

ICP Test Report Certification Packet

| Company name: | Littelfuse, Inc. |
|--|---|
| Product Series: | 216 series Axial Leaded Fuse |
| Product #: | 216XEP |
| Issue Date: | February 6, 2013 |
| recasting 2002/95/EC)-refor packing/packaging male in addition, it is hereby refor unit parts, the packing | Littelfuse, Inc. that there is neither RoHS (EU Directive 2011/65/EU, estricted substance nor such use, for materials to be used for unit parts, aterials, and for additives and the like in the manufacturing processes. eported to you that the parts and sub-materials, the materials to be used /packaging materials, and the additives and the like in the manufacturing used of the following components. |
| | Issued by: KRISTEEN BACILA <global ehs="" engineer=""></global> |
| (1) Parts, sub-materials | and unit parts |
| | vers the 5x20 Fuse RoHS-Compliant series products manufactured by |
| < Raw Materials U | |
| | measurable substances propriate pages as identifed in Table 1 |
| Remarks : | |



Table 1: List of Raw Materials covered by this report

| Total Parts | Raw Material Part Number | Raw Material Description | Page(s) |
|-------------|--------------------------|-------------------------------|---------|
| 1 | 910-005 | Сар | 3-6 |
| 2 | 692539-002 | Solder | 7-11 |
| 3 | 909-455 | Body | 12-22 |
| 4 | 091251 | Sand Filler (RoHs & Halogens) | 23-29 |
| 5 | 082xxx | Wire-AgCu | 30-34 |
| 6 | C030210 | Overcap | 35-38 |



NO.: A002R12050740-1R02 Date: May. 09, 2012 Page 1 of 4

Customer: SuZhou FuHong Electronic Industrial Co., Ltd.

Address: NO. 89 WEI DU ROAD, WANGTING TOWN, XIANGCHENG DISTRICT, SUZHOU, CHINA

Report on the submitted sample said to be

Sample name: Copper shell

Model: /

Item/Lot No.: / Material: / Buyer: / Supplier: /

Manufacturer: /

Sample received date: May. 07, 2012

Testing period: From May. 07, 2012 to May. 09, 2012

Testing Requested

As specified by client, to determine the Lead, Cadmium, Mercury & Hexavalent Chromium content in the submitted sample in accordance with Directive 2002/95/EC (RoHS).

Testing method:

| Testing Item | Pretreatment method | Measuring instrument | MQL |
|------------------|----------------------------|----------------------|------------|
| Lead (Pb) | IEC 62321: 2008, section 9 | ICP-OES | 2mg/kg |
| Cadmium (Cd) | IEC 62321: 2008, section 9 | ICP-OES | 2 mg/kg |
| Mercury (Hg) | IEC 62321: 2008, section 7 | ICP-OES | 2 mg/kg |
| Chromium (Cr VI) | IEC 62321: 2008, Annex B | UV-VIS | 0.02mg/kg* |

Note:

Conclusion:

-When tested as specified the submitted sample complied with the requirements of commission Decision of 18 Aug 2005 amending Directive 2002/95/EC notified under document 2005/618/EC.

******FOR FURTHER DETAILS, PLEASE REFER TO THE FOLLOWING PAGE(S)******

Signed for and on behalf of Shenzhen AOV Testing Technology Co., Ltd, Kunshan Branch

Project Leader:

Li Tingting, Maggie

Chemical Test Director

Reviewed by: Weik

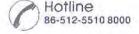
Wang Wexin, Weikin

Technical Director

Approved by:

Yuan Qi, Mickey

Lab Manager



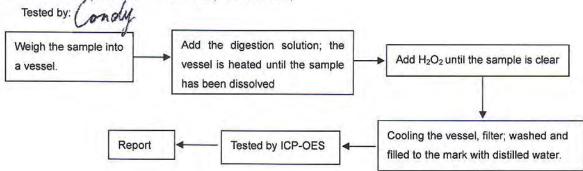
^{-* 0.02} mg/kg refers to the MQL of sample extraction liquid.



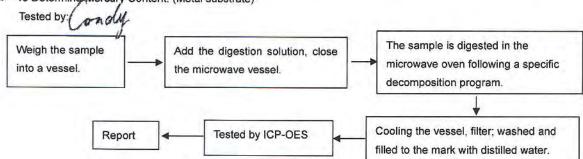
NO.: A002R12050740-1R02 Date: May. 09, 2012 Page 2 of 4

Test Flow:

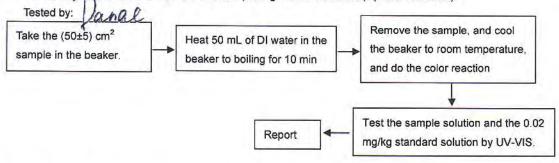
1. To Determine Lead, Cadmium Content: (Metal substrate)



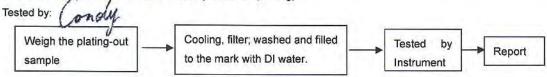
2. To Determine Mercury Content: (Metal substrate)



3. To Determine Hexavalent Chromium Content (boiling- water- extraction): (Metal substrate)



4. To Determine Lead, Cadmium and Mercury Content: (Plating)







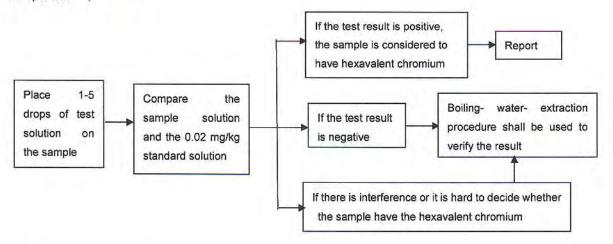
NO.: A002R12050740-1R02

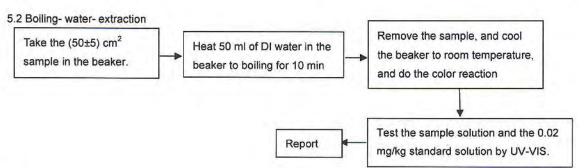
Date: May. 09, 2012

Page 3 of 4

To Determine Hexavalent Chromium Content in colorless and colored chromate coating on metals: (Plating)
 Tested by: 1







