



ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

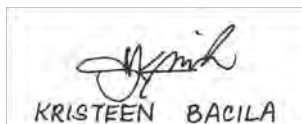
Product Series: Ultra-low Capacitance Protection Array

Product #: SP300x-xxXTG

Issue Date: September 29, 2011

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:



KRISTEEN BACILA

<Global EHS Engineer>

(1) Parts, sub-materials and unit parts

This document covers the SP300x-xxXTG 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

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	IC Wafer	Wafer	3-6
2	A194	Lead Frame	7-17
3	2200D	Adhesive - ROHS	18-22
4	2200D	Adhesive - Halogen	23-26
5	Wire	Gold Wire	27-31
6	KMC3580	Compound - RoHS	32-36
7	KMC3580	Compound - Halogen	37-40
8	EME G600	Epoxy Molding Compound	41-48

Test Report

No. : CE/2011/11952 Date : 2011/01/18 Page : 1 of 4

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



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

Sample Description : IC WAFER
Style/Item No. : ALUMINUM PROCESS
Sample Receiving Date : 2011/01/11
Testing Period : 2011/01/11 TO 2011/01/18

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.

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


Nicole Chien / Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

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Test Report

No. : CE/2011/11952 Date : 2011/01/18

Page : 2 of 4

EPISIL TECHNOLOGIES INC.

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



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

TEST PART DESCRIPTION:

No.1 : MULTICOLOR WAFER

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

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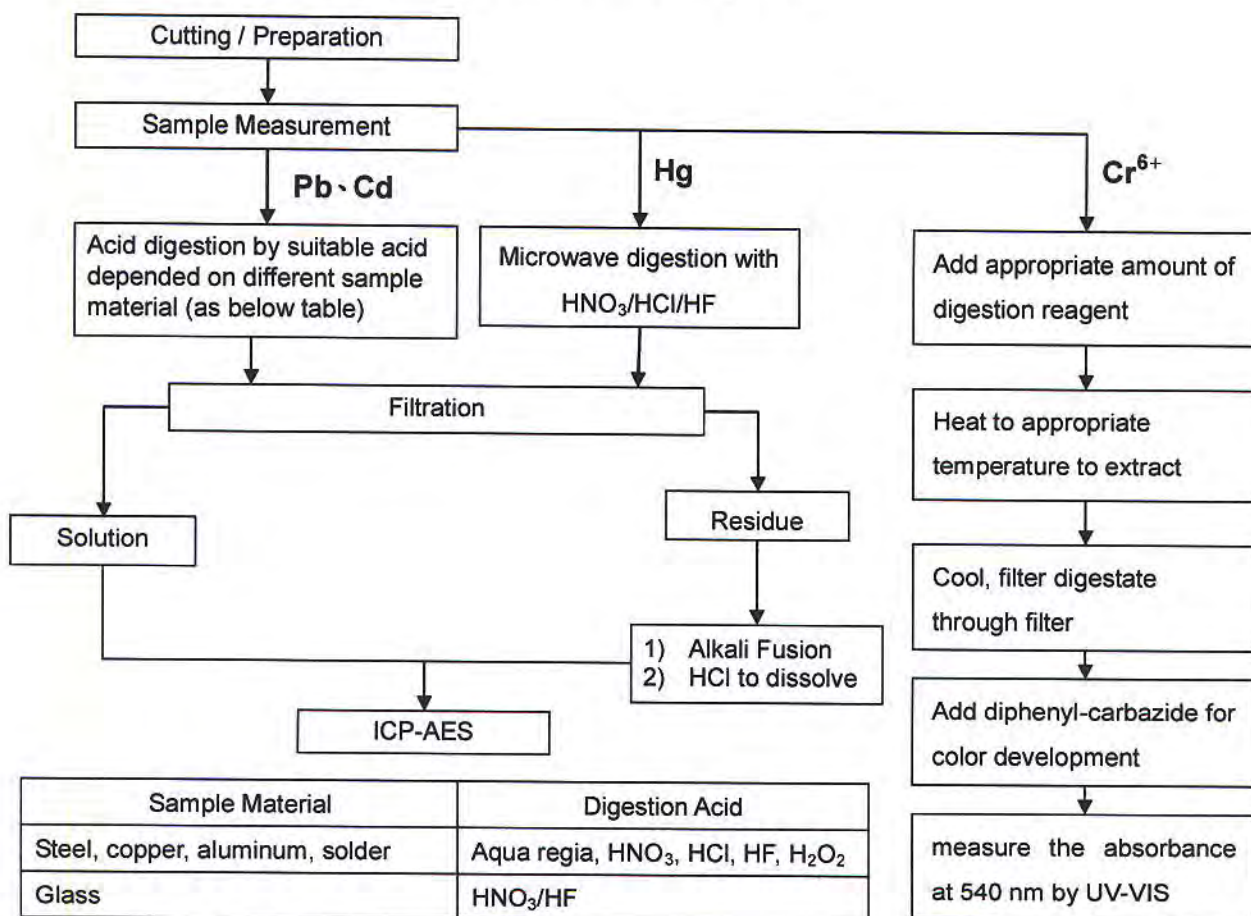
Page : 3 of 4

EPISIL TECHNOLOGIES INC.

NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK,
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- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr⁶⁺ test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



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

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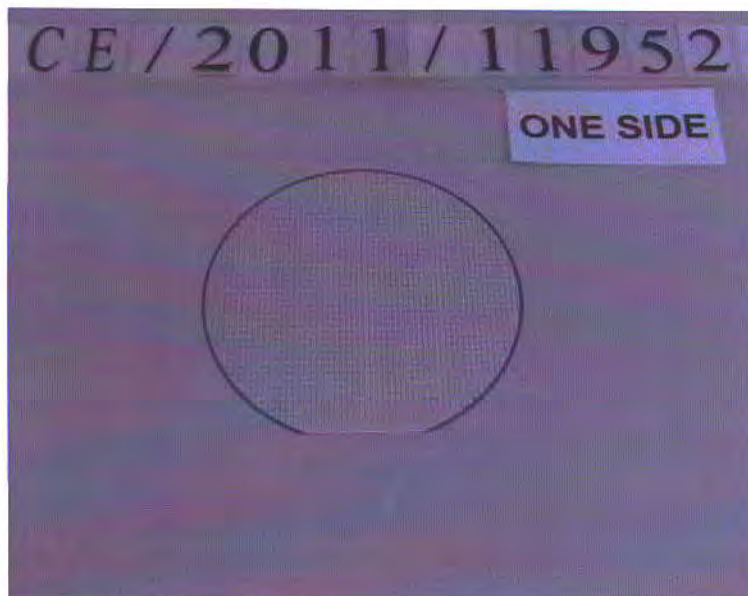
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No. : CE/2011/11952 Date : 2011/01/18

Page : 4 of 4

EPISIL TECHNOLOGIES INC.

