

ICP Test Report Certification Packet

Company name:	Littelfuse, Inc.	
Product Series:	4 Ch 8KV 5V TVS Diode Arra	ay SOT23-6
Product #:	SP3012-04HTG	
Issue Date:	September 5, 2013	
2011/65/EU)-restricted so packing/packaging material In addition, it is hereby refor unit parts, the packing/	ubstance nor such use, for ma als, and for additives and the like ported to you that the parts and s	her RoHS (EU Directive 2002/95/EC sterials to be used for unit parts, for the in the manufacturing processes. Sub-materials, the materials to be used ditives and the like in the manufacturing
		JUFF H. CABILAN HS Engineer>
	ers the 4 Ch 8KV 5V TVS Dic nufactured by Littelfuse, Inc.	ode Array SOT23-6 RoHS-Compliant
Please see Tab		
(2) The ICP data on all I	neasurable substances ropriate pages as identifed in Tal	ble 1
Remarks : .		



Table 1: List of Raw Materials covered by this report

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	NA	IC Wafer	3-9
2	A194	Lead Frame	10-35
3	8006NS	Die Attach Adhesive	36-49
4	NA	Wire	50-62
5	EME-G600	Epoxy molding compound	63-71
6	SN100A	Pure Tin	72-81



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Test Report

No.: CE/2012/C1068F

Date: 2013/01/18

Page: 1 of 7

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

Sample Description

: IC WAFER

Style/Item No.

AI PROCESS

Sample Receiving Date

: 2012/12/07

Testing Period

2012/12/07 TO 2012/12/18

Test Requested

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

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

submitted sample.

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

contents in the submitted sample.

Test Method

Please refer to next page(s).

Test Result(s)

Please refer to next page(s).



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Test Result(s)

PART NAME No.1

: MULTICOLOR WAFER

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



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Test Item(s)	11644		MDI	Result
	Unit	Method	MDL	No.1
Halogen				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)			50	n.d.
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)		With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
Halogen-lodine (I) (CAS No.: 14362-44-8)			50	n.d.

Note:

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. " - " = Not Regulated



No.: CE/2012/C1068F

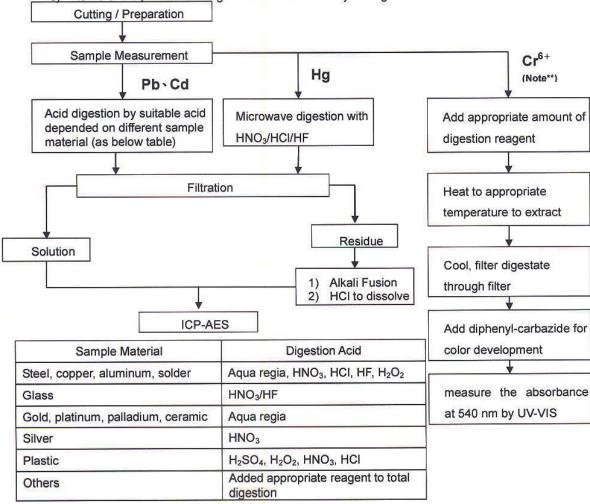
Date: 2013/01/18

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

2) Name of the person who made measurement: Climbgreat Yang

Name of the person in charge of measurement: Troy Chang



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

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



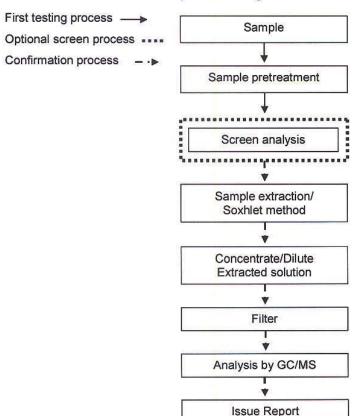
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PBB/PBDE analytical FLOW CHART

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



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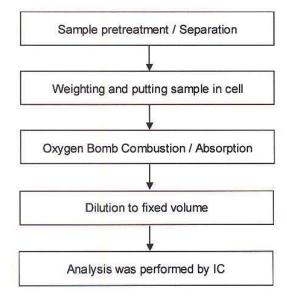
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Analytical flow chart of halogen content

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



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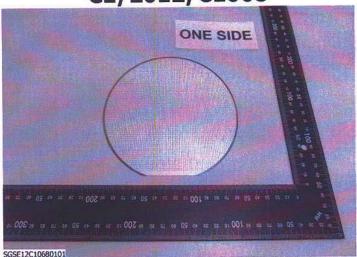
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Date: 2013/01/18

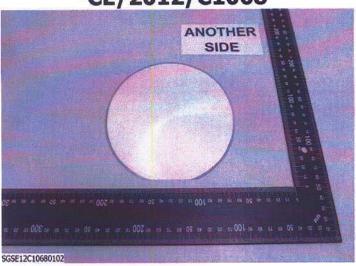
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

CE/2012/C1068



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** End of Report **

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測試報告 **Test Report**

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

ASM HK

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

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

樣品名稱(Sample Description)

收件日期(Sample Receiving Date)

測試期間(Testing Period)

送樣廠商(Sample Submitted By)

: A194/C194 Cu ALLOY

: 2012/12/25

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

: ASM HK

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

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



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ASM HK

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2

測試結果(Test Results)