Sample Description:

| Code | Sample Description |
|------|--------------------|
| 1-1 | Substrate |
| 1-2 | Plating |

Test Results:

| Item | Unit | RoHS Limit | Results | | |
|-----------------|-------|------------|----------|----------|--|
| _ | | | 1-1 | 1-2** | |
| Lead (Pb) | mg/kg | 1000 | N.D. | N.D. | |
| Cadmium (Cd) | mg/kg | 100 | N.D. | N.D. | |
| Mercury (Hg) | mg/kg | 1000 | N.D. | N.D. | |
| Chromium (CrVI) | mg/kg | 1000 | Negative | Negative | |





NO.: A002R12050740-1R02 Date: May. 09, 2012

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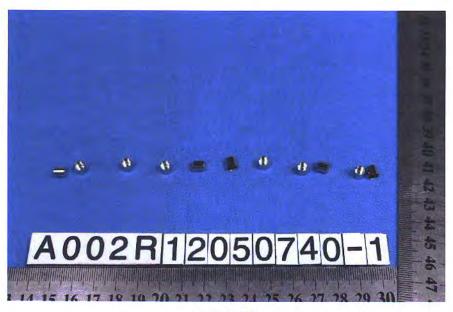
Note:

- -The new RoHS directive 2011/65/EU, on Jul. 21, 2011 come into force, on Jan. 03, 2013 the formal implementation, Directive 2002/95/EC shall be repealed simultaneously.
- -Specimens, which requested to determine Lead, Cadmium and Mercury Content, have been dissolved completely.
- -mg/kg=ppm
- -N.D.=not detected(<MQL)
- -MQL=Method Quantitation Limit
- -Negative=Absence of Cr (VI);
- -Positive=Presence of Cr (VI);

Uncertain= can not verify whether the sample have Hexavalent Chromium by spot-test.

- (The tested sample should be further verified by boiling-water-extraction method if the spot test result is uncertain or negative.)
- -**The test is based on the following assumption: The sample plating is a single layer and each part is uniform. The test result maybe cannot stand for the physical truth of sample plating.
- -Photo is included

Photograph of Sample



Copper shell

End of Report





Test Report

No. SHAEC1216714750

Date: 25 Sep 2012

Page 1 of 5

ZHEJIANG ASIA GENERAL SOLDERING&BRAZING MATERIAL CO., LTD XIHU INDUSTRIAL PARK, SANDUN, HANGZHOU CITY, ZHEJIANG, PROVINCE, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: LEAD-FREE SOLDER WIRE

SGS Job No. :

SP12-028285 - SH

Part No. (P/N):

YTW102 (692539-002)

Composition:

Sn2.0CuRE

Date of Sample Received:

21 Sep 2012

Testing Period:

21 Sep 2012 - 25 Sep 2012

Test Requested:

Selected test(s) as requested by client.

Test Method:

Please refer to next page(s).

Test Results:

Please refer to next page(s).

Conclusion:

Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ Approved Signatory

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Test Report

No. SHAEC1216714750

Date: 25 Sep 2012

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Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description SHA12-167147.043 Silvery wire

Remarks:

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

(1) Determination of Cadmium by ICP-OES.

(2) Determination of Lead by ICP-OES.

(3) Determination of Mercury by ICP-OES.

(4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.

(5) Determination of PBBs / PBDEs by GC-MS.

| Test Item(s) | <u>Limit</u> | <u>Unit</u> | MDL | 043 |
|------------------------------|--------------|-------------|-----------|----------|
| Cadmium (Cd) | 100 | mg/kg | 2 | ND |
| Lead (Pb) | 1000 | mg/kg | 2 | 168 |
| Mercury (Hg) | 1000 | mg/kg | 2 | ND |
| Hexavalent Chromium (Cr(VI)) | - | - | \Q | Negative |
| Sum of PBBs | 1000 | mg/kg | - | ND |
| Monobromobiphenyl | - | mg/kg | 5 | ND |
| Dibromobiphenyl | 4 | mg/kg | 5 | ND |
| Tribromobiphenyl | * | mg/kg | 5 | ND |
| Tetrabromobiphenyl | 4 | mg/kg | 5 | ND |
| Pentabromobiphenyl | 2 | mg/kg | 5 | ND |
| Hexabromobiphenyl | - | mg/kg | 5 | ND |
| Heptabromobiphenyl | - | mg/kg | 5 | ND |
| Octabromobiphenyl | - 2 | mg/kg | 5 | ND |
| Nonabromobiphenyl | = | mg/kg | 5 | ND |
| Decabromobiphenyl | 2 | mg/kg | 5 | ND |
| Sum of PBDEs | 1000 | mg/kg | - | ND |
| Monobromodiphenyl ether | - | mg/kg | 5 | ND |

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| Test Report | No. SHAEC121671475 | 50 | Date: 25 | Sep 2012 | Page 3 of 5 |
|--------------------------|--|-------------|----------|------------|-------------|
| Test Item(s) | <u>Limit</u> | <u>Unit</u> | MDL | <u>043</u> | |
| Dibromodiphenyl ether | The state of the s | mg/kg | 5 | ND | |
| Tribromodiphenyl ether | Sian . | mg/kg | 5 | ND | |
| Tetrabromodiphenyl ether | (*) | mg/kg | 5 | ND | |
| Pentabromodiphenyl ether | , i | mg/kg | 5 | ND | |
| Hexabromodiphenyl ether | 4 | mg/kg | 5 | ND | |
| Heptabromodiphenyl ether | 4 | mg/kg | 5 | ND | |
| Octabromodiphenyl ether | - | mg/kg | 5 | ND | |
| Nonabromodiphenyl ether | | mg/kg | 5 | ND | |
| Decabromodiphenyl ether | - | mg/kg | 5 | ND | |

Notes:

- (1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II
- (2) Spot-test:

Negative = Absence of Cr(VI) coating, Positive = Presence of Cr(VI) coating;

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

◇Boiling-water-extraction:

Negative = Absence of Cr(VI) coating

Positive = Presence of Cr(VI) coating; the detected concentration in 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.

