		n.d.	1000
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl phthalate (DIDP)) (CAS No.: 26761-40-0, 68515-49-1)	was performed by GC/MS.)	mg/kg	50		n.d.	-
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl phthalate (DINP)) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
, ,	, ,	, ,		No.1	No.2	
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl phthalate (DNOP)) (CAS No.: 117-84-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)	参考IEC 62321-8: 2017·以氣相層 析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis	mg/kg	50		n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 (DMEP) (Bis-(2-methoxyethyl) phthalate (DMEP)) (CAS No.: 117-82-8)		mg/kg	50		n.d.	-
鄰苯二甲酸正戊異戊酯 (NPIPP) (N-pentyl iso-pentyl phthalate (NPIPP)) (CAS No.: 776297-69-9)		mg/kg	50		n.d.	-
鄰苯二甲酸二異戊酯 (DIPP) (Diisopentyl phthalate (DIPP)) (CAS No.: 605-50-5)	was performed by GC/MS.)	mg/kg	50		n.d.	-
鄰苯二甲酸二(C7-11支鏈與直鏈)烷基 酯 (DHNUP) (1,2- Benzenedicarboxylic acid, di-C7-11- branched and linear alkyl esters (DHNUP)) (CAS No.: 68515-42-4)		mg/kg	50		n.d.	-
1,2-苯二酸-二(C6-8支鏈)烷基酯(富C7) (DIHP) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)) (CAS No.: 71888-89- 6)		mg/kg	50		n.d.	-



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 7. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 8. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including):
  CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7,
  - CAS No.: 1763-23-1, 2795-39-3, 29457-72-3, 29081-36-9, 70225-14-8, 36773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.
- 9. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):
  - CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.
- 10. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²,表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).)
  - b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²) · 表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating)
  - c. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive unavoidable coating variations may influence the determination.)
- 11. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.)

換算公式 (Conversion Formula): AX = A × F

AX	Α	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276
三氧化二銻 (Antimony trioxide) (Sb <sub>2</sub> O <sub>3</sub> )	銻 (Antimony)	1.1971

參數換算表 (Parameter Conversion Table):

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

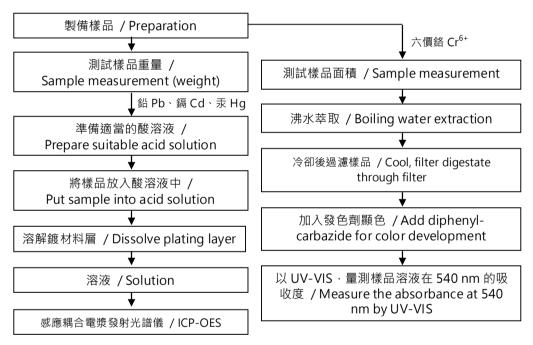
12. 除非另有說明,參照ILAC-G8:09/2019,採用簡單二元(w=0)允收規則進行符合性判定;根據此規則,符合性結果之判定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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#### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

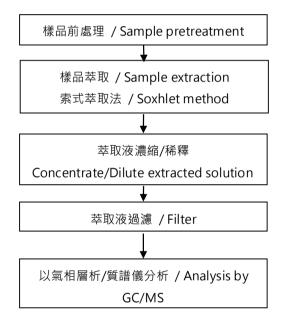
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。( 六價鉻測試方法除外 ) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (  $Cr^{6+}$  test method excluded )





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#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART





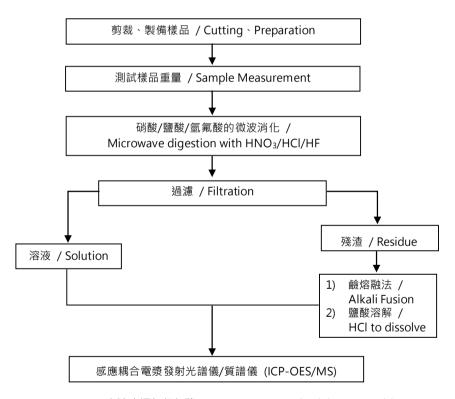
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#### 元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

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

【參考方法/Reference method: US EPA 3051、US EPA 3052】



\* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.

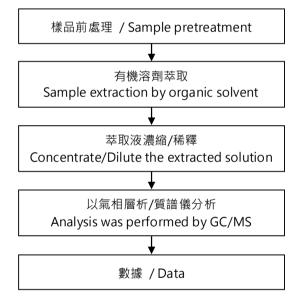


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#### 分析流程圖 / Analytical flow chart

【適用於:多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

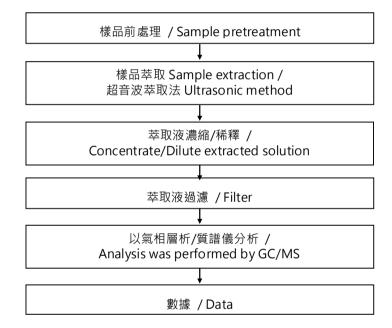
\*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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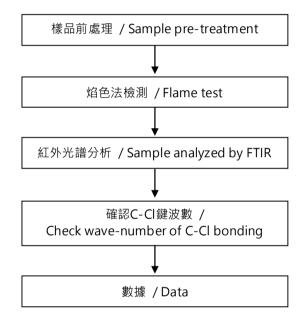
#### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD





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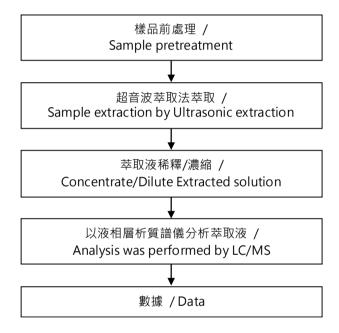
#### 聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





