



## ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: Ultra-low Capacitance Protection Array, with zener

Product #: SP3003-04ATG

Issue Date: June 24, 2010

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (EU Directive 2002/95/EC)-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: \_\_\_\_\_

<Global EHS Coordinator>

(1) Parts, sub-materials and unit parts

This document covers the SP3003-04ATG 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	N/A	A194 Alloy	3-11
2	N/A	Nipdau Plating Material	12-20
3	2200D	Adhesive	21-25
4	EME-G600	Epoxy Molding Compound	26-33
5	N/A	Au Bonding Wire	34-39
6	N/A	Pure Tin	40-44

## 測試報告 Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 1 of 9



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以下測試樣品係由客戶送樣，且由客戶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 Cu ALLOY
收件日期(Sample Receiving Date)	: 2010/01/08
測試期間(Testing Period)	: 2010/01/08 TO 2010/01/14

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

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

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## Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 2 of 9



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### 測試結果(Test Results)

測試部位(PART NAME) NO.1 : 棕色 A194 Cu ALLOY (BROWN A194 Cu ALLOY)

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
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 用感應耦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, 用感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	34.8
汞 / Mercury (Hg)	mg/kg	參考IEC 62321: 2008方法, 用感應耦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 Spot test / boiling water extraction	**	參考IEC 62321: 2008方法, 用Spot test / boiling water extraction方法檢測. / With reference to IEC 62321: 2008 and performed by Spot test / boiling water extraction Method. (See Note 6)	0.02mg/kg with 50 cm <sup>2</sup> surface area	Negative
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.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS) PFOS — Acid PFOS — Metal Salt PFOS — Amide	μg/m <sup>2</sup>	參考US EPA 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	1	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 000335-67-1)	μg/m <sup>2</sup>	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.	1	n.d.

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# 測試報告

## Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 3 of 9



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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
<b>多溴聯苯總和 / Sum of PBBs</b>	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 / 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			5	n.d.
五溴聯苯 / Pentabromobiphenyl			5	n.d.
六溴聯苯 / Hexabromobiphenyl			5	n.d.
七溴聯苯 / Heptabromobiphenyl			5	n.d.
八溴聯苯 / Octabromobiphenyl			5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl			5	n.d.
<b>多溴聯苯醚總和 / Sum of PBDEs</b>	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.
<b>鹵素 / Halogen</b>				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 014762-94-8)	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.: 022537-15-1)	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.: 010097-32-2)	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.: 014362-44-8)	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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# 測試報告 Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 4 of 9



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SINGAPORE(ASM TECHNOLOGY SINGAPORE)**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. \*\* = Qualitative analysis (No Unit) 定性分析(無單位)
  6. Spot-test:
    - Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),
    - Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);
    - The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.
    - (當該測項無法確認時, 測試樣品可藉由boiling-water-extraction測試方法進一步確認)
- Boiling-water-extraction:
- Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),
  - Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);
  - the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.
  - 該溶液濃度 $\geq$ 0.02 mg/kg with 50 cm<sup>2</sup> (sample surface area)

**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並參照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 $\mu$ g/m<sup>2</sup>.  
(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 $\mu$ g/m<sup>2</sup> of the coated material.)

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# 測試報告

## Test Report

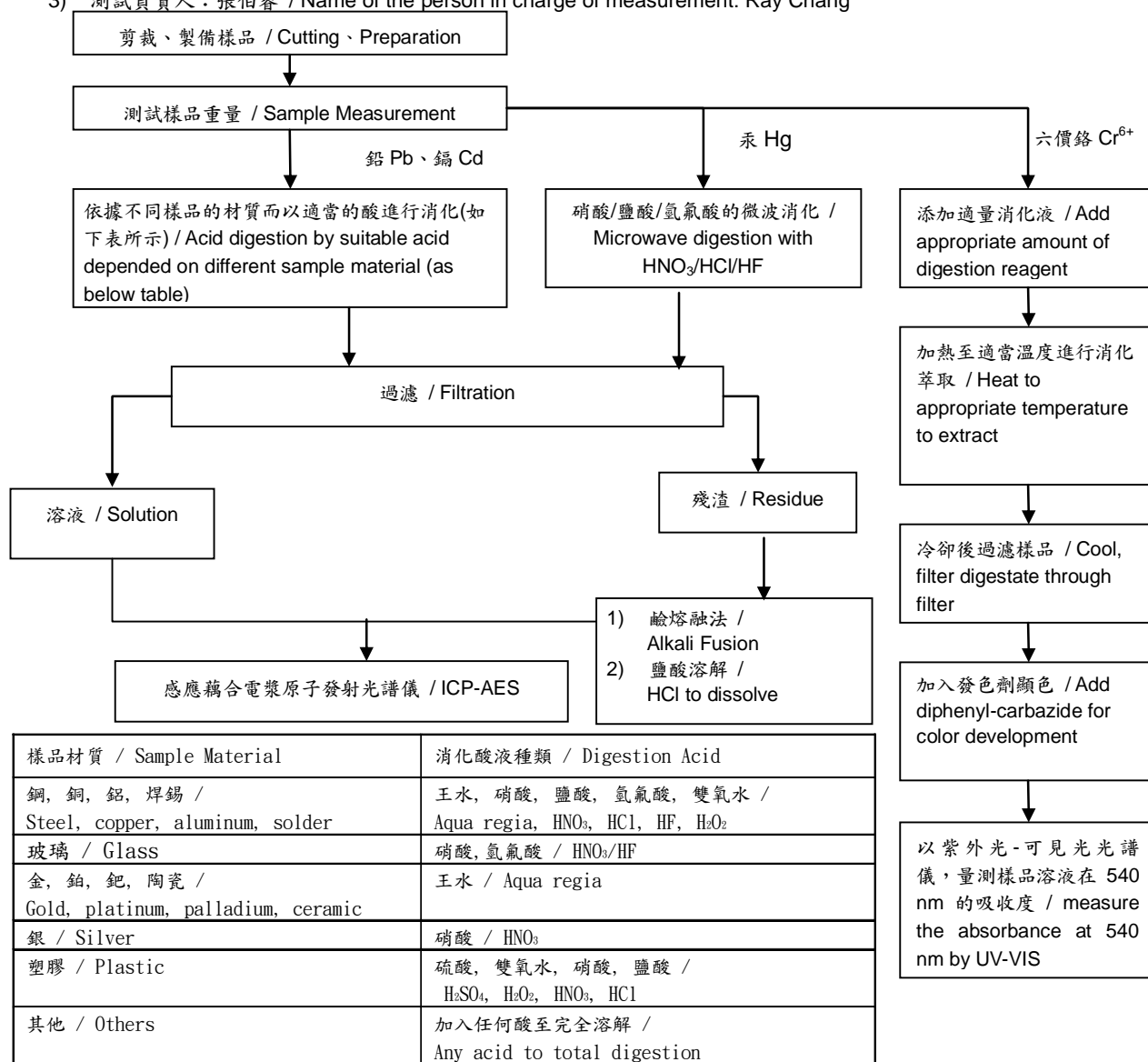
號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 5 of 9



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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：李宏明 / Name of the person who made measurement: Hungming Li
- 3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 6 of 9



