

#### **ICP Test Report Certification Packet**

Company name:	Littelfuse, Inc.
Product Series:	TVS Array for ESD Protection
Product #:	SP3003-02UTG
Issue Date:	February 6, 2013
Directive 2002/95/EC)-restor packing/packaging main addition, it is hereby refor unit parts, the packing/	cittelfuse, Inc. that there is neither RoHS (2011/65/EU – recast of EU stricted substance nor such use, for materials to be used for unit parts, aterials, and for additives and the like in the manufacturing processes. ported to you that the parts and sub-materials, the materials to be used packaging materials, and the additives and the like in the manufacturing sed of the following components.
	Issued by: KRISTEEN BACILA  Global EHS Engineer
(1) Parts, sub-materials a This document of manufactured by Li	covers the SP3003-02UTG RoHS-Compliant series products
< Raw Materials U	
(2) The ICP data on all i	measurable substances propriate pages as identifed in Table 1
Remarks : .	



Table 1: List of Raw Materials covered by this report

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	CEL-9220	Molding Compound	3-17
2	A194	Leadframe	18-43
3	N/A	Au Bonding Wire	44-56
4	N/A	Ni-Pd-Au plating	57-92
5	8006NS	Ероху	93-102
6	N/A	Wafer	103-109



No.: CE/2012/42804 Date: 2012/04/25 Page: 1 of 8

HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description

: EPOXY MOLDING COMPOUND

Style/Item No.

CEL-9220HF

Sample Receiving Date

: 2012/04/16

**Testing Period** 

: 2012/04/16 TO 2012/04/25

Test Result(s)

: Please refer to next page(s).





Date: 2012/04/25 Page: 2 of 8 No.: CE/2012/42804

HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Test Result(s)

PART NAME No.1

: DARK GRAY LUMP

Total Manufal	Unit	Method	MDL	Result
Test Item(s)	Unit		1 2 2 2 2	No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
Antimony (Sb)	mg/kg	With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
Halogen				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	g With reference to BS EN 14582:2007.	50	n.d.
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)	mg/kg		50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
Halogen-lodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.
Sum of PBBs			7	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl			5	n.d.
Tribromobiphenyl	mg/kg kg mg/kg kg mg/kg kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg		5	n.d.
Tetrabromobiphenyl	1.0	With reference to IEC 62321: 2008 and	5	n.d.
Pentabromobiphenyl	mg/kg mg/kg mg/kg mg/kg	performed by GC/MS.	5	n.d.
Hexabromobiphenyl		ponomina of comme	5	n.d.
Heptabromobiphenyl	mg/kg	1	5	n.d.
Octabromobiphenyl			5	n.d.
Nonabromobiphenyl	13/4		5	n.d.
Decabromobiphenyl	7		5	n.d.



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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



	The Pa	Method	MDL	Result
Test Item(s)	Unit	Wethod	MDL	No.1
Sum of PBDEs				n.d.
Monobromodiphenyl ether		mg/kg With reference to IEC 62321: 2008 and performed by GC/MS.	5	n.d.
Dibromodiphenyl ether	100		5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether			5	n.d.
Pentabromodiphenyl ether	mg/kg		5	n.d.
Hexabromodiphenyl ether	- 17.77		5	n.d.
Heptabromodiphenyl ether			5	n.d.
Octabromodiphenyl ether			5	n.d.
Nonabromodiphenyl ether			5	n.d.
Decabromodiphenyl ether			5	n.d.

#### Note:

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. " - " = Not Regulated

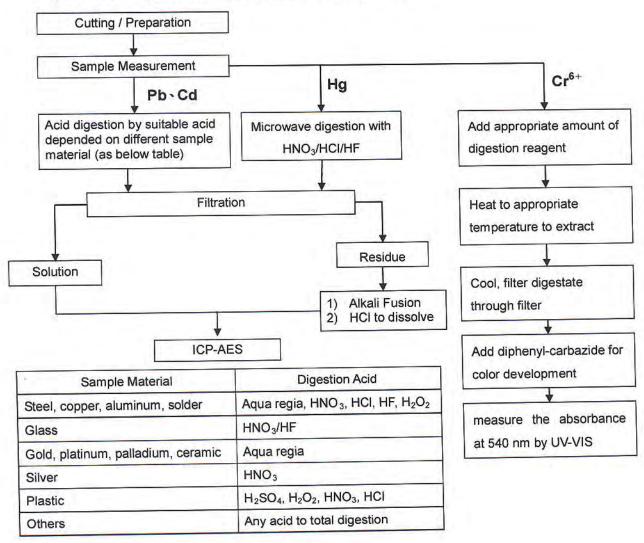


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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



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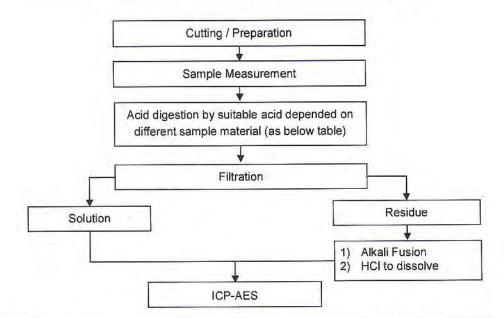
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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
- Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang

#### Flow Chart of digestion for the elements analysis performed by ICP-AES



Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCI, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO₃/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> , HCI
Others	Any acid to total digestion

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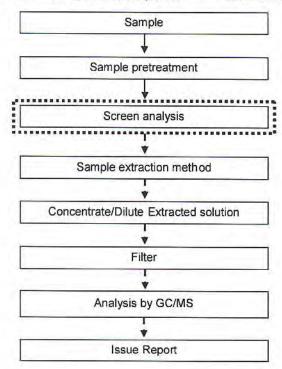


#### Analytical flow chart

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

#### [ Test Items: PBB/PBDE, TBBP-A-bis ]

First testing process -→ Optional screen process - · ► Confirmation process - · ►



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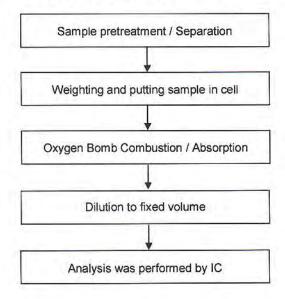
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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Rita Chen
- 2) Name of the person in charge of measurement: Troy Chang





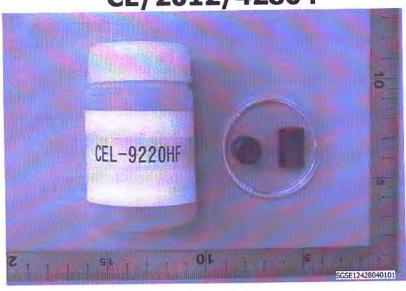
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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



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

CE/2012/42804



\*\* End of Report \*\*

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**Test Report** 

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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description

: EPOXY MOLDING COMPOUND

Style/Item No.

CEL-9220HF

Sample Receiving Date

: 2012/04/16

**Testing Period** 

: 2012/04/16 TO 2012/04/25

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

Test Result(s)

: Please refer to next page(s).



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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Test Result(s)

PART NAME No.1

DARK GRAY LUMP

Test Item(s)	Unit	Method	MDL	Result
	77.77	Title of Lax		No.1
PVC	**	Analysis was performed by FTIR and FLAME Test.		Negative
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	5	n.d.
BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	%	With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.



Date: 2012/04/25 Page: 3 of 7 No.: CE/2012/42805

HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN 

#### Note:

- 1. mg/kg = ppm : 0.1wt% = 1000ppm
- 2. n.d. = Not Detected
- 3. MDL = Method Detection Limit
- 4. " " = Not Regulated
- 5. \*\* = Qualitative analysis (No Unit)
- Negative = Undetectable / Positive = Detectable

#### PFOS Reference Information : POPs - (EU) 757/2010

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µ g/m².

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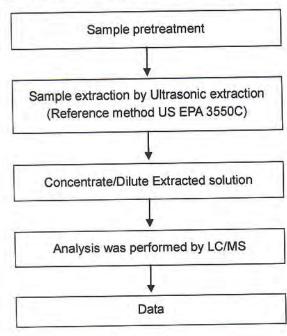
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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Analytical flow chart of Ultrasonic extraction (LC/MS) procedure

- 1) Name of the person who made measurement: Roman Wong
- 2) Name of the person in charge of measurement: Troy Chang
  - Test Items: PFOA/PFOS · Bisphenol A



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Date: 2012/04/25 Page: 5 of 7 No.: CE/2012/42805

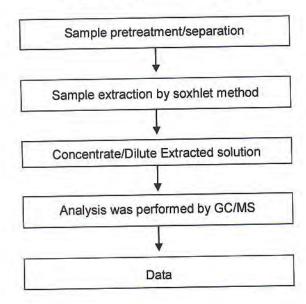
HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Analytical flow chart of Soxhlet extraction (GC/MS) procedure

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

Test Items: Phthalate . Benzotriazole . HBCDD . NP . DBBT . Organic phosphorus compounds ]



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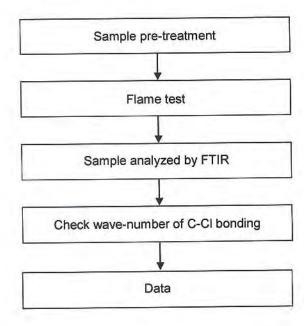
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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN



#### Analysis flow chart for determination of PVC in material

- Name of the person who made measurement: Ginny Chen
- Name of the person in charge of measurement: Troy Chang

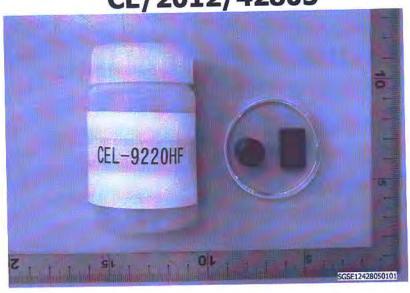




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HITACHI CHEMICAL CO., LTD. 1772-1 KANAKUBO YUUKI-SHI IBARAKI, 307-0015, JAPAN \* The tested sample / part is marked by an arrow if it's shown on the photo. \*

CE/2012/42805



\*\* End of Report \*\*



Signature valid For Question Please Conta t with SGS www.tw.sgs.com

#### 測試報告 **Test Report**

號碼(No.): KA/2012/C2128 日期(Date): 2013/01/02 頁數(Page): 1 of 26

ASM HK

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG. HONG KONG (ASM HK)