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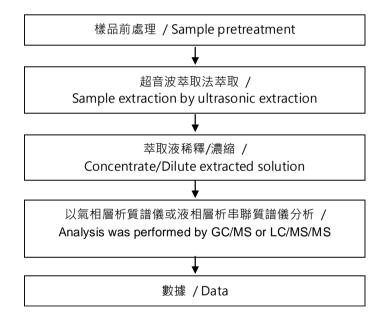
#### 四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart





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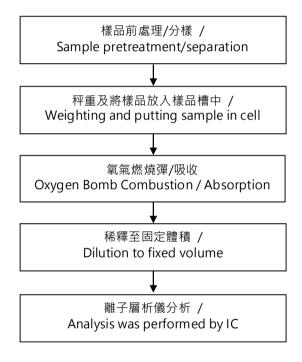
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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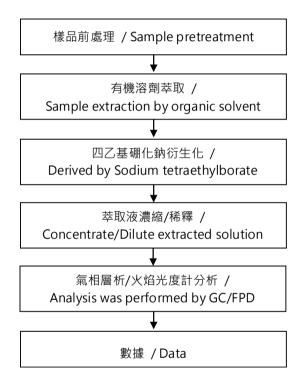
#### 鹵素分析流程圖 / Analytical flow chart of Halogen





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#### 有機錫分析流程圖 / Analytical flow chart - Organic-Tin

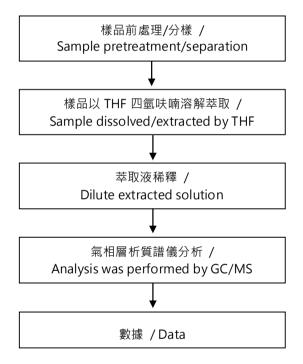




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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

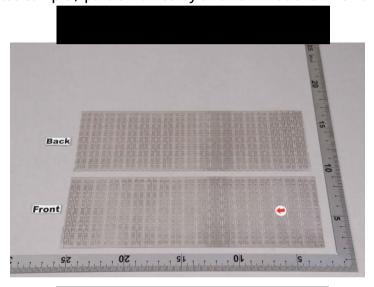
【測試方法/Test method: IEC 62321-8】

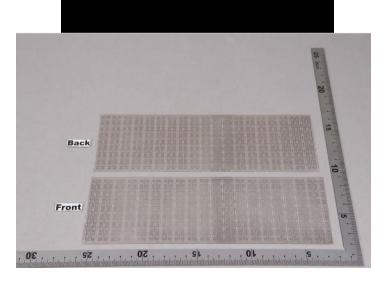




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\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)





\*\* 報告結尾 (End of Report) \*\*



TI Report Number: 61988978

Component: Lead Frame

Analysis Type: RoHS 10 & Halogens

Analysis Date: 08/14/2023



#### 測試報告

#### **Test Report**

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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant as):

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

送樣廠商(Sample Submitted By)

△塚殿尚(Sample Submitted by)

樣品名稱(Sample Name)

Ag PLATING LAYER

製造日期(Manufacturing Date) : 07/29/2023

收件日(Sample Receiving Date)

04-Aug-2023

測試期間(Testing Period)

04-Aug-2023 to 11-Aug-2023

測試需求(Test Requested) :

BBP, DEHP, DIBP contents in the submitted sample(s).)

測試結果(Test Results)

結 論(Conclusion)

(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

請參閱下一頁 (Please refer to following pages.)

(1) 根據客戶所選擇的部位測試·其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU)

2015/863 amending Annex II to Directive 2011/65/EU.)



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#### 測試部位敘述 (Test Part Description)

No.1 : 銀色鍍層 (SILVER COLORED METAL PLATING LAYER)

No.2 : 銀色金屬片(含鍍層) (SILVER COLORED METAL SHEET(INCLUDING THE PLATING LAYER))

