



## ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: Ultra-low Capacitance Protection Array –  
SOT553 & SOT563

Product #: SP3003-02XTG (SOT 553), SP3003-04XTG (SOT 563)

Issue Date: August 30, 2012

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (EU Directive 2002/95/EC, 2011/65/EU)-restricted substance nor such use, for materials to be used for unit parts, for packing/packaging materials, and for additives and the like in the manufacturing processes.

In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/packaging materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by:

  
KRISTEEN BACILA

<Global EHS Engineer>

(1) Parts, sub-materials and unit parts

This document covers the S RoHS-Compliant series products manufactured by Littelfuse, Inc.

< Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

Remarks : .

**Table 1: List of Raw Materials covered by this report**

<b>Total Parts</b>	<b>Raw Material Part Number</b>	<b>Raw Material Description</b>	<b>Page(s)</b>
1	ELER-8	Molding Compound	3-15
2	NA	Gold	16-26
3	H9607	Epoxy	27-31
4	NA	Leadframe	32-34
5	NA	Tin	35-42







## 測試報告 Test Report

號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 3 of 25

義典科技股份有限公司

E'DALE (WUXI-E'DALE) TECHNOLOGY CO., LTD.

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NO. 130, LIQUAN, LIQUAN T.I., JIALI, TAINAN, TAIWAN 722, R.O.C.

NO.35 XIGANG ROAD, DONGHUTANG TOWN YISHAN DISTRICT, WUXI CITY

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result) NO.1
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	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 GC/MS.	-	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			5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether			5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether			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.
銻 / Antimony (Sb)	mg/kg	參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測銻含量。 / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
磷 / Phosphorus (P)	mg/kg	參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測磷含量。 / With reference to US EPA Method 3052 for Phosphorus Content. Analysis was performed by ICP-AES.	2	104
全氟辛酸磺酸 / Perfluorooctane sulfonates (PFOS - Acid, Metal Salt, Anide)	mg/kg	參考US EPA 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛酸磺酸含量。 / With reference to US EPA 3540C: 1996 method for PFOS Content. 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 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛酸(銨)含量。 / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	n.d.

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## 測試報告 Test Report

號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 4 of 25

義典科技股份有限公司

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NO.35 XIGANG ROAD, DONGHUTANG TOWN YISHAN DISTRICT, WUXI CITY

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result) NO.1
多氯聯苯 / Polychlorinated Biphenyls (PCBs) (CAS No.: 1336-36-3)	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.
多氯萘 / 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.
氯化石蠟 / Chlorinated Paraffin (C10-C13) (CAS No.: 85533-84-8)	%	參考US EPA 3540C: 1996方法, 以氣相層析儀/電子捕獲偵測器檢測。 / 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.
五氯酚 / PCP (Pentachlorophenol) (CAS No.: 87-86-5)	mg/kg	參考KOH方法, 以氣相層析儀/電子捕獲偵測器(GC/ECD)檢測。 / With reference to KOH method. Analysis was performed by GC/ECD.	3	n.d.

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## 測試報告 Test Report

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號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 5 of 25

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
聚氯乙烯 / PVC	**	以紅外光譜分析及焰色法檢測。 / Analysis is performed by FTIR and FLAME Test.	-	Negative
四溴雙酚-A / Tetrabromobisphenol A (TBRP-A) (CAS No.: 79-94-7)	mg/kg	參考DIN 53313方法, 以氣相層析儀/質譜 儀檢測。 / With reference to DIN 53313 method. Analysis was performed by GC/MS.	10	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.
鹵素 / Halogen				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	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.
鹵素 (氯) / 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	91.9
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	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.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
可塑劑定量分析 / Phthalates				
鄰苯二甲酸甲苯基丁酯 / BPP (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.
己二酸二(2-乙基己基)酯 / DEHA (Di-2-ethylhexyl adipate)(DOA) (CAS No.: 103-23-1)	%	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.
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	%	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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NO.35 XIGANG ROAD, DONGHUTANG TOWN XISHAN DISTRICT, WUXI CITY

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				NO.1
鄰苯二甲酸二甲酯 / DMP (Di-methyl phthalate) (CAS No.: 131-11-3)	%	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.
鄰苯二甲酸二丙酯 / DPrP (Di-propyl phthalate) (CAS No.: 131-16-8)	%	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.
鄰苯二甲酸二環己酯 / DCHP (Di-cyclohexyl phthalate) (CAS No.: 84-61-7)	%	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.
鄰苯二甲酸二乙酯 / DEP (Di-ethyl phthalate) (CAS No.: 84-66-2)	%	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.
鄰苯二甲二異辛酯 / DIOP (Di-isooctyl phthalate) (CAS No.: 27554-26-3)	%	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.
鄰苯二甲酸二正壬酯 / DNNP (Di-n-nonyl phthalate)(DNP) (CAS No.: 84-76-4)	%	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.
鄰苯二甲酸二戊酯 / DPP (Di-pentyl phthalate) (CAS No.: 131-18-0)	%	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.
鄰苯二甲酸二己酯 / DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	%	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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4. 廣州宣統政事刊布型(2)冊

DOI: 10.13733/j.issn.1004-2464.2012.02.012

Mr. Kaufman, Texas.

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2. 待测溶液加入三氯化铁试剂后

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NO.35 XIGANG ROAD ,DONGHUTANG TOWN YISHAN DISTRICT, WUXI CITY

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
多苯環芳香族化合物 / Polynuclear Aromatic Hydrocarbons (PAHs)				
Acenaphthene (CAS No.: 83-32-9)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Acenaphthylene (CAS No.: 208-96-8)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Anthracene (CAS No.: 120-12-7)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Benzo[a]anthracene (CAS No.: 56-55-3)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Benzo[a]pyrene (CAS No.: 50-32-8)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Benzo[b]fluoranthene (CAS No.: 205-99-2)	ng/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.

[illegible]

本報記者 邱建群 攝於高雄

Nov. 4-11, Kariya Forest, N  
Japan, 1970-1971, 4-11, 1971

10/20/2014

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號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 9 of 25

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
Benzo[g,h,i]perylene (CAS No.: 191-24-2)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Benzo[k]fluoranthene (CAS No.: 207-08-9)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Chrysene (CAS No.: 218-01-9)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Dibenzo[a,h]anthracene (CAS No.: 53-70-3)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Fluoranthene (CAS No.: 206-44-0)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Fluorene (CAS No.: 86-73-7)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.

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號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 10 of 25

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
Indeno[1,2,3-c,d] pyrene (CAS No.: 193-39-5)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Naphthalene (CAS No.: 91-20-3)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Phenanthrene (CAS No.: 85-01-8)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
Pyrene (CAS No.: 129-00-0)	mg/kg	參考ZLS standard ZEK 01.2-08方法, 以氣相層析質譜儀(GC/MS)檢測。 / With reference to ZLS standard ZEK 01.2-08 method. Analysis was performed by GC/MS.	0.2	n.d.
多環芳烴族化合物16項總和 / Sum of 16 PAHs	mg/kg	-	-	n.d.

備註(Notes):

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. \*\* = Qualitative analysis (No Unit) 定性分析(無單位)
6. 聚氯乙稀(PVC): Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
7. 聚氯乙稀測試由SGS其他實驗室執行 (The PVC test was subcontracted to other SGS Laboratory.)