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

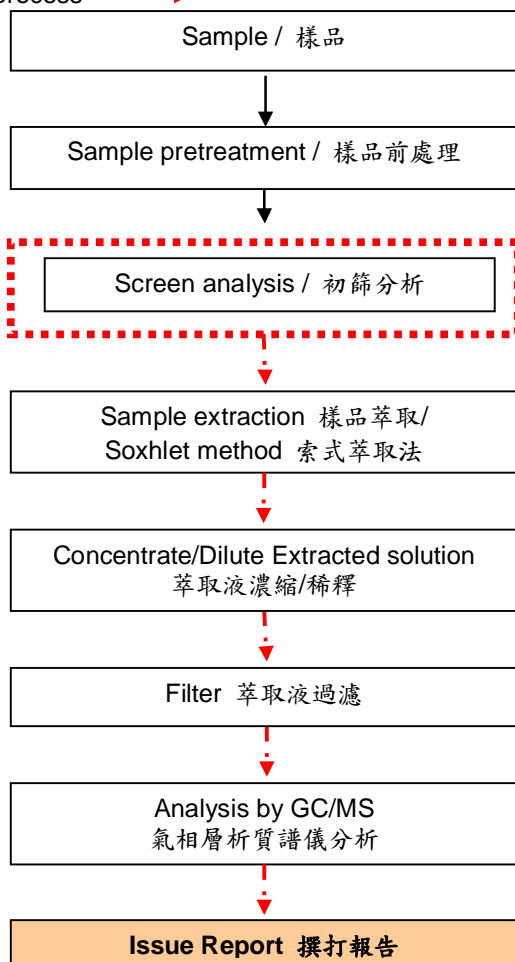
1)測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)測試負責人：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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# 測試報告 Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 7 of 9



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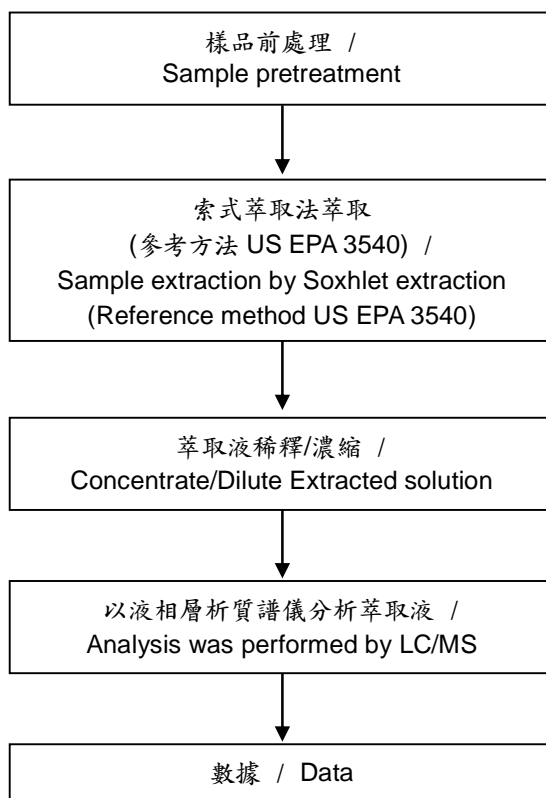
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## 全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 /

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



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# 測試報告 Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 8 of 9

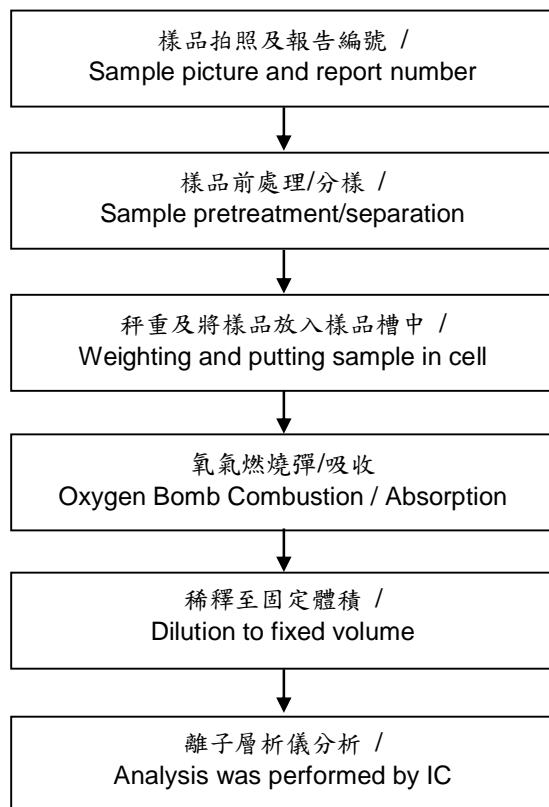


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## 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員：李宏明 / Name of the person who made measurement: Hungming Li
- 2) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 9 of 9



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\*\* 報告結尾(End of Report) \*\*

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號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 1 of 9



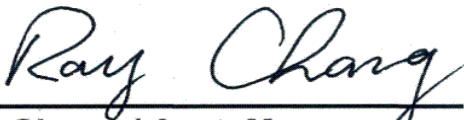
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以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as) :

樣品名稱(Sample Description)	:	NiPdAu PLATING MATERIAL
收件日期(Sample Receiving Date)	:	2010/01/08
測試期間(Testing Period)	:	2010/01/08 TO 2010/01/14

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).



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

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# 測試報告

## Test Report

號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 2 of 9



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### 測試結果(Test Results)

測試部位(PART NAME) NO.1 : 銀色 NiPdAu PLATING MATERIAL (SILVER NiPdAu PLATING MATERIAL)

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
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 用感應耦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, 用感應耦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.
汞 / Mercury (Hg)	mg/kg	參考IEC 62321: 2008方法, 用感應耦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 Spot test / boiling water extraction	**	參考IEC 62321: 2008方法, 用Spot test / boiling water extraction方法檢測. / With reference to IEC 62321: 2008 and performed by Spot test / boiling water extraction Method. (See Note 6)	0.02mg/kg with 50 cm <sup>2</sup> surface area	Negative
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.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS) PFOS — Acid PFOS — Metal Salt PFOS — Amide	μg/m <sup>2</sup>	參考US EPA 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	1	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 000335-67-1)	μg/m <sup>2</sup>	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.	1	n.d.

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# 測試報告

## Test Report

號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 3 of 9



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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
多溴聯苯總和 / Sum of PBBs	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 / 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			5	n.d.
五溴聯苯 / Pentabromobiphenyl			5	n.d.
六溴聯苯 / Hexabromobiphenyl			5	n.d.
七溴聯苯 / Heptabromobiphenyl			5	n.d.
八溴聯苯 / Octabromobiphenyl			5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl			5	n.d.
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.
鹵素 / Halogen				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 014762-94-8)	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.: 022537-15-1)	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.: 010097-32-2)	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.: 014362-44-8)	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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# 測試報告 Test Report

號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 4 of 9



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SINGAPORE(ASM TECHNOLOGY SINGAPORE)**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. \*\* = Qualitative analysis (No Unit) 定性分析(無單位)
  6. Spot-test:
    - Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),
    - Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);
    - The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.
    - (當該測項無法確認時, 測試樣品可藉由boiling-water-extraction測試方法進一步確認)
- Boiling-water-extraction:
- Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),
  - Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);
  - the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.
  - 該溶液濃度 $\geq$ 0.02 mg/kg with 50 cm<sup>2</sup> (sample surface area)

**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並參照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 $\mu$ g/m<sup>2</sup>.  
(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 $\mu$ g/m<sup>2</sup> of the coated material.)