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Test Report

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Date: 25 Sep 2012

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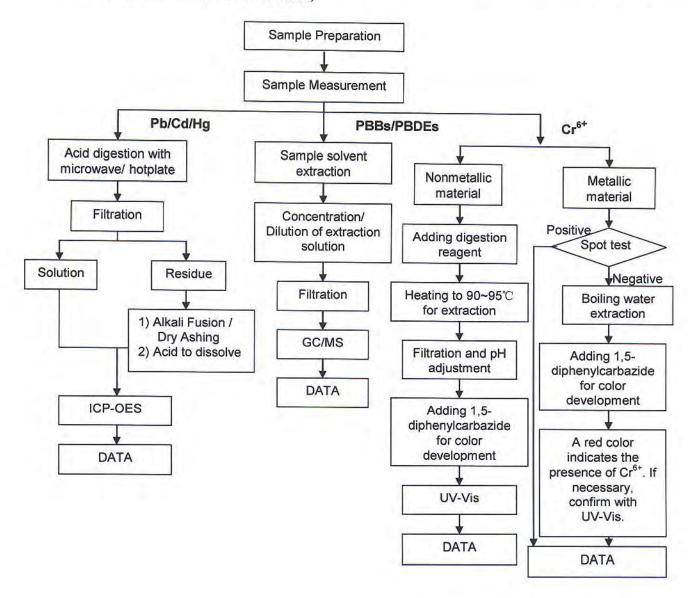
ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu

2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Linda Li

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



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Sample photo:



SGS authenticate the photo on original report only

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號碼(No.): CF/2012/37057 日期(Date): 2012/04/05 頁數(Page): 1 of 11

Test Report

永晉電瓷股份有限公司 / YUEN JINN ELECTRICAL CERAMIC CO., LITD. (永晉宣瓷(蘇州)有限公司 / YUEN JINN ELECTRICAL CERANTC (SUZHOU) CO., [7]).) 新北市樹林區豐林街40號 / NO. 40, FENG LIN ST., SHU LIN DIST., NEW TAIPE! CITY, TAIWAN (江蘇省吳江市松陵鎮江陵西路 / JIANG LING WEST ROAD SONG LING TOWN WU JIANG CITY JIANG SU CHINA P. R. C.)

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

樣品名稱(Sample Description)

identified by/on behalf of the client as):

: CERAMIC BASE (陶瓷體)

樣品型號(Style/Item No.)

: YJ50/YJM

批號(Barch No.)

: A28

收件日期(Sample Receiving Date)

: 2012/3/28

測試期間(Testing Period)

: 2012/3/28 TO 2018/04/05

測試結果(Test Results)

請見下一頁 (Please refer to next pages).

結論(Conclusion)

根據客户所提供的樣品。其錫、鉛、汞、六價鉻、多溴聯苯及多溴聯苯醚的測試結果符合 RollS指令2002/95/EC的更新指令9111/65/ED之要求 (Based on the performed tests on submitted samples, the test results of Cadmium, Lead. Mercury. Hexavalent Chromium Cr(VI), PBBs and PBDEs comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.)

Chenyu Kung / Signed for and on behalf on SGS TAIWAN LTD. Chemical Laboratory - Taipei

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ACCUPATION OF THE REPORT OF THE PARTY OF THE



Test Report

日期(Date): 2012/04/05 頁數(Page): # 11 魏码(No.): CE/2012/37057

永晉電瓷股份有限公司 / YUEN JINN ELECTRICAL GERAMIC CO., LTD. (永晉電瓷(蘇州)有限公司 / YUEN JINN ELECTRICAL CERAMIC (SUZHOU) CO., LTD.) 新北市樹林區豐林街40號 / NO. 40, FENG LIN ST., SHU LIN DIST., NEW TAIPEI CITY, TAIWAN (江蘇省吳江市松陵鎮江陵西路 / JIANG LING WEST ROAD SONG LING TOWN WU JIANG CITY JIANG SH CHINA P. R. C.)

测试结果(Test Results)

测试部位(PART NAME)No.1

白色陶瓷 (WHITE CERAMIC)

| 測試項目 (Test liems) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限値 (MDL) | 結果 (Result) No.1 | 法规 限值 (Limis) |
|--|--------------|--|----------------------|------------------------|---------------------|
| 鎬 / Cadmium (Cd) | mg/kg | 麥考1HX 62321: 2008方法,以感應耦合電 | 2 | n.d. | 100 |
| 鉛 / Lead (Pb) | mg/kg | 業原子發射光譜儀檢測. / With reference to NXC 62321: 2008 and performed by | 3 | 16 | 1000 |
| 汞 / Mercury (Ng) | mg/kg | ICP-AES. | 2 | n.d. | 1000 |
| 去價絡 d Hexavalent Chromium Cn(VI) | mg/kg | 参考(EC 6232): 2008方法,以UV-VIS檢測, / With reference to IEC 62321: 2008 and performed by UV VIS. | 2 | n.d. | 1000 |
| 会換環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4) | mg/kg | 參考US EPA 3540C方法,以氣相層析/質譜 儀檢測。/ With reference to US EPA 354UC method, Analysis was performed by GC/MS. | - 5 | n.d. | |
| 全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Sali, Amide) | mg/kg | 参考US EPA 3540C: 1996方法,以液相唇析/質譜儀檢測全藏辛烷磺酸含量. / With reference to US EPA 3540C: 1996 method for PPOS Content. Analysis was performed by LC/WS. | | n.d. | - 3 |
| 全氣辛酸(銨) / PYOA (CAS No.; 335-67-1) | mg/kg | The second secon | - | n.d. | |
| 鄭苯二甲酸甲苯基丁酯 / BBP (Mensyl buryl phihalate) (CAS No.: 85-68-7) | * | 參考EN 14372, 以氣相層析/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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Test Report