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NO. 35 XIGANG ROAD, DONGHUTANG TOWN YISHAN DISTRICT, WUXI CITY

參考資料(Reference information):

依據ZEX 01.2-08之要求：產品中最大值為

(Requirement of ZEK 01.2-08 : Restraining maximum values for products)

項目 (Parameter)	第1類 (Category 1)	第2類 (Category 2)	第3類 (Category 3)
	與食品接觸或放入嘴內的材料，以及給三歲以下的幼兒使用的玩具。 (Materials in contact with foodstuff or materials which are meant to put in the mouth as well as toys for children <36 months.)	持續地(長時間)與皮膚接觸逾30秒，以及不屬第1類的玩具。 (Materials with foreseeable skin contact >30 s (prolonged skin contact) and toys not covered by category 1.)	暫時地(短時間)與皮膚接觸但不逾30秒或不會與皮膚接觸。 (Materials with foreseeable skin contact <30 s (short time skin contact) or without skin contact.)
苯[a]芘 Benzo[a]pyrene (mg/kg)	<MDL {(0.2)**}	1	20
環保署規範16項PAH總濃度 (Sum of 16 EPA-PAH) (mg/kg)*	<MDL {(0.2)**}	10	200

注意(Remark): \* = PAH濃度大於0.2mg/kg時, 則須計算PAH總濃度值

(Only PAH substances >0.2 mg/kg are taken into account while calculating the sum of PAHs)

\*\* 三、最大濃度值超出等級一的限制，但在等級二的濃度限制值內時，可能需要確認測試材質

是不合適於食品容器或是依照DIN EN 18611/ § 64 LFGB 80.30-1方法，針對特定PAH的

遷移測試進行測試。遷移測試的結論需依照食品法規規範

(In case that the maximum values exceed the limits of category 1, but are within the limits of category 2, one may confirm the suitability of the tested material for contact with foodstuff or oral mucosa by additional specific migration tests of PAH components based on DIN EN 1186ff and § 64 LFGB 80.30-1. The conclusion of the migration test results must be made based on food law criteria.)

[illegible]

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PFOS參考資訊(Reference Information)：指令 2006/122/EC (Directive 2006/122/EC)

(1) 該物質不可置於市場上或使用於特殊物質或配置成分重量濃度等於或大於0.005%

(May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.)

(2) 該物質不可置於市場上的半成品或商品或其物件；假若零件上明顯地具有PFOS並多聚結構上及微細構造上計算PFOS重量濃度等於或大於0.1%，而紡織品或其他覆蓋物質，如果PFOS在覆蓋物質中含量等於或大於 $1\mu\text{g}/\text{m}^2$ 。(May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1% by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than  $1\mu\text{g}/\text{m}^2$  of the coated material.)

[illegible]

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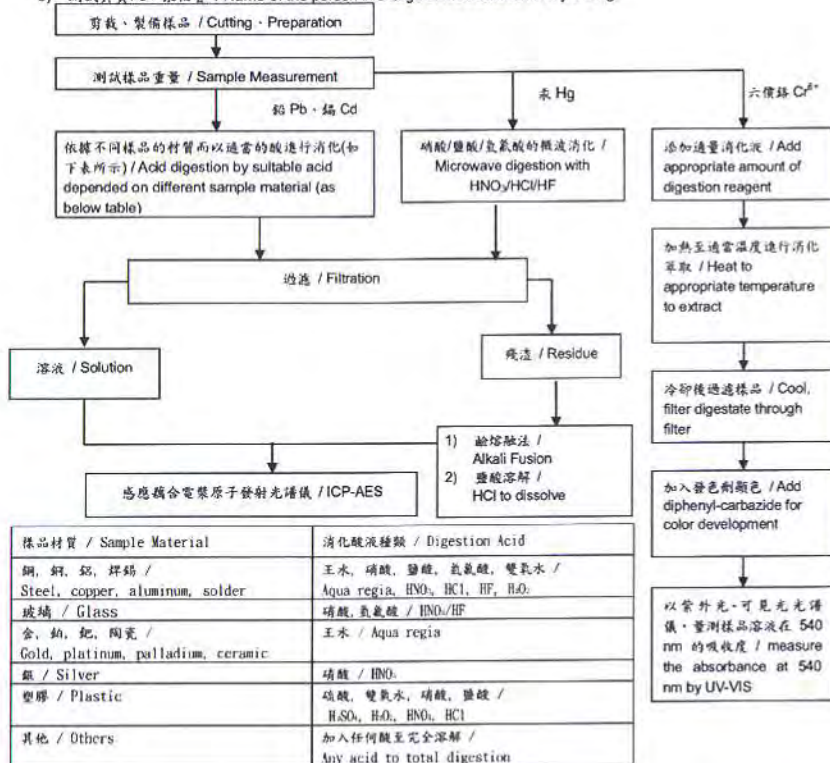
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)
- 2) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人：張伯豪 / Name of the person in charge of measurement: Ray Chang



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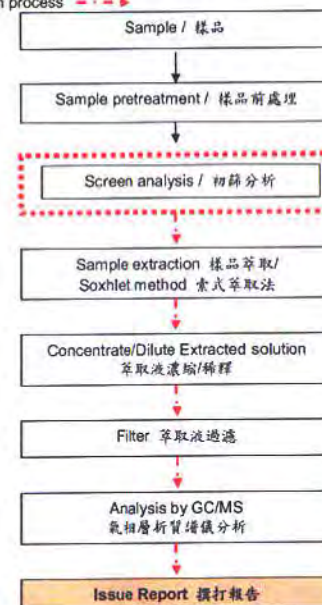
## 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

- 2) 測試負責人: 張伯森 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process →

### 选择性筛检程序 / Optional screen process

確認程序 / Confirmation process

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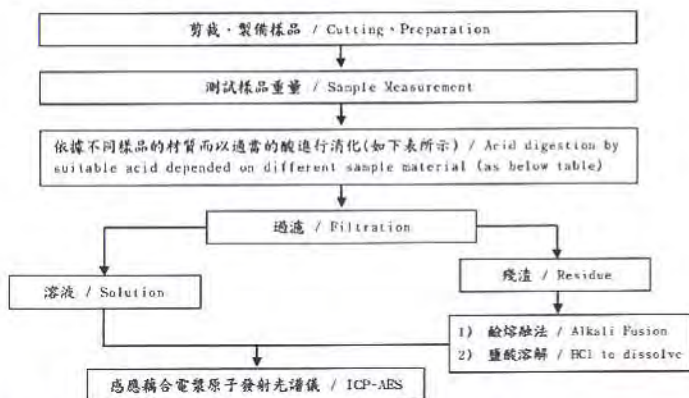
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人：張伯豪 / Name of the person in charge of measurement: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

元素以 ICP-AES 分析的消化流程图

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



鋼、銅、鋁、焊料 / Steel, copper, aluminum, solder	王水、硝酸、鹽酸、氫氟酸、雙氧水 / Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
玻璃 / Glass	硝酸、氫氟酸 / HNO <sub>3</sub> /HF
金、鈷、鉑、陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO <sub>3</sub>
塑膠 / Plastic	硝酸、雙氧水、硝酸、鹽酸 / HNO <sub>3</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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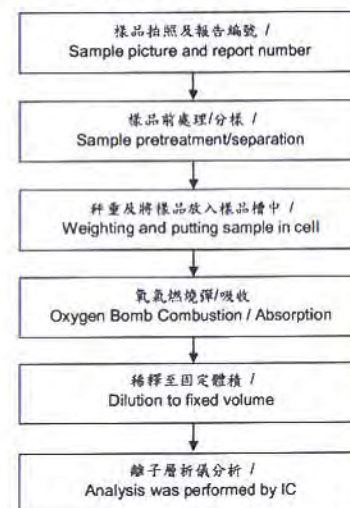
台南縣佳里鎮六安里六安130號/江蘇省無錫市東港鎮錫港東路35號

NO. 130, LIQUAN, LIQUAN LI, JIALI, TAINAN, TAIWAN 722, R.O.C.