#### 測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層·參考IEC 62321-5: 2013·以感應耦合電漿發射光譜儀 分析。(IEC 62321-5: 2013	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439- 92-1)	application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	9.32		1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層、參考IEC 62321-4: 2013+ AMD1: 2017·以感應耦合 電漿發射光譜儀分析。(IEC 62321- 4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015 · 以紫外 光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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No.1   No.2     一溴聯苯 (Monobromobiphenyl)   mg/kg 5 n.d.     三溴聯苯 (Dibromobiphenyl)   mg/kg 5 n.d.     三溴聯苯 (Tribromobiphenyl)   mg/kg 5 n.d.     四溴聯苯 (Tetrabromobiphenyl)   mg/kg 5 n.d.     五溴聯苯 (Pentabromobiphenyl)   mg/kg 5 n.d.     六溴聯苯 (Hexabromobiphenyl)   mg/kg 5 n.d.	- - - - - - -
一溴聯苯 (Monobromobiphenyl)mg/kg5n.d.二溴聯苯 (Dibromobiphenyl)mg/kg5n.d.三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	- - - -
二溴聯苯 (Dibromobiphenyl)mg/kg5n.d.三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	- - - -
三溴聯苯 (Tribromobiphenyl)mg/kg5n.d.四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
四溴聯苯 (Tetrabromobiphenyl)mg/kg5n.d.五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
五溴聯苯 (Pentabromobiphenyl)mg/kg5n.d.六溴聯苯 (Hexabromobiphenyl)mg/kg5n.d.	-
六溴聯苯 (Hexabromobiphenyl) mg/kg 5 n.d.	-
3, 3	
十海畯芸 (Hantahramahinhanyi)	-
七溴聯苯 (Heptabromobiphenyl) mg/kg 5 n.d.	
八溴聯苯 (Octabromobiphenyl) mg/kg 5 n.d.	
九溴聯苯 (Nonabromobiphenyl) mg/kg 5 n.d.	-
十溴聯苯 (Decabromobiphenyl)        參考IEC 62321-6: 2015,以氣相層 mg/kg 5 n.d.	-
多溴聯苯總和 (Sum of PBBs)析儀/質譜儀分析。(With reference mg/kg n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether) to IEC 62321-6: 2015, analysis mg/kg 5 n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether) was performed by GC/MS.) mg/kg 5 n.d.	
三溴聯苯醚 (Tribromodiphenyl ether) mg/kg 5 n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)	=.
五溴聯苯醚 (Pentabromodiphenyl ether)	-
六溴聯苯醚 (Hexabromodiphenyl ether)	-
七溴聯苯醚 (Heptabromodiphenyl ether)	-
八溴聯苯醚 (Octabromodiphenyl ether)	-
九溴聯苯醚 (Nonabromodiphenyl ether)	-
十溴聯苯醚 (Decabromodiphenyl ether)	-
多溴聯苯醚總和 (Sum of PBDEs) mg/kg n.d.	1000
銻 (Sb) (Antimony (Sb)) (CAS No.: 参考US EPA 3052: 1996、以感應 mg/kg 2 n.d.	-
7440-36-0)	
reference to US EPA 3052: 1996,	
analysis was performed by ICP-	
OES.)	
三氧化二銻(Sb₂O₃) (Antimony 由銻結果計算得之。(Calculated mg/kg 2▲ n.d.	
trioxide (Sb <sub>2</sub> O <sub>3</sub> )) (CAS No.: 1309-64- from the result of Antimony.)	
4)	



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)			sult)	(Limit)
				No.1	No.2	
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
多氯奈 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10- C13) (SCCP)) (CAS No.: 85535-84-8)	參考ISO 18219-1: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
(Test items)	(iviethod)	(Unit)		No.1	No.2	(LIMIL)
中鏈氯化石蠟(C14-C17) (MCCP) (Medium Chain Chlorinated Paraffins(C14-C17) (MCCP)) (CAS No.: 85535-85-9)	參考ISO 18219-2: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-2: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - HBCDD) (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))	to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2021 · 以傅立 葉轉換紅外線光譜儀及焰色法分 析。(With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.)	**	-		Negative	-
四溴雙酚 A (TBBP-A) (Tetrabromobisphenol A (TBBP-A)) (CAS No.: 79-94-7)	參考RSTS-E&E-121 · 以液相層析 儀/質譜儀分析。(With reference to RSTS-E&E-121, analysis was performed by LC/MS.)	mg/kg	10		n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	参考CEN/TS 15968: 2010,以液相 層析串聯質譜儀分析。(With	mg/kg	0.01		n.d.	-
全氟辛酸 (PFOA)及其鹽類 (Perfluorooctanoic acid (PFOA) and it's salt) (CAS No.: 335-67-1 and its salts)	reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	 果 sult) No.2	限值 (Limit)
氟 (F) (Fluorine (F)) (CAS No.: 14762- 94-8)		mg/kg	50	 n.d.	-
氯 (Cl) (Chlorine (Cl)) (CAS No.: 22537-15-1)	參考BS EN 14582: 2016·以離子 層析儀分析。(With reference to	mg/kg	50	 n.d.	-
溴 (Br) (Bromine (Br)) (CAS No.: 10097-32-2)	BS EN 14582: 2016, analysis was performed by IC.)	mg/kg	50	 n.d.	-
碘 (I) (Iodine (I)) (CAS No.: 14362-44-8)	, · · · · · · · · · · · · · · · · · · ·	mg/kg	50	 n.d.	-
三丁基錫 (TBT) (Tributyl tin (TBT))	參考ISO 17353: 2004 · 以氣相層析	mg/kg	0.03	 n.d.	-
三苯基錫 (TPT) (Triphenyl tin (TPT))	reference to ISO 17353: 2004, analysis was performed by	mg/kg	0.03	 n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))		mg/kg	0.03	 n.d.	-
二辛基錫 (DOT) (Dioctyl tin (DOT))		mg/kg	0.03	 n.d.	-
氧化雙三丁基錫 (TBTO) (Bis(tributyltin) oxide (TBTO)) (CAS No.: 56-35-9)	由三丁基錫測試結果計算得之。 (Calculated from the result of Tributyl Tin (TBT).)	mg/kg	0.03 🛦	 n.d.	-
鄰苯二甲酸二丁酯 (DBP) (Dibutyl phthalate (DBP))		mg/kg	50	 n.d.	1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl benzyl phthalate (BBP))		mg/kg	50	 n.d.	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP))	参考IEC 62321-8: 2017,以氣相層	mg/kg	50	 n.d.	1000
鄰苯二甲酸二(2-乙基己基)酯 (DEHP) (Di-(2-ethylhexyl) phthalate (DEHP))	析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis	mg/kg	50	 n.d.	1000
鄰苯二甲酸二異癸酯 (DIDP) (Diisodecyl phthalate (DIDP)) (CAS No.: 26761-40-0, 68515-49-1)	was performed by GC/MS.)	mg/kg	50	 n.d.	-
鄰苯二甲酸二異壬酯 (DINP) (Diisononyl phthalate (DINP)) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50	 n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl phthalate (DNOP)) (CAS No.: 117-84-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50		n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 (DMEP) (Bis-(2-methoxyethyl) phthalate (DMEP)) (CAS No.: 117-82-8)		mg/kg	50		n.d.	-
鄰苯二甲酸正戊異戊酯 (NPIPP) (N-pentyl iso-pentyl phthalate (NPIPP)) (CAS No.: 776297-69-9)		mg/kg	50		n.d.	-
鄰苯二甲酸二異戊酯 (DIPP) (Diisopentyl phthalate (DIPP)) (CAS No.: 605-50-5)	was performed by GC/MS.)	mg/kg	50		n.d.	-
鄰苯二甲酸二(C7-11支鏈與直鏈)烷基 酯 (DHNUP) (1,2- Benzenedicarboxylic acid, di-C7-11- branched and linear alkyl esters (DHNUP)) (CAS No.: 68515-42-4)		mg/kg	50		n.d.	-
1,2-苯二酸-二(C6-8支鏈)烷基酯(富C7) (DIHP) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)) (CAS No.: 71888-89- 6)		mg/kg	50		n.d.	-