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** End of Report **

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測試報告 Test Report

Signature Not Verified
For Question
Please Contact with SGS
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號碼(No.) : KA/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 1 of 11



ASM HK & ASM TECHNOLOGY SINGAPORE

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN
AVENUE 7, SINGAPORE (ASM TECHNOLOGY SINGAPORE)

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/C194 ALLOY
收件日期(Sample Receiving Date) : 2011/01/05
測試期間(Testing Period) : 2011/01/05 TO 2011/01/10

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

根據客戶所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯及多溴聯苯醚的測試結果符合RoHS(2002/95/EC)及其修定指令之要求 (Based upon the performed tests by submitted samples, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium Cr(VI), PBBs and PBDEs comply with the limits of RoHS Directive 2002/95/EC and its subsequent amendments).


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/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 2 of 11



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測試結果(Test Results)

測試部位(PART NAME) NO.1 : 銅紅色 A194/C194 ALLOY (COPPER RED A194/C194 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)	法規 限值 (Limit)
				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.	100
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.	1000
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.	1000
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 5)	0.02mg/kg with 50 cm ² 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.	-

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號碼(No.) : KA/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 3 of 11

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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)	法規 限值 (Limit)
				NO.1	
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS) PFOS — Acid PFOS — Metal Salt PFOS — Amide	mg/kg	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.	10	n.d.	-
全氟辛酸(銨) / PFOA (CAS No.: 000335-67-1)	mg/kg	參考US EPA 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛酸(銨)含量。 / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	n.d.	-
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/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 4 of 11

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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)	法規 限值 (Limit)
				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.	1000
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.	1000
一溴聯苯醚 / Monobromodiphenyl			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			5	n.d.	-
五溴聯苯醚 / Pentabromodiphenyl			5	n.d.	-
六溴聯苯醚 / Hexabromodiphenyl			5	n.d.	-
七溴聯苯醚 / Heptabromodiphenyl			5	n.d.	-
八溴聯苯醚 / Octabromodiphenyl			5	n.d.	-
九溴聯苯醚 / Nonabromodiphenyl			5	n.d.	-
十溴聯苯醚 / Decabromodiphenyl			5	n.d.	-

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測試報告

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號碼(No.) : KA/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 5 of 11

ASM HK & ASM TECHNOLOGY SINGAPORE



4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, 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. 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 cm² sample surface area.
該溶液濃度 ≥ 0.02 mg/kg with 50 cm² (sample surface area)
6. # = Positive indicates the presence of Cr(VI) on the tested areas and result be regarded as not comply with RoHS requirement. (Positive表示測試區域之六價鉻不符合RoHS要求)
Negative indicates the absence of Cr(VI) on the tested areas and result be regarded as comply with RoHS requirement. (Negative表示測試區域之六價鉻符合RoHS要求)

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 μ g/m².
(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 μ g/m² of the coated material.)

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測試報告

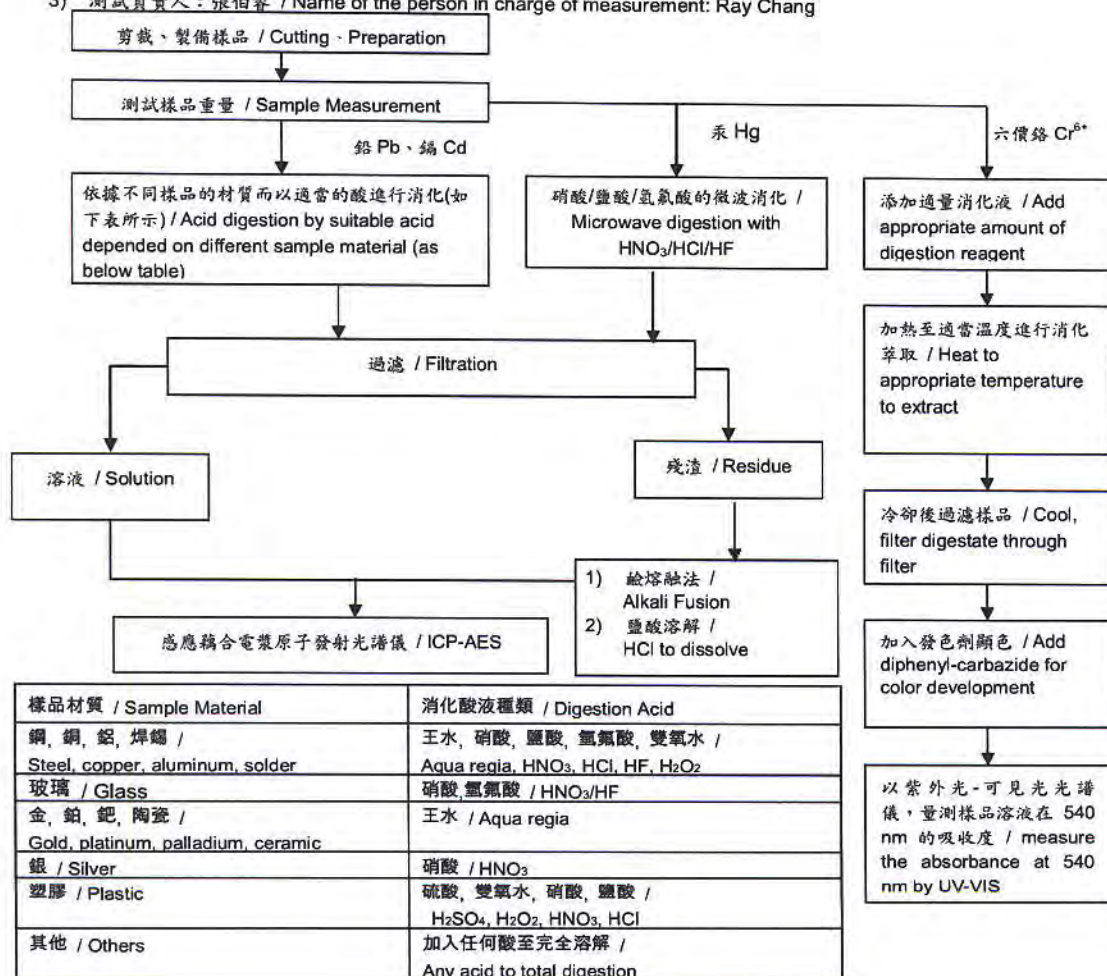
Test Report

號碼(No.) : KA/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 6 of 11

ASM HK & ASM TECHNOLOGY SINGAPORE

4/F, WATSON CENTRE, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, SINGAPORE (ASM TECHNOLOGY SINGAPORE)