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# 測試報告

## Test Report

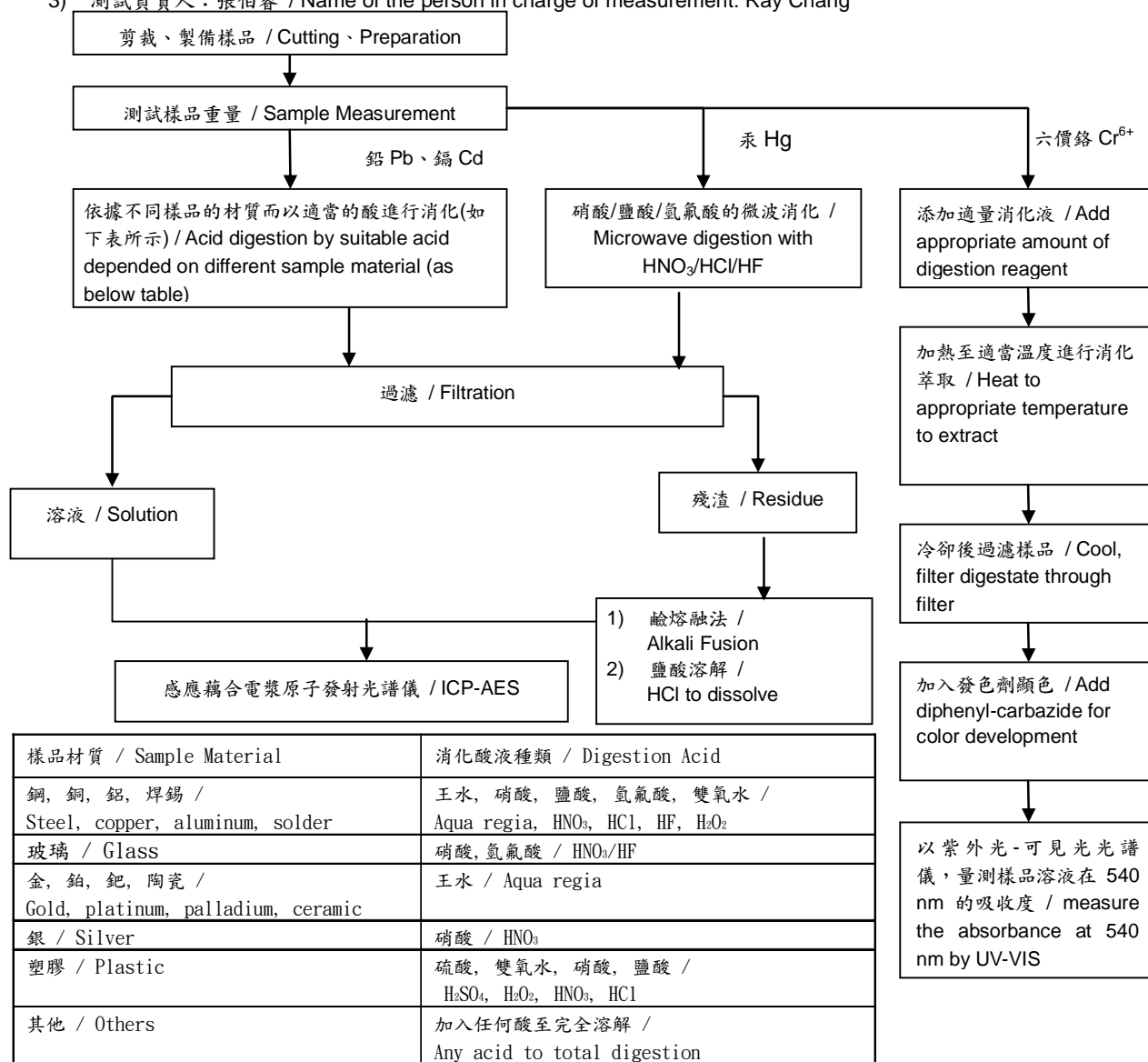
號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 5 of 9



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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：李宏明 / Name of the person who made measurement: Hungming Li
- 3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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## 測試報告 Test Report

號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 6 of 9



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

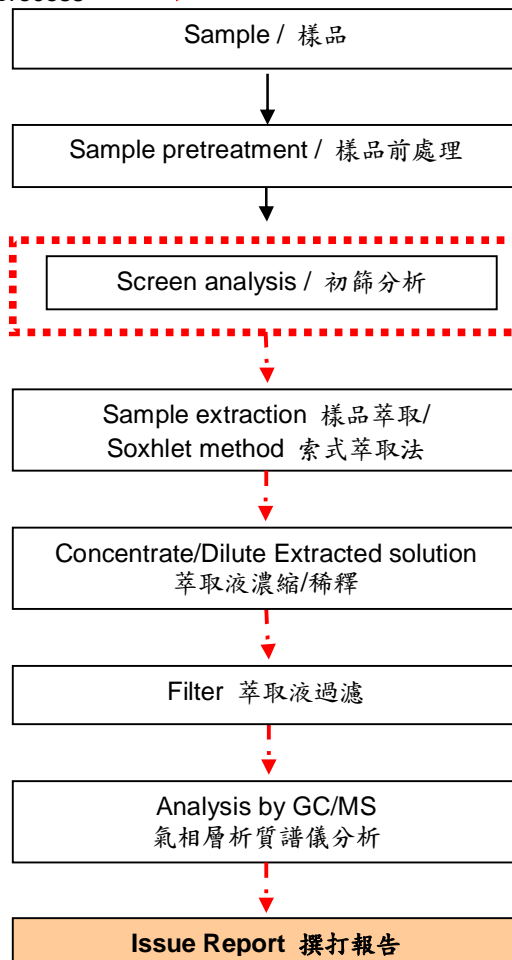
1)測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)測試負責人：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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號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 7 of 9



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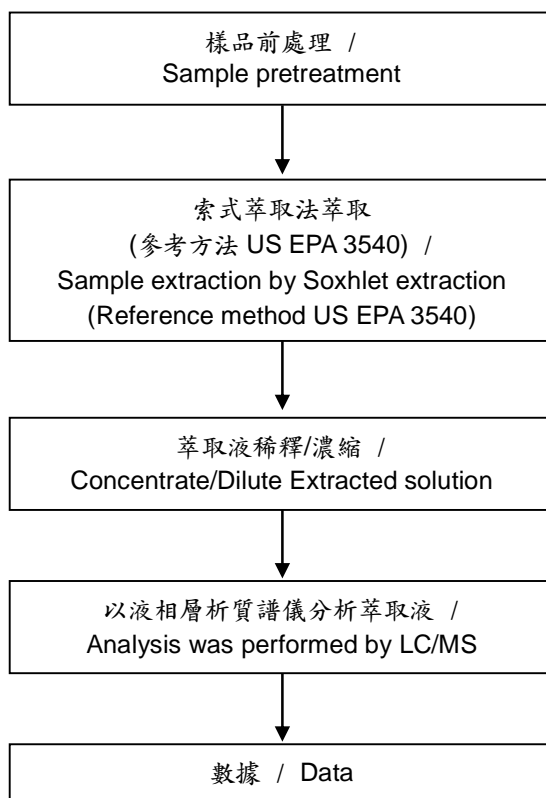
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## 全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 /

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



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號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 8 of 9