號碼(No.): CE/2012/37057 頁数(Page): 3 of 11 日期(Date): 2018/04/05

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| 測試項目 (Test Items) | 單位 (Unit) | 测试方法 (Method) | 方法偵測 極限値 (MDL.) | 結果 (Resuli) No.1 | 決規 限値 (Limit) |
|--|---|--|-----------------------|------------------------|---------------------|
| 鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-sthylhoxyl) phthalate) (CAS No.: 117-81-7) | 36 | 参考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0,003 | N-W- | - |
| 鄰苯二甲酸二異癸酯 / DIDP (Di- isodecyl phthalate) (CAS No.s 26761-46-0) | Đ, | 參考EN 14372, 以氣相層析/質譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS. | 0.01 | n.d. | 3€, |
| 郵苯二甲酸二異去酯 / DINP (Di- isononyl phthalate) (CAS No.: 28553-12-0) | Sign Sign Sign Sign Sign Sign Sign Sign | 參考EN 14372。以氣相層析/質譜儀檢測之. / With reference to RN 14372. Analysis was performed by GC/MS. | 0.01 | nede | ÷ |
| 鄰苯二甲酸二正辛酯 / DNOP (Di-n- octyl phthalate) (CAS No.: 117- 84-0) | * | 多考FN 14372, 以氣相層析/實譜儀檢測之. / With reference to EN 14372. Analysis was performed by GC/MS. | 0.003 | n.d. | |
| 都苯二甲酸二丁酯 / DBP (Dibuty) phihalate) (CAS No.; 84-74-2) | 70. | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | | n.d. | |
| 商素 / Halogen | | | | | |
| 鹵素 (氣) / Halogen-Pluorine (F) (CAS No.: 14762-94-8) | mg/kg | | 1.5() | n.d. | |
| 鹵素(氦)/ Halogen-Chlorine (CI) (CAS No.: 22537-15-I) | mg/kg | 參考RS EN 1/1582:2007、以離子層析儀分析: / With reference to BS EN | 50 | ग ∍ लें +। | - |
| 鹵素(溴)/ Halogen-Bromine (Br) (CAS No.: 10097-32-2) | mg/kg | 14582:2007. Analysis was performed by IC. | :50 | n.d. | - |
| 鹵素 (碘) / Halogen-Indine (1) (CAS No.: 14362-44-8) | nig/kg | | .50 | n.d. | |

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Test Report

號稿(No.): CE/2012/37057 日期(Date): 2012/04/05 頁數(Page): 4 of 11

BULLEY TRANSPORT STREET, WAS ALL THE 永會電瓷股份有限公司 / YUEN JINN ELECTRICAL CERAMIC CO., LTD.

(永晉電瓷(蘇州)有限公司 / YUEN JINN ELECTRICAL CFRAMIC (SUZHOU) CO., LTD.) 新北市樹林區豐林街40號 / NO. 40、FENG LIN ST., SHU LIN DIST., NEW TAIPEI CITY, TAIWAN (江蘇省吳江市松陵鎮江陵西路 / JIANG LING WEST ROAD SONG LING TOWN WU JIANG CITY JIANG SU CHINA P. R. C.)

| 測試項目 (Test Items) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限値 | 結果 (Result) | 法規. 限值 |
|----------------------------------|--------------|--|-------------|----------------|-----------|
| (lest frems) | (duit) | (method) | (MDL.) | No.: I | (Limit.) |
| 多溴磷苯總和 / Sum of PBBs | ng/kg | | - 0×0 | n.d. | 1000 |
| 一溴聯苯 / Manabramabiphenyl | mg/kg | | 5 | n.d. | - è - |
| 二溴聯苯 / Dibromobiphenyl | mg/kg | | В | क और | 4 |
| 三溴聯苯 / Tribromobiphenyl | mg/kg | | 5 | ii ali | e_ |
| 四溴聯苯 / Tetrabromobiphenyl | mg/kg | | 5 | n.d. | |
| 五溴醇苯 / Pentabromobiphonyl | mg/kg | | 5 | n.d. | 1 |
| 六溴聯苯 / Hexabramohiphonyl | mg/kg | | 5 | n.d. | |
| 七溴聯苯 / Heptabromobipheny! | ng/kg | | 5 | n.d. | 1 |
| 八溴聯基 / Octabromobipheoy! | mg/kg | | 5 | n.d. | - |
| 九後聯苯 / Nonabramahijhenyl | mg/kg | a second control of the second control of th | 5 | n.d. | ÷ |
| 十溴聯苯 / Decahromolijpheny! | mg/kg | 參考IEC 69321: 2008方法, 以氣相層析儀/ | 5 | n.d. | X |
| 多溴聯苯醚總和 / Sum of PBDEs | mg/Rg | 質譜儀檢測,/ With reference to LEC 62321: 2008 and performed by GC/MS, | 112 | m.d. | 1000 |
| 一溴聯苯醚 / Mamabramadiphenyl ether | mg/kg | uzuzi. sind and periorised by sorner | 5 | n.d. | |
| 二溴聯苯醚 / Dibrowediphenyl ether - | mg/kg | | 5 | n.d. | 7 8 |
| 三溴聯苯醚 / Tribromodiphenyl ather | - mg/kg | | 5 | n.d. | 100 |
| 四溴聯苯醚 / Telrabromodiphecyl ether | mg/kg | | 6 | n.d. | - |
| 五溴聯苯醚 / Pentabramadighenyl ether | mg/kg | | 5 | n.d. | 1 |
| 六溴聯苯醚 / Hexabromodiphenyl ether | mg/kg | | 5 | n.d. | |
| 七溴聯苯醚 / Heptabromodiphenyl ciber | mg/kg | | Đ. | n.d. | 1 |
| 入溴聯苯醚 / Octabrosodiphenyl other | mg/kg | | .57 | n.d. | |
| 九溴聯苯醚 / Nanabramadiphenyl other | mg/kg | | 5 | n.d. | 1000 |
| 十溴哪苯醚 / Decabromodiphonyl ether | mg/kg | 1 | - Z | mod: | 100 |

備註(Note):

1. mg/kg = ppm; 0. (web = 1000ppm

3. n.d. = Not Delected (未检出)

8. MDL = Method Detection Limit (方法侦测極限值)

4, "-" = Not Regulated (無規格值)

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PPOS參考資訊(Reference Information): 持久性有機污染物 POPs (EU) 757/2010

PPOS濃度在物質或製備中不得超過0,001%(10ppm),在半成品,成品或零部件中不得超過0.1%(1000ppm),在紡織品或 塗層材料中不得超過Tug/m?。

(Outlawing PPOS as substances or proparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textites or other coated materials above lug/m?.)