測試部位(PART NAME) NO.1

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

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

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

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测試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	结果 (Result) NO.1
氣化石蠟 / Chlorinated Paraffin (C10∼C13) (CAS No.: 85535-84-8)	%	參考US EPA 3540C: 1996方法, 以氣相 層析儀/電子補捉偵測器檢測. / With reference to US EPA 3540C: 1996 method. Analysis was performed by GC/ECD.	0.01	n.d.
滅蟻靈 / Mirex (CAS No.: 2385-85-5)	mg/kg	参考US EPA 8270D方法,以氣相層析質 譜儀(GC/MS)檢測. / With reference to US EPA 8270D method. Analysis was performed by GC/MS.	4	n.d.
绨 / Antimony (Sb)	mg/kg	冬考US EPA 3052方法,用感應藕合電漿原子發射光譜儀檢測錦含量./With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
三氧化二錦 / Antimony trioxide (Sb2O3)*** (CAS No.: 1309-64-4)	mg/kg	參考US EPA 3052方法, 用感應藕合電漿原子發射光譜儀檢測錦含量. / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.		n.d.
四溴雙酚-A-雙 / TBBP-A-bis (CAS No.: 21850-44-2)	mg/kg	參考US EPA 3550C方法, 以氣相層析儀/質譜儀檢測. / With reference to US EPA 3550C method. Analysis was performed by GC/MS.		n.d.
六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4)	mg/kg	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.		n.d.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法負測 極限值 (MDL)	結果 (Result) NO.1
福馬林(甲醛)/ Formaldehyde (CAS No.: 50-00-0)	mg/kg	冬考ISO 17226-1(2008)方法,以高效液相層析儀/二極體陣列偵測器檢測./ With reference to ISO 17226- 1(2008). Analysis was performed by HPLC/DAD.	3	n.d.
有機錫 / Organic-tin compounds				
三丁基錫 / Tributyl Tin (TBT)	mg/kg	本測試參考DIN 38407-13方法,以氣相層析儀/火焰光度偵測器檢測./With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.
三苯基錫 / Triphenyl Tin (TphT)	mg/kg	本測試參考DIN 38407-13方法,以氣相層析儀/火焰光度偵測器檢測./With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.
三丁基錫氧化物 / Tributyl Tin Oxide (TBTO)*** (CAS No.: 56-35-9)	mg/kg	本測試参考DIN 38407-13方法,以氣相 層析儀/火焰光度偵測器檢測. / With reference to DIN 38407-13. Analysis was performed by GC/FPD.	12	n.d.
聚氯乙烯 / PVC	**	以紅外光譜分析及焰色法檢測./ Analysis was performed by FTIR and FLAME Test.	-	Negative
紅磷 / Red phosphorus	**	本測試以熱裂解儀分析. / Analysis was performed by Pyrolyzer-GC/MS.	2	Negative

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ASM HK

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

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

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

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

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

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

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) NO.1
遂閃石 / Tremolite (CAS No.: 77536-68-6)	%	參考EPA 600/R-93/116 / 立體顯微鏡 (SM), 分散染色式偏光顯微鏡 (DS-PLM) 及X光鏡射光譜分析法 (XRD) / With reference to EPA 600/R-93/116 method. Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).	-	Negative
偶氮 (AZO)				9
1): 4-氨基二苯 / 4-AMINODIPHENYL (CAS No.: 92-67-1)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質譜儀檢測./With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
2): 聯苯胺 / BENZIDINE (CAS No.: 92-87- 5)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
3): 4-氣鄰甲苯胺 / 4-CHLORO-O-TOLUIDINE (CAS No.: 95-69-2)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
4): 2-萘胺 / 2-NAPHTHYLAMINE (CAS No.: 91-59-8)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.

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

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

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法負測 極限値 (MDL)	結果 (Result) NO.1
19): 2,4-二氨基甲苯 / 2,4- TOLUYLENEDIAMINE (CAS No.: 95-80-7)	mg/kg	参考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
20): 2,4,5-三甲基苯胺 / 2,4,5- TRIMETHYLANILINE (CAS No.: 137-17-7)	mg/kg	參考LFGB 82.02-2方法, 以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
21): 鄭位甲氧基苯胺 / O-ANISIDINE (CAS No.: 90-04-0)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
22): 對氨基偶氮苯 / P-AMINOAZOBENZENE (CAS No.: 60-09-3)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
23): 2,4-二甲基苯胺 / 2,4-XYLIDINE (CAS No.: 95-68-1)	mg/kg	參考LFGB 82.02-2方法,以氣相層析/質 譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
24): 2,6-二甲基苯胺 / 2,6-XYLIDINE (CAS No.: 87-62-7)	mg/kg	参考LFGB 82.02-2方法,以氣相層析/質譜儀檢測. / With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.
放射性物質 / Radioactive Substances	µSv/ hour	蓋革計數器 (Geiger counter)	121	Negative*

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備註(Note):

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

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

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

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高雄市楠祥加工出口区周瑜路61號 www.tw.sgs.com



型際 / Plastic

其他 / Others

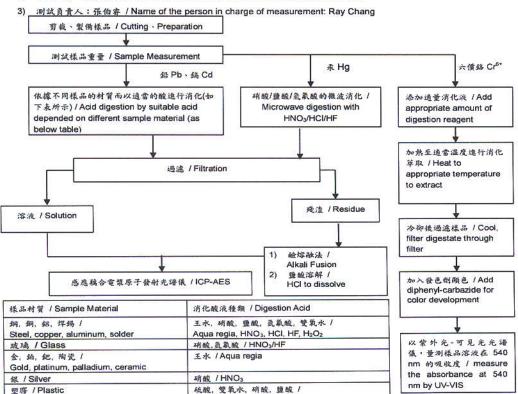
測試報告 **Test Report**

號碼(No.): KA/2012/C2128 日期(Date): 2013/01/02 頁數(Page): 14 of 26

ASM HK

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

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



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

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

H₂SO₄, H₂O₂, HNO₃, HCI

加入任何酸至完全溶解 / Any acid to total digestion

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ASM HK

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

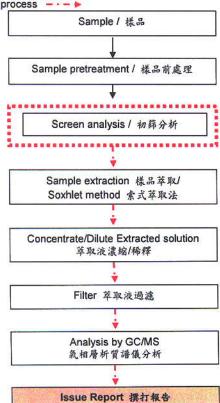
多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