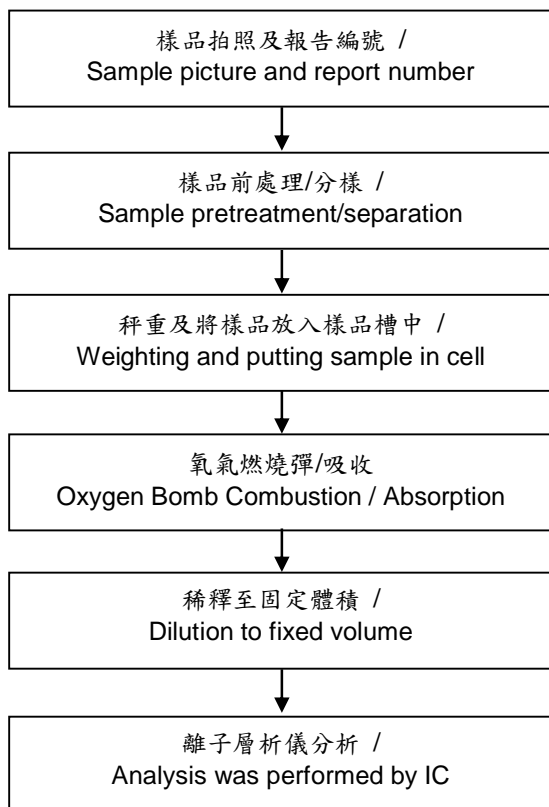


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## 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員：李宏明 / Name of the person who made measurement: Hungming Li
- 2) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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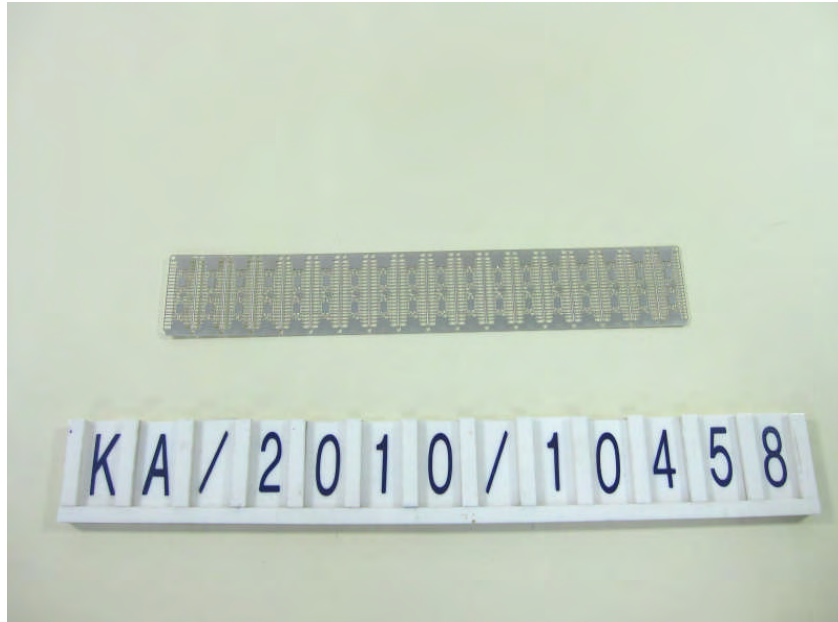
# 測試報告 Test Report

號碼(No.) : KA/2010/10458 日期(Date) : 2010/01/14 頁數(Page) : 9 of 9



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\*\* 報告結尾(End of Report) \*\*

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## Test Report

No. : CE/2009/B2959

Date : 2009/11/18

Page : 1 of 5



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

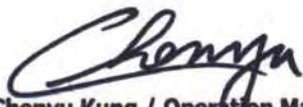
Sample Description : ADHESIVE  
Style/Item No. : 2200D  
Sample Receiving Date : 2009/11/11  
Testing Period : 2009/11/11 TO 2009/11/18

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.

Test Method : With reference to IEC 62321: 2008  
Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products.

- (1) Determination of Cadmium by ICP-AES.
- (2) Determination of Lead by ICP-AES.
- (3) Determination of Mercury by ICP-AES.
- (4) Determination of Hexavalent Chromium by UV/Vis Spectrometry.
- (5) Determination of PBB and PBDE by GC/MS.

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 Report

No. : CE/2009/B2959 Date : 2009/11/18

Page : 2 of 5

HENKEL

MANUFACTURING SITES: USA, KOREA, CHINA, UK, AND JAPAN.  
MAIN OFFICE: 20021 SUSANA ROAD, RANCHO DOMINGUEZ,  
CALIFORNIA, 90221, USA



Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result	MDL
		No.1	
Cadmium (Cd)	(1)	n.d.	2
Lead (Pb)	(2)	n.d.	2
Mercury (Hg)	(3)	n.d.	2
Hexavalent Chromium Cr(VI) by alkaline extraction	(4)	n.d.	2
<b>Sum of PBBs</b>	(5)	n.d.	-
Monobromobiphenyl		n.d.	5
Dibromobiphenyl		n.d.	5
Tribromobiphenyl		n.d.	5
Tetrabromobiphenyl		n.d.	5
Pentabromobiphenyl		n.d.	5
Hexabromobiphenyl		n.d.	5
Heptabromobiphenyl		n.d.	5
Octabromobiphenyl		n.d.	5
Nonabromobiphenyl		n.d.	5
Decabromobiphenyl		n.d.	5
<b>Sum of PBDEs</b>		n.d.	-
Monobromodiphenyl ether		n.d.	5
Dibromodiphenyl ether		n.d.	5
Tribromodiphenyl ether		n.d.	5
Tetrabromodiphenyl ether		n.d.	5
Pentabromodiphenyl ether		n.d.	5
Hexabromodiphenyl ether		n.d.	5
Heptabromodiphenyl ether		n.d.	5
Octabromodiphenyl ether		n.d.	5
Nonabromodiphenyl ether		n.d.	5
Decabromodiphenyl ether		n.d.	5

### TEST PART DESCRIPTION:

NO.1 : SILVER COLORED PASTE

- 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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## Test Report

No. : CE/2009/B2959

Date : 2009/11/18

Page : 3 of 5

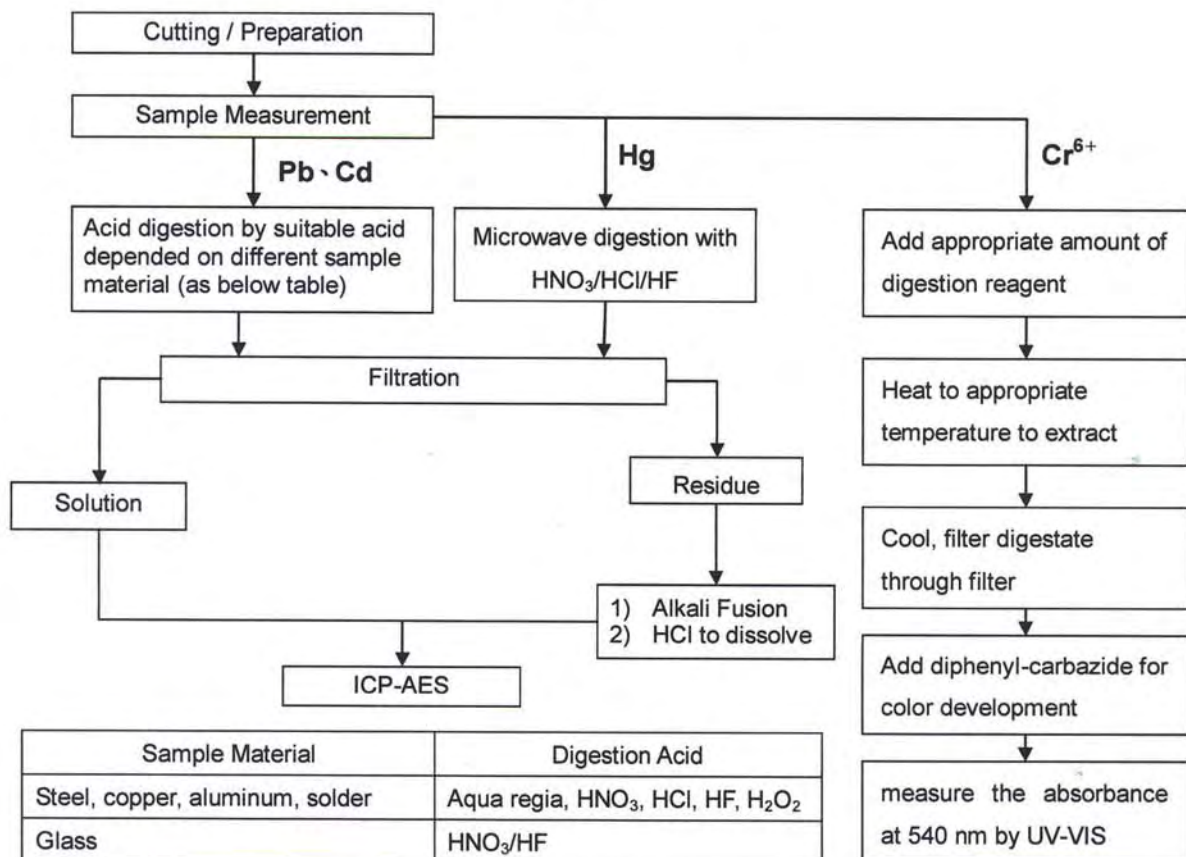
HENKEL

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MAIN OFFICE: 20021 SUSANA ROAD, RANCHO DOMINGUEZ,  
CALIFORNIA, 90221, USA