- 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) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人：張伯容 / Name of the person in charge of measurement: Ray Chang



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號碼(No.) : KA/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 7 of 11

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

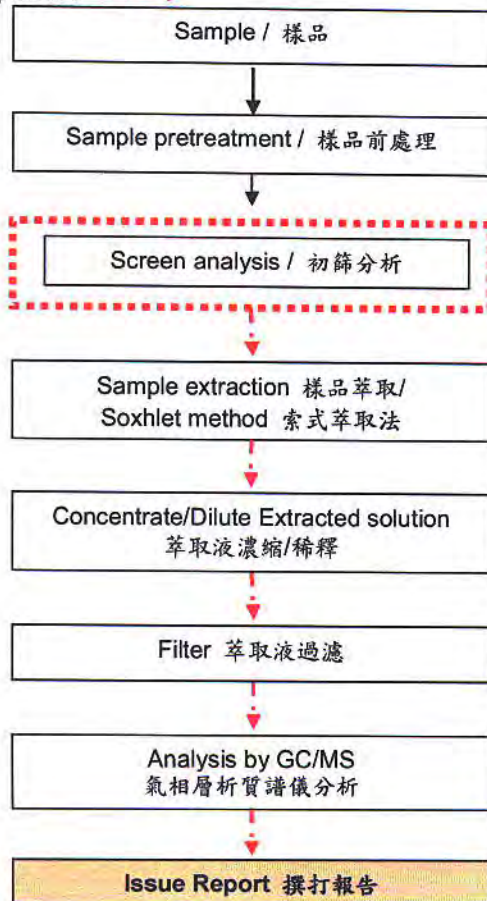
1)測試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao

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

初次測試程序 / First testing process —————>

選擇性篩檢程序 / Optional screen process>

確認程序 / Confirmation process - - - ->



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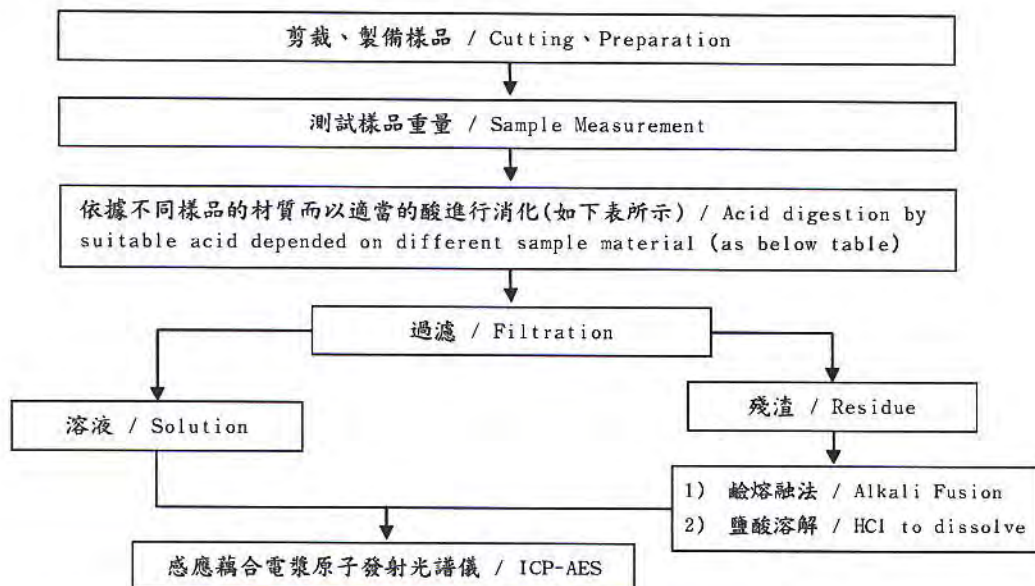
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人：張伯睿 / Name of the person in charge of measurement: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

元素以 ICP-AES 分析的消化流程圖

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



鋼, 銅, 鋁, 焊錫 / Steel, copper, aluminum, solder	王水, 硝酸, 鹽酸, 氫氟酸, 雙氧水 / Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
玻璃 / Glass	硝酸, 氫氟酸 / HNO ₃ /HF
金, 鉑, 鈱, 陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO ₃
塑膠 / Plastic	硫酸, 雙氧水, 硝酸, 鹽酸 / H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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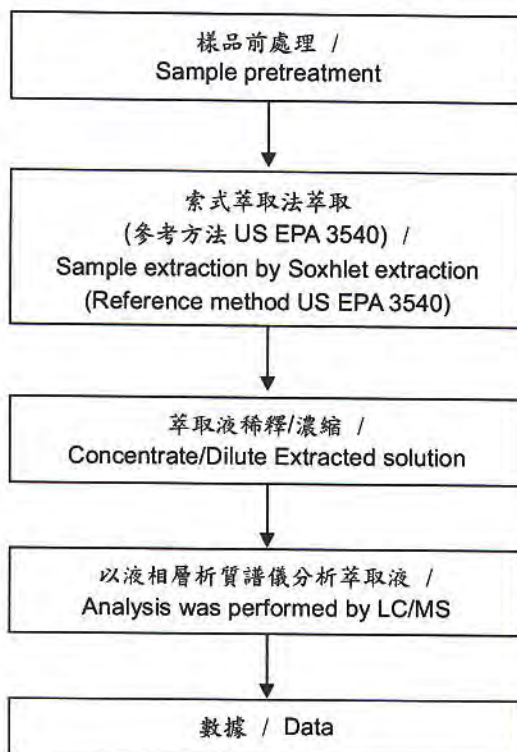
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全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 /

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/2011/10113 日期(Date) : 2011/01/10 頁數(Page) : 10 of 11

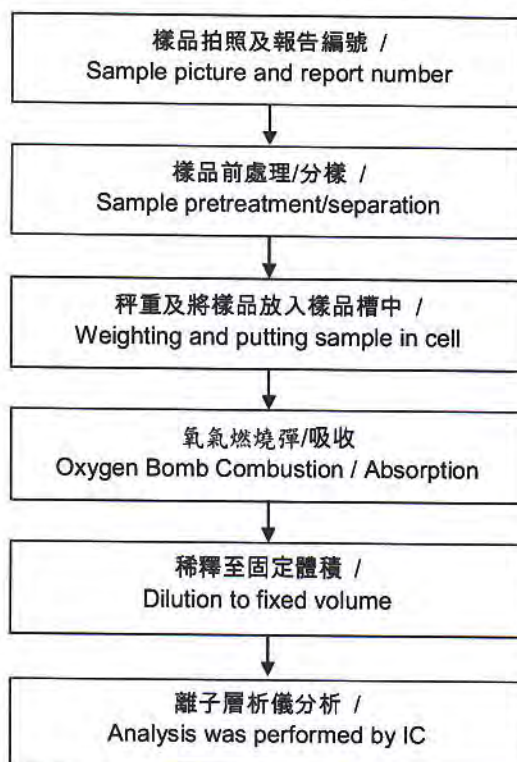
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鹵素分析流程圖 / Analytical flow chart of halogen content