NO.35 XIGANG ROAD ,DONGHUTANG TOWN XISHAN DISTRICT, WUXI CITY

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

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





## 測試報告 Test Report

義典科技股份有限公司

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號碼(No.): KA/2011/91531 日期(Date): 2011/10/03 頁數(Page): 17 of 25

### 四溴雙酚-A分析流程圖 / TBBP-A 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: 張伯容 / Name of the person in charge of measurement: Ray Chang



## 測試報告 Test Report

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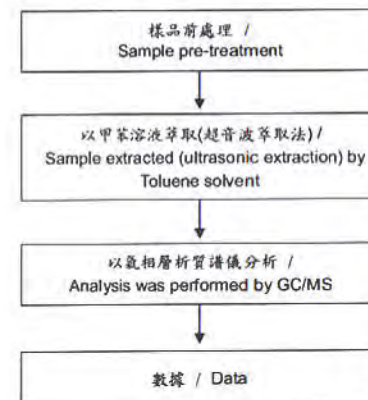
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### 多苯環芳香族化合物分析流程圖 / PAHs (Poly Aromatic Hydrocarbons) analytical flow chart

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





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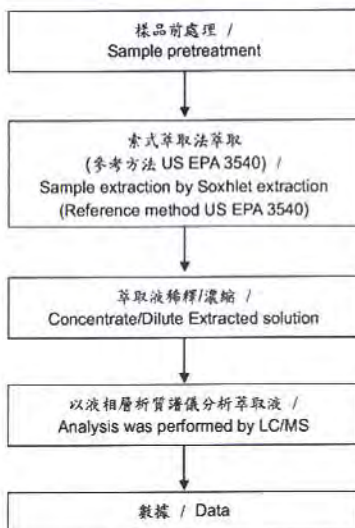
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號碼(No.) : KA/2011/91531 日期(Date) : 2011/10/03 頁數(Page) : 19 of 25

#### Analytical flow chart of PFOA/PFOS content

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

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



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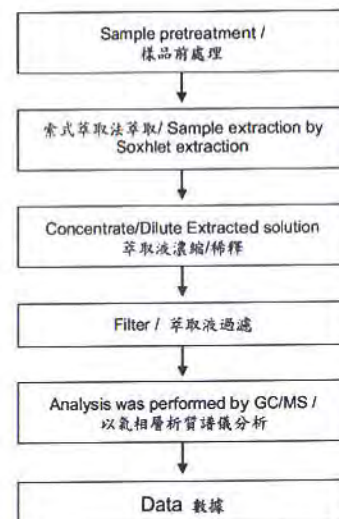
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1) 測站人員：曾喜琪 / Name of the person who made measurement: Anson Tsao

1) 測站人員：曾喜琪 / Name of the person who made measurement: Anson Tsao

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



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## 測試報告 Test Report

義興科技股份有限公司

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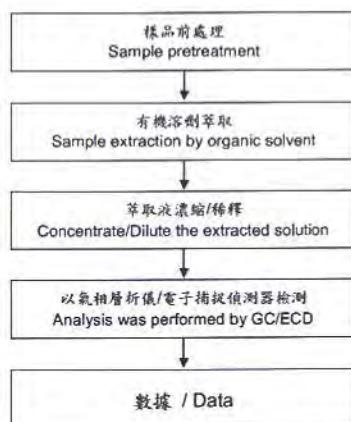
### 含氯阻燃劑分析流程 /

#### 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: 張伯豪 / Name of the person in charge of measurement: Ray Chang

■ 參考方法(Reference method): USEPA 3540

■ 測試項目(Test Items): PCBs, CP, MCCP / 多氯聯苯, 氯化石蠟, 中鏈氯化石蠟



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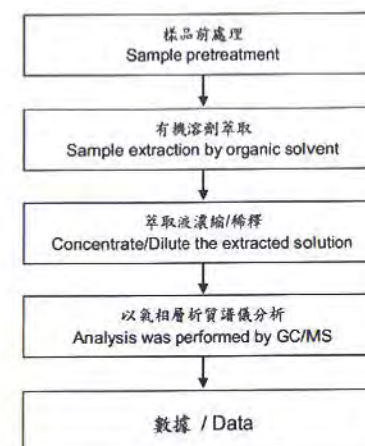
### 含氯阻燃劑分析流程 /

#### 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: 張伯豪 / Name of the person in charge of measurement: Ray Chang

■ 參考方法(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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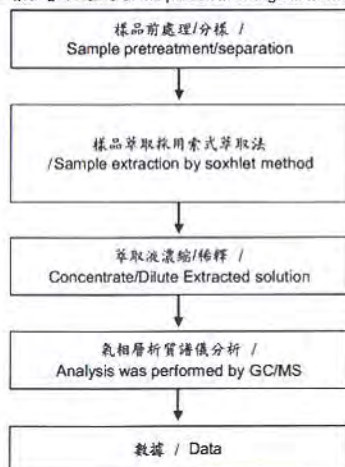
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NO.35 XIGANG ROAD ,DONGHUTANG TOWN XISHAN DISTRICT, WUXI CITY

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

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

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



## 測試報告 Test Report

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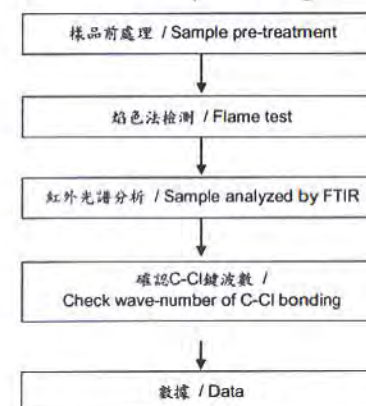
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### 聚氯乙烯物質判定分析流程圖 /

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

1)測試人員：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





號碼(No.) : KA/2011/91531 日期(Date) : 2011/10/03 頁數(Page) : 25 of 25

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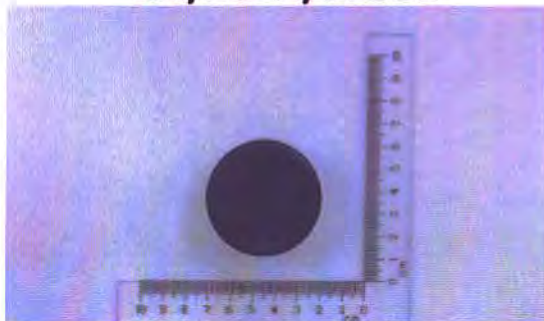
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\* 照片中如有箭頭標示, 則表示為實際檢測之樣品/部位。\*

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

**KA/2011/91531**



“ 報告結尾(End of Report) ”



## Test Report

No. SHAEC1120860307 A01 Date: 23 Mar 2012 Page 1 of 13

Heraeus (Zhaoyuan )Metal Materials Co.,Ltd/Heraeus Zhaoyuan (Changshu) Electronic Materials Co., Ltd.  
No.238 Linglong Road Zhaoyuan Shandong/Huangpujiang Road, Changshu Southeast Economic Development Zone, Changshu, Jiangsu

**THIS REPORT IS TO SUPERSEDE TEST REPORT NO.SHAEC1120860303 DATE: 2011/12/30**

The following sample(s) was/were submitted and identified on behalf of the clients as : GOLD BONDING WIRE  
HD

SGS Job No. : SP11-038762 - SH

Model No. : HD

Composition : GOLD

Date of Sample Received : 26 Dec 2011

Testing Period : 26 Dec 2011 - 30 Dec 2011

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).

Conclusion : Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of  
SGS-CSTC Ltd.