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

初次測試程序 / First testing process —

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

確認程序 / Confirmation process - - - ▶



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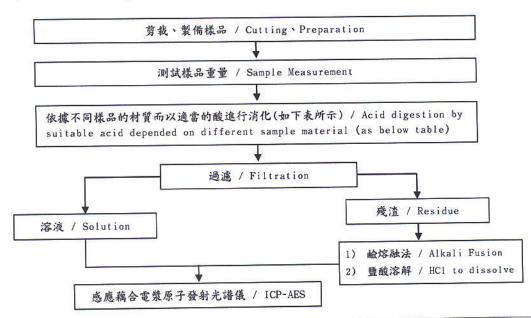
ASM HK

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

元素以 ICP-AES 分析的消化流程圖

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



王水,硝酸,鹽酸,氫氯酸,雙氧水 / Aqua regia, HNO2, HC1, HF, H2O2		
硝酸,氫氯酸 / HNOs/HF		
王水 / Aqua regia		
硝酸 / HNO3		
硫酸,雙氧水,硝酸,鹽酸 / HaSOa, HaOa, HNOa, HC1		
加入任何酸至完全溶解 / Any acid to total digestion		

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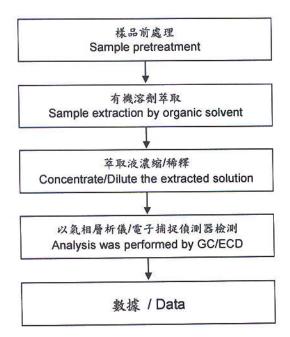
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含氯阻燃劑分析流程 /

Chlorinated Flame retardant analytical flow chart

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



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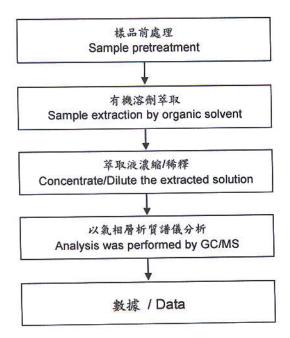
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含氯阻燃劑分析流程 /

Chlorinated Flame retardant analytical flow chart

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



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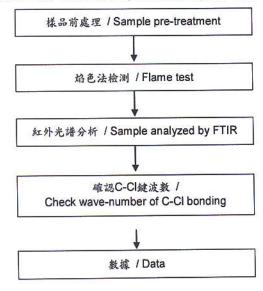
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聚氯乙烯物質判定分析流程圖 /

Analysis flow chart for determination of PVC in material

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



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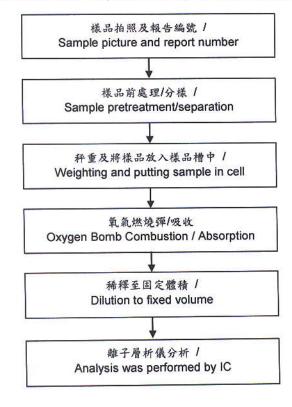
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鹵素分析流程圖 / Analytical flow chart of halogen content

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



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

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

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



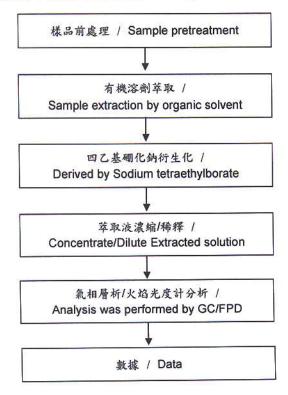
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有機錫分析流程圖 / Analytical flow chart of Organic-Tin content

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



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

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

樣品 / Sample 樣品前處理 / Sample pretreatment 初篩分析 / Screen analysis 樣品萃取法 / Sample extraction method 萃取液濃縮/稀釋 / Concentrate/Dilute Extracted solution 萃取液過滤 / Filter 氣相層析質譜儀分析 / Analysis by GC/MS Issue Report / 撰打報告

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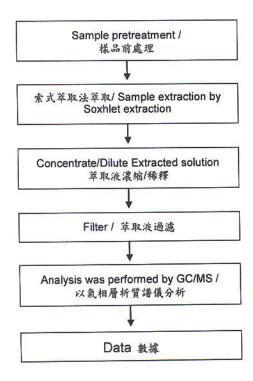
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六溴環十二烷分析流程圖 / HBCDD Analytical FLOW CHART

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





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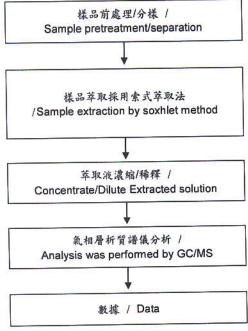
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可塑劑分析流程圖 / Analytical flow chart of phthalate content

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

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





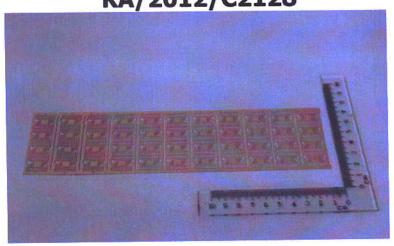
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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

KA/2012/C2128



** 報告結尾(End of Report) **

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Test Report No. F690101/LF-CTSAYAA13-36969C

Issued Date: 2013. 08. 06

Page 1 of 7

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

SGS File No.

. AYAA13-36969C

Product Name

: 8006NS

Item No./Part No.

: N/A

Received Date

: 2013. 07. 31

Test Period

: 2013. 08. 01

to 2013. 08. 06

Test Results

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

Test Performed

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

SGS Korea Co., Ltd.