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



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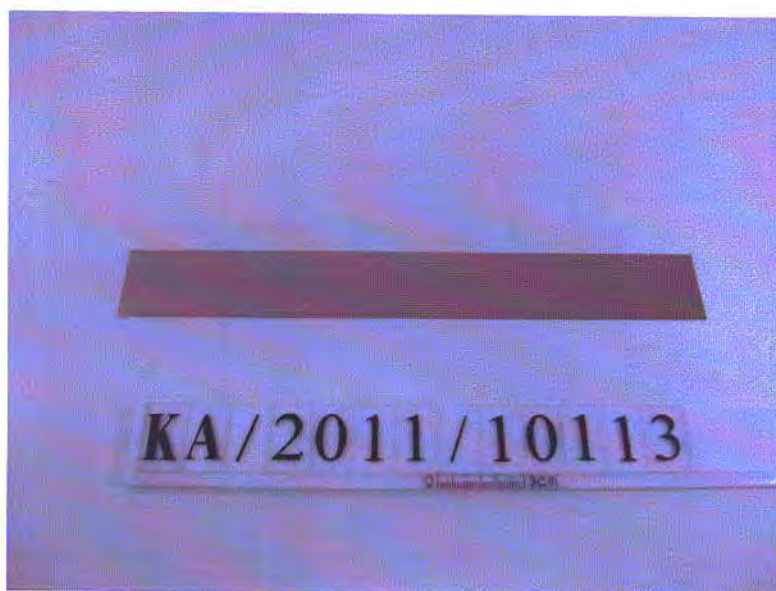
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**** 報告結尾(End of Report) ****

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Test Report

No. : CE/2010/A1945 Date : 2010/10/18 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 : 2010/10/12
Testing Period : 2010/10/12 TO 2010/10/18

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/2010/A1945

Date : 2010/10/18

Page : 2 of 5



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 : 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

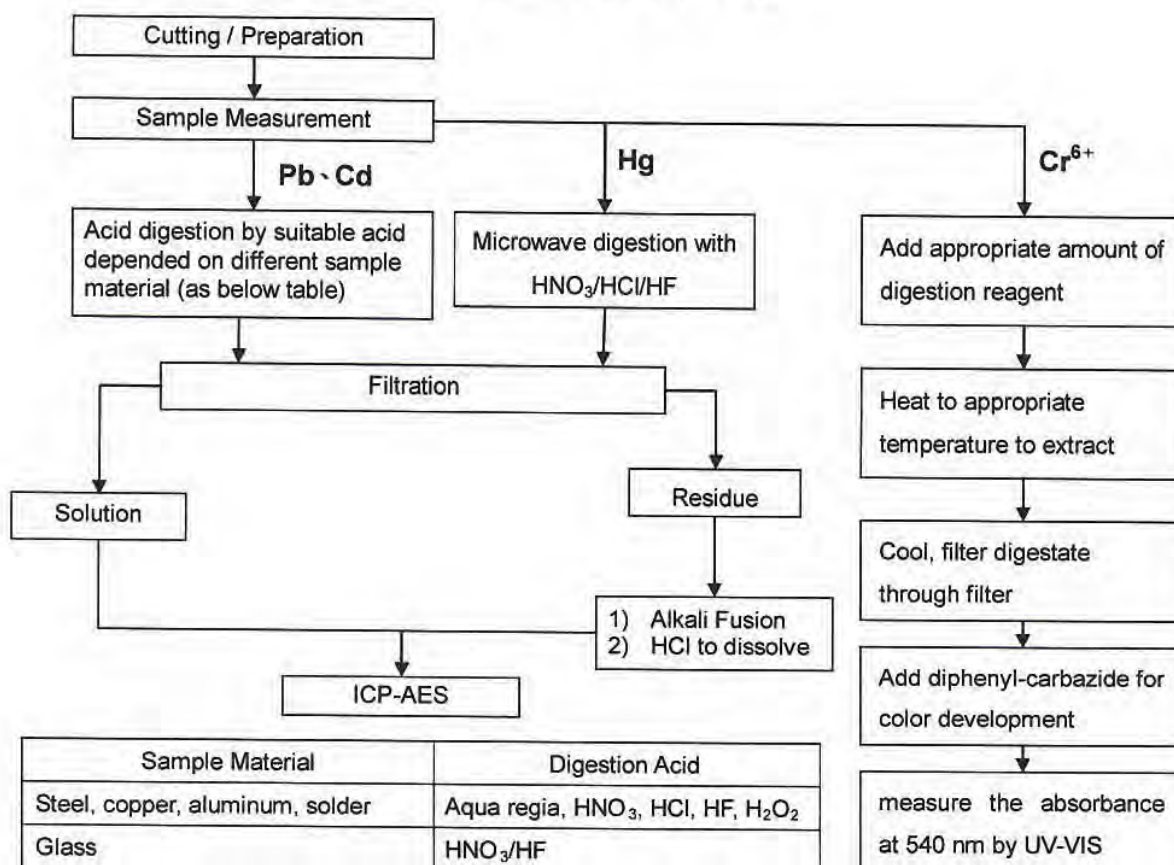
No. : CE/2010/A1945

Date : 2010/10/18

Page : 3 of 5



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



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

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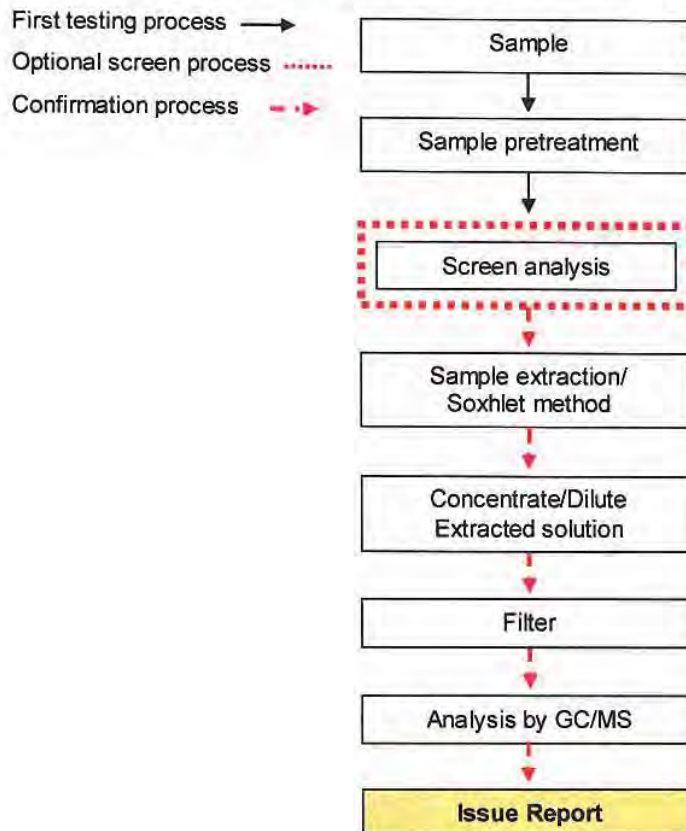
Date : 2010/10/18