Fan Jingjie, JJ  
Approved Signatory

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## Test Report

No. SHAEC1120860307 A01 Date: 23 Mar 2012 Page 2 of 13

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA11-208603.002	Gold metal wire

Remarks :

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

### RoHS Directive 2011/65/EU

Test Method : With reference to IEC 62321:2008

- (1) Determination of Cadmium by ICP-OES.
- (2) Determination of Lead by ICP-OES.
- (3) Determination of Mercury by ICP-OES.
- (4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.
- (5) Determination of PBBs / PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	002
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	0	Negative
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tri bromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

No. SHAEC1120860307 A01

Date: 23 Mar 2012

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Test Item(s)	Limit	Unit	MDL	002
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

### Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II

(2) Spot-test:

Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;

(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:

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 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.

### Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	002
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

### Element(s)

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

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## Test Report

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Test Item(s)	Unit	MDL	002
Antimony (Sb)	mg/kg	10	ND
Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> )*	mg/kg	12	ND
Phosphorus (P)	mg/kg	20	ND

### Notes :

(1) \* Calculated concentration of Sb<sub>2</sub>O<sub>3</sub> is based on the identified Sb

### Hexabromocyclododecane (HBCDD)

Test Method : Determination of HBCDD by GC-MS based on IEC 62321:2008.

Test Item(s)	Unit	MDL	002
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

### Notes :

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD) is considered as a priority for risk evaluation and substance restriction.

### Tetrabromobisphenol A (TBBP-A)

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

Test Item(s)	Unit	MDL	002
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

### Phthalates

Test Method : Determination of phthalates by GC-MS based on EN 14372:2004.

Test Item(s)	Unit	MDL	002
Dibutyl Phthalate (DBP)	%	0.003	ND
Benzylbutyl Phthalate (BBP)	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	%	0.003	ND

### Notes :

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

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### PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

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

Test Item(s)	Limit	Unit	MDL	002
Perfluorooctane Sulfonates (PFOS) and related Acid, Metal Salt and Amide	1,000	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

#### Notes :

Max. limit specified by commission regulation (EU) No. 757/2010 (previously restricted under entry 53 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006)

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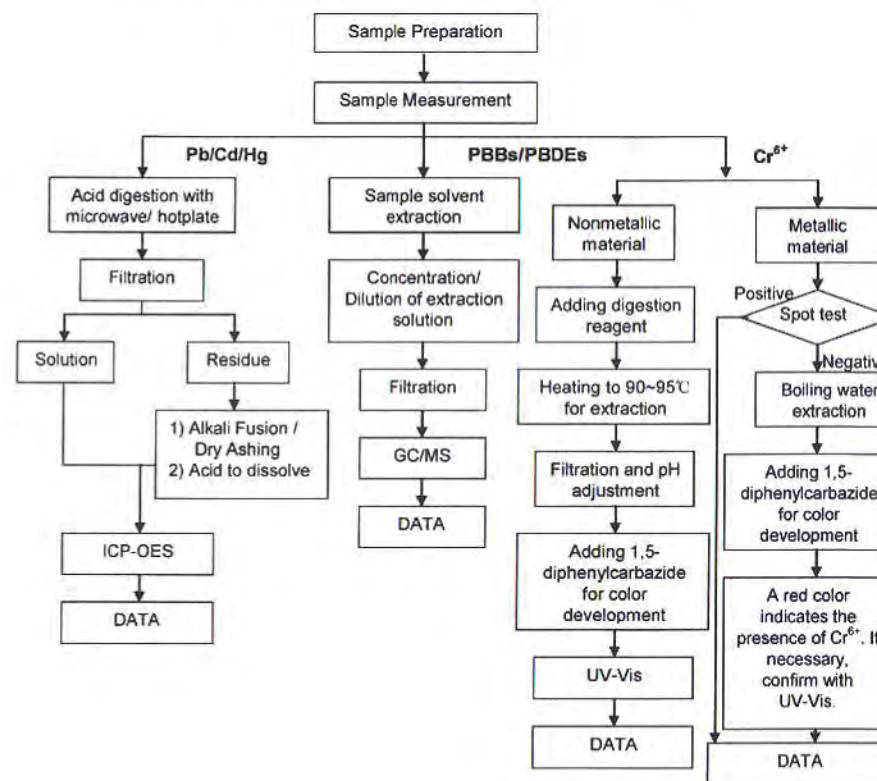
## Test Report

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### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)



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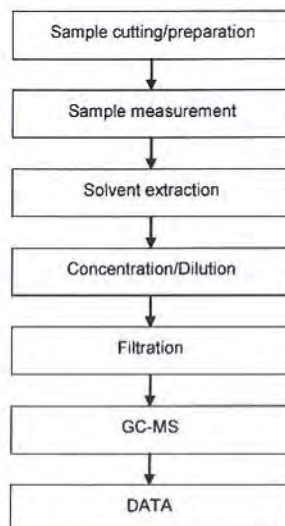
## Test Report

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### Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Elyn Yao
- 2) Name of the person in charge of testing: Rachel Zhang



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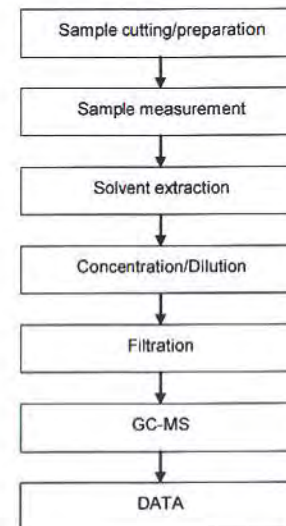
## Test Report

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### HBCDD Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Elim Lin



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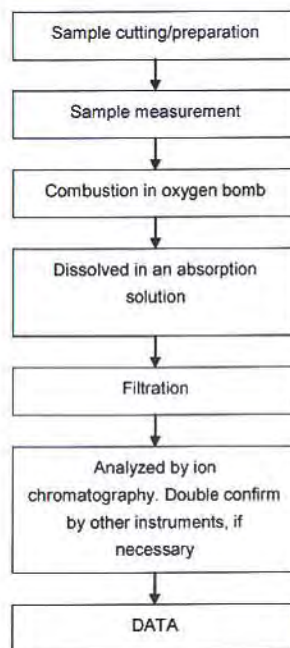
## Test Report

No. SHAEC1120860307 A01 Date: 23 Mar 2012

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### Halogen Testing Flow Chart

- 1) Name of the person who made testing: Sisily Yin
- 2) Name of the person in charge of testing: Daisy Gong



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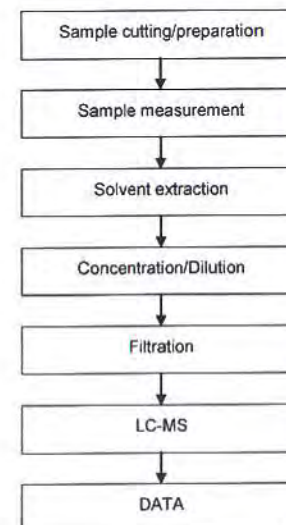
## Test Report

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### PFOS/PFOA Testing Flow Chart

- 1) Name of the person who made testing: Judy Li
- 2) Name of the person in charge of testing: Linda Li



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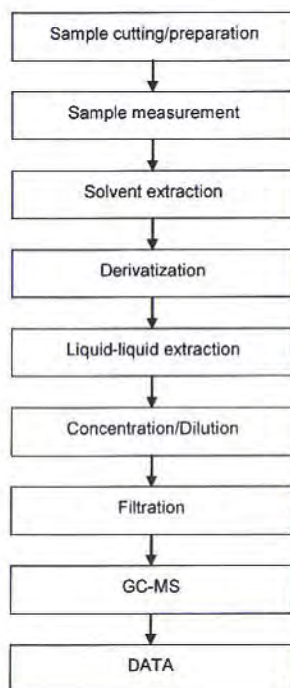
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### TBBP-A Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Elim Lin