以下測試樣品係由客户送樣,且由客户聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as):

樣品名稱(Sample Description)

: A194/C194 Cu ALLOY

收件日期(Sample Receiving Date)

: 2012/12/25

測試期間(Testing Period)

: 2012/12/25 TO 2013/01/02

送樣廠商(Sample Submitted By)

: ASM HK

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

Ray Chang / Asst. Manage Signed for and on behalf of **SGS Taiwan Limited** 



號碼(No.): KA/2012/C2128 日期(Date): 2013/01/02 頁數(Page): 2 of 26

ASM HK

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG. HONG KONG (ASM HK)

#### 測試結果(Test Results)

測試部位(PART NAME) NO.1

紅銅色 A194/C194 Cu ALLOY (RED COPPERY A194/C194 Cu ALLOY)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鍋 / Cadmium (Cd)	mg/kg	参考IEC 62321: 2008方法, 用感應藕合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	參考IEC 62321: 2008方法, 用感應藕合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	18.1
汞 / Mercury (Hg)	mg/kg	參考IEC 62321: 2008方法, 用感應藕合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n,d.
六價鉻 / Hexavalent Chromium Cr(VI) by boiling water extraction#	**	参考IEC 62321: 2008方法,用Boiling water extraction方法檢測. / With reference to IEC 62321: 2008 and performed by boiling water extraction Method.	0.02mg/kg with 50 cm <sup>2</sup> surface area	Negative
多溴聯苯總和 / Sum of PBBs			E - 97 J	n.d.
一溴聯苯 / Monobromobiphenyl		Vi I	5	n.d.
二溴聯苯 / Dibromobiphenyl			5	n.d.
三溴聯苯 / Tribromobiphenyl		冬考IEC 62321: 2008方法, 以氣相層析	5	n.d.
四溴聯苯 / Tetrabromobiphenyl	mg/kg mg/kg mg/kg	養/質譜儀檢測. / With reference to	0	n.d.
五溴聯苯 / Pentabromobiphenyl		IEC 62321: 2008 and performed by	5	n.d.
六溴聯苯 / Hexabromobiphenyl		GC/MS.	5	n.d.
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.
八溴聯苯 / Octabromobiphenyl			5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl	4		5	n.d.

台灣檢驗科技股份有限公司

L + 886 (07)301 2121



號碼(No.): KA/2012/C2128 日期(Date): 2013/01/02 頁數(Page): 3 of 26

ASM HK

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG. HONG KONG (ASM HK)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
多溴聯苯醚總和 / Sum of PBDEs				n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether			5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether		參考IEC 62321: 2008方法, 以氣相層析	5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg	儀/質譜儀檢測. / With reference to	5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether		IEC 62321: 2008 and performed by GC/MS.	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether		OCT AIS.	5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether			5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether			5	n.d.
多氣聯苯 / Polychlorinated Biphenyls (PCBs)	mg/kg	參考US EPA 3540C方法,以氣相層析質 譜儀(GC/MS)檢測. / With reference to US EPA 3540C method. Analysis was performed by GC/MS.	0.5	n.d.
多氣奈 / Polychlorinated Naphthalene (PCNs)	mg/kg	參考US EPA 3540C方法, 以氣相層析質 譜儀(GC/MS)檢測. / With reference to US EPA 3540C method. Analysis was performed by GC/MS.	5	n.d.
多氯三聯苯 / Polychlorinated Terphenyls (PCTs)	mg/kg	參考US EPA 3540C方法, 以氣相層析質 譜儀(GC/MS)檢測. / With reference to US EPA 3540C method. Analysis was performed by GC/MS.	0.5	n.d.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
氯化石螺 / Chlorinated Paraffin (C10~C13) (CAS No.: 85535-84-8)	%	参考US EPA 3540C: 1996方法,以氣相 層析儀/電子補捉偵測器檢測. / With reference to US EPA 3540C: 1996 method. Analysis was performed by GC/ECD.	0.01	n.d.
滅蟻靈 / Mirex (CAS No.: 2385-85-5)	mg/kg	參考US EPA 8270D方法,以氣相層析質 譜儀(GC/MS)檢測. / With reference to US EPA 8270D method. Analysis was performed by GC/MS.	4	n.d.
绨 / Antimony (Sb)	mg/kg	參考US EPA 3052方法,用感應額合電漿原子發射光譜儀檢測錦含量./With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
三氧化二锑 / Antimony trioxide (Sb203)*** (CAS No.: 1309-64-4)	mg/kg	參考US EPA 3052方法, 用感應藕含電漿原子發射光譜儀檢測錦含量. / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.		n.d.
四溴雙酚-A-雙 / TBBP-A-bis (CAS No.: 21850-44-2)	mg/kg	参考US EPA 3550C方法, 以氣相層析儀/質譜儀检測. / With reference to US EPA 3550C method. Analysis was performed by GC/MS.		n.d.
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	参考US EPA 3540C: 1996方法,以氣相 層析質譜儀檢測. / With reference to US EPA 3540C: 1996 method. Analysis was performed by GC/MS.		n.d.

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ASM HK

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测試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	结果 (Result) NO.1
福馬林(甲醛)/ Formaldehyde (CAS No.: 50-00-0)	mg/kg	參考ISO 17226-1(2008)方法,以高效液相層析儀/二極體陣列偵測器檢測。/ With reference to ISO 17226- 1(2008). Analysis was performed by HPLC/DAD.	3	n.d.
有機錫 / Organic-tin compounds				
三丁基锡 / Tributyl Tin (TBT)	mg/kg	本測試參考DIN 38407-13方法,以氣相 層析儀/火焰光度偵測器檢測。/ With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.
三苯基錫 / Triphenyl Tin (TphT)	mg/kg	本測試參考DIN 38407-13方法, 以氣相 層析儀/火焰光度偵測器檢測, / With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.
三丁基錫氧化物 / Tributyl Tin Oxide (TBTO)*** (CAS No.: 56-35-9)	mg/kg	本測試参考DIN 38407-13方法, 以氣相層析儀/火焰光度偵測器檢測. / With reference to DIN 38407-13. Analysis was performed by GC/FPD.		n.d.
聚氯乙烯 / PVC	**	以紅外光譜分析及焰色法檢測. / Analysis was performed by FTIR and FLAME Test.		Negative
紅磷 / Red phosphorus	**	本測試以熱裂解儀分析. / Analysis was performed by Pyrolyzer-GC/MS.		Negative

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鹵素 / Halogen				
鹵素(氣)/ Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀 分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(氣)/ Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg	參考BS EN 14582:2007, 以離子層析儀 分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	参考BS EN 14582:2007, 以離子層析儀 分析, / With reference to BS EN 14582:2007, Analysis was performed by IC.	50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
可塑劑定量分析 / Phthalates				
鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鄭苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄭苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之, / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
石棉 / Asbestos				
陽起石 / Actinolite (CAS No.: 77536-66-4)	%	参考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).	3	Negative
斜方角閃石 / Anthophyllite (CAS No.: 77536-67-5)	%	参考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光绕射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).	<del></del>	Negative

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测试项目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
棕石棉 / Amosite (CAS No.: 12172-73-5)	%	參考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).		Negative
白石棉 / Chrysotile (CAS No.: 12001-29-5)	%	參考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).	•	Negative
青石棉 / Crocidolite (CAS No.: 12001-28-4)	%	冬考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).		Negative

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法負測 極限値 (MDL)	結果 (Result) NO.1
透閃石 / Tremolite (CAS No.: 77536-68- 6)	%	参考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).		Negative
偶氮 (AZO)				
1): 4-氨基二苯 / 4-AMINODIPHENYL (CAS No.: 92-67-1)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
2): 聯苯胺 / BENZIDINE (CAS No.: 92-87- 5)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
3): 4-氯鄰甲苯胺 / 4-CHLORO-O-TOLUIDINE (CAS No.: 95-69-2)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
4): 2-萘胺 / 2-NAPHTHYLAMINE (CAS No.: 91-59-8)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
5): 鄭氨基二甲基偶氮 / O- AMINOAZOTOLUENE (CAS No.: 97-56-3)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
6): 對硝基鄰甲苯胺 / 2-AMINO-4- NITROTOLUENE (CAS No.: 99-55-8)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
7): 對氣苯胺 / P-CHLOROANILINE (CAS No.: 106-47-8)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
8): 4-甲氧基-間苯二胺 / 2,4- DIAMINOANISOLE (CAS No.: 615-05-4)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
9): 4,4'-二氨基二苯甲烷 / 4,4'- DIAMINODIPHENYLMETHANE (CAS No.: 101- 77-9)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
10): 3,3'-二氯聯苯胺 / 3,3'- DICHLOROBENZIDINE (CAS No.: 91-94-1)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
11): 3,3'-二甲氧基聯苯胺 / 3,3'- DIMETHOXYBENZIDINE (CAS No.: 119-90-4)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.

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测試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
12): 3,3'-二甲基聯苯胺 / 3,3'- DIMETHYLBENZIDINE (CAS No.: 119-93-7)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
13): 3,3'-二甲基-4,4'-二氨基二苯甲烷 / 3,3'-DIMETHYL-4,4'- DIAMINODIPHENYLMETHANE (CAS No.: 838- 88-0)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質譜儀絵測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
14): 2-甲氧基-5-甲基聯苯 / P-CRESIDINE (2-METHOXY-5-METHYLANILINE) (CAS No.: 120-71-8)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測, / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
15): 4,4'-亞甲基雙(氯苯胺)/ 4,4'- METHYLENE-BIS- (2-CHLOROANILINE) (CAS No.: 101-14-4)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
16): 4,4'-氧化雙苯胺 / 4,4'- OXYDIANILINE (CAS No.: 101-80-4)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
17): 4,4'-硫代雙苯胺 / 4,4'- THIODIANILINE (CAS No.: 139-65-1)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.		n.d.
18): 鄭甲苯胺 / O-TOLUIDINE (CAS No.: 95-53-4)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.		n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	结果 (Result) NO.1
19): 2,4-二氨基甲苯 / 2,4- TOLUYLENEDIAMINE (CAS No.: 95-80-7)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
20): 2,4,5-三甲基苯胺 / 2,4,5- TRIMETHYLANILINE (CAS No.: 137-17-7)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
21): 鄰位甲氧基苯胺 / O-ANISIDINE (CAS No.: 90-04-0)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
22): 對氣基偶氮苯 / P-AMINOAZOBENZENE (CAS No.: 60-09-3)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
23): 2,4-二甲基苯胺 / 2,4-XYLIDINE (CAS No.: 95-68-1)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
24): 2,6-二甲基苯胺 / 2,6-XYLIDINE (CAS No.: 87-62-7)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
放射性物質 / Radioactive Substances	ЦSv/ hour	蓋革計數器 (Geiger counter)	-	Negative*