Page : 4 of 5



PBB/PBDE analytical FLOW CHART

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



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Test Report

No. : CE/2010/A1945

Date : 2010/10/18

Page : 5 of 5



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Test Report

No. : CE/2010/A1942 Date : 2010/10/18 Page : 1 of 4

HENKEL CORPORATION

HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE,
CALIFORNIA, 92606 U.S.A



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	:	2010/10/12
Testing Period	:	2010/10/12 TO 2010/10/18

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

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

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Test Report

No. : CE/2010/A1942 Date : 2010/10/18 Page : 2 of 4

HENKEL CORPORATION

HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE,
CALIFORNIA, 92606 U.S.A



Test Result(s)

PART NAME No.1 : SILVER COLORED PASTE

Test Item (s):	Unit	Method	MDL	Result No.1
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 (Cl) (CAS No.: 022537-15-1)			50	n.d.
Halogen-Bromine (Br) (CAS No.: 010097-32-2)			50	n.d.
Halogen-Iodine (I) (CAS No.: 014362-44-8)			50	n.d.

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

2. n.d. = Not Detected

3. MDL = Method Detection Limit

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Test Report

No. : CE/2010/A1942 Date : 2010/10/18 Page : 3 of 4

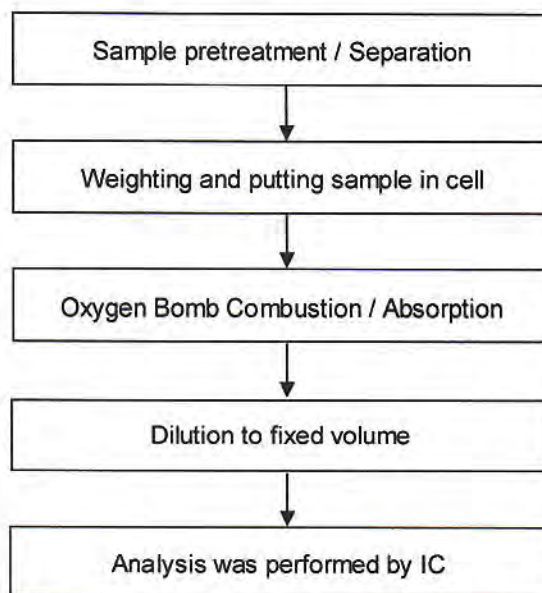
HENKEL CORPORATION

HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE,
CALIFORNIA, 92606 U.S.A



Analytical flow chart of halogen content

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



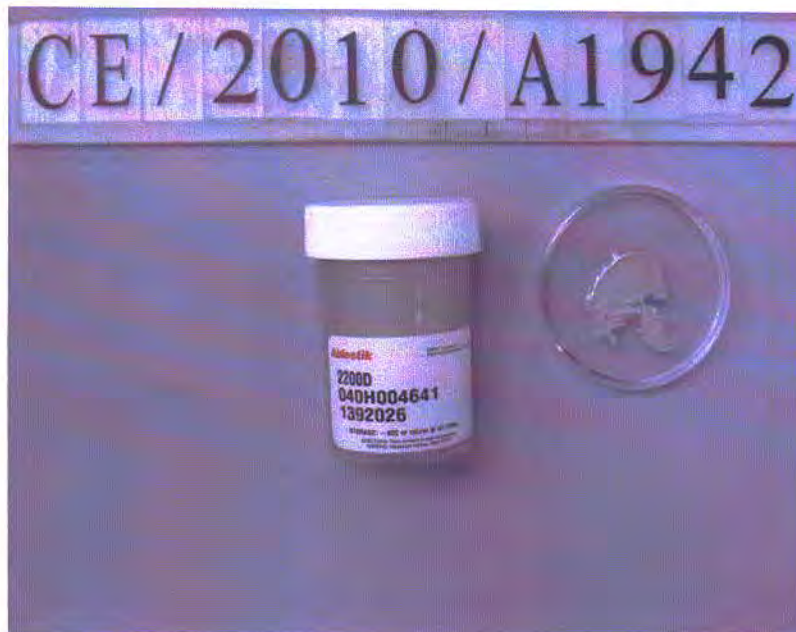
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Test Report

No. : CE/2010/A1942 Date : 2010/10/18 Page : 4 of 4

HENKEL CORPORATION

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Test Report

No. LPCI/24523/10
CTS Ref. CTS/10/4480/MEM

Date : 26/11/2010

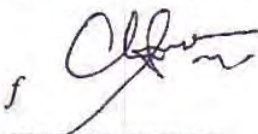
Page: 1 of 5

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

Sample Description : AU WIRE F0
Sample Receiving Date : 22/11/2010
Testing Period : 22/11/2010 to 26/11/2010

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.
Test Method : Please refer to next page(s).
Test Results : Please refer to next page(s).
Analysts : Ng Mei Kheng & Loi Woan Yee

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Test Report

No. LPCI/24523/10
CTS Ref. CTS/10/4480/MEM

Date : 26/11/2010

Page: 2 of 5

Test results:

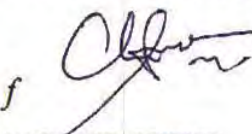
Test Part Description :

Sample Description : AU WIRE F0

RoHS Directive 2002/95/EC

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) by Spot test / boiling water extraction (optional) #	---	With reference to IEC 62321:2008, and performed by UV-VIS Spectrophotometry (boiling water extraction only)	Negative	-
Sum of PBBs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
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
Hexabromobiphenyl	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
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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Test Report

No. LPCI/24523/10
CTS Ref. CTS/10/4480/MEM

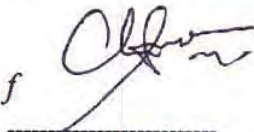
Date : 26/11/2010

Page: 3 of 5

Test Item(s):	Unit	Test Method	Results	MDL
Sum of PBDEs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
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) ## = 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 is included in the sum of PBDE after 01.07.2008
 (e) # = a. Positive means the presence of Cr(VI) on the tested areas
 b. Negative means the absence of Cr(VI) on the tested areas
 For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.
 (f) - = Not regulated