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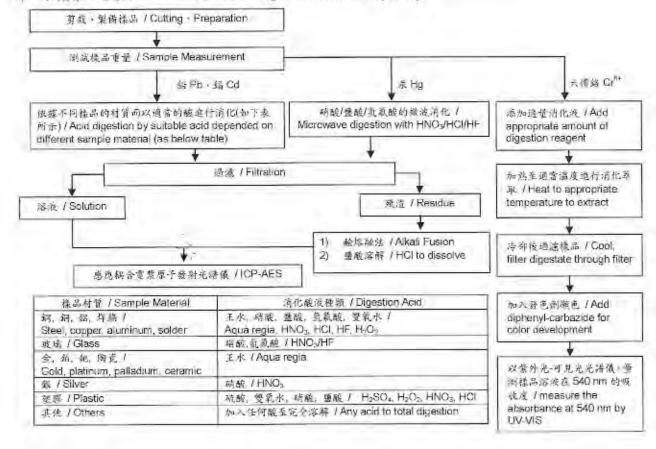
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號稿(No.): CE/2012/37057 日期(Date); 2012/04/05 頁數(Page); 6 nf II

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SERVICE OF CONTROL SHOWING MADE IN THE

- 根據以下的流程圖之條件,樣品已完全溶解。(云價格測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁰⁺ test method excluded)
- 测试人员:畸登修 / Name of the person who made measurement: Climbgreat Yang
- 测试负责人: 张序典 / Name of the person in charge of measurement. Troy Chang 3)



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CHINA P. R. C.)

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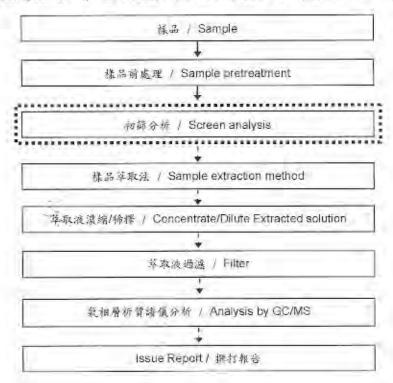
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分析流程圖 / Analytical flow chart

- 测式人员: 翁賜彬 / Name of the person who made measurement: Roman Wong
- 测试负责人: 张啓與 / Name of the person in charge of measurement: Troy Chang 【测试项目(Test Items): 多溴聯苯/多溴聯苯醚、四溴雙酚-A-雙 / PBB/PBDE, TBBP-A-bis 】

验染测试程序 / First testing process → 連絡技術序 / Optional screen process • • • ● 確認程序 / Confirmation process ← • ▶



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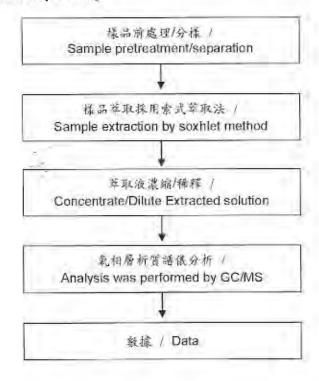
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索式萃取分析流程圖 / Analytical flow chart of Soxhlet extraction (GC/MS) procedure

- 割試人員:翁賜夥 / Name of the person who made measurement. Roman Wong
- 測試負責人: 張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目:可塑劑、苯並三唑類化合物、六溴環十二烷、壬酚、單甲基二溴二苯基甲烷、 有機磷化合物 / Test Items: Phthalate、Benzotriazole、HBCDD、NP、DBBT、Organic phosphorus compounds]



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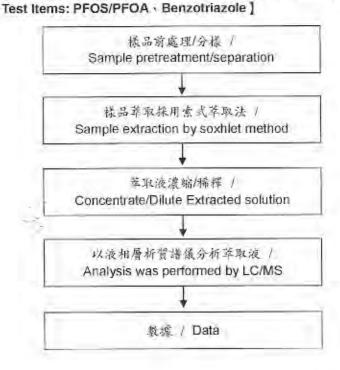
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索式萃取分析流程圖 /

Analytical flow chart of Soxhlet extraction (LC/MS) procedure

- 测载人员: 翁赐彬 / Name of the person who made measurement: Roman Wong
- 测試負責人士張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目:全氣辛烷磺酸/全氟辛酸(錠)、苯並三唑類化合物/



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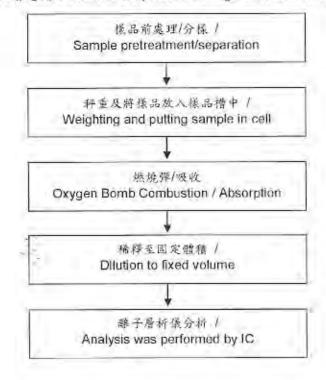
號碼(No.): CB/2012/37057 日期(Date): 2012/04/05 頁數(Page): 10 of 11

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

- 1) 测試人員: 陳思臻 / Name of the person who made measurement: Rita Chen
- 2) 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang



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

CE/2012/37057

** 報告結尾 (End of Report) **

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Number: TWNC00282887 Test Report

Littelfuse Philippines Inc. Applicant:

Date : Oct 31, 2012

LIMA Technology Center, Lipa City,

Malvar, Batangas

Sample Description:

One (1) group of submitted samples said to be :

Part Description : Filler : 091251 Part Number

: Oct 24, 2012 Date Sample Received Date Test Started : Oct 25, 2012

Test Conducted :

As requested by the applicant, for details please refer to attached pages.