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This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms\_and\_conditions.htm and, for This document is activated that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not experted a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, torgery or falsification of the content or appearance of this document is unlawful and offenders may be prosequed to the fullest extent of the law. No. 81, Karfa Road, Nanzih Export Processing Zene, Kaohsung, Taiwan | \$48 \pi 48 \pi 48 \pi 4 \pi 4 \pi 48 \pi 61 \pi 301 \quad 12121 | \$1 \pi 886 \( \text{Individual Road} \)

\*\*Www.hwsps.com\*\*



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#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未检出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)
- 5. # = a. Positive means the presence of CrVI on the tested areas (Positive表示測試區域偵測到六價路) b. Negative means the absence of CrVI on the tested areas (Negative表示測試區域未偵測到六價鉻)

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02~mg/kgwith 50 cm² tested areas . / 該溶液濃度≧0.02 mg/kg with 50 cm² (tested areas)

- 8. \*\*= Qualitative analysis (No Unit) 定性分析(無單位)
- 9. 聚氯乙烯(PVC):Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
- 10. 石棉定性分析試驗範圍: <0.1%-100%, 石棉鑑定的判定基準是以檢出含有石棉纖維為『Positive』, 未檢出石棉纖維 為『Negative』。/ Testing range of asbestos qualitative analysis is from less than 0.1% to 100%. The judgment criterion: asbestos fibers being found is shown as "Positive"; asbestos fibers not being found is shown as "Negative".
- 11. Negative\*/Positive\*: 蓋革計數器偵測放射性物質的檢測結果係利用檢測值與環境背景值相比較的結果, 一般天然環境下都存在微量的輻射劑量(一般環境背景的輻射劑量約小於等於 0.2μSv/hr)。如果檢測值低於環境背景值時,表示正常或無異常(Negative\*); 相反地,檢測值高於環境背景值時,表示異常(Positive\*)。 (The test result of Geiger counter is from comparison between test outcome and environment background. In general, there is little radiation dose existing in environment. (Radiation dose from environment background usually less than or equal to 0.2µSv/hr) The test result less than environment background was shown as Negative\*; the result greater than environment background was shown as Positive\*.)
- 12. 石棉測試由SGS其他實驗室執行 (The Asbestos test was subcontracted to other SGS Laboratory. )
- 13. 聚氯乙烯测试由SGS其他實驗室執行 (The PVC test was subcontracted to other SGS Laboratory. )
- 14. 紅磷測試由SGS其他實驗室執行 (The Red phosphorus test was subcontracted to other SGS Laboratory. )

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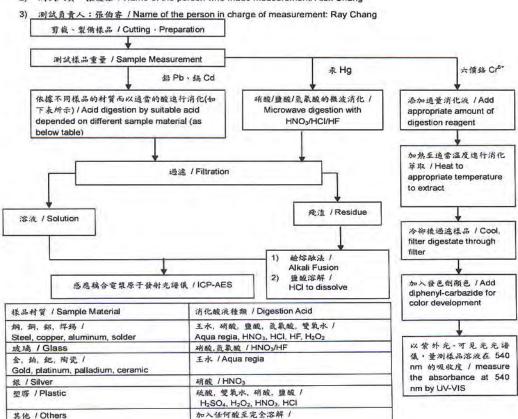


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- 1) 根據以下的流程圖之條件,樣品已完全溶解。( 六價鉻測試方法除外 ) / These samples were dissolved totally by pre-conditioning method according to below flow chart. ( Cr6+ test method excluded )
- 2) 测试人员:張俊雄 / Name of the person who made measurement: Alex Chang



Note\*\*:(1) 針對非金屬材料加入鹼性消化液,加熱至 90~95℃萃取./For non-metallic material, 

(2) 針對金屬材料加入純水,加熱至沸騰萃取. / For metallic material, add pure water and heat to boiling.

Any acid to total digestion

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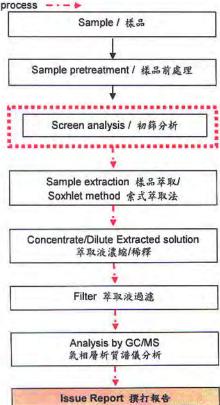
#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1)测試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao 2)测試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process —

選擇性篩檢程序 / Optional screen process -------

確認程序 / Confirmation process ---▶



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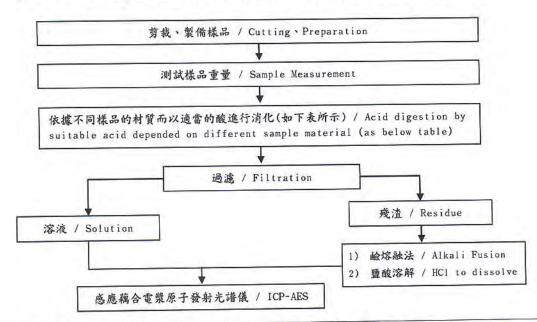
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員:張俊雄 / Name of the person who made measurement; Alex Chang
- 3) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

#### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO3, HC1, HF, H2O2
玻璃 / Glass	硝酸,氫氯酸 / HNOs/HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNOs
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / HaSOa, HaOa, HNOa, HC1
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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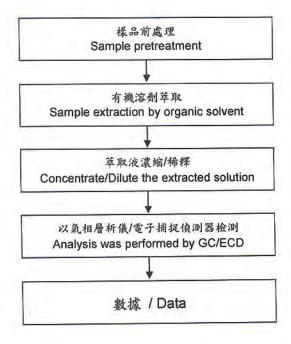
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#### 含氯阻燃劑分析流程 /

#### Chlorinated Flame retardant analytical flow chart

- 1) 測試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao
- 2) 測試負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang
  - 冬考方法(Reference method): USEPA 3540
  - 測試項目(Test Items): PCBs, CP, MCCP / 多氣聯苯, 氯化石蠟, 中鏈氣化石蠟



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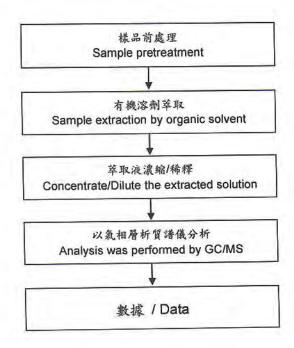
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#### 含氯阻燃劑分析流程 /

#### Chlorinated Flame retardant analytical flow chart

- 1) 測試人員:曹嘉琪 / Name of the person who made measurement: Anson Tsao
- 2) 测試負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang
  - 参考方法(Reference method): US EPA 8270D, US EPA 3540
  - 測試項目(Test Items): PCNs, PCTs, Mirex / 多氯奈, 多氯三聯苯,滅蟻靈,



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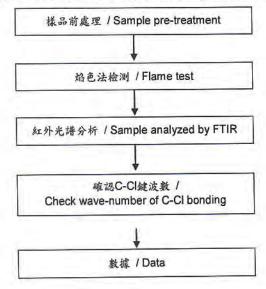
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#### 聚氯乙烯物質判定分析流程圖 /

#### Analysis flow chart for determination of PVC in material

1)测試人員: 邱韻如 / Name of the person who made measurement: Joyce Chiu 2)測試負責人: 林立翔 / Name of the person in charge of measurement: Roger Lin



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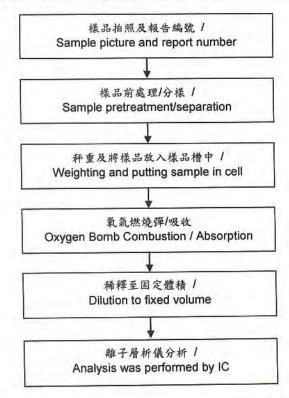
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#### 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 测試人員: 洪秀真/ Name of the person who made measurement: Jean Hung
- 2) 测試負責人:張伯睿/ Name of the person in charge of measurement; Ray Chang



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#### 石棉鑑定分析流程圖 / Analysis flow chart for determination of Asbestos

- 測試人員:高鍵忠 / Name of the person who made measurement: Victor Kao
- 測試負責人:魏明芬 / Name of the person in charge of measurement: Wendy Wei 【参考方法(Reference method): EPA 600/R-93/116】

#### 取樣 / Sampling 分樣及保存 / Transportation and Storage 分析樣品的製備 / Preparation of primary analytical sample 立體顯微鏡偵測 / Examination by stereomicroscope (SM) 分散染色式偏光顯微鏡石棉鑑定 / Asbestos identification by dispersion staining polarized light microscope (DS-PLM) 偏光顯微鏡有疑慮時或是品保確認時, 繼續後續鑑定 Continue when problems are encountered with DS-PLM and/or for quality assurance purposes 移除干擾基質 / Interference matrix removal X 光绕射光譜石棉鑑定 / 分散染色式偏光顯微鏡石棉鑑定 / Asbestos identification by dispersion Asbestos identification by X-ray staining polarized light microscope diffraction spectrometer 含有石棉纖維 / 未含有石棉纖維 / Asbestos fiber is present Asbestos fiber is absent 含有石棉 1 不含有石棉 / Containing Asbestos/ Not containing Asbestos/ 陰性 / Negative 陽性 / Positive

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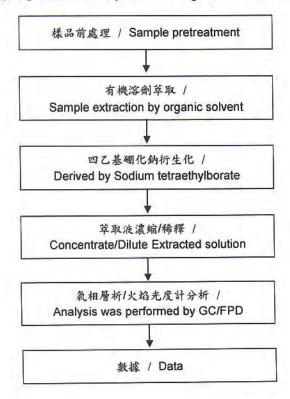
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#### 有機錫分析流程圖 / Analytical flow chart of Organic-Tin content

- 1) 測試人員:曹嘉琪 / Name of the person who made measurement: Anson Tsao
- 2) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang



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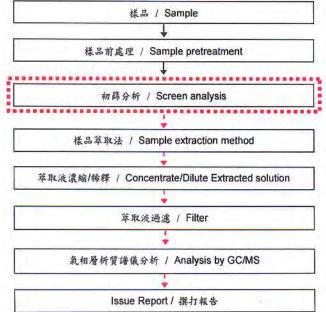
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#### 四溴雙酚-A-雙分析流程圖 / Analytical flow chart of TBBP-A-bis

1)测試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao 2)测試負責人:張伯容 / Name of the person in charge of measurement: Ray Chang

和决测试程序 / First testing process ——→ 選擇性篩檢程序 / Optional screen process ········ 磁边程序 / Confirmation process — ◆ ▶



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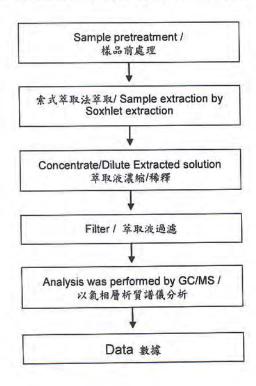
號碼(No.): KA/2012/C2128 日期(Date): 2013/01/02 頁數(Page): 24 of 26

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#### 六溴環十二烷分析流程圖 / HBCDD Analytical FLOW CHART

- 1) 測試人員:曹嘉琪/ Name of the person who made measurement: Anson Tsao
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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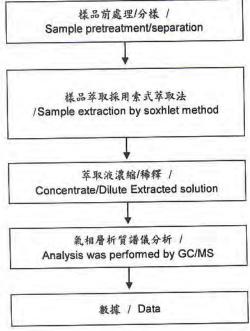
ASM HK

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK)

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

1)測試人員:曾嘉琪 / Name of the person who made measurement: Anson Tsao

2)测試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang



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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.)