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 7. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 8. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including): CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.
- 9. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):

CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.

- 10. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²,表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI).)
  - b. 當六價鉻結果為n.d. (濃度小於 $0.10~\mu g/cm^2$ )·表示表層不含六價鉻。(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. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive unavoidable coating variations may influence the determination.)
- 11. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.)

換算公式 (Conversion Formula): AX = A × F

AX	Α	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276
三氧化二銻 (Antimony trioxide) (Sb2O3)	銻 (Antimony)	1.1971

參數換算表 (Parameter Conversion Table):

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

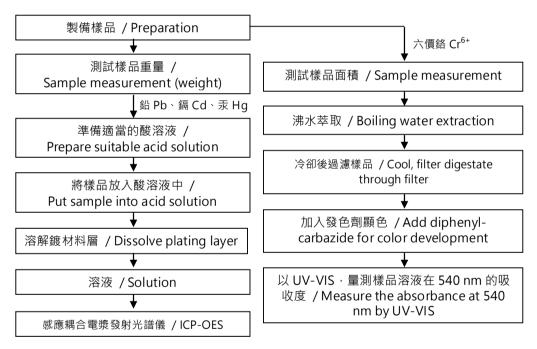
12. 除非另有說明,參照ILAC-G8:09/2019,採用簡單二元(w=0)允收規則進行符合性判定;根據此規則,符合性結果之判定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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#### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

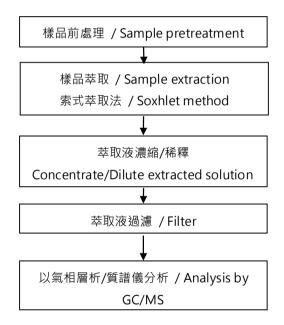
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。( 六價鉻測試方法除外 ) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. ( $Cr^{6+}$  test method excluded)





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#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART





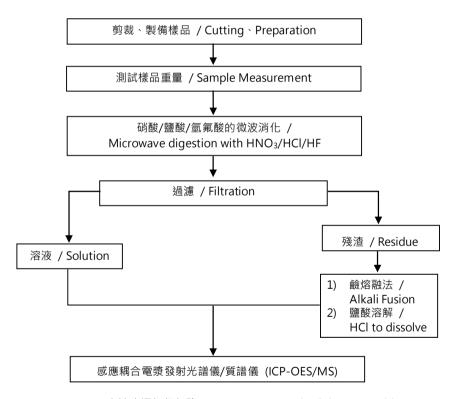
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#### 元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

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

【參考方法/Reference method: US EPA 3051、US EPA 3052】



\* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.

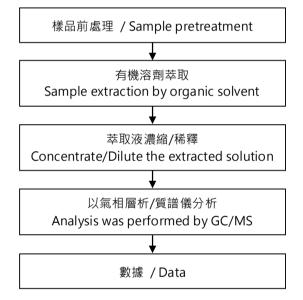


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#### 分析流程圖 / Analytical flow chart

【適用於:多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

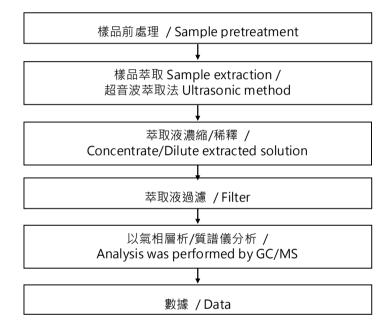
\*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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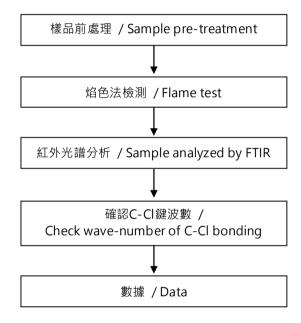
#### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD





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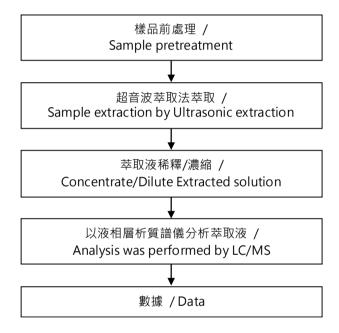
#### 聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