- 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



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## Test Report

No. : CE/2009/B2959

Date : 2009/11/18

Page : 4 of 5

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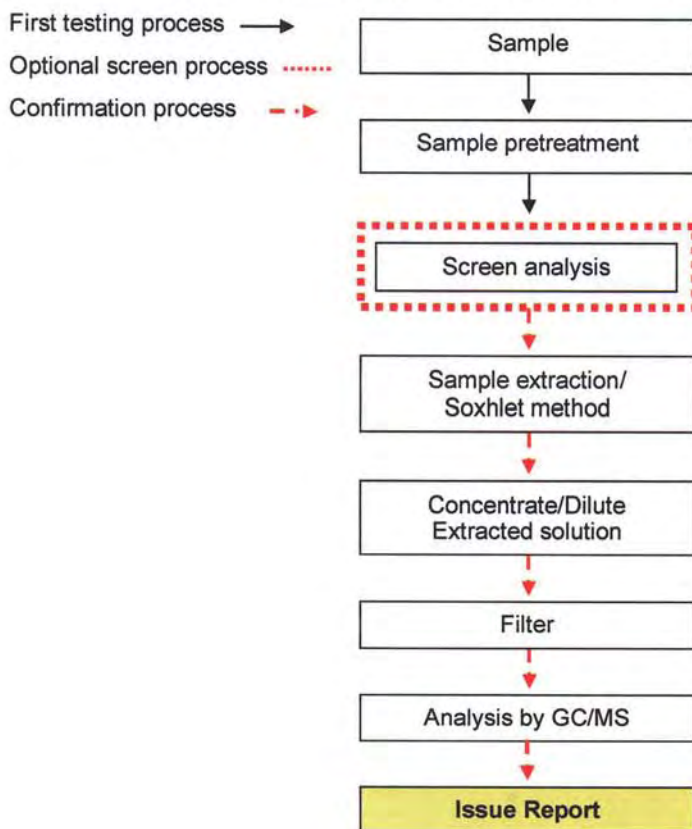
MAIN OFFICE: 20021 SUSANA ROAD, RANCHO DOMINGUEZ,

CALIFORNIA, 90221, USA



### PBB/PBDE analytical FLOW CHART

- 1) Name of the person who made measurement: Roman Wong
- 2) Name of the person in charge of measurement: Shinjyh Chen



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## Test Report

No. : CE/2009/B2959

Date : 2009/11/18

Page : 5 of 5

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\*\* End of Report \*\*

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台灣檢驗科技股份有限公司 Chemical-Taipei 33 WuChyuan Road, Wuku Industrial Zone, Taipei County, Taiwan / 台北縣五股工業區五權路33號 t + 886 (02)2299 3279 f + 886 (02)2299 3237 [www.sgs.com](http://www.sgs.com)

Member of the SGS Group (SGS SA)

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

Sample Description : EME-G600  
Type : Type  
Lot No. : 0032203  
Manufacturing Date : 3/17/10  
Contact Name : Chen Yi Jun  
Contact Tel : +65-67503782  
Contact Email : [yijun@sbs.sumibe.co.jp](mailto:yijun@sbs.sumibe.co.jp)

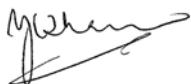
Sample Receiving Date : 15-Apr-10  
Testing Period : 15-Apr-10 to 26-Apr-10

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.

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

Conclusion : Based on the performed tests on submitted sample(s), the results **comply with** the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Laboratory Manager

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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# Test Report

No: 10193333(4)

Date: 26-Apr-10

Page 2 of 8

## Test Result(s):

Sample Description : EME-G600  
Type : Type  
Lot No. : 0032203  
Manufacturing Date : 3/17/10

Test Item(s):	Unit	Method	Results	MDL	RoHS Limit
Cadmium(Cd)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	n.d.	2	100
Lead (Pb)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	n.d.	2	1000
Mercury (Hg)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	n.d.	2	1000
Hexavalent Chromium (CrVI)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by UV/Vis Spectrometry	n.d.	2	1000
<b>Sum of PBBs</b>	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by GC/MS	<b>n.d.</b>	-	1000
Monobromobiphenyl	mg/kg		n.d.	5	-
Dibromobiphenyl	mg/kg		n.d.	5	-
Tribromobiphenyl	mg/kg		n.d.	5	-
Tetrabromobiphenyl	mg/kg		n.d.	5	-
Hexabromobiphenyl	mg/kg		n.d.	5	-
Pentabromobiphenyl	mg/kg		n.d.	5	-
Heptabromobiphenyl	mg/kg		n.d.	5	-
Octabromobiphenyl	mg/kg		n.d.	5	-
Nonabromobiphenyl	mg/kg		n.d.	5	-
Decabromobiphenyl	mg/kg		n.d.	5	-
<b>Sum of PBDEs</b>	mg/kg		<b>n.d.</b>	-	1000
Monobromodiphenyl ether	mg/kg		n.d.	5	-
Dibromodiphenyl ether	mg/kg		n.d.	5	-
Tribromodiphenyl ether	mg/kg		n.d.	5	-
Tetrabromodiphenyl ether	mg/kg		n.d.	5	-
Pentabromodiphenyl ether	mg/kg		n.d.	5	-
Hexabromodiphenyl ether	mg/kg		n.d.	5	-
Heptabromodiphenyl ether	mg/kg		n.d.	5	-
Octabromodiphenyl ether	mg/kg		n.d.	5	-
Nonabromodiphenyl ether	mg/kg		n.d.	5	-
Decabromodiphenyl ether ##	mg/kg		n.d.	5	-

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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# Test Report

No: 10193333(4)

Date: 26-Apr-10

Page 3 of 8

## Test Result(s):

Sample Description : EME-G600  
Type : Type  
Lot No. : 0032203  
Manufacturing Date : 3/17/10

Test Item(s):	Unit	Method	Results	MDL
Antimony (Sb)	mg/kg	With reference to US EPA3051A. Analysis was performed by ICP/AES	n.d.	2
Perfluorooctane Sulfonates (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
<b>Halogen</b>				
Halogen - Bromine (Br)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Chlorine (Cl)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Fluorine (F)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Iodine (I)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50

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

Remarks: Sample received was totally dissolved by pre-conditioning method.

Lab Analyst(s): Jenny

\* **Tested by SGS Lab ( Ref: CE/2010/43692)**

## PFOS Reference Information : Directive 2006/122/EC

- (1) 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) 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 1µg/m<sup>2</sup> of the coated material.

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- Note:
- (1) mg/kg = ppm ; 0.1wt% = 1000ppm
  - (2) n.d.= Not Detected
  - (3) MDL = Method Detection Limit
  - (4) ## = The exemption of DecaBDE in polymeric application according 2005/717/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008.
  - (5) "-" = Not regulated
  - (6) \* : Exceeds limit

Remarks: Sample received was totally dissolved by preconditioning method.  
Lab Analyst(s): Jay, Ruihan and Jojo

**Sample photo:**

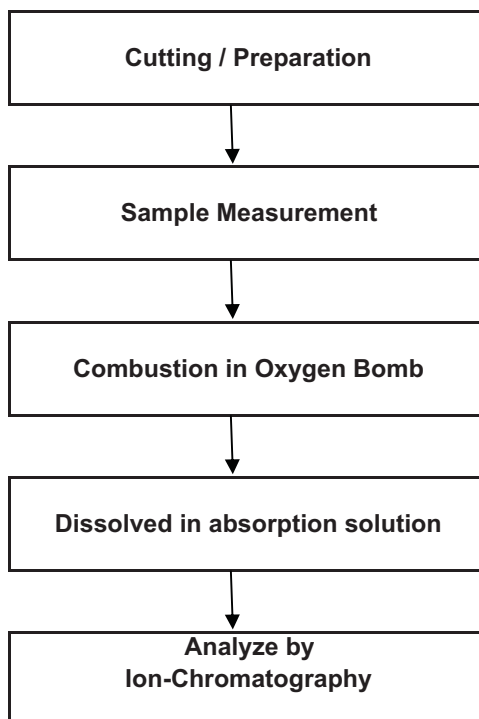
Sample Description	:	EME-G600
Type	:	Type
Lot No.	:	0032203
Manufacturing Date	:	3/17/10
Sample Submission Qty	:	50gm