KA/2012/C2128



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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 1 of 13

CTS Ref. CTSSA/12/3702/Tanaka

TANAKA ELECTRONICS (M) SDN BHD PLOT 11, PHASE IV, BAYAN LEPAS FREE INDUSTRIAL ZONE 11900 PENANG, MALAYSIA

The following merchandise was (were) submitted and identified by the client as:

Sample Description

Au BONDING WIRE

Sample Receiving Date

16/10/2012

**Testing Period** 

16/10/2012 to 19/11/2012

Test Requested

Selected test(s) as requested by client

Test Method

Please refer to next page(s).

**Test Results** 

: Please refer to next page(s).

Analysts

Teh Pui Sean, Tay Siam Pine, Lim Meng Hoe, Eileen Tan Yi Pin

& Yee Sook Wai

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CTS Ref. CTSSA/12/3702/Tanaka

Test results:

Test Part Description :

Sample Description : Au BONDING WIRE

#### RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Results	MDL
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Hexavalent Chromium (CrVI)	mg/kg	With reference to JIS H 8625, and performed by UV-VIS Spectrophotometry	N.D.	2
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional) #		With reference to IEC 62321:2008	Negative	
Sum of PBBs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	14.0
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

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#### No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 3 of 13 CTS Ref. CTSSA/12/3702/Tanaka

Sum of PBDEs mg/kg		With reference to IEC 62321:2008, and performed by GC-MS	N.D.	0.0
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

- Note: (a) mg/kg = ppm; (0.1wt% = 1000ppm)
  - (b) N.D. = Not Detected
  - (c) MDL = Method Detection Limit
  - (d) # = Spot-Test:
    - a. Negative means the absence of Cr(VI) on the tested areas
    - b. Positive means the presence of Cr(VI) on the tested areas

(The tested sample should be further verified by boiling-water-extraction method if the spot test result is negative or cannot be confirmed)

#### **Boiling water extraction:**

- a. Negative means the absence of Cr(VI) on the tested areas
- b. Positive means the presence of Cr(VI) on the tested areas; The detected concentration in 50 mL boiling water extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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.

(e) - = Not regulated

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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 4 of 13 CTS Ref. CTSSA/12/3702/Tanaka

Test results by chemical method:

Test Item (s): Unit		Method	Result	MDL	
Antimony (Sb)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2	
Magnesium (Mg)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2	
Beryllium (Be)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2	
Polyvinylchloride (PVC)	**	Analysis was performed by FT-IR/ATR	Negative		
Halogen					
Halogen-Fluorine (F)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Fluorine content.	N.D.	50	
Halogen-Chlorine (CI)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Chlorine content.	N.D.	50	
Halogen-Bromine (Br)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Bromine content.	N.D.	50	
Halogen-lodine (I) mg/kg		With reference to BS EN 14582. Analysis was performed by IC method for lodine content.	N.D.	50	

#### Test Part Description:

Sample Description : Au BONDING WIRE

Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) --- = Not Conducted

(e) \*\* = Qualitative analysis (no unit)

(f) Negative = Undetectable / Positive = Detectable

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Test results by chemical method:

Test Item (s):	Unit	Method	Result	MDL
Hexabromocyclododecane (HBCDD)	mg/kg	Based on EPA 3540C, and performed by GC-MS	N.D.	10
Phthalates				
DBP (Di-butyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DEHP (Di-(2-ethylhexyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
BBP (Benzyl Butyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DINP (Di-isononyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.01
DIDP (Di-isodecyl phthalate	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.01
DNOP (Di-n-octyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DNHP (Di-n-hexyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DMEP (Bis(2-methoxyethyl)phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003

#### Test Part Description:

Sample Description : Au BONDING WIRE

Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) --- = Not Conducted

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CTS Ref. CTSSA/12/3702/Tanaka

**Test Part Description:** 

Sample Description Au BONDING WIRE

#### Test results:

Test Item (s):	Unit	Method	Result	MDL
Dimethyl Furnarate (CAS No. 624-49-7)	mg/kg	With reference to US EPA 3550C method. Analysis was performed by GC/MS.	N.D.	0.1
Perfluorooctane sulfonates (PFOS) PFOS – Acid, Metal Salt, Amide	mg/kg	With reference to US EPA 3540C: 1996 method for PFOS content. Analysis was performed by LC/MS.	N.D.	10
PFOA (CAS No.: 000335-67-1)	mg/kg	With reference to US EPA 3540C: 1996 method for PFOA content. Analysis was performed by LC/MS.	N.D.	10
*Phosphorus (P)	mg/kg	With reference to US EPA Method 3052 for Phosphorus Content. Analysis was performed by ICP-AES.	N.D.	2

Note: (a) mg/kg = ppm

- (b) N.D. = Not Detected
- (c) MDL = Method Detection Limit
- (d) --- = Not Conducted
- (e) The sample(s) was/were analysed on behalf of the applicant as mixing sample in one testing.
- (f) \*The above tests were subcontracted to SGS Taiwan based on report no. KA/2012/A1244

<u>PFOS Reference Information : POPs – (EU) 757/2010</u>
Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m<sup>2</sup>.

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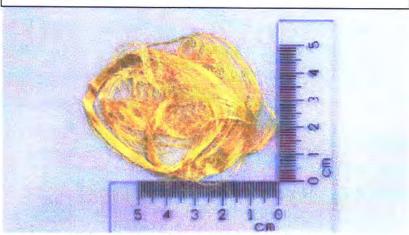
CTS Ref. CTSSA/12/3702/Tanaka

**Test Part Description:** 

Sample Description

Au BONDING WIRE

#### TANAKA ELECTRONICS (M) SDN BHD CTSSA/22961(B)/12+KA/2012/A1244



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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 8 of 13 CTS Ref. CTSSA/12/3702/Tanaka

#### 1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP

#### 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP

#### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321 2008

Cut sample in small pieces

Weight sample (0.5-4.0g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

#### 2. DETERMINATION OF LEAD CONTENT BY IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP

# 4. MICROWAVE ASSISTED ACID DIGESTION OF ORGANICALLY BASED METRICES (US EPA 3051A)

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (HNO<sub>3</sub>) - Microwave

"Totally Dissolved"

Filtration

Analyses by ICP

## 6. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008
Sample Receiving and Registration

1

Sample Preparation

Spot-test (Qualitative)

Boiling-water-extraction

Analyses by UV- Spectrophotometer

Test Report

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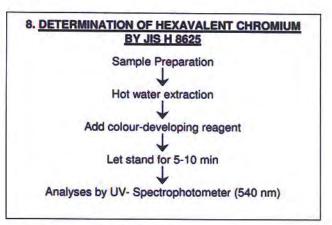
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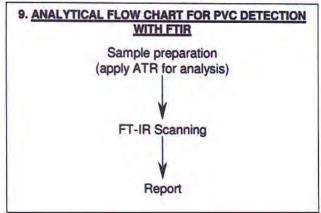
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# 7. DETERMINATION OF HALOGEN CONTENT Sample pretreatment Weighting and putting sample in cell Combustion / Absorption Dilution to fixed volume Analyses by IC





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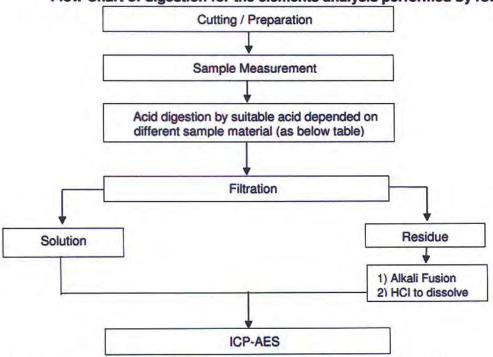
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- These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) Name of the person who made measurement: Alex Chang
- 3) Name of the person in charge of measurement: Ray Chang

#### Flow Chart of digestion for the elements analysis performed by ICP-AES



Steel, copper, aluminium, solder	Aqua regia, HNO <sub>3</sub> , HCI, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO₃
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCI
Others	Any acid to total digestion

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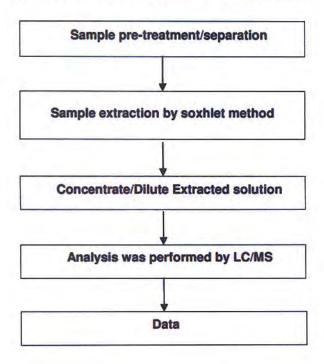
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#### Analytical Flow Chart of PFOS & PFOA Content



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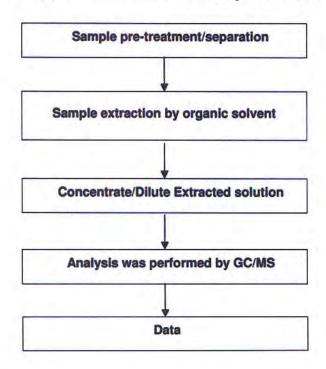
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#### **Analytical Flow Chart for Dimethyl Fumarate**