## Test Report

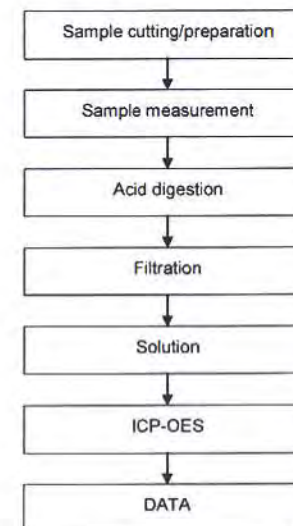
No. SHAEC1120860307 A01

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### Elements Testing Flow Chart

- 1) Name of the person who made testing: Yoyo Wang/ Jan Shi
- 2) Name of the person in charge of testing: Jeff Zhang



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Sample photo:



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## Test Report

No. SHAEC1201126601

Date: 13 Feb 2012

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NINGBO KANGQIANG ELECTRONICS CO.,LTD.

NO.988 JINYUAN ROAD YINZHOU INVESTMENT &amp; BUSINESS INCUBATION,NINGBO,CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : GOLD BONDING WIRE

SGS Job No. : SP12-001948 - SH

Composition : Au

Model No. : KG3

Sample May Cover : KG2,KG5,KGA3,KGA6,KGA7,KGA10

Date of Sample Received : 07 Feb 2012

Testing Period : 07 Feb 2012 - 10 Feb 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).

Conclusion : Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of  
SGS-CSTC Ltd.

Fan Jingjie, JJ  
Approved Signatory

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## Test Report

No. SHAEC1201126601

Date: 13 Feb 2012

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Test Results :

### Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-011266.001	Gold metal wire

Remarks :

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

### RoHS Directive 2011/65/EU

Test Method : With reference to IEC 62321:2008

- (1) Determination of Cadmium by ICP-OES.
- (2) Determination of Lead by ICP-OES.
- (3) Determination of Mercury by ICP-OES.
- (4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.
- (5) Determination of PBBs / PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tri bromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Item(s)	Limit	Unit	MDL	001
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

### Notes :

- (1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II.
- (2) ◊ = a. Positive means the presence of Cr(VI) on the tested areas;  
b. Negative means the absence of Cr(VI) on the tested areas

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.

### Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	001
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

### PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

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

Test Item(s)	Limit	Unit	MDL	001
Perfluorooctane Sulfonates (PFOS) and related Acid, Metal Salt and Amide	1,000	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

### Notes :

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Date: 13 Feb 2012

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Max. limit specified by commission regulation (EU) No. 757/2010 (previously restricted under entry 53 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006)

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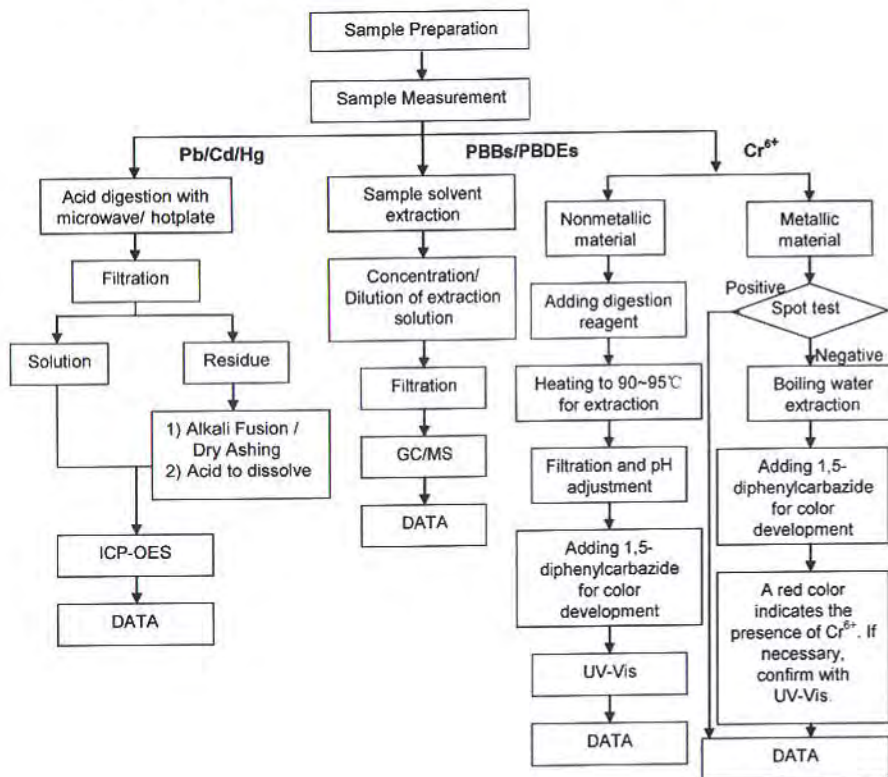
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## ATTACHMENTS

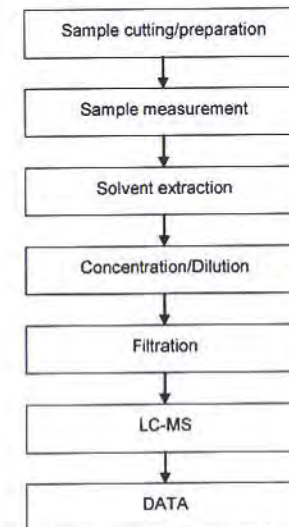
### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



## PFOS/PFOA Testing Flow Chart

- 1) Name of the person who made testing: Judy Li
- 2) Name of the person in charge of testing: Linda Li



## Test Report

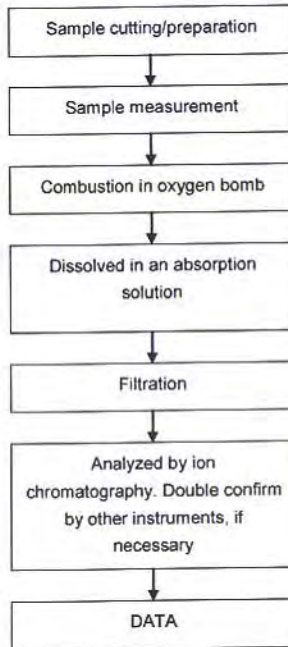
No. SHAEC1201126601

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### Halogen Testing Flow Chart

- 1) Name of the person who made testing: Sisily Yin
- 2) Name of the person in charge of testing: Daisy Gong



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Sample photo:



SGS authenticate the photo on original report only

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## Test Report

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Date : 2012/02/22

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

Sample Description : H9607  
 Sample Receiving Date : 2012/02/16  
 Testing Period : 2012/02/16 TO 2012/02/22

Test Requested : 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.