SGS authenticate the photo on original report only



Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

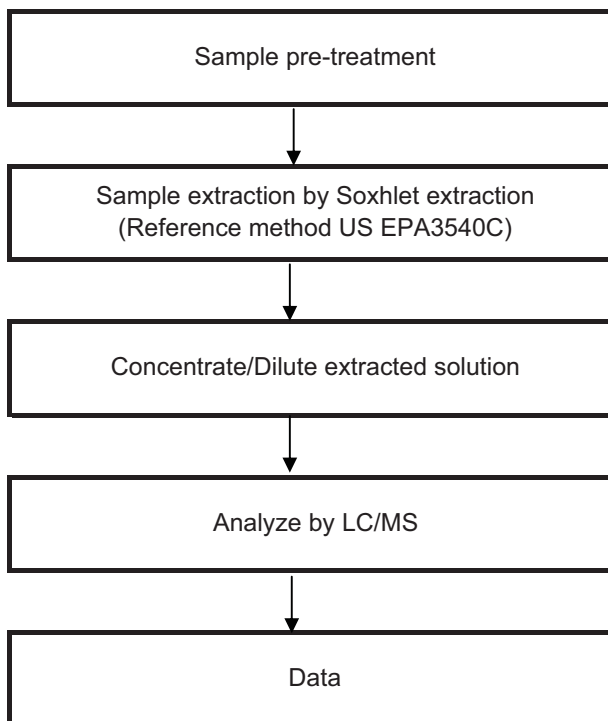
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**Process Flow of BS EN 14582 (Halogen Analysis)**


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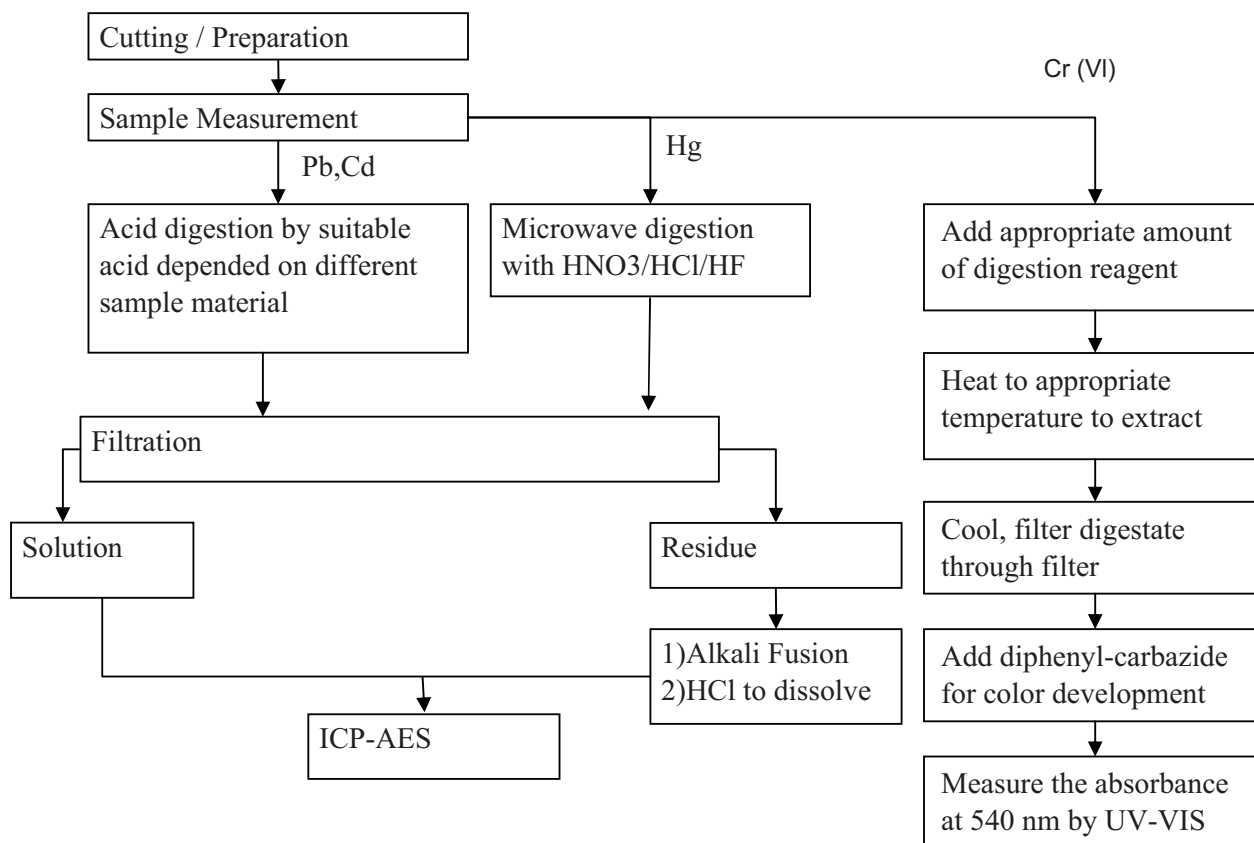
**Process Flow of PFOS/PFOA**



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### Process Flow of IEC 62321 (Pb, Cd, Hg & Cr<sup>6+</sup>)



Remarks: Sample received was totally dissolved by preconditioning method. (CrVI method excluded)

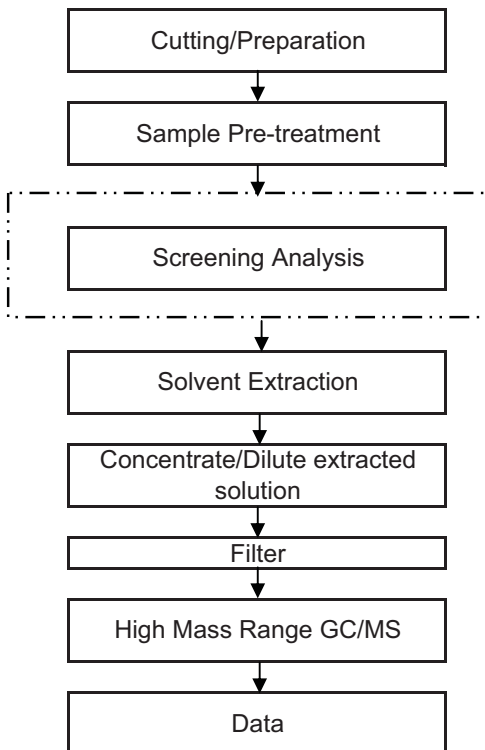
Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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### Process Flow of PBBs and PBDEs by GC/MS (IEC 62321)

First Testing Process → Optional screen process ..... Confirmation process ...→



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

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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## Test Report

No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 1 of 6

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



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

Sample Description : AU BONDING WIRE  
Sample Receiving Date : 2009/12/15  
Testing Period : 2009/12/15 TO 2009/12/18

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.

Test Method : With reference to IEC 62321: 2008  
Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products.

- (1) Determination of Cadmium by ICP-AES.
- (2) Determination of Lead by ICP-AES.
- (3) Determination of Mercury by ICP-AES.
- (4) Determination of Hexavalent Chromium by UV/Vis Spectrometry.
- (5) Determination of PBB and PBDE by GC/MS.