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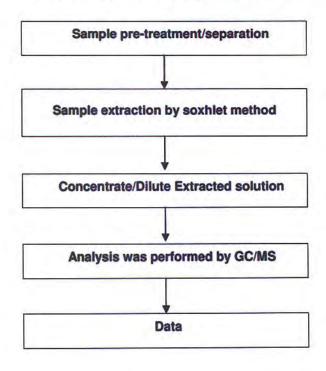
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#### **Analytical flow chart of Phthalates Content**



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

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# 測試報告 **Test Report**

號碼(No.): KA/2012/C2130 日期(Date): 2013/01/04 頁数(Page): 1 of 12

ASM HK

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG. HONG KONG(ASM HK)

以下測試樣品係由客户送樣,且由客户聲稱並經客户確認如下 (The following samples was/were submitted and identified by/on behalf of the client as):

: Ni PLATING MATERIAL 樣品名稱(Sample Description)

收件日期(Sample Receiving Date) : 2012/12/25

: 2012/12/25 TO 2013/01/04 测試期間(Testing Period)

送樣廠商(Sample Submitted By) : ASM HK

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

Ray Chang / Asst. Manage Signed for and on behalf of **SGS Taiwan Limited** 



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銀色 Ni PLATING MATERIAL (SILVER Ni PLATING MATERIAL)

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#### 測試結果(Test Results)

測試部位(PART NAME) NO.1

三溴聯苯 / Tribromobiphenyl

四溴聯苯 / Tetrabromobiphenyl

五溴聯苯 / Pentabromobiphenyl

六溴聯苯 / Hexabromobiphenyl

七溴聯苯 / Heptabromobiphenyl

八溴聯苯 / Octabromobiphenyl

九溴聯苯 / Nonabromobiphenyl

十溴聯苯 / Decabromobiphenyl

方法偵測 單位 測試方法 測試項目 (Result) 極限值 (Test Items) (Unit) (Method) (MDL) NO.1 酸洗脱鍍層, 参考IEC 62321: 2008方法 n.d. 鎬 / Cadmium (Cd) mg/kg 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES. 酸洗脱鍍層, 參考IEC 62321: 2008方法 n.d. 鉛 / Lead (Pb) mg/kg 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES. 酸洗脱鍍層, 参考IEC 62321: 2008方法, n.d. mg/kg 乘 / Mercury (Hg) 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES. 參考IEC 62321: 2008方法, 用Boiling 0.02mg/kg Negative 六價鉻 / Hexavalent Chromium Cr(VI) water extraction方法檢測. / With with 50 cm by boiling water extraction# reference to IEC 62321: 2008 and 2 surface area performed by boiling water extraction Method. n.d. 多溴聯苯總和 / Sum of PBBs 5 n.d. 一溴聯苯 / Monobromobiphenyl 5 n.d. 二溴聯苯 / Dibromobiphenyl n.d.

mg/kg

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參考IEC 62321: 2008方法, 以氣相層析

儀/質譜儀檢測. / With reference to

IEC 62321: 2008 and performed by

n.d.

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結果



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値	結果 (Result)
(lest Items)	(onic)	(method)	(MDL)	NO.1
多溴聯苯醚總和 / Sum of PBDEs				n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether		A STATE OF THE STA	5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether		參考IEC 62321: 2008方法, 以氣相層析	5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg	儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by	5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether		GC/MS.	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether		GC/.MS.	5	n.d.
入溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether			5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether			5	n.d.
绨 / Antimony (Sb)	mg/kg	參考US EPA 3052方法,用感應藕合電漿原子發射光譜儀檢測締含量./ With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	參考US EPA 3540C: 1996方法, 以氣相層 析質譜儀檢測. / With reference to US EPA 3540C: 1996 method. Analysis was performed by GC/MS.	5	n.d.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS - Acid, Metal Salt, Amide)	mg/kg	參考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測./With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 335-67- 1)	mg/kg	參考US EPA 3550C: 2007方法, 以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
可塑劑定量分析 / Phthalates 鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.; 84-74-2)	%	本測試參考EN 14372, 以氣相層析儀/質譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二異癸酯 / DIDP (Di- isodecyl phthalate) (CAS No.: 26761- 40-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di- isononyl phthalate) (CAS No.: 28553- 12-0)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	本測試參考EN 14372, 以氣相層析儀/質 譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鹵素 / Halogen 鹵素 (氣) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(氣)/ Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.

#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)
- 5. # = a. Positive means the presence of CrVI on the tested areas (Positive表示測試區域偵測到六價絡)
  - b. Negative means the absence of CrVI on the tested areas (Negative表示測試區域未偵測到六價絡)

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² tested areas . / 該溶液濃度≧0.02 mg/kg with 50 cm² (tested areas)

## PFOS参考資訊(Reference Information): 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm),在半成品、成品或零部件中不得超過0.1%(1000ppm),在紡織品或塗層材料中不得 超過1µg/m2 · (Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m².)

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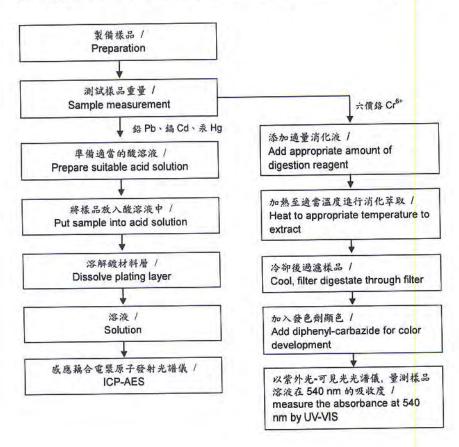
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## 鍍層重金屬測試流程圖 /

#### Flow Chart of Stripping method for metal analysis

- 1) 根據以下的流程圖之條件,樣品之外部鍍層已完全溶解已完全溶解。(六價鉻測試方注 除外)/The plating layer of samples were dissolved totally by pre-conditioning metho according to below flow chart. (Cr6+ test method excluded)
- 2) 測試人員:張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang



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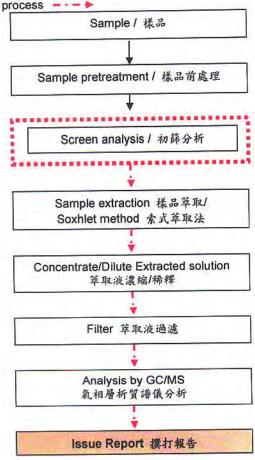
## 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1)測試人員:曹嘉琪 / Name of the person who made measurement: Anson Tsao 2)测试負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process —

選擇性篩檢程序 / Optional screen process ......

確認程序 / Confirmation process --->



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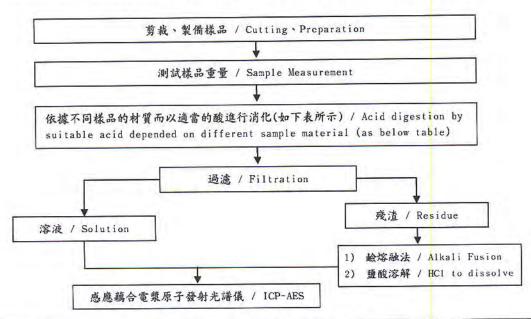
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員:張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

#### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



鋼,銅,銘,焊錫 / Steel, copper, aluminum, solder	王水,硝酸、鹽酸、氫氟酸、雙氧水 / Aqua regia, HNOz, HC1, HF, H2Oz
玻璃 / Glass	硝酸,氫氟酸 / HNO <sub>3</sub> /HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO3
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / HaSOa, HaOa, HNOa, HCl
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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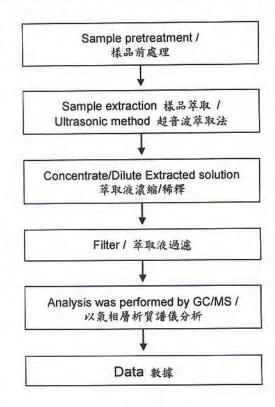
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## 六溴環十二烷分析流程圖 / HBCDD Analytical FLOW CHART

- 1) 測試人員: 曹嘉琪/ Name of the person who made measurement: Anson Tsao
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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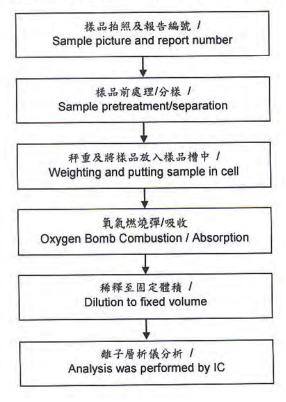
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## 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 测試人員:洪秀眞/ Name of the person who made measurement: Jean Hung
- 2) 測試負責人:張伯容/ Name of the person in charge of measurement: Ray Chang



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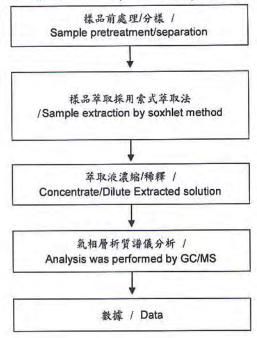
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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

1)测试人员:曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)测試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang



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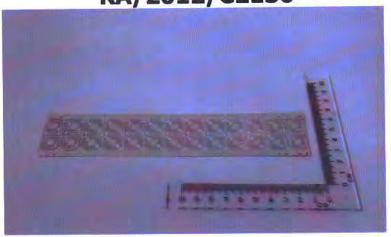
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\* 照片中如有箭頭標示,則表示爲實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)

KA/2012/C2130



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# 測試報告 **Test Report**

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以下測試樣品係由客户送樣,且由客户聲稱並經客户確認如下 (The following samples was/were submitted and identified by/on behalf of the client as):

樣品名稱(Sample Description)

: Pd PLATING MATERIAL

收件日期(Sample Receiving Date)

: 2012/12/25

測試期間(Testing Period)

: 2012/12/25 TO 2013/01/04

送樣廠商(Sample Submitted By)

: ASM HK

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

Ray Chang / Asst. Manage Signed for and on behalf of SGS Taiwan Limited

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### 測試結果(Test Results)