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr

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Issued Date: 2013. 08. 06 Page 2 of 7

Sample No.

: AYAA13-36969C.001

Sample Description

: 8006NS

Item No./Part No.
Materials

: N/A : Paste

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.
Phosphorous (P)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.

Phthalates

Test Items	Unit	Test Method	MDL	Results
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Dibutyl phthalate (DBP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Butylbenzyl phthalate (BBP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Diisodecyl phthalate (DIDP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Diisononyl phthalate (DINP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.
Diisobutyl Phthalate (DIBP)	mg/kg	With reference to ASTM D3421-75, GC-MS	50	N.D.

Flame Retardants

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

Other(s)

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

NOTE:

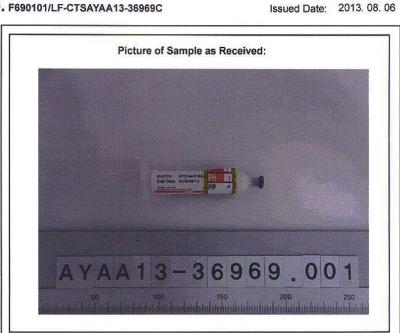
- (1) N.D. = Not detected.(<MDL)
- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) = No regulation
- (5) ** = Qualitative analysis (No Unit)
- (6) Negative = Undetectable / Positive = Detectable

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NOTE:

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- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) = No regulation
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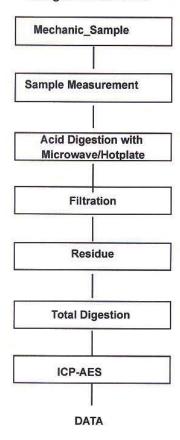
Page 3 of 7



Issued Date: 2013. 08. 06 Page 4 of 7

Flow Chart for Inorganic Elements Testing

Inorganic Elements



NOTE:

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

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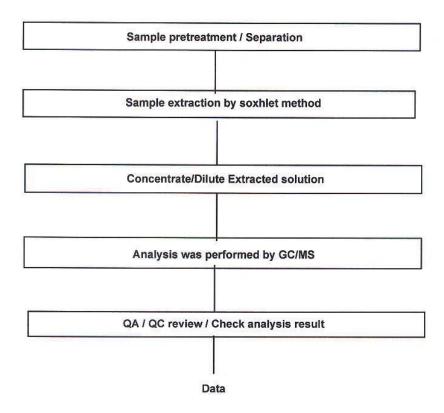
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Flow Chart for Phthalate Test



NOTE:

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

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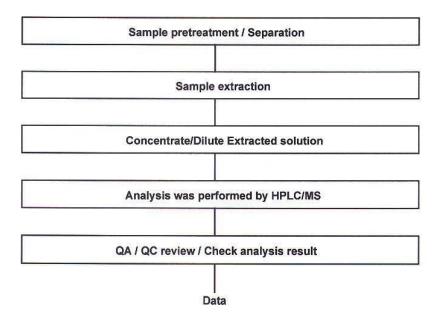
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Issued Date: 2013. 08. 06 Page 6 of 7

Flow Chart for PFOS/PFOA Test



NOTE:

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

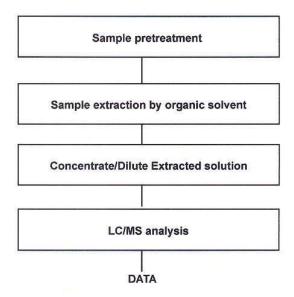
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Issued Date: 2013. 08. 06 Page 7 of 7

Testing Flow Chart for HBCD



*** End ***

NOTE:

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

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Issued Date: 2013. 08. 05 Page 1 of 3

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

SGS File No.

: AYAA13-36969B

Product Name

: 8006NS

Item No./Part No.

: N/A

Received Date

: 2013. 07. 31

Test Period

; 2013. 08. 01

to 2013. 08. 05

Test Results

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

Test Performed

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

SGS Korea Co., Ltd.

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr

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Issued Date: 2013. 08. 05 Page 2 of 3

Sample No.

: AYAA13-36969B.001

Sample Description

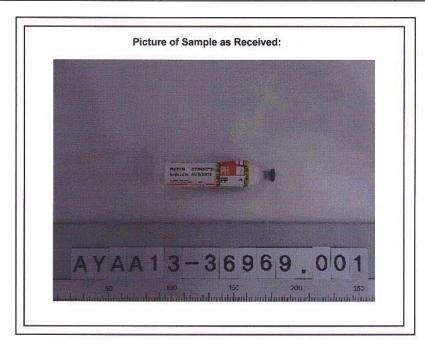
: 8006NS : N/A

Item No./Part No.
Materials

: Paste

Halogen Content

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	BS EN 14582:2007, IC	30	N.D.
Chlorine(CI)	mg/kg	BS EN 14582:2007, IC	30	324
Fluorine(F)	mg/kg	BS EN 14582:2007, IC	30	N.D.
lodine(I)	mg/kg	BS EN 14582:2007, IC	50	N.D.



NOTE:

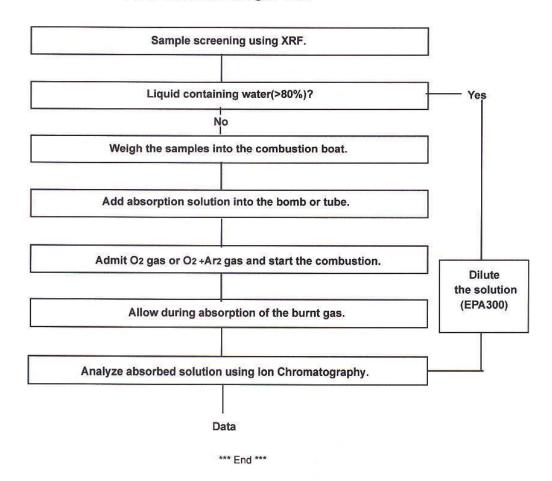
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- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
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Issued Date: 2013. 08. 05 Page 3 of 3

Flow Chart for Halogen Test



NOTE:

- (1) N.D. = Not detected.(<MDL)
- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) = No regulation
- (5) ** = Qualitative analysis (No Unit)
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Issued Date: 2013. 08. 05 Page 1 of 4

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

SGS File No.