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

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

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# Test Report

No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 2 of 6

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



Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result	MDL
		No.1	
Cadmium (Cd)	(1)	n.d.	2
Lead (Pb)	(2)	n.d.	2
Mercury (Hg)	(3)	n.d.	2
Hexavalent Chromium Cr(VI) by alkaline extraction	(4)	n.d.	2
Sum of PBBs	(5)	n.d.	-
Monobromobiphenyl		n.d.	5
Dibromobiphenyl		n.d.	5
Tribromobiphenyl		n.d.	5
Tetrabromobiphenyl		n.d.	5
Pentabromobiphenyl		n.d.	5
Hexabromobiphenyl		n.d.	5
Heptabromobiphenyl		n.d.	5
Octabromobiphenyl		n.d.	5
Nonabromobiphenyl		n.d.	5
Decabromobiphenyl		n.d.	5
Sum of PBDEs		n.d.	-
Monobromodiphenyl ether		n.d.	5
Dibromodiphenyl ether		n.d.	5
Tribromodiphenyl ether		n.d.	5
Tetrabromodiphenyl ether		n.d.	5
Pentabromodiphenyl ether		n.d.	5
Hexabromodiphenyl ether		n.d.	5
Heptabromodiphenyl ether		n.d.	5
Octabromodiphenyl ether		n.d.	5
Nonabromodiphenyl ether		n.d.	5
Decabromodiphenyl ether		n.d.	5

## TEST PART DESCRIPTION:

NO.1 : GOLD AU BONDING WIRE

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SGS Taiwan Ltd.  
台灣檢驗科技股份有限公司

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## Test Report

No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 3 of 6

TANAKA ELECTRONICS (MALAYSIA) SDN. BHD.  
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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
  5. This is the additional test report of KA/2009/C1254 which was issued on 2009/12/18.  
Please refer to KA/2009/C1254 for original information.

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## Test Report

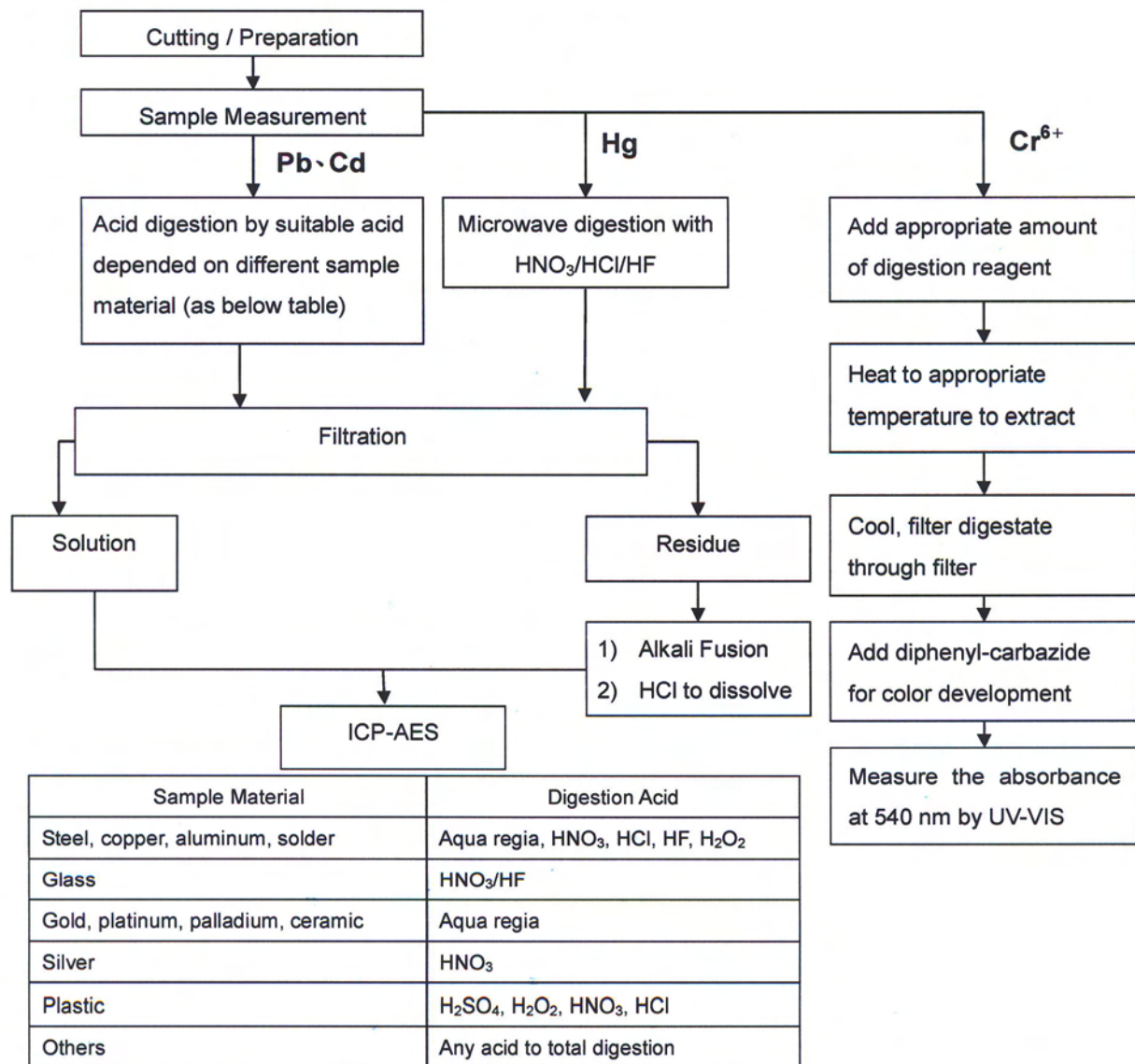
No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 4 of 6

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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: Hungming Li
- 3) Name of the person in charge of measurement: Ray Chang



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## Test Report

No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 5 of 6

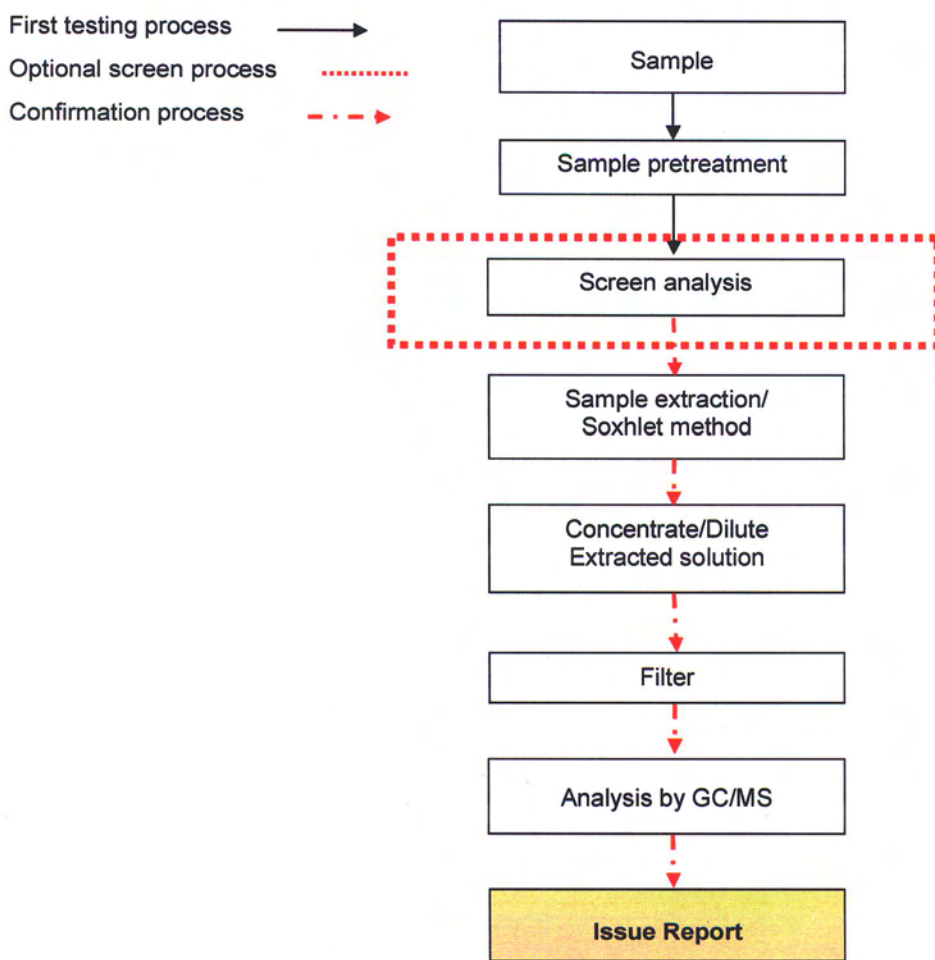
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### PBB/PBDE analytical FLOW CHART