Authorized By: On Behalf Of Intertek Testing Services Taiwan Limited



K. Y. Liang Director





Test Conducted

(I) Test Result Summarv:

|) Test Result Summary : | |
|--|-------------------|
| Togt Itom | Result (ppm) |
| Test Item | Submitted Samples |
| Heavy Metal | |
| Cadmium (Cd) content | ND |
| Lead (Pb) content | ND |
| Mercury (Hg) content | ND |
| Chromium VI (Cr ⁶⁺) content | ND |
| Polybrominated Biphenyls (PBBs) | |
| Monobrominated Biphenyls (MonoBB) | ND |
| Dibrominated Biphenyls (DiBB) | ND |
| Tribrominated Biphenyls (TriBB) | ND |
| Tetrabrominated Biphenyls (TetraBB) | ND |
| Pentabrominated Biphenyls (PentaBB) | ND |
| Hexabrominated Biphenyls (HexaBB) | ND |
| Heptabrominated Biphenyls (HeptaBB) | ND |
| Octabrominated Biphenyls (OctaBB) | ND |
| Nonabrominated Biphenyls (NonaBB) | ND |
| Decabrominated Biphenyl (DecaBB) | ND |
| Polybrominated Diphenyl Ethers (PBDEs) | |
| Monobrominated Diphenyl Ethers (MonoBDE) | ND |
| Dibrominated Diphenyl Ethers (DiBDE) | ND |
| Tribrominated Diphenyl Ethers (TriBDE) | ND |
| Tetrabrominated Diphenyl Ethers (TetraBDE) | ND |
| Pentabrominated Diphenyl Ethers (PentaBDE) | ND |
| Hexabrominated Diphenyl Ethers (HexaBDE) | ND |
| Heptabrominated Diphenyl Ethers (HeptaBDE) | ND |
| Octabrominated Diphenyl Ethers (OctaBDE) | ND |
| Nonabrominated Diphenyl Ethers (NonaBDE) | ND |
| Decabrominated Diphenyl Ether (DecaBDE) | ND |
| Halogen Content | |
| Fluorine (F) | ND |
| Chlorine (Cl) | ND |
| Bromine (Br) | ND |
| Iodine (I) | ND |

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg

ND = Not detected

Responsibility of Chemist : Irene Chiou / Kevin Liu / Cathy Chen

Date Sample Received : Oct 24, 2012

Test Period : Oct 25, 2012 To Oct 30, 2012





Test Conducted

(Ⅱ) RoHS Limits:

| Restricted Substances | <u>Limits</u> |
|---|----------------|
| Cadmium (Cd) Content | 0.01% (100ppm) |
| Lead (Pb) Content | 0.1% (1000ppm) |
| Mercury (Hg) Content | 0.1% (1000ppm) |
| Chromium VI (Cr ⁶⁺) Content | 0.1% (1000ppm) |
| Polybrominated Biphenyls (PBBs) | 0.1% (1000ppm) |
| Polybrominated Diphenyl Ehters (PBDEs) | 0.1% (1000ppm) |

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.

(Ⅲ) Test Method:

| Test Item Test Method | | Reporting Limit |
|---|---|-----------------|
| Cadmium (Cd) content | With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES. | 2 ppm |
| Lead (Pb) content | 2 ppm | |
| Mercury (Hg) content | Idigestion until the tested samples | |
| Chromium VI (Cr ⁶⁺) content | With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer. | 1 ppm |





Test Conducted

(Ⅲ) Test Method:

| Test Item | Test Method | Reporting Limit |
|--|---|-----------------|
| With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. | | 5 ppm |
| With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent Diphenyl Ethers extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. | | 5 ppm |
| Halogen Content | With reference to EN 14582:2007 by calorimetric bomb with oxygen and determined by Ion Chromatograph. | 50 ppm |

Remark: Reporting limit = Quantitation limit of analyte in sample



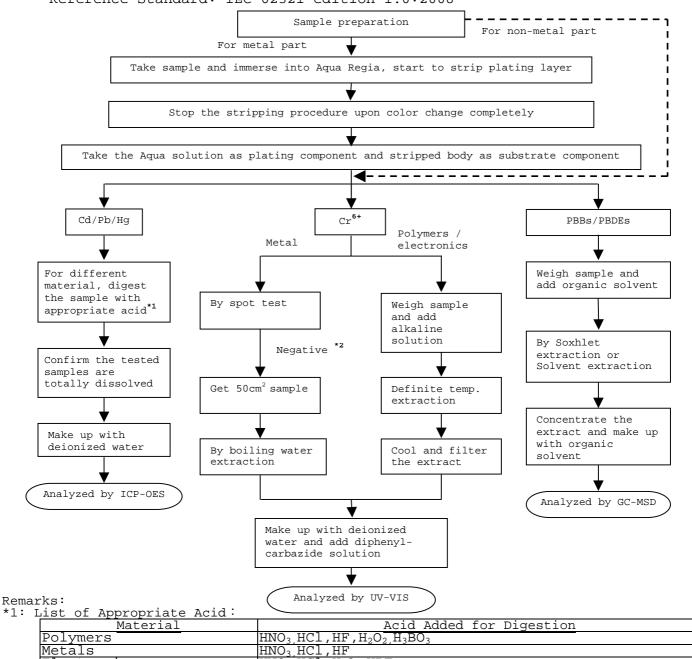


Test Conducted

(IV) Measurement Flowchart:

Electronics

Test for Cd/Pb/Hg/Chromium (VI)/PBBS/PBDES Contents Reference Standard: IEC 62321 edition 1.0:2008



*2: If the result of spot test is positive, Chromium VI would be determined as detected.

HNO3 HCl, H2O2 HBF4

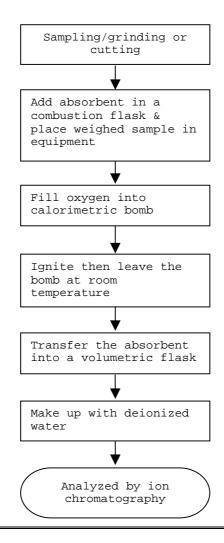




Test Conducted

(N) Measurement Flowchart:

Test for Halogen Content Reference Standard: EN 14582



End of Report

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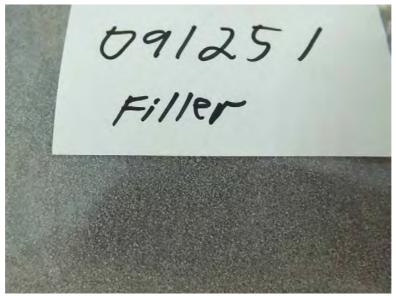


Test Conducted

Number: TWNC00282887

Photo









Test Report Number: SHAH0036227401

Applicant: ELSCHUKOM ELEKTROSCHUTZKOMPONENTENBAU

GEWERBESTRASSE 87, D-98669 VEILSDORF,

GERMANY

Sample Description:

Two(2) pieces of submitted samples said to be:

(1) Mixed all kinds of metal substrates.

(2) Mixed all kinds of plating layers.