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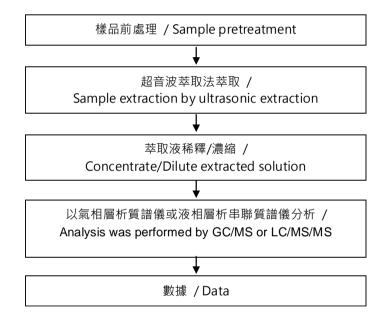
#### 四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart





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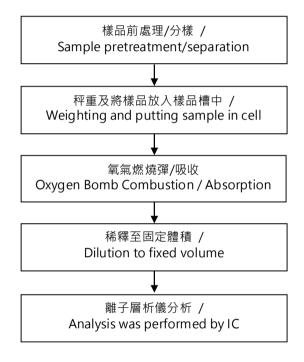
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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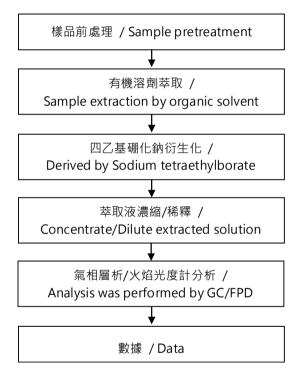
#### 鹵素分析流程圖 / Analytical flow chart of Halogen





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#### 有機錫分析流程圖 / Analytical flow chart - Organic-Tin

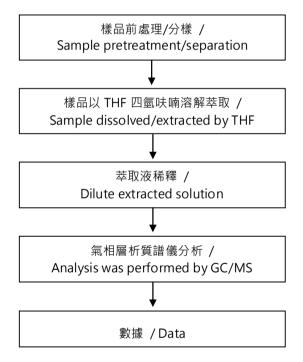




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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

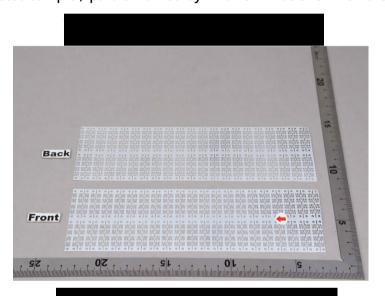
【測試方法/Test method: IEC 62321-8】

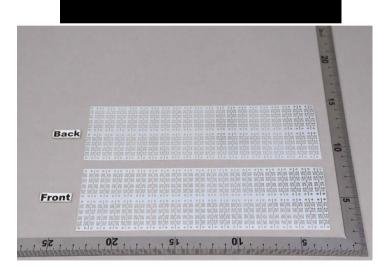




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\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)





\*\* 報告結尾 (End of Report) \*\*



TI Report Number: 61988980

Component: Lead Frame

Analysis Type: RoHS 10 & Halogens

Analysis Date: 08/14/2023



### 測試報告

**Test Report** 

日期(Date): 14-Aug-2023 頁數(Page): 1 of 20

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by the applicant as):

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

送樣廠商(Sample Submitted By)

樣品名稱(Sample Name) :

: Au PLATING LAYER

製造日期(Manufacturing Date)

07/25/2023

收件日(Sample Receiving Date)

04-Aug-2023

測試期間(Testing Period)

: 04-Aug-2023 to 11-Aug-2023

測試需求(Test Requested)

(2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

測試結果(Test Results)

結 論(Conclusion)

請參閱下一頁 (Please refer to following pages.)

(1) 根據客戶所選擇的部位測試,其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求。 (Based on the performed tests on selected part of submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU)

2015/863 amending Annex II to Directive 2011/65/EU.)



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#### 測試部位敘述 (Test Part Description)

No.1 : 紅銅色鍍層 (RED COPPERY COLORED METAL PLATING LAYER)

No.2 : 紅銅色金屬片(含鍍層) (RED COPPER COLORED METAL SHEET(INCLUDING THE PLATING LAYER))

#### 測試結果 (Test Results)

測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
				No.1	No.2	
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層,參考IEC 62321-5: 2013.以感應耦合電漿發射光譜儀 分析。(IEC 62321-5: 2013	mg/kg	2	n.d.		100
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439- 92-1)	application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	10.5		1000
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層·參考IEC 62321-4: 2013+ AMD1: 2017·以感應耦合 電漿發射光譜儀分析。(IEC 62321- 4: 2013+AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.		1000
六價鉻 (Hexavalent Chromium) Cr(VI) (#2)	參考IEC 62321-7-1: 2015 · 以紫外 光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.		-



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(Test Items)  一溴聯苯 (Monobromobiphenyl)	(Method)	(Unit)		(Res	sult)	(Limit)
一溴聯苯 (Monobromobiphenyl)						
一溴聯苯 (Monobromobiphenyl)				No.1	No.2	
		mg/kg	5		n.d.	-
二溴聯苯 (Dibromobiphenyl)	·	mg/kg	5		n.d.	-
三溴聯苯 (Tribromobiphenyl)		mg/kg	5		n.d.	-
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5		n.d.	-
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5		n.d.	-
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5		n.d.	-
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5		n.d.	-
八溴聯苯 (Octabromobiphenyl)		mg/kg	5		n.d.	-
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5		n.d.	-
十溴聯苯 (Decabromobiphenyl) 參考	考IEC 62321-6: 2015・以氣相層 🛭	mg/kg	5		n.d.	-
多溴聯苯總和 (Sum of PBBs) 析儀	義/質譜儀分析。(With reference	mg/kg	-		n.d.	1000
一溴聯苯醚 (Monobromodiphenyl ether) to IE	IEC 62321-6: 2015, analysis	mg/kg	5		n.d.	-
二溴聯苯醚 (Dibromodiphenyl ether) was	s performed by GC/MS.)	mg/kg	5		n.d.	-
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5		n.d.	-
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5		n.d.	-
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5		n.d.	-
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5		n.d.	-
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5		n.d.	-
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5		n.d.	-
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5		n.d.	-
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5		n.d.	-
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	-		n.d.	1000
銻 (Sb) (Antimony (Sb)) (CAS No.: 參考	考US EPA 3052: 1996,以感應	mg/kg	2		n.d.	-
7440-36-0) 耦合	合電漿發射光譜儀分析。(With					
refe	erence to US EPA 3052: 1996,					
ana	alysis was performed by ICP-					
OES	S.)					
三氧化二銻(Sb <sub>2</sub> O <sub>3</sub> ) (Antimony 由鏻	湖結果計算得之。(Calculated	mg/kg	2▲		n.d.	-
	m the result of Antimony.)					
4)	, ,					