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

  
 Chenyu Kung / Operation Manager  
 Signed for and on behalf of  
 SGS TAIWAN LTD.  
 Chemical Laboratory – Taipei

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## Test Result(s)

PART NAME No.1

GRAY PASTE

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	mg/kg		-	n.d.
Monobromobiphenyl	mg/kg		5	n.d.
Dibromobiphenyl	mg/kg		5	n.d.
Tribromobiphenyl	mg/kg		5	n.d.
Tetrabromobiphenyl	mg/kg		5	n.d.
Pentabromobiphenyl	mg/kg		5	n.d.
Hexabromobiphenyl	mg/kg		5	n.d.
Heptabromobiphenyl	mg/kg		5	n.d.
Octabromobiphenyl	mg/kg		5	n.d.
Nonabromobiphenyl	mg/kg		5	n.d.
Decabromobiphenyl	mg/kg		5	n.d.
Sum of PBDEs	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.
Monobromodiphenyl ether	mg/kg		5	n.d.
Dibromodiphenyl ether	mg/kg		5	n.d.
Tribromodiphenyl ether	mg/kg		5	n.d.
Tetrabromodiphenyl ether	mg/kg		5	n.d.
Pentabromodiphenyl ether	mg/kg		5	n.d.
Hexabromodiphenyl ether	mg/kg		5	n.d.
Heptabromodiphenyl ether	mg/kg		5	n.d.
Octabromodiphenyl ether	mg/kg		5	n.d.
Nonabromodiphenyl ether	mg/kg		5	n.d.
Decabromodiphenyl ether	mg/kg		5	n.d.

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### Note :

1. mg/kg = ppm : 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

## Test Report

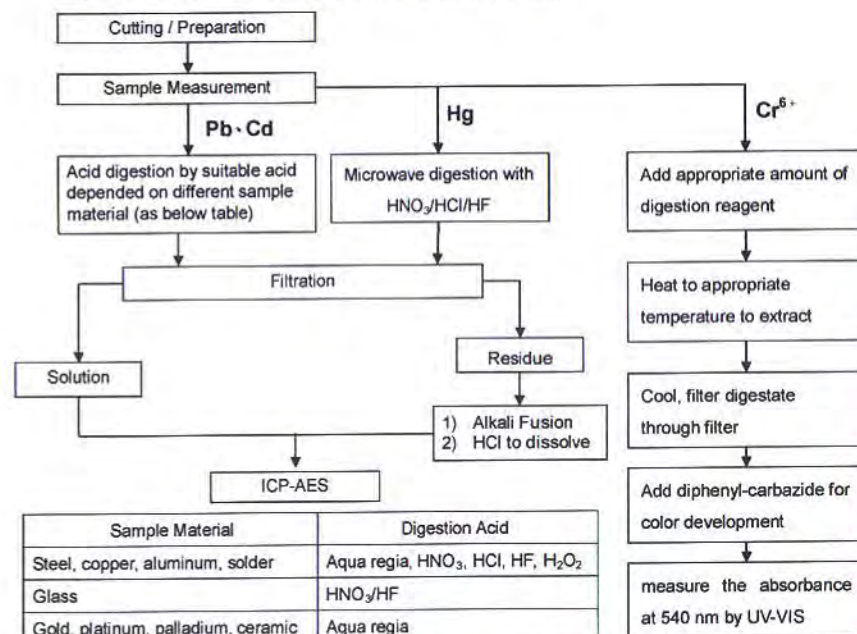
No. : CE/2012/23585

Date : 2012/02/22

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- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

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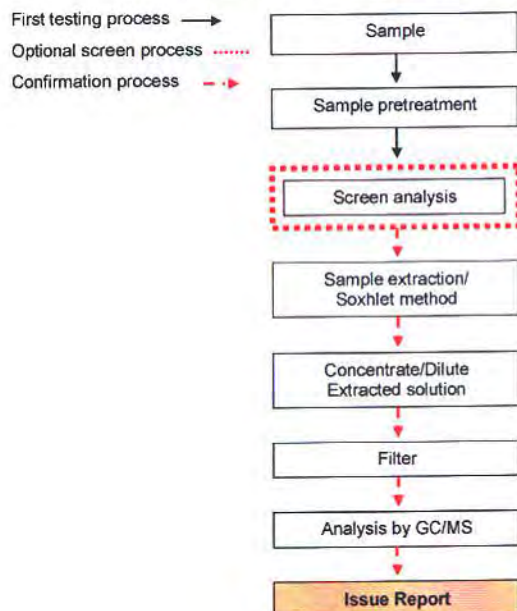
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## PBB/PBDE analytical FLOW CHART

- Name of the person who made measurement: Roman Wong
- 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. \*

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## Test Report

No. : CE/2011/94900

Date : 2011/10/05

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

Sample Description : H9607  
Sample Receiving Date : 2011/09/29  
Testing Period : 2011/09/29 TO 2011/10/05

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

## Test Report

No. : CE/2011/94900

Date : 2011/10/05

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NAMICS CORPORATION

3993 NIGORIKAWA, KITA-KU, NIIGATA-CITY 950-3131, JAPAN



### Test Result(s)

PART NAME No.1 : SILVER COLORED PASTE

Test Item (s):	Unit	Method	MDL	Result No.1
<b>Halogen</b>				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)			50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)			50	n.d.
Halogen-Iodine (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

Shin-jyh Chen  
SGS  
Shin-jyh Chen, Asst. Manager  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei

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## Test Report

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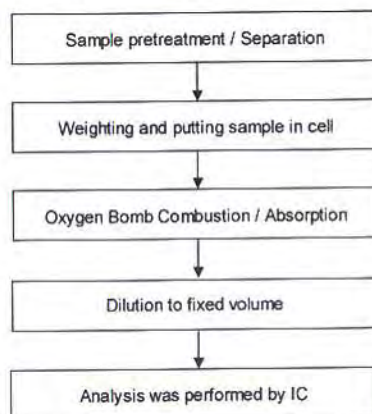
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## Analytical flow chart of halogen content

- 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. \*



\*\* End of Report \*\*

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TEL: 886-0212299 3279 / 886-0212299 3237 [www.sgs.com](http://www.sgs.com)

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## Test Report

No. SHAEC1113830501

Date: 21 Sep 2011

Page 1 of 5

SHUEN DER INDUSTRY(JIANGSU) CO.,LTD

NO.6 SHANGHAI ROAD, ZHANGJIAGANG FREE TRADE ZONE JIANGSU PROVINCE CHINA

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

SGS Job No. : SP11-026949 - SUZ

Main Substance : CAC92

Model No. : SOT

Date of Sample Received : 19 Sep 2011

Testing Period : 19 Sep 2011 - 21 Sep 2011

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).

Conclusion : Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of  
SGS-CSTC Ltd.

Fan Jingjie, JJ  
Approved Signatory

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SGS SA Standards Technical Service Shanghai Co., Ltd.  
Testing Center (SGS SA)

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## Test Report

No. SHAEC1113830501

Date: 21 Sep 2011

Page 2 of 5

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA11-138305.001	Copper metal

Remarks :

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

### RoHS Directive 2011/65/EU

Test Method : With reference to IEC 62321:2008

- (1) Determination of Cadmium by ICP-OES.
- (2) Determination of Lead by ICP-OES.
- (3) Determination of Mercury by ICP-OES.
- (4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.
- (5) Determination of PBBs / PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tri bromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Testing Center (SGS SA)

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中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

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## Test Report

No. SHAEC1113830501

Date: 21 Sep 2011

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Test Item(s)	Limit	Unit	MDL	001
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

### Notes :

- (1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II
- (2) ◊ Spot-test:  
Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;  
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:  
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 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