. AYAA13-36969A

Product Name

: 8006NS

Item No./Part No.

: N/A

Received Date

: 2013. 07. 31

Test Period

: 2013. 08. 01

to 2013. 08. 05

Test Results

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

Test Performed

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

SGS Korea Co., Ltd.

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr

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Issued Date: 2013. 08. 05 Page 2 of 4

Sample No.

: AYAA13-36969A.001

Sample Description

: 8006NS

Item No./Part No.

: N/A

Materials

: Paste

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.

Flame Retardants-PBBs/PBDEs

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

NOTE:

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- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) = No regulation
- (5) Negative = Undetectable / Positive = Detectable
- (6) ** = Qualitative analysis (No Unit)
- (7) * = Boiling-water-extraction:

Negative = Absence of CrVI coating

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

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

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Issued Date: 2013. 08. 05

Page 3 of 4

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Negative = Absence of CrVI coating

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

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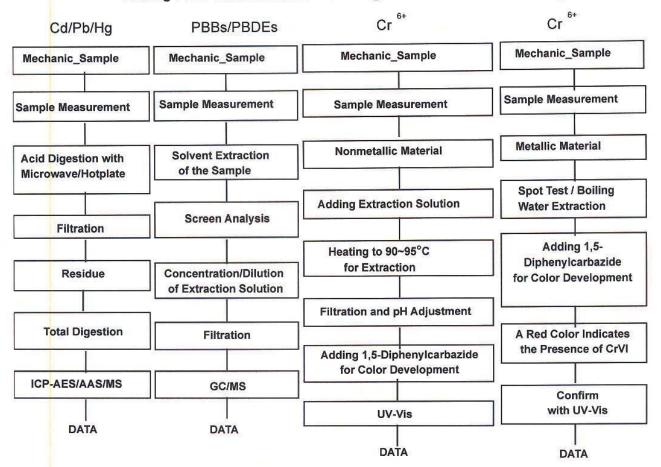
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Issued Date: 2013. 08. 05 Page 4 of 4

Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr6+ /PBBs&PBDEs Testing



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

*** End ***

NOTE:

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

Negative = Absence of CrVI coating

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

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

CTS Ref. CTSSA/12/3702/Tanaka

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

Sample Description

Au BONDING WIRE

Sample Receiving Date

16/10/2012

Testing Period

16/10/2012 to 19/11/2012

Test Requested

Selected test(s) as requested by client

Test Method

Please refer to next page(s).

Test Results

Please refer to next page(s).

Analysts

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

& Yee Sook Wai

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CHONG KIEN LEN B.Sc.(HONS) AMIC

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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 2 of 13

CTS Ref. CTSSA/12/3702/Tanaka

Test results:

Test Part Description :

Sample Description

Au BONDING WIRE

RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Results	MDL
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Hexavalent Chromium (CrVI)	mg/kg	With reference to JIS H 8625, and performed by UV-VIS Spectrophotometry	N.D.	2
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional) #	(222)	With reference to IEC 62321:2008	Negative	120
Sum of PBBs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	125
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

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CHÓNG KIEN LEN B.Sc.(HONS) AMIC

SENIOR LAB MANAGER

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

Sum of PBDEs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	157.1
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

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

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

Boiling water extraction:

- a. Negative means the absence of Cr(VI) on the tested areas
- b. Positive means the presence of Cr(VI) on the tested areas; The detected concentration in 50 mL boiling water extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

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

(e) - = Not regulated

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

Test results by chemical method:

Test Item (s):	Unit	Method	Result	MDL
Antimony (Sb)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2
Magnesium (Mg)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2
Beryllium (Be)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES	N.D.	2
Polyvinylchloride (PVC)	44:	Analysis was performed by FT-IR/ATR	Negative	
Halogen			1444	
Halogen-Fluorine (F)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Fluorine content.	N.D.	50
Halogen-Chlorine (CI)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Chlorine content.	N.D.	50
Halogen-Bromine (Br)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Bromine content.	N.D.	50
Halogen-lodine (I)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for lodine content.	N.D.	50

Test Part Description :

Sample Description

Au BONDING WIRE

Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) --- = Not Conducted

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

(f) Negative = Undetectable / Positive = Detectable

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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 5 of 13 CTS Ref. CTSSA/12/3702/Tanaka

Test results by chemical method:

Test Item (s):	Unit	Method	Result	MDL
Hexabromocyclododecane (HBCDD)	mg/kg	Based on EPA 3540C, and performed by GC-MS	N.D.	10
Phthalates		2018 201 		
DBP (Di-butyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DEHP (Di-(2-ethylhexyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
BBP (Benzyl Butyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DINP (Di-isononyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.01
DIDP (Di-isodecyl phthalate	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.01
DNOP (Di-n-octyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DNHP (Di-n-hexyl phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003
DMEP (Bis(2-methoxyethyl)phthalate)	%	With reference to Chromatographia Vol.47, No.784, 1998. Analysis was performed by GC/MS.	N.D.	0.003

Test Part Description:

Sample Description

Au BONDING WIRE

Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) --- = Not Conducted

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No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 6 of 13

CTS Ref. CTSSA/12/3702/Tanaka

Test Part Description:

Sample Description

Au BONDING WIRE

Test results:

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

Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) --- = Not Conducted

(e) The sample(s) was/were analysed on behalf of the applicant as mixing sample in one testing.