測試部位(PART NAME) NO.1

銀色 Pd PLATING MATERIAL (SILVER Pd PLATING MATERIAL)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鍋 / Cadmium (Cd)	mg/kg	酸洗脫鍍層,參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	酸洗脱鍍層,參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
乘 / Mercury (Hg)	mg/kg	酸洗脱鍍層,參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
六價络 / Hexavalent Chromium Cr(VI) by boiling water extraction#	**	参考IEC 62321: 2008方法、用Boiling water extraction方法檢測. / With reference to IEC 62321: 2008 and performed by boiling water extraction Method.	0.02mg/kg with 50 cm <sup>2</sup> surface area	
多溴聯苯總和 / Sum of PBBs			3	n.d.
一溴聯苯 / Monobromobiphenyl			5	n.d.
二溴聯苯 / Dibromobiphenyl			5	n.d.
三溴聯苯 / Tribromobiphenyl			5	n.d.
四溴聯苯 / Tetrabromobiphenyl		参考IEC 62321: 2008方法,以氣相層析儀		n.d.
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.
六溴聯苯 / Hexabromobiphenyl		62321: 2008 and performed by GC/MS.	5	n.d.
七溴聯苯 / Heptabromobiphenyl			5	n.d.
八溴聯苯 / Octabromobiphenyl		(0)	5	n.d.
九溴聯苯 / Nonabromobiphenyl	4		5	n.d.
十溴聯苯 / Decabromobiphenyl			3	n.u.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
多溴聯苯醚總和 / Sum of PBDEs			-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether			5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether		参考IEC 62321: 2008方法, 以氣相層析儀	5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg	/質譜儀檢測. / With reference to IEC	5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether		62321: 2008 and performed by GC/MS.	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether			5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether			5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether			5	n.d.
绨 / Antimony (Sb)	mg/kg	參考US EPA 3052方法,用感應藕合電漿原子發射光譜儀檢測錦含量。/ With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	參考US EPA 3540C: 1996方法,以氣相層 析質譜儀檢測. / With reference to US EPA 3540C: 1996 method. Analysis was performed by GC/MS.	5	n.d.
全氣辛烷磺酸 / Perfluorooctane sulfonates (PFOS - Acid, Metal Salt, Amide)	mg/kg	參考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測。/ With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 335-67- 1)	mg/kg	參考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測。/ With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二異癸酯 / DIDP (Di- isodecyl phthalate) (CAS No.: 26761- 40-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄭苯二甲酸二異壬酯 / DINP (Di- isononyl phthalate) (CAS No.: 28553- 12-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀絵測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鹵素 / Halogen 鹵素 (氣) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(氣)/ Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(溴)/ Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.

#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)
- 5. # = a. Positive means the presence of CrVI on the tested areas

(Positive表示測試區域偵測到六價鉻)

b. Negative means the absence of CrVI on the tested areas

(Negative表示測試區域未偵測到六價絡)

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² tested areas . / 該溶液濃度≧0.02 mg/kg with 50 cm² (tested areas)

## PFOS参考資訊(Reference Information): 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm),在半成品、成品或零部件中不得超過0.1%(1000ppm),在紡織品或塗層材料中不得超 過 $1\mu g/m^2$ 。(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above lμg/m².)

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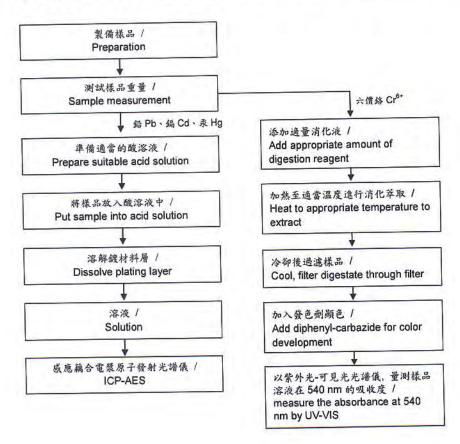
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#### 鍍層重金屬測試流程圖 /

### Flow Chart of Stripping method for metal analysis

- 1) 根據以下的流程圖之條件,樣品之外部鍍層已完全溶解已完全溶解。(六價鉻測試方注 除外)/The plating layer of samples were dissolved totally by pre-conditioning metho according to below flow chart. (Cr6+ test method excluded)
- 2) 測試人員:張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人: 張伯容 / Name of the person in charge of measurement: Ray Chang



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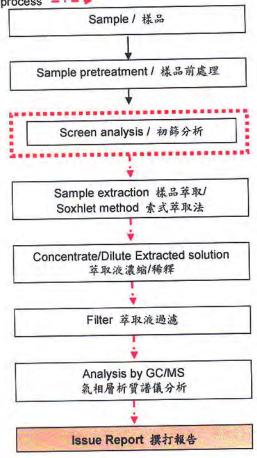
## 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1)測試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao 2)测試負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process —

選擇性篩檢程序 / Optional screen process ......

確認程序 / Confirmation process - - - >



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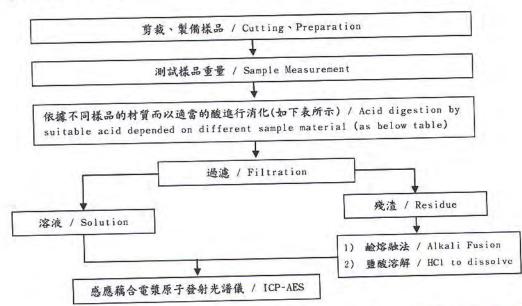
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員:張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

#### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



纲,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNOs, HCl, HF, H2Os
玻璃 / Glass	硝酸, 氫氯酸 / HNO:/HF
金, 鉅, 鲍, 陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNOs
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H <sub>1</sub> SO <sub>1</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCI
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion



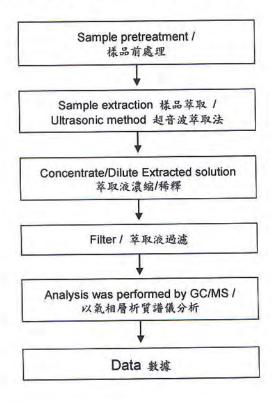
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### 六溴環十二烷分析流程圖 / HBCDD Analytical FLOW CHART

- 1) 测试人員: 曹嘉琪/ Name of the person who made measurement: Anson Tsao
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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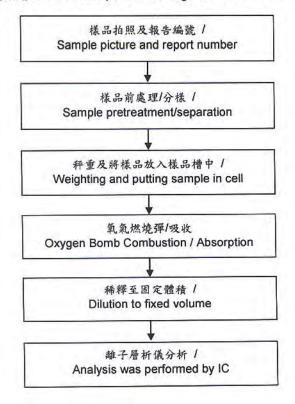
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#### 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員: 洪秀真/ Name of the person who made measurement: Jean Hung
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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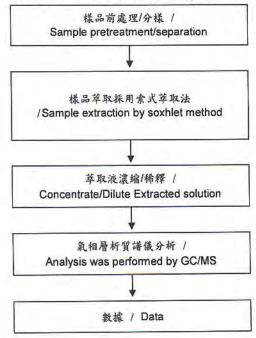
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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

1)测試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)测試負責人:張伯容 / Name of the person in charge of measurement: Ray Chang



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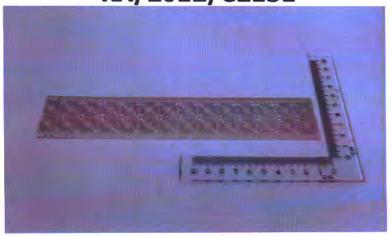
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\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)

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## 測試報告 **Test Report**

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以下測試樣品係由客户送樣,且由客户聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as):

樣品名稱(Sample Description)

: Au PLATING MATERIAL

收件日期(Sample Receiving Date)

2012/12/25

測試期間(Testing Period)

: 2012/12/25 TO 2013/01/04

送樣廠商(Sample Submitted By)

: ASM HK

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

Ray Chang / Asst. Manage Signed for and on behalf of SGS Taiwan Limited

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#### 測試結果(Test Results)

測試部位(PART NAME) NO.1

紅銅色 Au PLATING MATERIAL (RED COPPERY Au PLATING MATERIAL)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
鎬 / Cadmium (Cd)	mg/kg	酸洗脱镀層,多考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測。/ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	酸洗脱鍍層,參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
汞 / Mercury (Hg)	mg/kg	酸洗脱鍍層,參考IEC 62321: 2008方法、 以感應耦合電漿原子發射光譜儀檢測./ IEC 62321: 2008 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.
六價絡 / Hexavalent Chromium Cr(VI) by boiling water extraction#	**	参考IEC 62321: 2008方法、用Boiling water extraction方法检測. / With reference to IEC 62321: 2008 and performed by boiling water extraction Method.	0.02mg/kg with 50 cm <sup>2</sup> surface area	Negative
多溴聯苯總和 / Sum of PBBs	1			n.d.
一溴聯苯 / Monobromobiphenyl			5	n.d.
二溴聯苯 / Dibromobiphenyl	1		5	n,d.
三溴聯苯 / Tribromobiphenyl			5	n.d.
四溴聯苯 / Tetrabromobiphenyl		参考IEC 62321: 2008方法, 以氣相層析儀		n.d.
五溴聯苯 / Pentabromobiphenyl	mg/kg	/質譜儀檢測. / With reference to IEC	5	n.d.
六溴聯苯 / Hexabromobiphenyl		62321; 2008 and performed by GC/MS.	5	n.d.
七溴聯苯 / Heptabromobiphenyl	1	N	5	n.d.
八溴聯苯 / Octabromobiphenyl	1		5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl			5	n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
多溴聯苯醚總和 / Sum of PBDEs				n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether			5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether		參考IEC 62321: 2008方法, 以氣相層析儀	5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	## Property of the content of the	5	n.d.	
六溴聯苯醚 / Hexabromodiphenyl ether		62321: 2008 and performed by GC/MS.	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether			5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether			5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether			5	n.d.
绨 / Antimony (Sb)	mg/kg	reference to US EPA Method 3052 for Antimony Content. Analysis was	2	n.d.
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	析質譜儀檢測. / With reference to US EPA 3540C: 1996 method. Analysis was	5	n.d.
全氯辛烷磺酸 / Perfluorooctane sulfonates (PFOS - Acid, Metal Salt, Amide)	mg/kg		10	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 335-67- 1)	mg/kg	参考US EPA 3550C: 2007方法,以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
可塑劑定量分析 / Phthalates			(MDL)	NO.1
鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.
鄰苯二甲酸二異癸酯 / DIDP (Di- isodecyl phthalate) (CAS No.: 26761- 40-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di- isononyl phthalate) (CAS No.: 28553- 12-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.01	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	%	本測試參考EN 14372, 以氣相層析儀/質譜 儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS.	0.003	n.d.