Item Name : Silver Plated & Pure Silver Wires.

Item No. : (B-1) 101.014 -. ----

- silver plated copper wire - Cu, Ag--%

(B-2) 101.0131.----

- pure silver wire - Ag 1000

(B-3) 101.0123.0---

- silver plated purest nickel wire - Ni99.98%, Ag1%

(B-4) 101.0182.0---

- silver-copper alloy plated copper plated iron nickel alloy wire

Date:

JAN 18, 2013

- ElconD, AgCu5%

(B-5) 101.0120.0---

- silver plated constantan wire - CuNi44, Ag5%

(B-6) 101.0151.0---

- silver plated copper - nickel 44 alloy wire

- CuNi44, Ag10%

(B-7) 1050--31.----

pure silver strips – Ag 1000 pure

Country Of Origin Germany.

Tests Conducted:

As requested by the applicant, for details refer to attached page(s).

To Be Continued

Authorized by:

For intertek testing services Ltd., Shanghai

Jacob Lin

General Manager





Test Report SHAH0036227401 Number:

Tests Conducted

(A) Test result of RoHS Directive:

| Testing item | <u>Result</u> | |
|--|---------------|--|
| resund item | (1) | |
| Cadmium (Cd) content (mg/kg) | ND | |
| Lead (Pb) content (mg/kg) | ND | |
| Mercury (Hg) content (mg/kg) | ND | |
| Chromium (VI)(Cr ⁶⁺) result (by boiling water extraction on metal) (mg/kg with 50cm ²) | ND | |

| Testing item | Result | | |
|---|--------|--|--|
| resung item | (2) | | |
| Cadmium (Cd) content (mg/kg) /Plating | ND | | |
| Lead (Pb) content (mg/kg) /Plating | ND | | |
| Mercury (Hg) content (mg/kg) /Plating | ND | | |
| Chromium (VI)(Cr ⁶⁺) result (by boiling water extraction on metal) (mg/kg with 50cm ²) /Plating | ND | | |

Remark: mg/kg with 50cm² = milligram per kilogram with 50 square centimeter

ND = not detected

(B) RoHS Requirement:

| (B) None requirement. | |
|-----------------------------------|-------------------|
| Restricted substances | Limits |
| Cadmium (Cd) | 0.01% (100 mg/kg) |
| Lead (Pb) | 0.1% (1000 mg/kg) |
| Mercury (Hg) | 0.1% (1000 mg/kg) |
| Chromium (VI) (Cr ^{o+}) | 0.1% (1000 mg/kg) |

The above limits were quoted from RoHS Directive 2011/65/EU for homogeneous material.

(C) Test method:

| Testing item | Testing method | Reporting limit |
|---|--|--|
| Cadmium (Cd) content | determined by ICP-OES. | 2 mg/kg |
| Lead (Pb) content | determined by ICP-OES. | 2 mg/kg |
| Mercury (Hg) content | With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES. | 2 mg/kg |
| Chromium (VI) (Cr ⁶⁺) content (for metal) | With reference to IEC 62321 Edition 1.0: 2008, by boiling water extraction and determined by UV-VIS Spectrophotometer. | 0.02mg/kg with 50cm ² (in testing solution) |

Date sample received: Jan.14, 2013 Testing period: Jan.14, 2013 To Jan.17, 2013

To Be Continued

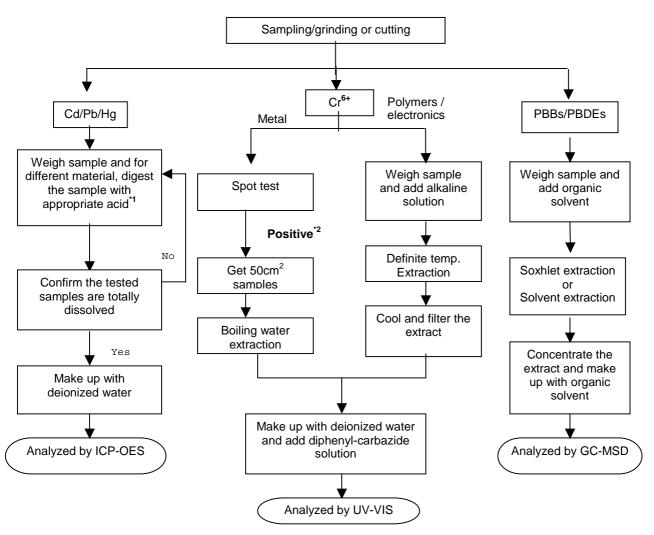


Test Report Number: SHAH0036227401

Tests Conducted

(D) Measurement flowchart:

Test for Cd/Pb/Hg/Cr (VI)/PBBs/PBDEs contents Reference standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: list of appropriate acid:

| | . appropriate actar | | | | | |
|---|-----------------------------------|--|--|--|--|--|
| ĺ | Material Acid added for digestion | | | | | |
| ĺ | Polymers | HNO ₃ ,HCL,HF,H ₂ O ₂ ,H ₃ BO ₃ | | | | |
| | Metals | HNO ₃ ,HCL,HF | | | | |
| ſ | Electronics | HNO_{3} , HCL , $H_{2}O_{2}$, HBF_{4} | | | | |

*2: If the result of spot test is positive, Chromium VI would be determined as detected.

To Be Continued



Test Report Number: SHAH0036227401



To Be Continued



Test Report Number: SHAH0036227401

Tests Conducted



End Of Report

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NO.: A002R121008024-2R02

Date: Oct.10, 2012

Page 1 of 4

Customer: SuZhou FuHong Electronic Industrial Co., Ltd.

Address: NO. 89 WEI DU ROAD, WANGTING TOWN, XIANGCHENG DISTRICT, SUZHOU, CHINA

Report on the submitted sample said to be

Sample name: Lead wire copper shell

Model: /

Item/Lot No.: /

Material: /

Buyer: /

Supplier: / Manufacturer: /

Comple resolved date.

Sample received date: Oct. 08, 2012

Testing period: From Oct. 08, 2012 to Oct. 10, 2012

Testing Requested

As specified by client, to determine the Lead, Cadmium, Mercury & Hexavalent Chromium content in the submitted sample in accordance with Directive 2002/95/EC (RoHS).