1) Name of the person who made measurement: Anson Tsao

2) Name of the person in charge of measurement: Ray Chang



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## Test Report

No. : KA/2009/C1254A-06 Date : 2009/12/18

Page : 6 of 6

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

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**Test Report**

1820737

Date : 18-May-2010

Page 1 of 5

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

Sample Description : Tin  
 Sample No. : 1865971  
 Sample Condition : As per attached photograph  
 Part No. : Sn 100A  
 Batch/Lot No. : 497  
 Sample Receiving Date : 11-May-2010  
 Testing Period : 11-May-2010 to 18-May-2010  
 Test Requested : In accordance with the RoHS Directive 2002/95/EC and its amendment directives  
 Test Method : (1) With reference to IEC 62321:2008 for Lead content, Analysis was performed by ICP-OES.  
 (2) With reference to IEC 62321:2008 for Cadmium content, Analysis was performed by ICP-OES.  
 (3) With reference to IEC 62321:2008 for Mercury content, Analysis was performed by ICP-OES.  
 (4) With reference to IEC 62321:2008 for Hexavalent Chromium by Colorless and Colored Chromate Coating on Metals/ Colorimetric Method, Analysis was performed by UV-Vis spectrometry.  
 (5) With reference to IEC 62321:2008 for PBB/PBDE content, Analysis was performed by GC/MS.  
 Test Results : Please refer to next page.

## CONCLUSION

Based on the performed tests on submitted samples, the result comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of  
SGS (Thailand) Limited



Pornpana Lirathpong  
Hardlines Testing Manager

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# Test Report

1820737

Date : 18-May-2010

Page 2 of 5

## TEST RESULTS

Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Lead (Pb)	(1)	34	2	1000
Cadmium (Cd)	(2)	n.d.	2	100
Mercury (Hg)	(3)	n.d.	2	1000
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional)	(4)	Negative	-	#
sum of PBBs	(5)*	n.d.	-	1000
Monobromobiphenyl		n.d.	5	-
Dibromobiphenyl		n.d.	5	-
Tribromobiphenyl		n.d.	5	-
Tetrabromobiphenyl		n.d.	5	-
Pentabromobiphenyl		n.d.	5	-
Hexabromobiphenyl		n.d.	5	-
Heptabromobiphenyl		n.d.	5	-
Octabromobiphenyl		n.d.	5	-
Nonabromobiphenyl		n.d.	5	-
Decabromobiphenyl		n.d.	5	-

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TEST RESULTS

Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Sum of PBDEs	(5)*	n.d.	-	1000
Monobromodiphenyl ether		n.d.	5	-
Dibromodiphenyl ether		n.d.	5	-
Tribromodiphenyl ether		n.d.	5	-
Tetrabromodiphenyl ether		n.d.	5	-
Pentabromodiphenyl ether		n.d.	5	-
Hexabromodiphenyl ether		n.d.	5	-
Heptabromodiphenyl ether		n.d.	5	-
Octabromodiphenyl ether		n.d.	5	-
Nonabromodiphenyl ether		n.d.	5	-
Decabromodiphenyl ether		n.d.	5	-

Test Part Description

Result (1) metal

Note :

(a) mg/kg = ppm ; 0.1 wt% = 1000 ppm

(b) The results shown are based on the total weight of dry sample

(c) n.d. = Not Detected

(d) MDL = Method Detection Limit

(e) The exemption of DecaBDE in polymeric application according 2005/17/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008

(f) 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 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 area.

(g) # = Positive indicates the presence of Hexavalent Chromium on the areas and result be regarded as conflict with RoHS requirement.

Negative indicates the absence of CrVI on the tested areas and result be regarded as no conflict with RoHS requirement.

(h) "-" = Not regulated

"Test(s) marked \* on this Report are not included in the TISI Accreditation Schedule for our Laboratory"

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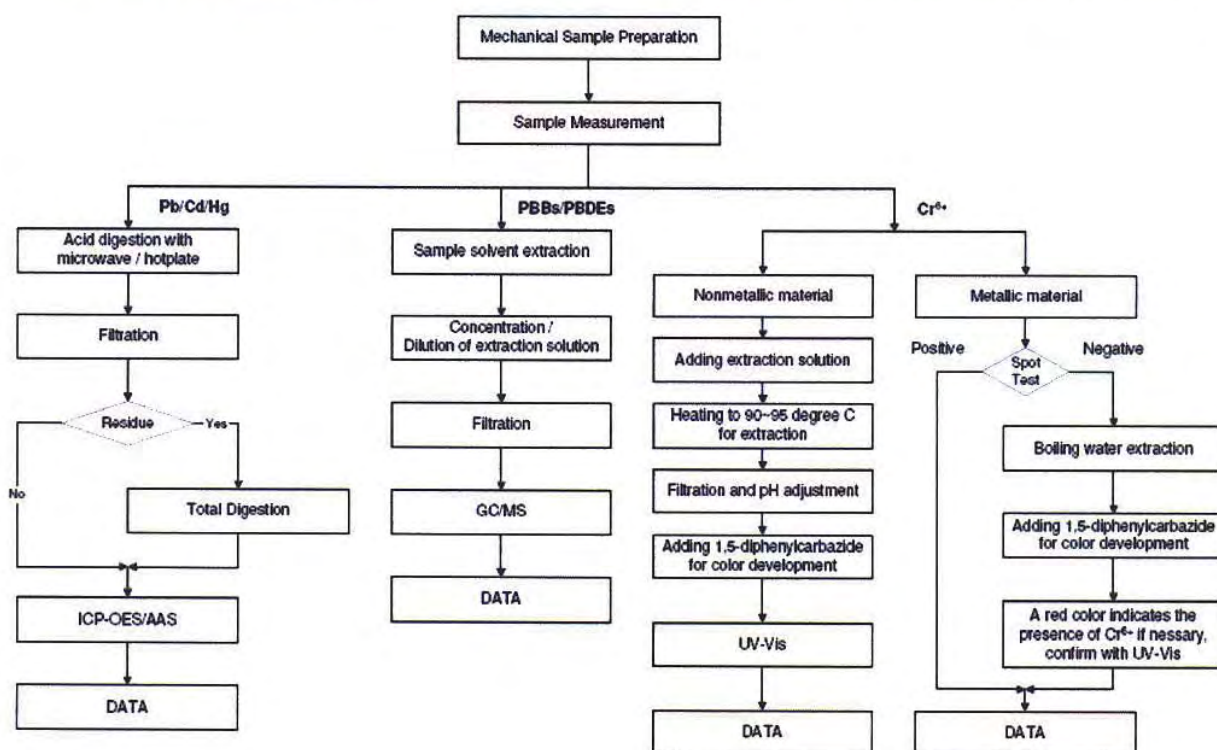
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Flow Chart for RoHS : Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing

1. Operator : Siam Polarwut
2. Section Chief : Laddawan Uranpitr
3. The sample was dissolved totally by pre-conditioning method according to below flowchart. (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)



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Test Report

1820737

Date : 18-May-2010

Page 5 of 5

## SAMPLE/ATTACHMENT PICTURE



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