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測試項目	測試方法	單位	MDL		果	限值
(Test Items)	(Method)	(Unit)			sult)	(Limit)
				No.1	No.2	
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
砷 (As) (Arsenic (As)) (CAS No.: 7440-38-2)	參考US EPA 3052: 1996.以感應 耦合電漿發射光譜儀分析。(With reference to US EPA 3052: 1996, analysis was performed by ICP- OES.)	mg/kg	2		n.d.	-
多氯聯苯 (PCBs) (Polychlorinated biphenyls (PCBs))	參考US EPA 3550C: 2007·以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
多氯奈 (PCNs) (Polychlorinated naphthalene (PCNs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
多氯三聯苯 (PCTs) (Polychlorinated terphenyls (PCTs))	參考US EPA 3550C: 2007 · 以氣相層析儀/質譜儀分析。(With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.)	mg/kg	0.5		n.d.	-
短鏈氯化石蠟(C10-C13) (SCCP) (Short Chain Chlorinated Paraffins(C10- C13) (SCCP)) (CAS No.: 85535-84-8)	參考ISO 18219-1: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-1: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
(Test items)	(iviethod)	(Unit)		No.1	No.2	(Limit)
中鏈氯化石蠟(C14-C17) (MCCP) (Medium Chain Chlorinated Paraffins(C14-C17) (MCCP)) (CAS No.: 85535-85-9)	參考ISO 18219-2: 2021 · 以氣相層 析儀/質譜儀分析。(With reference to ISO 18219-2: 2021, analysis was performed by GC/MS.)	mg/kg	50		n.d.	-
六溴環十二烷及所有主要被辨別出的異構物(HBCDD) ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - HBCDD) (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))	to IEC 62321: 2008, analysis was performed by GC/MS.)	mg/kg	5		n.d.	-
聚氯乙烯 (Polyvinyl chloride) (PVC)	參考ASTM E1252: 2021 · 以傅立 葉轉換紅外線光譜儀及焰色法分 析。(With reference to ASTM E1252: 2021, analysis was performed by FT-IR and Flame Test.)	**	-		Negative	-
四溴雙酚 A (TBBP-A) (Tetrabromobisphenol A (TBBP-A)) (CAS No.: 79-94-7)	參考RSTS-E&E-121 · 以液相層析 儀/質譜儀分析。(With reference to RSTS-E&E-121, analysis was performed by LC/MS.)	mg/kg	10		n.d.	-
全氟辛烷磺酸及其鹽類 (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	参考CEN/TS 15968: 2010,以液相 層析串聯質譜儀分析。(With	mg/kg	0.01		n.d.	-
全氟辛酸 (PFOA)及其鹽類 (Perfluorooctanoic acid (PFOA) and it's salt) (CAS No.: 335-67-1 and its salts)	reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.)	mg/kg	0.01		n.d.	-



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL	結 (Res	ult)	限值 (Limit)
氟 (F) (Fluorine (F)) (CAS No.: 14762-		ma /lea	50	No.1	No.2	
94-8)		mg/kg	50		n.d.	-
氯 (CI) (Chlorine (CI)) (CAS No.:	   参考BS EN 14582: 2016,以離子	mg/kg	50		n.d.	_
22537-15-1)	層析儀分析。(With reference to	1119/109	30		11.0.	
溴 (Br) (Bromine (Br)) (CAS No.:	BS EN 14582: 2016, analysis was	mg/kg	50		n.d.	-
10097-32-2)	performed by IC.)	5, 5				
碘 (I) (Iodine (I)) (CAS No.: 14362-44-		mg/kg	50		n.d.	-
8)						
三丁基錫 (TBT) (Tributyl tin (TBT))	參考ISO 17353: 2004,以氣相層析	mg/kg	0.03		n.d.	-
三苯基錫 (TPT) (Triphenyl tin (TPT))	儀/火焰光度偵測器分析。(With reference to ISO 17353: 2004, analysis was performed by GC/FPD.)	mg/kg	0.03		n.d.	-
二丁基錫 (DBT) (Dibutyl tin (DBT))		mg/kg	0.03		n.d.	-
二辛基錫 (DOT) (Dioctyl tin (DOT))		mg/kg	0.03		n.d.	-
氧化雙三丁基錫 (TBTO)	由三丁基錫測試結果計算得之。	mg/kg	0.03 🛦		n.d.	-
(Bis(tributyltin) oxide (TBTO)) (CAS	(Calculated from the result of					
No.: 56-35-9)	Tributyl Tin (TBT).)					
鄰苯二甲酸二丁酯 (DBP) (Dibutyl		mg/kg	50		n.d.	1000
phthalate (DBP))						1000
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl		mg/kg	50		n.d.	1000
benzyl phthalate (BBP))			50		اء ما	1000
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl phthalate (DIBP))	   參考IEC 62321-8: 2017,以氣相層	mg/kg	50		n.d.	1000
	参与IEC 02321-8. 2017,以照相層     析儀/質譜儀分析。(With reference	mg/kg	50		n.d.	1000
(Di-(2-ethylhexyl) phthalate (DEHP))	to IEC 62321-8: 2017, analysis	mg/kg	30		n.u.	1000
鄰苯二甲酸二異癸酯 (DIDP)	was performed by GC/MS.)	mg/kg	50		n.d.	_
(Diisodecyl phthalate (DIDP)) (CAS		9,9				
No.: 26761-40-0, 68515-49-1)						
鄰苯二甲酸二異壬酯 (DINP)		mg/kg	50		n.d.	-
(Diisononyl phthalate (DINP)) (CAS		2 3				
No.: 28553-12-0, 68515-48-0)						