## Test Report

No. SHAEC1113830501

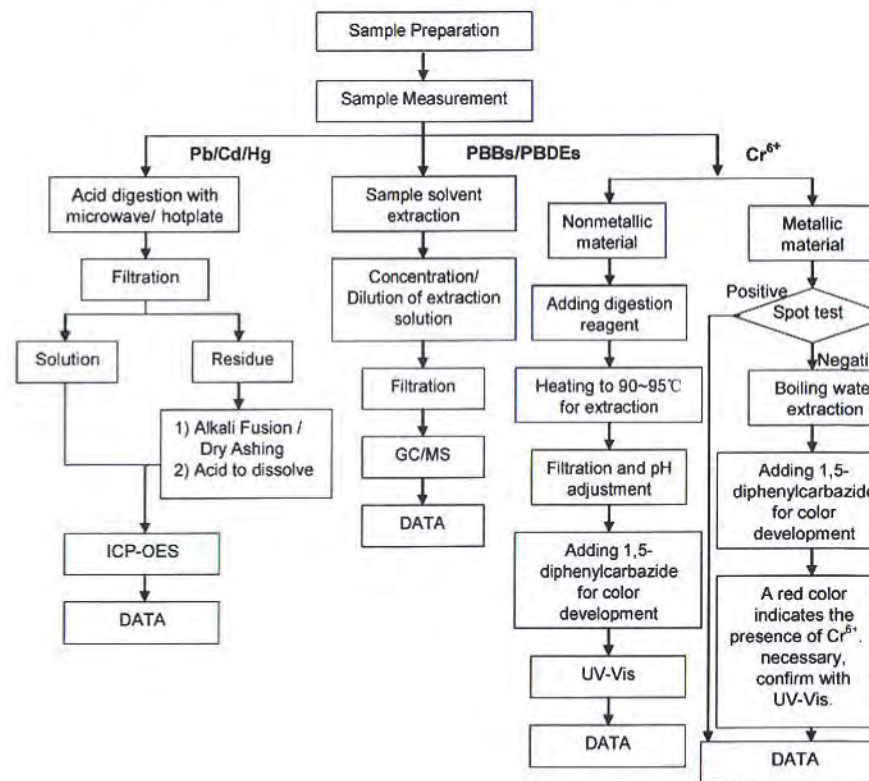
Date: 21 Sep 2011

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### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



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301251, 301252, 301253, 301254, 301255, 301256, 301257, 301258, 301259, 301260, 301261, 301262, 301263, 301264,

## Test Report

No. SHAEC1113830501

Date: 21 Sep 2011

Page 5 of 5

Sample photo:



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## Test Report

No. CANEC1103340401

Date: 01 Sep 2011

Page 1 of 8

GEJIU ZILI MINING&SMELTING CO.,LTD  
HUOGUDU,JIJIE TOWN,GEJIU CITY,HONGHE ZHOU,YUNNAN PROVINCE  
CHINA

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

SGS Job No. : 13332781 - GZ  
Model No. : Sn 99.90  
SGS Internal Reference No. : 2.1  
Date of Sample Received : 26 Aug 2011  
Testing Period : 26 Aug 2011 - 01 Sep 2011  
  
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).  
Conclusion : A:Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of  
SGS-CSTC Ltd.

Merry Lv  
Approved Signatory

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## Test Report

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### Test Results:

ID for specimen 1 : CAN11-033404.001  
Description for specimen 1 : Silvery metal block

### A:RoHS Directive 2011/65/EU

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium (Cd)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	100
Lead (Pb)	mg/kg	IEC 62321:2008, ICP-OES	46	2	1000
Mercury (Hg)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	1000
Hexavalent Chromium (CrVI) by boiling water extraction	-	IEC 62321:2008, UV-Vis	Negative	◇	#
Sum of PBBs	mg/kg	-	N.D.	-	1000
Monobromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Sum of PBDEs	mg/kg	-	N.D.	-	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	

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### Note:

1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit
4. ◇ = Spot-Test:  
 Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;  
 (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:  
 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 cm<sup>2</sup> sample surface area.  
 Storage conditions and production date of the tested sample are unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.
5. # = Positive indicates the presence of CrVI on the tested areas.  
 Negative indicates the absence of CrVI on the tested areas.
6. "-" = Not regulated

### B:Halogen

Test Item(s)	Unit	Test Method (Reference)	Result	MDL
Fluorine (F)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Chlorine (Cl)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Bromine (Br)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Iodine (I)	mg/kg	BS EN 14582:2007, IC	N.D.	50

### Note:

1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit

### C:PFOA & PFOS ( Perfluorooctanoic acid & Perfluorooctane sulfonates )

Test Item(s)	Unit	Test Method (Reference)	Result	MDL
Perfluorooctanoic acid (PFOA)	mg/kg	EPA 3550C: 2007, LC-MS	N.D.	10
Perfluorooctane sulfonates (PFOS)	mg/kg	EPA 3550C: 2007, LC-MS	N.D.	10
PFOS Acid				
PFOS Metal Salt				
PFOS Amide				

### Note:

1. mg/kg = ppm

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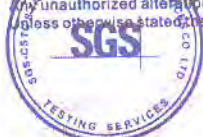
- 2. N.D. = Not Detected (< MDL)
- 3. MDL = Method Detection Limit

For reference: commission regulation (EU) No 757/2010 amending regulation (EC) No 850/2004:

(1) For the purposes of this entry, Article 4(1) (b) shall apply to concentrations of PFOS equal to or below 10 mg/kg (0,001 % by weight) when it occurs in substances or in preparations.

(2) For the purposes of this entry, Article 4(1) (b) shall apply to concentrations of PFOS in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0,1 % by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1µg /m<sup>2</sup> of the coated material.

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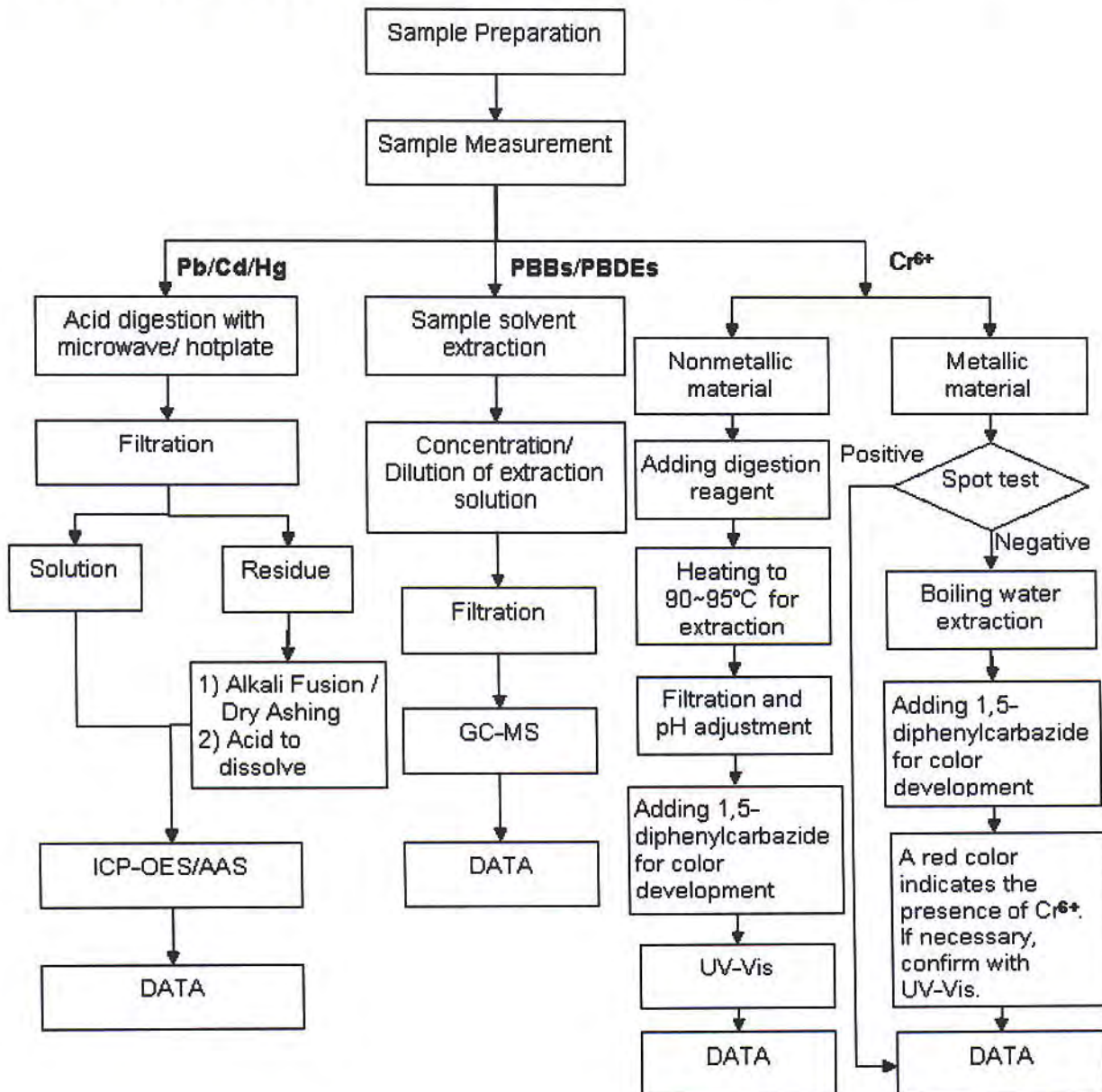
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### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bella Wang / Cutey Yu / Ross Zhan
- 2) Name of the person in charge of testing: Adams Yu / Ryan Yang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded).