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测試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法侦测 極限値 (MDL)	結果 (Result) NO.1
鹵素 / Halogen 鹵素 (氣) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007、以離子層析儀分析、/ With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(氣)/ Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.

#### 備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限値)
- 4. "-" = Not Regulated (無規格值)
- 5. # = a. Positive means the presence of CrVI on the tested areas

(Positive表示測試區域偵測到六價鉻)

b. Negative means the absence of CrVI on the tested areas

(Negative表示測試區域未偵測到六價鉻)

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² tested areas . / 該溶液濃度≧0.02 mg/kg with 50 cm² (tested areas)

### PFOS参考資訊(Reference Information): 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm),在半成品、成品或零部件中不得超過0.1%(1000ppm),在紡織品或塗層材料中不得超 過1µg/m2 · (Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m².)

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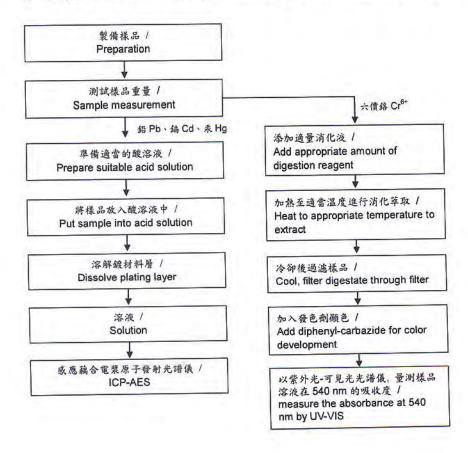
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#### 鍍層重金屬測試流程圖 /

#### Flow Chart of Stripping method for metal analysis

- 1) 根據以下的流程圖之條件,樣品之外部鍍層已完全溶解已完全溶解。(六價鉻測試方治 除外) / The plating layer of samples were dissolved totally by pre-conditioning metho according to below flow chart. (Cr6+ test method excluded)
- 2) 測試人員: 張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang



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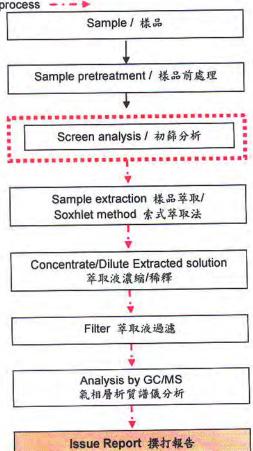
#### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1)測試人員:曹嘉琪 / Name of the person who made measurement: Anson Tsao 2)测试負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang

初次测試程序 / First testing process -

選擇性篩檢程序 / Optional screen process ......

確認程序 / Confirmation process - - - ▶



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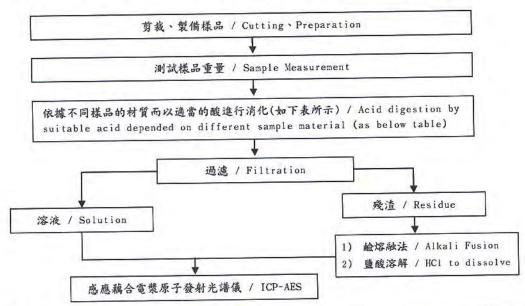
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員:張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人:張伯睿 / Name of the person in charge of measurement: Ray Chang

#### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



鋼.銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氯酸,雙氧水 /
	Aqua regia, HNO2, HC1, HF, H2O2
玻璃 / Glass	硝酸、氫氟酸 / HNOs/HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO:
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H:SO4, H:O2, HNOa, HC1
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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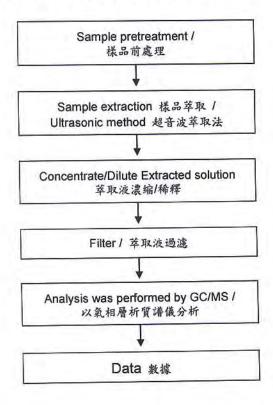
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#### 六溴環十二烷分析流程圖 / HBCDD Analytical FLOW CHART

- 1) 測試人員: 曹嘉琪/ Name of the person who made measurement: Anson Tsao
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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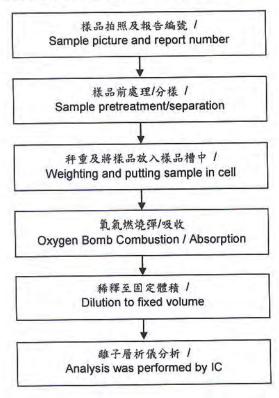
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### 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 测試人員: 洪秀真/ Name of the person who made measurement: Jean Hung
- 2) 測試負責人:張伯睿/ Name of the person in charge of measurement: Ray Chang



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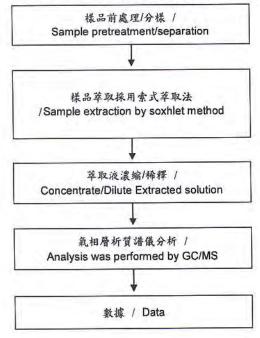
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#### 可塑劑分析流程圖 / Analytical flow chart of phthalate content

1)测試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)测試負責人: 張伯容 / Name of the person in charge of measurement: Ray Chang





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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.)

KA/2012/C2132



\*\* 報告結尾(End of Report) \*\*

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HENKEL TECHNOLOGIES

6th Fl. Daeryung techno town II 569-21, Gasan-dong

Geumcheon-gu

Seoul Korea

To:

The following merchandise was submitted and identified by the client as :

: AYAA12-29109 SGS File No.

: 8006NS **Product Name** 

: N/A Item No./Part No.

: 2012. 08. 03 Received Date

: 2012. 08. 06 to 2012. 08. 10 **Test Period** 

: For further details, please refer to following page(s) **Test Results** 

: SGS Korea tested the sample(s) selected by applicant with following results. **Test Performed** 

SGS Korea Co. Ltd.

Issued Date: 2012. 08. 10 Page 1 of 10

**Timothy Jeon** Jinhee Kim Cindy Park

Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr



Issued Date: 2012. 08. 10 Page 2 of 10

Sample No.

: AYAA12-29109.001

Sample Description

: 8006NS

Item No./Part No.

: N/A

**Materials** 

: Paste

#### **Heavy Metals**

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.
Phosphorous (P)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.

#### Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

NOTE:

- (1) N.D. = Not detected.(<MDL)
- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) = No regulation
- (5) Negative = Undetectable / Positive = Detectable
- (6) \*\* = Qualitative analysis (No Unit)
- (7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

SGS Korea Co., Ltd.

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Sample No.

: AYAA12-29109.001

Sample Description

: 8006NS

Item No./Part No.

: N/A

Materials

: Paste

#### Flame Retardants-PBBs/PBDEs

Unit	Test Method	MDL	Results
	With reference to IEC 62321:2008, GC-MS	5	N.D.
		5	N.D.
		5	N.D.
		5	N.D.
	Unit  mg/kg  mg/kg  mg/kg  mg/kg	mg/kg With reference to IEC 62321:2008, GC-MS mg/kg With reference to IEC 62321:2008, GC-MS mg/kg With reference to IEC 62321:2008, GC-MS	mg/kg         With reference to IEC 62321:2008, GC-MS         5           mg/kg         With reference to IEC 62321:2008, GC-MS         5           mg/kg         With reference to IEC 62321:2008, GC-MS         5

#### **Phthalates**

Test Items	Unit	Test Method	MDL	Results
111111111111111111111111111111111111111	mg/kg	US EPA 8061A, GC/MS	50	N.D.
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	US EPA 8061A, GC/MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	US EPA 8061A, GC/MS	50	N.D.
Dibutyl phthalate (DBP) Benzyl butyl phthalate (BBP)	mg/kg	US EPA 8061A , GC/MS	50	N.D.
Di-isononyl phthalate (DINP)	mg/kg	US EPA 8061A, GC/MS	50	N.D.
Di-isononyi phthalate (DIDP)	mg/kg	US EPA 8061A, GC/MS	50	N.D.
	mg/kg	US EPA 8061A, GC/MS	50	N.D.
Di-methyl phthalate (DMP) Di-ethyl phthalate(DEP)	mg/kg	US EPA 8061A, GC/MS	50	N.D.

#### **Halogen Contents**

Unit	Test Method	MDL	Results
	BS EN 14582:2007, IC	30	N.D.
		30	305
		30	N.D.
		50	N.D.
	Unit mg/kg mg/kg mg/kg mg/kg	mg/kg BS EN 14582:2007 , IC	mg/kg         BS EN 14582:2007 , IC         30           mg/kg         BS EN 14582:2007 , IC         30           mg/kg         BS EN 14582:2007 , IC         30           mg/kg         BS EN 14582:2007 , IC         30

#### Flame Retardants

Test Items	Unit	Test Method	MDL	Results	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					

- NOTE: (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) = No regulation
  - (5) Negative = Undetectable / Positive = Detectable
  - (6) \*\* = Qualitative analysis (No Unit)
  - (7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.



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Sample No.

: AYAA12-29109.001

**Sample Description** 

: 8006NS

Item No./Part No.

: N/A

Materials

: Paste

#### Flame Retardants

Test Items	Unit	Test Method	MDL	Results
Hexabromocyclododecane	mg/kg	USEPA 3540C, LC/MS	5	N.D.

#### Other(s)

Test Items	Unit	Test Method	MDL	Results
PFOA(Perfluorooctanoic acid)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D.
PFOS(Perfluorooctane Sulfonates-Acid/Metal Salt/Amide)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D.