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Test Report

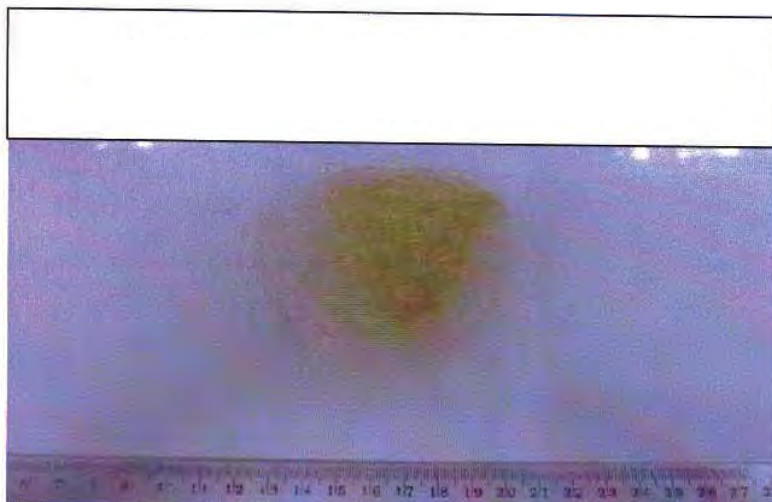
No. LPCI/24523/10
CTS Ref. CTS/10/4480/MEM

Date : 26/11/2010

Page: 4 of 5

Test Part Description :

Sample Description : AU WIRE F0



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Test Report

No. LPCI/24523/10
CTS Ref. CTS/10/4480/MEM

Date : 26/11/2010

Page: 5 of 5

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

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

3. DETERMINATION OF MERCURY CONTENT BY IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.1-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321 2008

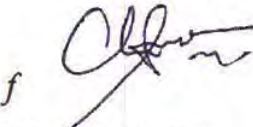
Sample Receiving and Registration
↓
Sample Preparation
↓
Spot-test (Qualitative)
↓
Boiling-water-extraction
↓
Analyses by UV- Spectrophotometer
↓
Test Report

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

Cut sample in small pieces
↓
Weight sample (0.5-2g) into extraction thimble
↓
Soxhlet Extraction with Toluene
↓
Filter through 0.45 µm membrane filter
↓
Analyses by GC-MS (with appropriate dilution)

**** End of Report ****

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Test Report

No. LPCI/01020/11
CTS Ref. CTS/11/0170/Shin

Date : 19/01/2011

Page: 1 of 5

SHIN-ETSU ELECTRONICS (M) SDN BHD
LOT 50, JALAN SERENDAH 26/17, HICOM INDUSTRIAL ESTATE
40000 SHAH ALAM, SELANGOR DARUL EHSAN

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

Sample Description	:	KMC-3580-14F
Sample Received	:	13/01/2011
Testing Date	:	13/01/2011 to 19/01/2011

Test Requested	:	In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.
Test Method	:	Please refer to next page(s).
Test Results	:	Please refer to next page(s).
Analysts	:	Ng Mei Kheng & Loi Woan Yee

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Test Report

No. LPCI/01020/11
CTS Ref. CTS/11/0170/Shin

Date : 19/01/2011

Page: 2 of 5

Test results:

Test Part Description :

Sample Description : KMC-3580-14F

RoHS Directive 2002/95/EC

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 IEC 62321:2008, and performed by UV-VIS Spectrophotometry	N.D.	2
Sum of PBBs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
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
Hexabromobiphenyl	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
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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Test Report

No. LPCI/01020/11
CTS Ref. CTS/11/0170/Shin

Date : 19/01/2011

Page: 3 of 5

Test Item(s):	Unit	Test Method	Results	MDL
Sum of PBDEs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
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) ## = 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 is included in the sum of PBDE after 01.07.2008
 (e) - = Not regulated
 (f) Testing based on original basis

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN
B.Sc.(HONS) AMIC
LAB MANAGER

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**Test Report**

No. LPCI/01020/11
CTS Ref. CTS/11/0170/Shin

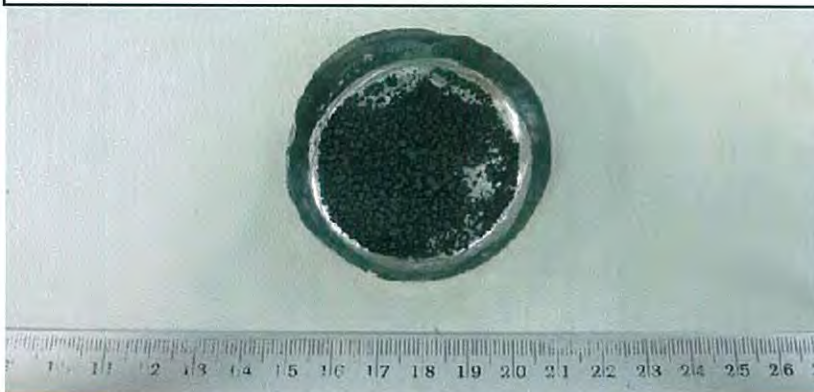
Date : 19/01/2011

Page: 4 of 5

Test Part Description :

Sample Description : KMC-3580-14F

SHIN-ETSU ELECTRONICS (M) SDN BHD
LPCI/01020/11



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Test Report

No. LPCI/01020/11
CTS Ref. CTS/11/0170/Shin

Date : 19/01/2011

Page: 5 of 5

1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321 2008

Sample Receiving and Registration
↓
Sample Preparation
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY IEC 62321 2008

Sample Receiving and Registration
↓
Sample Preparation
↓
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
↓
Sample Preparation
↓
Weight sample (0.1-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321 2008

Sample Preparation
↓
Add colour-developing reagent
↓
Acidify with H₂SO₄
↓
Let stand for 5-10 min
↓
Analyses by UV- Spectrophotometer (540 nm)

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

Sample Preparation
↓
Weight sample (0.5-4.0g) into extraction thimble
↓
Soxhlet Extraction with Toluene
↓
Filter through 0.45 µm membrane filter
↓
Analyses by GC-MS (with appropriate dilution)

**** End of Report ****

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Test Report

No. LPCI/15263/11
CTS Ref. CTS/11/2549/Shin

Date : 04/07/2011

Page: 1 of 4

SHIN-ETSU ELECTRONICS (M) SDN BHD
LOT 50, JALAN SERENDAH 26/17, HICOM INDUSTRIAL ESTATE
40000 SHAH ALAM, SELANGOR DARUL EHSAN

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

Sample Description : KMC-3580P-14F
Sample Receiving Date : 28/06/2011
Testing Date : 28/06/2011 to 04/07/2011

Test Results : Please refer to next page.