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測試項目 (Test Items)	測試方法 (Method)	單位 (Unit)	MDL		果 sult)	限值 (Limit)
	, ,	, ,		No.1	No.2	, , , , ,
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-octyl phthalate (DNOP)) (CAS No.: 117-84-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正戊酯 (DNPP) (Di-n-pentyl phthalate (DNPP)) (CAS No.: 131-18-0)		mg/kg	50		n.d.	-
鄰苯二甲酸二正己酯 (DNHP) (Di-n-hexyl phthalate (DNHP)) (CAS No.: 84-75-3)		mg/kg	50		n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 (DMEP) (Bis-(2-methoxyethyl) phthalate (DMEP)) (CAS No.: 117-82-8)		mg/kg	50		n.d.	-
鄰苯二甲酸正戊異戊酯 (NPIPP) (N-pentyl iso-pentyl phthalate (NPIPP)) (CAS No.: 776297-69-9)	參考IEC 62321-8: 2017·以氣相層 析儀/質譜儀分析。(With reference to IEC 62321-8: 2017, analysis	mg/kg	50		n.d.	-
鄰苯二甲酸二異戊酯 (DIPP) (Diisopentyl phthalate (DIPP)) (CAS No.: 605-50-5)	was performed by GC/MS.)	mg/kg	50		n.d.	-
鄰苯二甲酸二(C7-11支鏈與直鏈)烷基 酯 (DHNUP) (1,2- Benzenedicarboxylic acid, di-C7-11- branched and linear alkyl esters (DHNUP)) (CAS No.: 68515-42-4)		mg/kg	50		n.d.	-
1,2-苯二酸-二(C6-8支鏈)烷基酯(富C7) (DIHP) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)) (CAS No.: 71888-89- 6)		mg/kg	50		n.d.	-



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 7. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 8. 全氟辛烷磺酸及其鹽類包含等物質 (PFOS and its salts including): CAS No.: 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7, 91036-71-4, 4021-47-0 and others.
- 9. 全氟辛酸及其鹽類包含等物質 (PFOA and its salts including):

CAS No.: 335-67-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0, 3825-26-1 and others.

- 10. (#2) =
  - a. 當六價鉻結果大於0.13 μg/cm²·表示樣品表層含有六價鉻。(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. 當六價鉻結果為n.d. (濃度小於0.10 µg/cm²),表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-Cr(VI) based coating)
  - c. 當六價鉻結果介於 0.10 及 0.13 μg/cm² 時,無法確定塗層是否含有六價鉻。(The result between 0.10 μg/cm² and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.)
- 11. ▲: MDL是針對元素/測試化合物之評估。(The MDL was evaluated for element / tested substance.)

換算公式 (Conversion Formula): AX = A × F

37.57.27.0 (2011)		
AX	Α	F
氧化雙三丁基錫 (Bis(tributyltin)oxide) (TBTO)	三丁基錫 (Tributyl Tin) (TBT)	1.0276
三氧化二銻 (Antimony trioxide) (Sb <sub>2</sub> O <sub>3</sub> )	銻 (Antimony)	1.1971

參數換算表 (Parameter Conversion Table):

https://eecloud.sgs.com/Region TW/DocDownload.aspx?name=Others

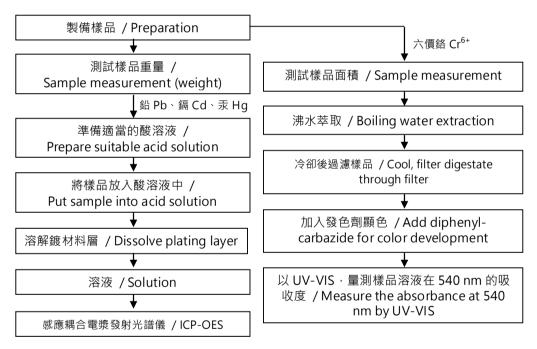
12. 除非另有說明·參照ILAC-G8:09/2019·採用簡單二元(w=0)允收規則進行符合性判定;根據此規則·符合性結果之判 定係以測試結果與限值做比較。(Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.)