(f) *The above tests were subcontracted to SGS Taiwan based on report no. KA/2012/A1244

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

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

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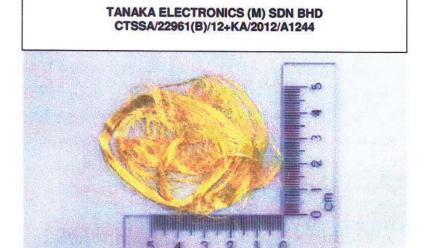
No. CTSSA/22961(B)/12+KA/2012/A1244 Date: 19/11/2012 Page: 7 of 13

CTS Ref. CTSSA/12/3702/Tanaka

Test Part Description:

Sample Description

Au BONDING WIRE



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

1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

1

Analyses by ICP

5. <u>DETERMINATION OF PBB/PBDE WITH GC-MS</u> BY IEC 62321 2008

Cut sample in small pieces

Weight sample (0.5-4.0g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

2. DETERMINATION OF LEAD CONTENT BY

IEC 62321 2008

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP

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

Cut sample in small pieces

Weight sample (0.2-0.5g) into digestion vessel

Acid digestion (HNO₃) - Microwave

"Totally Dissolved"

Filtration

Analyses by ICP

6. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008

Sample Receiving and Registration

Sample Preparation

Spot-test (Qualitative)

Boiling-water-extraction

Analyses by UV- Spectrophotometer

Test Report

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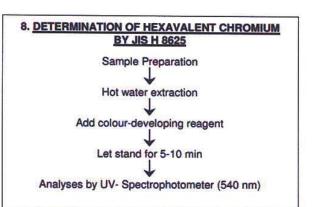
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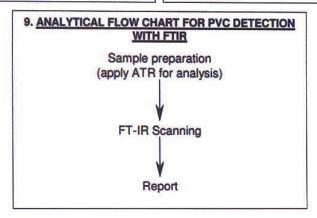
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7. DETERMINATION OF HALOGEN CONTENT Sample pretreatment Weighting and putting sample in cell Combustion / Absorption Dilution to fixed volume Analyses by IC





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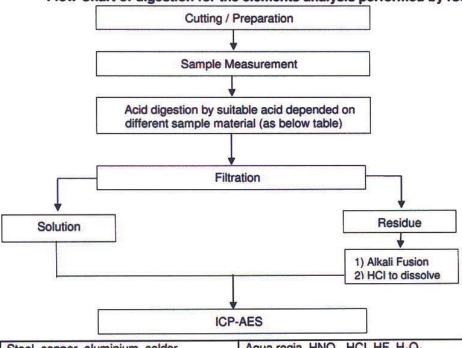
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- These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) Name of the person who made measurement: Alex Chang
- 3) Name of the person in charge of measurement: Ray Chang

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



Aqua regia, HNO ₃ , HCI, HF, H ₂ O ₂		
HNO₃/HF		
Aqua regia		
HNO ₃		
H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCI		
Any acid to total digestion		

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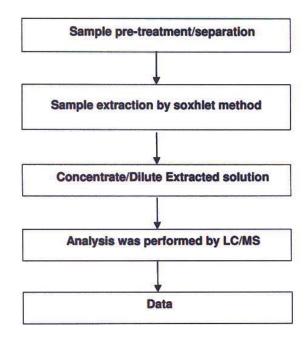
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Analytical Flow Chart of PFOS & PFOA Content



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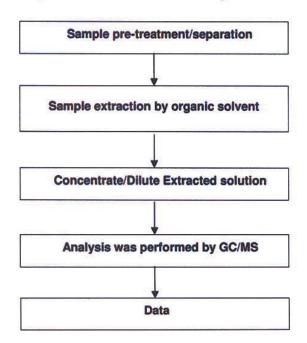
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Analytical Flow Chart for Dimethyl Fumarate



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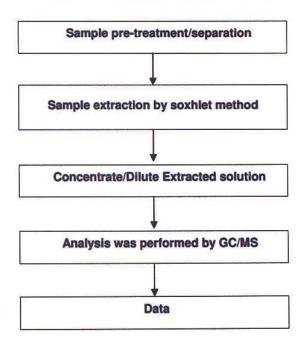
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Analytical flow chart of Phthalates Content



**** End of Report ****

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No.: KA/2013/30818 Date: 2013/03/13 Page: 1 of 9

SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

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

Sample Description **EPOXY MOLDING COMPOUND**

Style/Item No. EME-G600 TYPE

Sample Receiving Date 2013/03/07

Testing Period 2013/03/07 TO 2013/03/13

Sample Submitted By SUMITOMO BAKELITE SINGAPORE PTE CO., LTD.

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

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

SGS Taiwan Limited



No.: KA/2013/30818 Date: 2013/03/13 Page: 2 of 9

SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

Test Result(s)

PART NAME NO.1

BLACK EPOXY MOLDING COMPOUND

Test Item (s):	Unit	Method	MDL	Result
4-4,60-401W0013-504, A10-4010-4-104	100 TABLESTA	2750.00000000000000000000000000000000000	11-0-1-0-2-2-1-0-1	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) by alkaline extraction	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
Sum of PBBs			120	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl			5	n.d.
Tribromobiphenyl			5	n.d.
Tetrabromobiphenyl			5	n.d.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	5	n.d.
Hexabromobiphenyl		performed by GC/MS.	5	n.d.
Heptabromobiphenyl	7		5	n.d.
Octabromobiphenyl			5	n.d.
Nonabromobiphenyl			5	n.d.
Decabromobiphenyl			5	n.d.
Sum of PBDEs			(-)	n.d.
Monobromodiphenyl ether			5	n.d.
Dibromodiphenyl ether			5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether		With reference to IEO 60004, 0000	5	n.d.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	5	n.d.
Hexabromodiphenyl ether			5	n.d.
Heptabromodiphenyl ether			5	n.d.
Octabromodiphenyl ether			5	n.d.
Nonabromodiphenyl ether			5	n.d.
Decabromodiphenyl ether			5	n.d.