Testing method:

| Testing Item | Pretreatment method | Measuring instrument | MQL |
|------------------|----------------------------|----------------------|------------|
| Lead (Pb) | IEC 62321: 2008, section 9 | ICP-OES | 2mg/kg |
| Cadmium (Cd) | IEC 62321: 2008, section 9 | ICP-OES | 2 mg/kg |
| Mercury (Hg) | IEC 62321: 2008, section 7 | ICP-OES | 2 mg/kg |
| Chromium (Cr VI) | IEC 62321: 2008, Annex B | UV-VIS | 0.02mg/kg* |

Note:

Conclusion:

-When tested as specified the submitted sample complied with the requirements of commission Decision of 18 Aug 2005 amending Directive 2002/95/EC notified under document 2005/618/EC.

******FOR FURTHER DETAILS, PLEASE REFER TO THE FOLLOWING PAGE(S)******

Signed for and on behalf of Shenzhen AOV Testing Technology Co., Ltd, Kunshan Branch

Project Leader:

Li Tingting, Maggie

Chemical Test Director

Reviewed by: WEIKIN

Wang Wexin, Weikin

Technical Director

Approved by:

Yuan Qi, Mickey

Lab Manager

^{-* 0.02} mg/kg refers to the MQL of sample extraction liquid.



out sample

TEST REPORT

NO.: A002R121008024-2R02 Date: Oct.10, 2012 Page 2 of 4 Test Flow: 1. To Determine Lead, Cadmium Content: (Metal substrate) Tested by: onoul Weigh the sample into Add the digestion solution; the Add H2O2 until the sample is clear vessel is heated until the sample a vessel. has been dissolved Cooling the vessel, filter; washed and Tested by ICP-OES Report filled to the mark with distilled water. 2. To Determine Mercury Content: (Metal substrate) Tested by: The sample is digested in the Weigh the sample Add the digestion solution, close microwave oven following a specific into a vessel. the microwave vessel. decomposition program. Cooling the vessel, filter; washed and Tested by ICP-OES Report filled to the mark with distilled water. 3. To Determine Hexavalent Chromium Content (boiling- water- extraction): (Metal substrate) Tested by: Remove the sample, and cool Take the (50±5) cm2 Heat 50 mL of DI water in the beaker to room temperature, sample in the beaker. the beaker to boiling for 10 and do the color reaction Test the sample solution and the 0.02 Report mg/kg standard solution by UV-VIS. 4. To Determine Lead, Cadmium and Mercury Content: (Plating) Tested by: now Cooling, filter; washed and Weigh the plating-Tested by Report

filled to the mark with DI water.

Instrument



NO.: A002R121008024-2R02

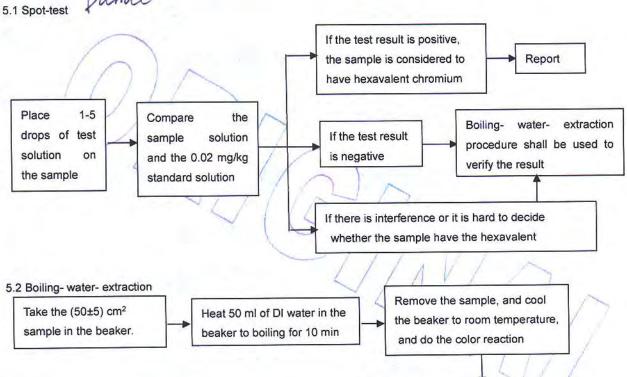
Date: Oct.10, 2012

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Test the sample solution and the 0.02

mg/kg standard solution by UV-VIS.

5. To Determine Hexavalent Chromium Content in colorless and colored chromate coating on metals: (Plating) Tested by:



Report

| ample Description. | | | | |
|-----------------------|---------------------|------|------------------------|--|
| Code | Sample Description | Code | Sample Description | |
| 2-1 | Lead wire substrate | 2-3 | Copper shell substrate | |
| 2-2 Lead wire Plating | | 2-4 | Copper shell Plating | |

st Results:

| Item | Unit | RoHS Limit | Result | | | |
|-----------------|-------|------------|----------|----------|----------|----------|
| | | | 2-1 | 2-2** | 2-3 | 2-4** |
| Lead (Pb) | mg/kg | 1000 | N.D. | N.D. | N.D. | N.D. |
| Cadmium (Cd) | mg/kg | 100 | N.D. | N.D. | N.D. | N.D. |
| Mercury (Hg) | mg/kg | 1000 | N.D. | N.D. | N.D. | N.D. |
| Chromium (CrVI) | mg/kg | 1000 | Negative | Negative | Negative | Negative |





NO.: A002R121008024-2R02

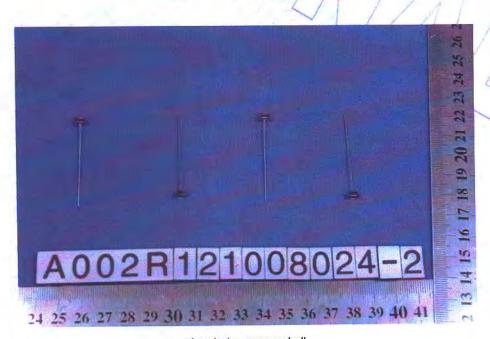
Date: Oct.10, 2012

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Note:

- -The new RoHS directive 2011/65/EU, on Jul. 21, 2011 come into force, on Jan. 03, 2013 the formal implementation, Directive 2002/95/EC shall be repealed simultaneously.
- -Specimens, which requested to determine Lead, Cadmium and Mercury Content, have been dissolved completely.
- -mg/kg=ppm
- -N.D.=not detected(<MQL)
- -MQL=Method Quantitation Limit
- -Negative=Absence of Cr (VI);
- -Positive=Presence of Cr (VI);
- Uncertain= can not verify whether the sample have Hexavalent Chromium by spot-test.
- (The tested sample should be further verified by boiling-water-extraction method if the spot test result is uncertain or negative.)
- -**The test is based on the following assumption: The sample plating is a single layer and each part is uniform. The test result maybe cannot stand for the physical truth of sample plating.
- -Photo is included

Photograph of Sample



Lead wire copper shell

End of Report