Analyst : Eileen Tan Yi Pin

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Test Report

No. LPCI/15263/11
CTS Ref. CTS/11/2549/Shin

Date : 04/07/2011

Page: 2 of 4

Test results by chemical method:

Test Item (s):	Unit	Method	Result	MDL
Halogen	---	---	---	---
Halogen-Fluorine (F)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Fluorine content.	N.D.	50
Halogen-Chlorine (Cl)	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-Iodine (I)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC method for Iodine content.	N.D.	50

Test Part Description:

Sample Description : KMC-3580P-14F

Note : (a) mg/kg = ppm
(b) N.D. = Not Detected
(c) MDL = Method Detection Limit
(d) --- = Not Conducted
(e) Testing based on original basis

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Test Report

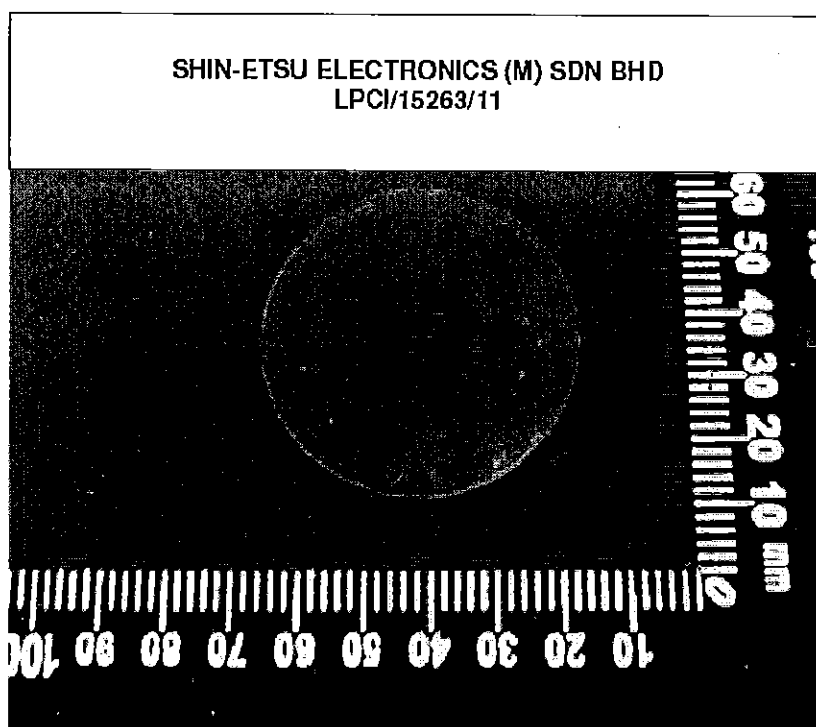
No. LPCI/15263/11
CTS Ref. CTS/11/2549/Shin

Date : 04/07/2011

Page: 3 of 4

Test Part Description :

Sample Description : KMC-3580P-14F



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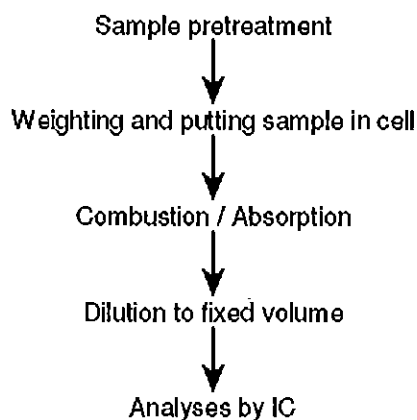
Test Report

No. LPCI/15263/11
CTS Ref. CTS/11/2549/Shin

Date : 04/07/2011

Page: 4 of 4

DETERMINATION OF HALOGEN CONTENT



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Test Report

No. 10229583(8)

Date: April 04, 2011

Page 1 of 8

Sumitomo Bakelite Singapore Pte Ltd
1 Senoko South Road, Singapore

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

Sample Description : EME-G600
Type : Type
Lot No. : 1032046
Manufacturing Date : 05-03-11
Contact Name : Chen Yi Jun
Contact Tel : +65-67503782
Contact Email : yijun@sbs.sumibe.co.jp

Sample Receiving Date : 28-Mar-2011
Testing Period : 28-Mar-2011 to 04-Apr-2011

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 (Ms)
Laboratory Manager

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

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Test Report

No. 10229583(8)

Date: April 04, 2011

Page 2 of 8

Test Result(s):

Sample Description : EME-G600
Type : Type
Lot No. : 1032046
Manufacturing Date : 05-03-11

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
Sum of PBBs	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by GC/MS	n.d.	-	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	-
Sum of PBDE	mg/kg		n.d.	-	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. 10229583(8)

Date: April 04, 2011

Page 3 of 8

Sample Description : EME-G600
Type : Type
Lot No. : 1032046
Manufacturing Date : 05-03-11

Test Item(s)	Unit	Method	Result	MDL
Antimony (Sb)	mg/kg	With reference to US EPA3051A. Analysis was performed by ICP/AES	n.d.	2
Halogen				
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
(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: Jay, Jenny and Jojo

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

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Sample photo:

Sample Description : EME-G600
Type : Type
Lot No. : 1032046
Manufacturing Date : 05-03-11
Sample Submission Qty : 50gm



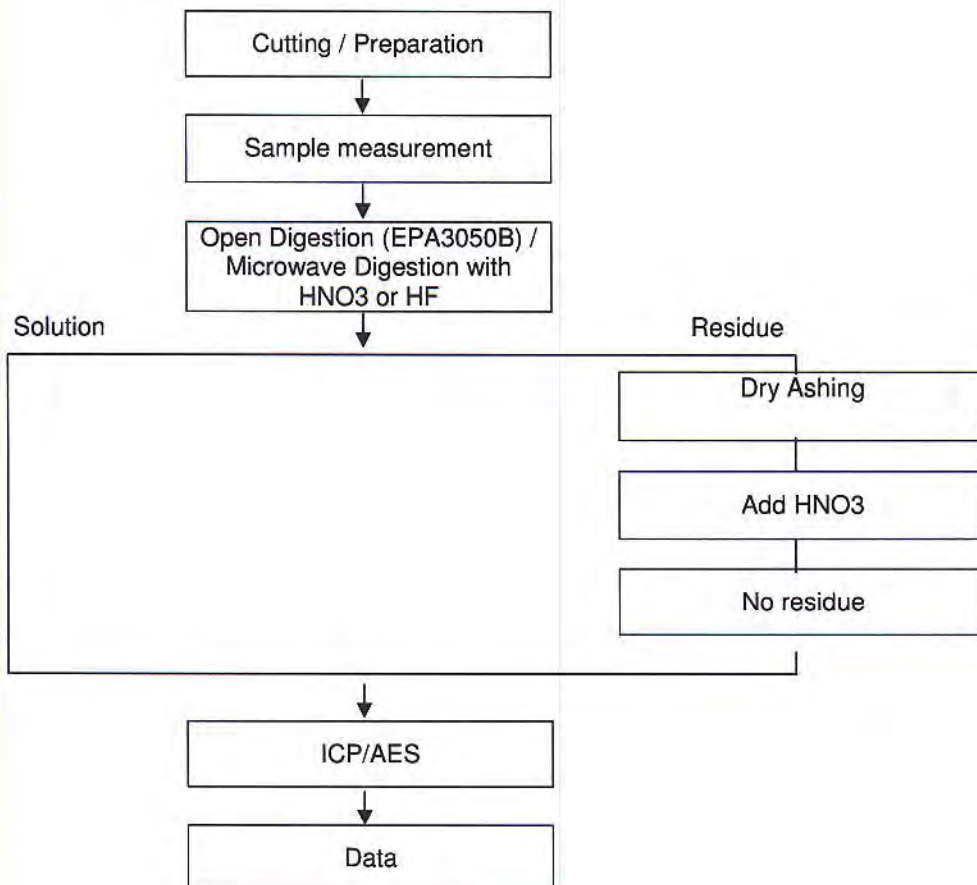
SGS authenticate the photo on original report only