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#### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

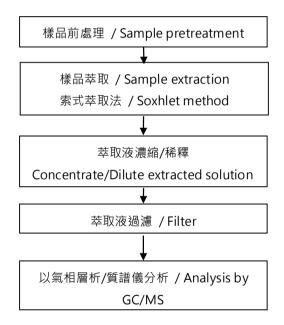
根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。( 六價鉻測試方法除外 ) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. ( $Cr^{6+}$  test method excluded)





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#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART





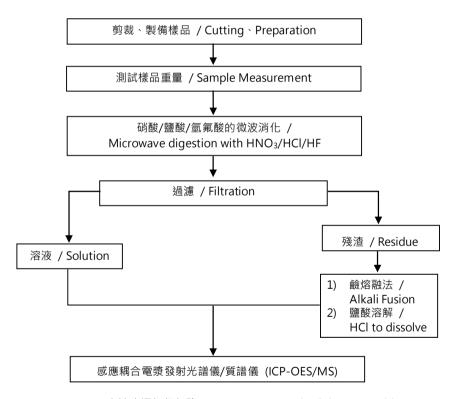
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#### 元素(含重金屬)分析流程圖 / Analytical flow chart of Elements (Heavy metal included)

根據以下的流程圖之條件,樣品已完全溶解。

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

【參考方法/Reference method: US EPA 3051、US EPA 3052】



\* US EPA 3051 方法未添加氫氟酸 / US EPA 3051 method does not add HF.

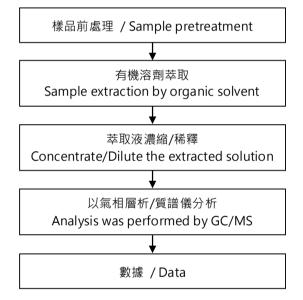


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#### 分析流程圖 / Analytical flow chart

【適用於:多氯聯苯、多氯奈、多氯三聯苯、滅蟻靈、氯化石蠟、DBBT】

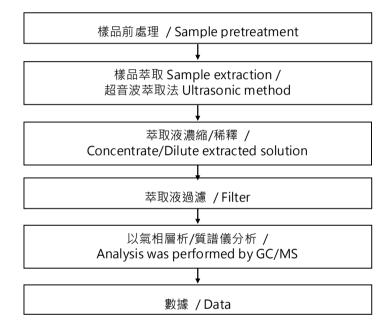
\*Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT





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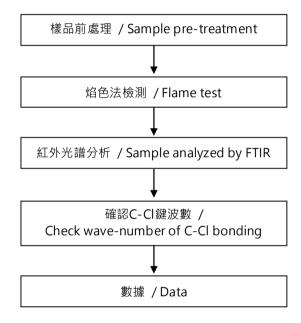
#### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD





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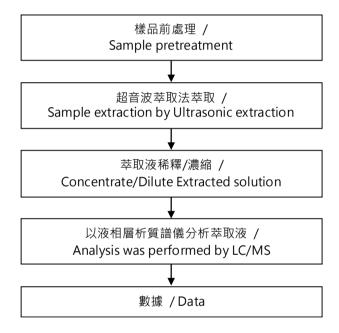
#### 聚氯乙烯物質判定分析流程圖 / Analysis flow chart - PVC





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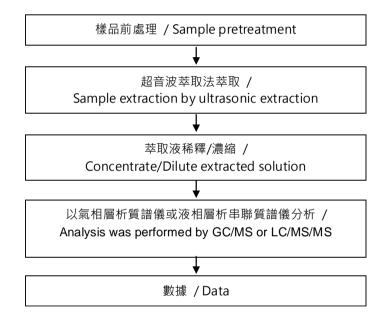
#### 四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart





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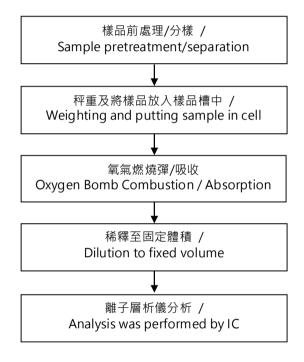
全氟化合物(包含全氟辛酸/全氟辛烷磺酸/其相關化合物等等)分析流程圖 / Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)





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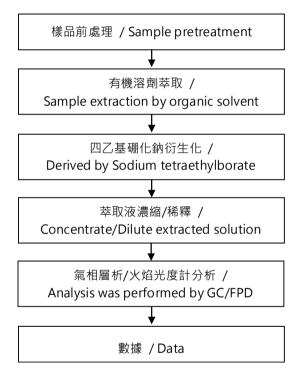
#### 鹵素分析流程圖 / Analytical flow chart of Halogen





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#### 有機錫分析流程圖 / Analytical flow chart - Organic-Tin

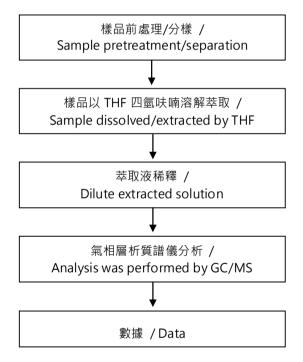




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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

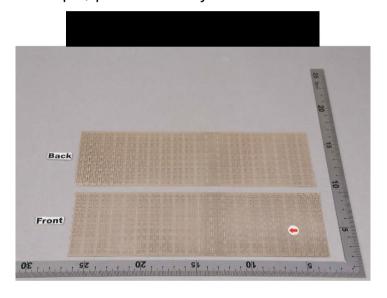
【測試方法/Test method: IEC 62321-8】

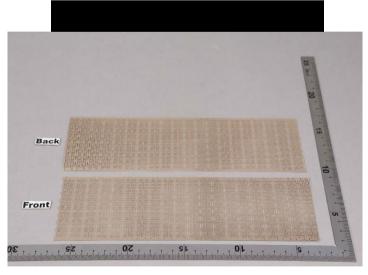




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\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)





\*\* 報告結尾 (End of Report) \*\*