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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

Test Item (s):	Unit	Method	MDL	Result No.1	
Antimony (Sb)	mg/kg	g/kg With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.		n.d.	
Perfluorooctane sulfonates (PFOS - Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	
Halogen					
Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	
Halogen-Chlorine (CI) (CAS No.: 022537-15-1)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	
Halogen-Bromine (Br) (CAS No.: 010097-32-2)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	
Halogen-lodine (I) (CAS No.: 014362-44-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. "-" = Not Regulated

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

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

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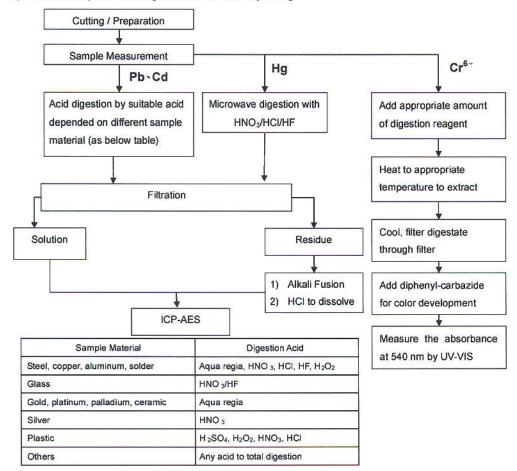
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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

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



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

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

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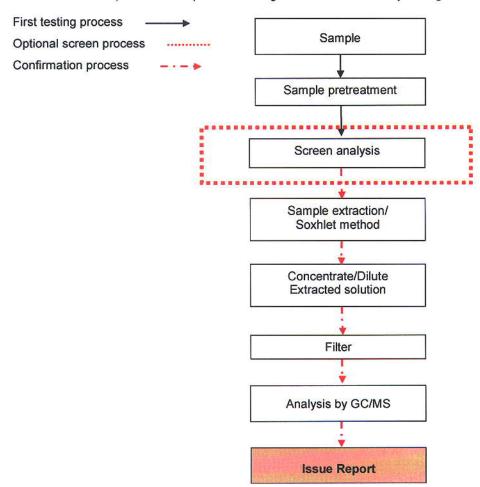


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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

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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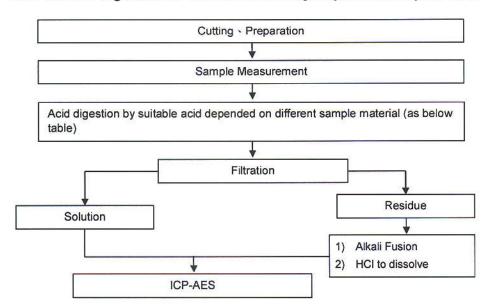


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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

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

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



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

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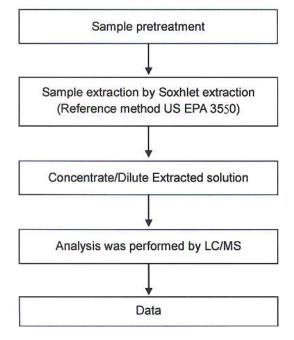
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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

Analytical flow chart of PFOA/PFOS content

- 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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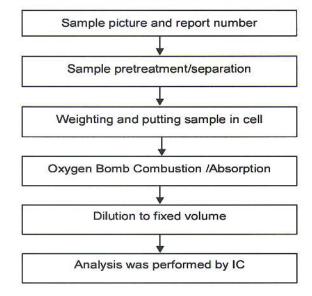
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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Jean Hung
- 2) Name of the person in charge of measurement: Ray Chang



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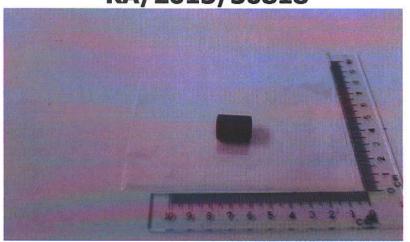


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SUMITOMO BAKELITE SINGAPORE PTE CO., LTD. NO. 1 SENOKO SOUTH ROAD, SINGAPORE 758069

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

KA/2013/30818



** End of Report **

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2449882

Date: 23-Apr-2013

Page 1 of 6

No.

Client: Thailand Smelting and Refining Co., Ltd. 116/17-18 Srivit Bldg. Soonthornkosa Klongtoey Bangkok 10110 Thailand

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

Sample Description

: Pure Tin

Sample No.

: 2526839

Sample Condition

: Sample is contained in plastic bag.

Quantity Submitted

: 20 pcs

Part No. Batch/Lot No. : Sn100A : 858

Sample Receiving Date: 18-Apr-2013

Testing Period

: 18-Apr-2013 to 23-Apr-2013

Test Requested

: In accordance with the RoHS Directive 2011/65/EU Annex II ; recasting 2002/95/EC

Test Method

: (1) In-house method LBTY-08409 with reference to IEC 62321 Ed.1:2008 for Lead

content, Analyzed by ICP-OES.

(2) In-house method LBTY-08409 with reference to IEC 62321 Ed.1:2008 for

Cadmium content, Analyzed by ICP-OES.

(3) In-house method LBTY-08408 with reference to IEC 62321 Ed.1:2008 for

Mercury content, Analyzed by ICP-OES.