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

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Process Flow of US EPA 3050B/3051A/3052

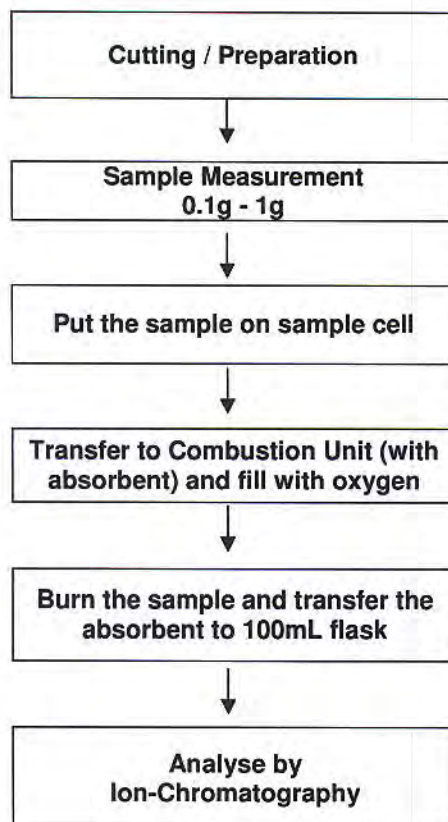


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Process Flow of BS EN 14582 (Halogen Analysis)

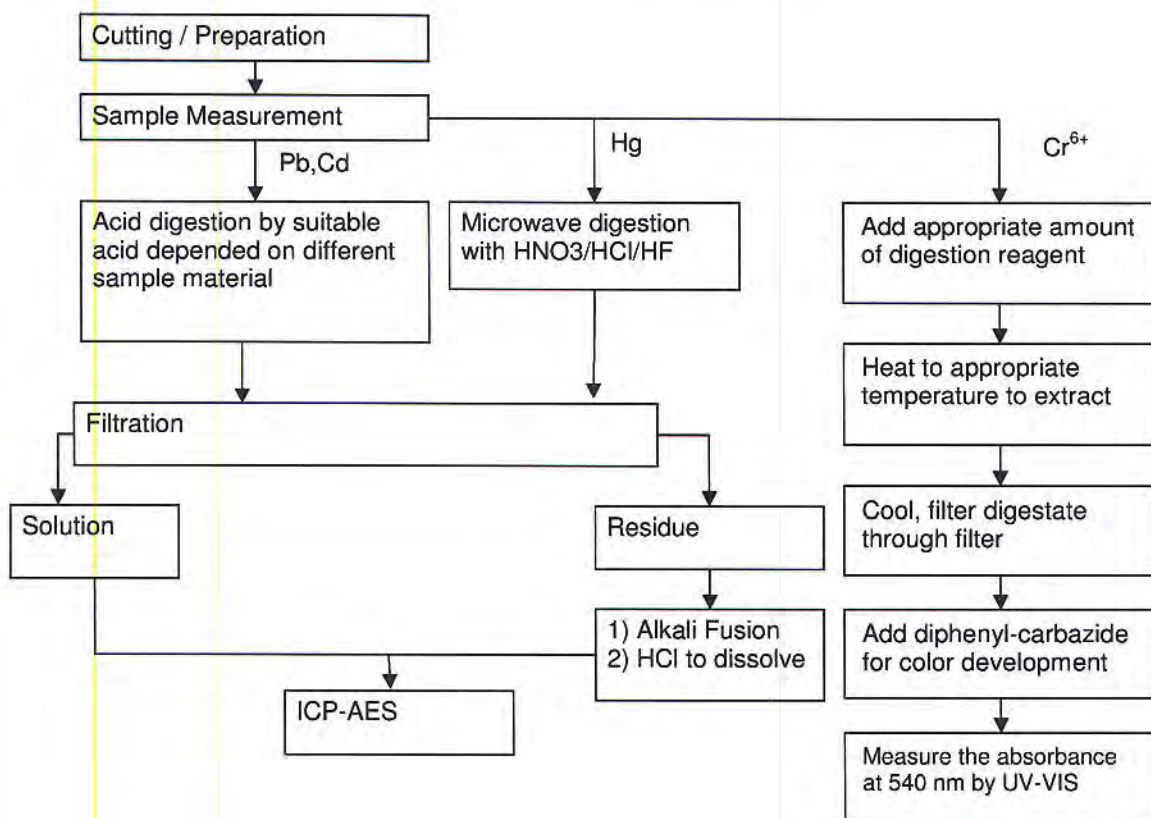


Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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Process Flow of IEC 62321 (Pb, Cd, Hg & Cr⁶⁺)



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

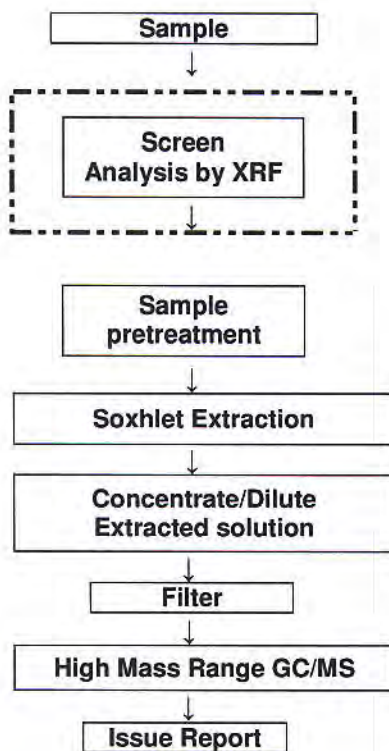
Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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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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