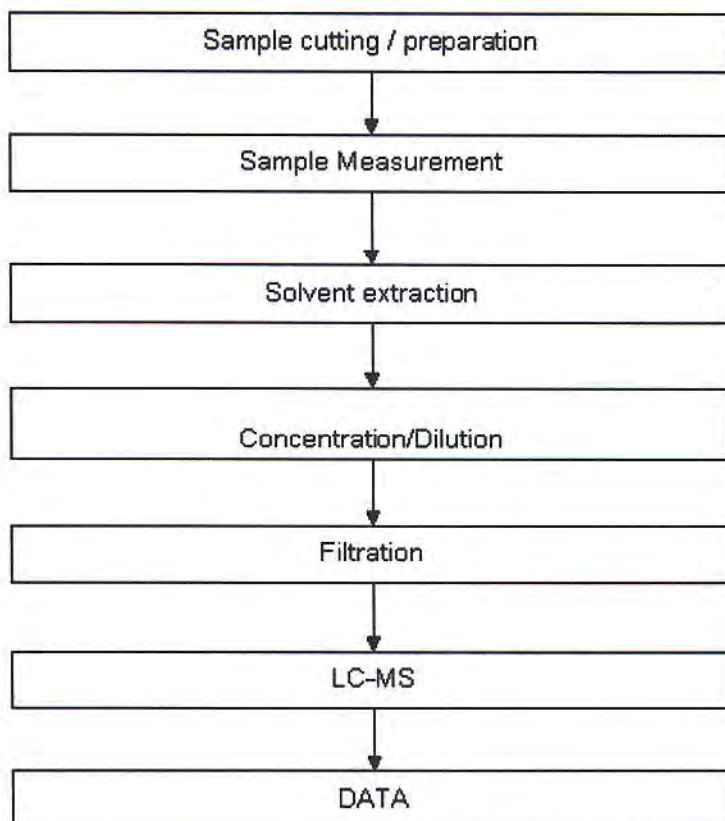
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## ATTACHMENTS

### PFOA / PFOS Testing Flow Chart

- 1) Name of the person who made testing: Cindy Huang
- 2) Name of the person in charge of testing: Ryan Yang



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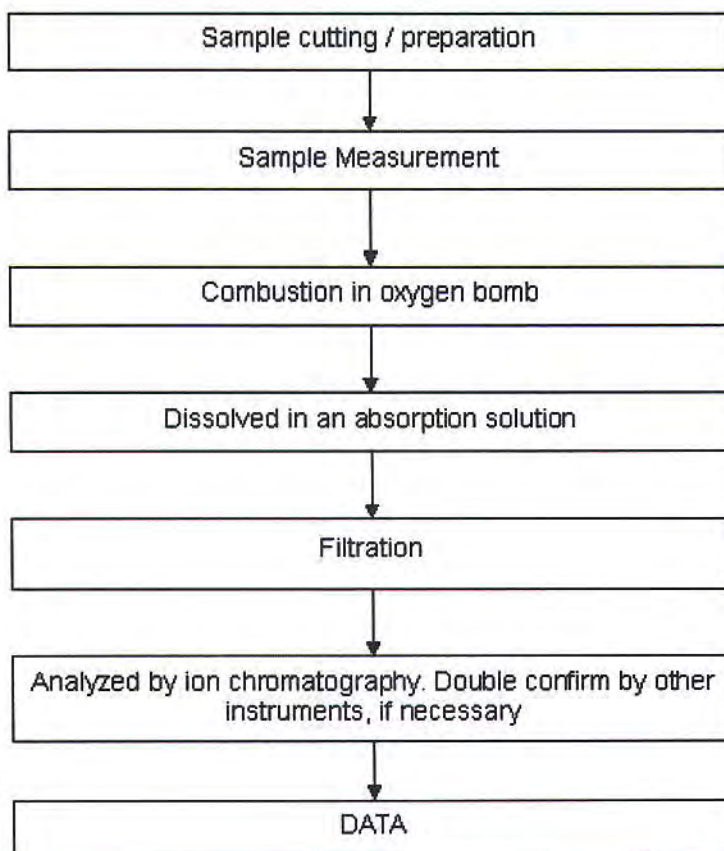




## ATTACHMENTS

### Halogen Testing Flow Chart

- 1) Name of the person who made testing: Liang Wang
- 2) Name of the person in charge of testing: Michelle Song



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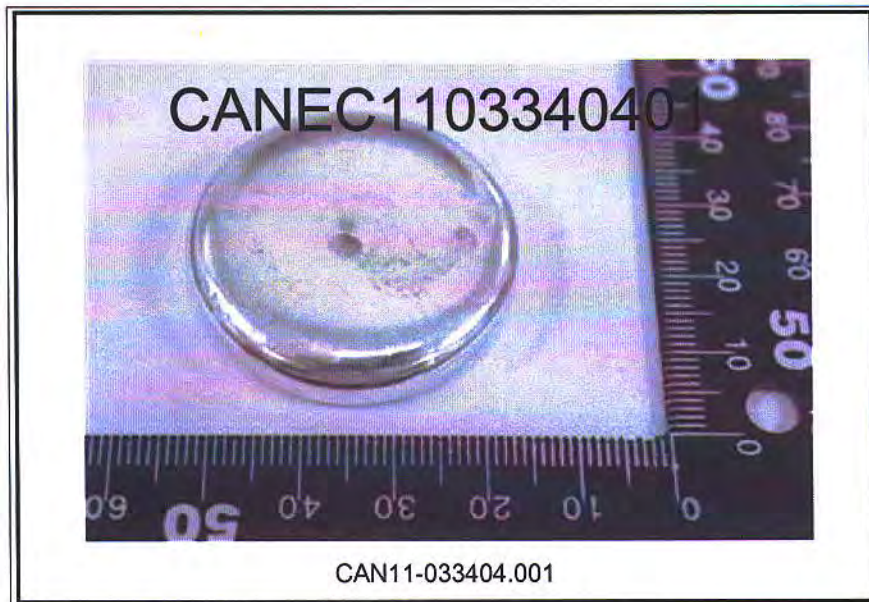
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Sample photo:



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