(4) In-house method LBTY-06378 with reference to IEC 62321 Ed.1:2008 for Hexavalent Chromium by Colorless and Colored Chromate Coating on Metals/

Colorimetric Method, Analyzed by UV-Vis spectrometry.

In-house method LBFD-08466 with reference to IEC 62321 Ed.1:2008 for

PBB/PBDE content, Analyzed by GC/MS.

Test Results

: Please refer to next page.

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 (Thailand) Limited



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Pornpana Lirathpong Hardlines Testing Manager

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Test Report No.

2449882

Date: 23-Apr-2013

Page 2 of 6

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	*	1000

Test Part Description Result (1) metal

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) 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 cm2 sample area.

(e) "-" = Not regulated

(f) For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of testing.

(g) Adjustment of Cr(VI) extraction following IEC 62321 recommendation was necessary due to surface area of sample less than 50 cm2

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Test Report No. **TEST RESULTS**

2449882

Date: 23-Apr-2013

Page 3 of 6

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

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
sum of PBBs	(5)*	n.d.		1000
Monobromobiphenyl		n.d.	5	+
Dibromobiphenyl		n.d.	5	ŧ
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	2

2151

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Test Report No. **TEST RESULTS**

2449882

Date: 23-Apr-2013

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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	E
Tribromodiphenyl ether		n.d.	5	*
Tetrabromodiphenyl ether		n.d.	5	+
Pentabromodiphenyl ether		n.d.	5	Ē
Hexabromodiphenyl ether		n.d.	5	+
Heptabromodiphenyl ether		n.d.	5	-
Octabromodiphenyl ether		n.d.	5	5.
Nonabromodiphenyl ether		n.d.	5	+
Decabromodiphenyl ether		n.d.	5	-

Test Part Description Result (1) metal

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) "-" = Not regulated

(e) Test done on client submited sample

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

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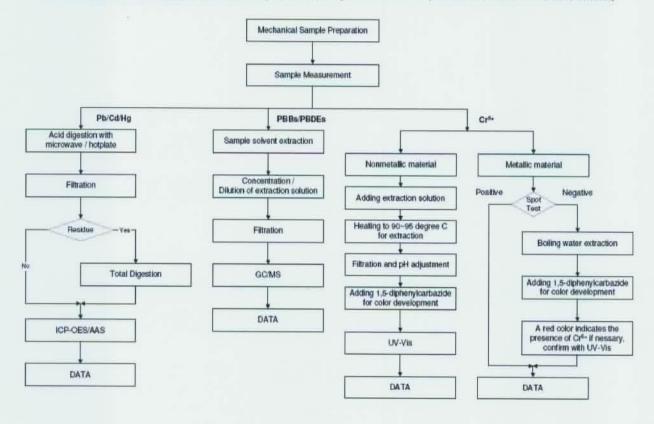
Test Report No. 2449882

Date: 23-Apr-2013

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Flow Chart for IEC 62321 : Pb/Cd/Hg/Crt+/PBBs/PBDEs Testing

- 1. Operator : Siam Pelarwut
- 2. Section Chief: Patcharee Treepernchareen
- 3. The sample was dissolved totally by pre-conditioning method according to below flowchart. (Cr6+ and PBBs/PBDEs test method excluded)



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Test Report No.

2449882

Date: 23-Apr-2013

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SAMPLE/ATTACHMENT PICTURE



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Test Report No. 2450847 Date : 24-Apr-2013 Page 1 of 4

Client: Thailand Smelting and Refining Co., Ltd.

116/17-18 Srivit Bldg. Soonthornkosa Klongtoey Bangkok 10110 Thailand

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

Sample Description : Pure Tin Sample No. : 2526840

Sample Condition : Sample is contained in plastic bag.

Quantity Submitted : 20 pcs
Part No. : Sn100A
Batch/Lot No. : 858

Sample Receiving Date : 18-Apr-2013

Testing Period : 18-Apr-2013 to 24-Apr-2013

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

Signed for and on behalf of SGS (Thailand) Limited

Pornpana Lirathpong Hardlines Testing Manager

2152560

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Member of the SGS Group



Test Report No. **TEST RESULTS**

2450847

Date: 24-Apr-2013

Page 2 of 4

Analysis	Test Method	Instrument	Unit	MDL	Resul
Halogen		-	2	*	-
Fluorine (F)	In-house method LBCH-08482 with reference to BS EN14582 : 2007	Analysis was performed by Ion Chromatography	mg/kg	50	n.d.
Chlorine (CI)	In-house method LBCH-08482 with reference to BS EN14582 : 2007	Analysis was performed by Ion Chromatography	mg/kg	50	n.d.
Bromine (Br)	In-house method LBCH-08482 with reference to BS EN14582 : 2007	Analysis was performed by Ion Chromatography	mg/kg	50	n.d.
Iodine (I)	In-house method LBCH-08482 with reference to BS EN14582 : 2007	Analysis was performed by Ion Chromatography	mg/kg	50	n.d.

Remark: (a) mg/kg = ppm (b) n.d. = non detected

- (c) MDL = Method detection limit
- (d) Test done on client submited sample
- (e) Result of metal

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Test Report No. 2450847

Date: 24-Apr-2013

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Analytical flow chart of halogen content

1.Operator : Korakot Junsomboon

2. Section Chief : Patcharee Treeporncharoen

```
| Sample pretreatment/ Separation|
| Weighting and putting sample in centifuge tube|
| Add HNO3 |
+-----
| Dilution to fixed volume |
| Analysis was performed by IC |
```

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Test Report No.

2450847

Date: 24-Apr-2013

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SAMPLE/ATTACHMENT PICTURE



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