- NOTE: (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) = No regulation
  - (5) Negative = Undetectable / Positive = Detectable
  - (6) \*\* = Qualitative analysis (No Unit)
  - (7) \* = Boiling-water-extraction:

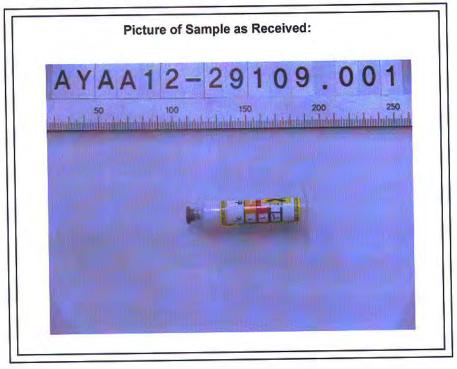
Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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Issued Date: 2012. 08. 10 Page 5 of 10



- NOTE: (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
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  - (5) Negative = Undetectable / Positive = Detectable
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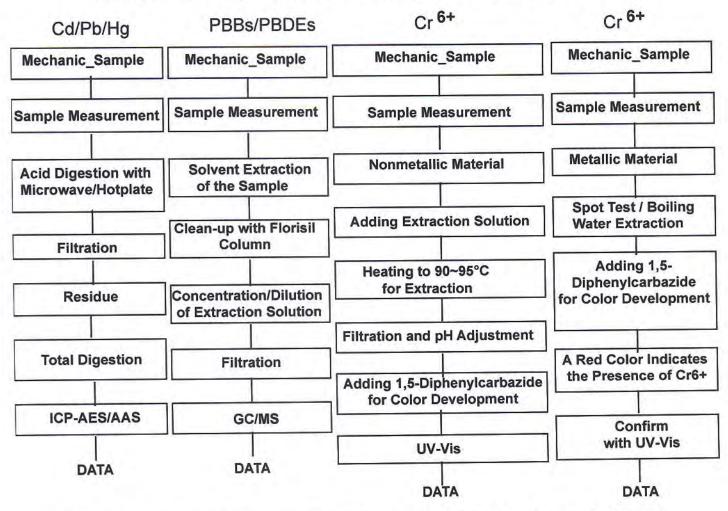
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## Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr6+ /PBBs&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg. Section Chief: Gilsae Yi

- NOTE: (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) = No regulation
  - (5) Negative = Undetectable / Positive = Detectable
  - (6) \*\* = Qualitative analysis (No Unit)
  - (7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

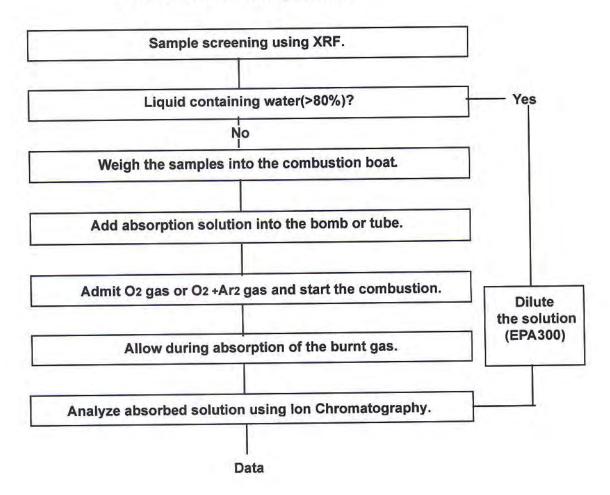
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#### Flow Chart for Halogen Test



NOTE: (1) N.D. = Not detected.(<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) Negative = Undetectable / Positive = Detectable

(6) \*\* = Qualitative analysis (No Unit)

(7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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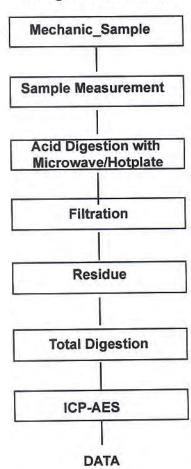
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## Flow Chart for Inorganic Elements Testing

Inorganic Elements



The samples were dissolved totally by pre-conditioning method according to above flow chart for Inorganic Elements.

Section Chief: Gilsae Yi

- NOTE: (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) = No regulation
  - (5) Negative = Undetectable / Positive = Detectable
  - (6) \*\* = Qualitative analysis (No Unit)
  - (7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

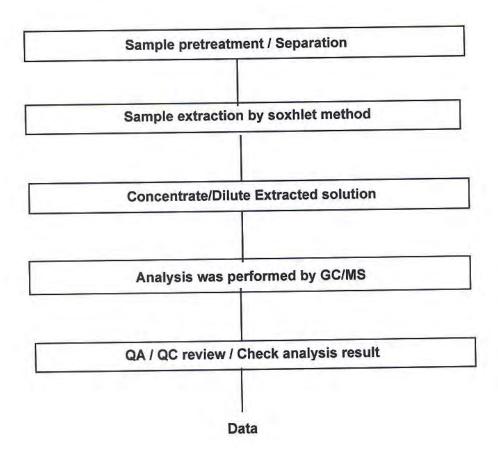
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#### Flow Chart for Phthalate Test



NOTE: (1) N.D. = Not detected.(<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) Negative = Undetectable / Positive = Detectable

(6) \*\* = Qualitative analysis (No Unit)

(7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction

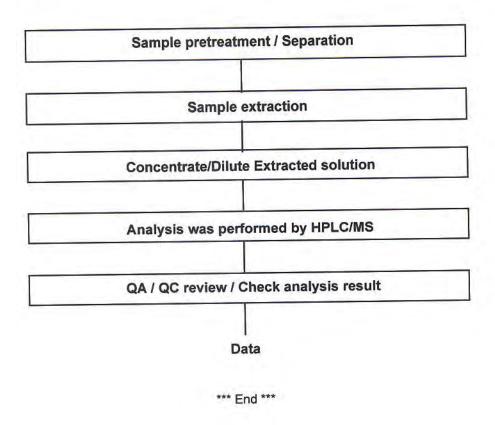
solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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### Flow Chart for PFOS/PFOA Test



NOTE: (1) N.D. = Not detected.(<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) Negative = Undetectable / Positive = Detectable

(6) \*\* = Qualitative analysis (No Unit)

(7) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction

solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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Signature valid For Question with SGS Please Cont www.tw.sgs.com

**Test Report** 

No.: CE/2012/C1068F

Date: 2013/01/18

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EPISIL TECHNOLOGIES INC.

NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

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

Sample Description

: IC WAFER

Style/Item No.

AI PROCESS

Sample Receiving Date

2012/12/07

**Testing Period** 

2012/12/07 TO 2012/12/18

**Test Requested** 

: (1) As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to

determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the

submitted sample.

(2) As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine

contents in the submitted sample.

**Test Method** 

Please refer to next page(s).

Test Result(s)

Please refer to next page(s).



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No.: CE/2012/C1068F

Date: 2013/01/18

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EPISIL TECHNOLOGIES INC.

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NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

#### Test Result(s)

PART NAME No.1

MULTICOLOR WAFER

Test Item(s)	Unit	Method	MDL	Result No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
Sum of PBBs				n.d.
Monobromobiphenyl	-		5	n.d.
Dibromobiphenyl		With reference to IEC 62321: 2008 and performed by GC/MS.	5	n.d.
Tribromobiphenyl	-		5	n.d.
Tetrabromobiphenyl	-		5	n.d.
Pentabromobiphenyl			5	n.d.
Hexabromobiphenyl	-		5	n.d.
Heptabromobiphenyl	-		5	n.d.
Octabromobiphenyl	-		5	n.d.
Nonabromobiphenyl	-		5	n.d.
Decabromobiphenyl			5	n.d.
Sum of PBDEs	mg/kg		*	n.d.
Monobromodiphenyl ether		A STATE OF THE STA	5	n.d.
Dibromodiphenyl ether			5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether	71		5	n.d.
Pentabromodiphenyl ether			5	n.d.
Hexabromodiphenyl ether			5	n.d
Heptabromodiphenyl ether			5	n.d
Octabromodiphenyl ether			5	n.d
Nonabromodiphenyl ether			5	n.d
Decabromodiphenyl ether			5	n.d



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EPISIL TECHNOLOGIES INC.

NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	
				No.1	
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)			50	n.d.	
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)	malla	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	
Halogen-Bromine (Br) (CAS No.: 10097-32-2)			50	n.d.	
Halogen-lodine (I) (CAS No.: 14362-44-8)			50	n.d.	

#### Note:

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. " - " = Not Regulated



No.: CE/2012/C1068F

Date: 2013/01/18

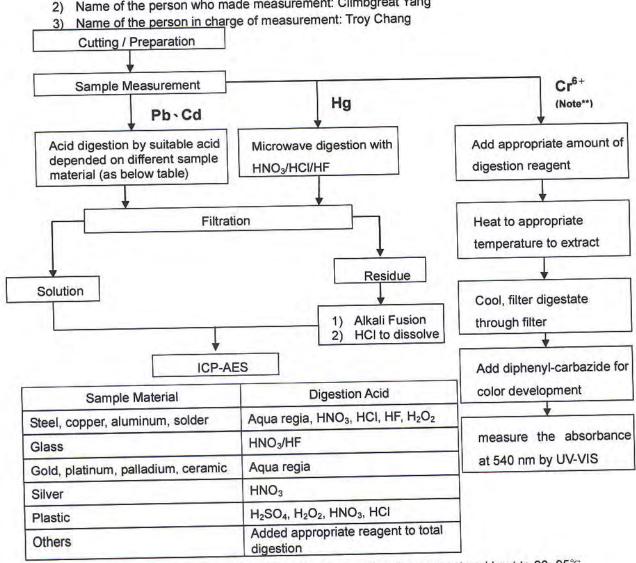
Page: 4 of 7

EPISIL TECHNOLOGIES INC.

NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

 These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ test method excluded)

Name of the person who made measurement: Climbgreat Yang



Note\*\*: (1) For non-metallic material, add alkaline digestion reagent and heat to 90~95°C.

(2) For metallic material, add pure water and heat to boiling.

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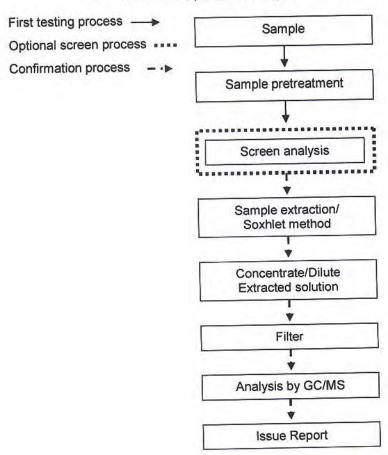
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NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

#### PBB/PBDE analytical FLOW CHART

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang





No.: CE/2012/C1068F

Date: 2013/01/18

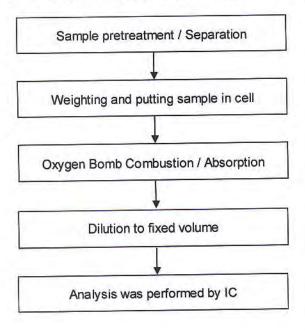
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EPISIL TECHNOLOGIES INC.

NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK, HSIN-CHU, TAIWAN, R. O. C.

### Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Rita Chen
- 2) Name of the person in charge of measurement: Troy Chang



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

CE/2012/C1068



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\*\* End of Report \*\*