

Company name:

# **ICP Test Report Certification Packet**

Littelfuse, Inc.

Product Series:	5x20 Cartridge		
Product #:	235xxxP Series		
Issue Date:	May 23, 2012		
Directive 2002/95/EC)-restor packing/packaging ma In addition, it is hereby re	stricted substance nor sterials, and for additive ported to you that the preackaging materials, a	such use, for es and the like parts and sub and the additi	RoHS (2011/65/EU – recast of EU or materials to be used for unit parts, se in the manufacturing processes. o-materials, the materials to be used eves and the like in the manufacturing
	-		-1
		A	mh
	Issued by:	KRISTEEN	BACILA
	-	<global ehs<="" td=""><td>S Engineer&gt;</td></global>	S Engineer>
(1) Parts, sub-materials a This document cov by Littelfuse, Inc.	·	RoHS-Com	pliant series products manufactured
< Raw Materials U Please see Tab			
(2) The ICP data on all r	measurable substances ropriate pages as iden		e 1
Remarks :			



Table 1: List of Raw Materials covered by this report

<b>Total Parts</b>	rts Raw Material Part Number Raw Material Description		Page(s)
1	C910510, C910541	Сар	3-6
2	C909543	Body-Soda Lime	7-10
3	497xxx	Element-99% Ni	11-17
4	082xxx	Wire-Ag Plated Cu	18-22
5	692529 (C692527)	Solder	23-27
6	692535-002	Solder	28-32
7	087244	HMA	33-41
8	087355	HMA	42-53
9	C030204, 934-077	Overcap (Cap base and plating)	54-57
10	C030204, 934-077	Overcap (Wire base and plating)	54-57
11	425907	Ink-Green	58-72



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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: / Description: / Buyer: / Supplier: /

Manufacturer: /

Sample received date: Dec.13,2011

Testing period: From Dec.13,2011 to Dec.15,2011

#### **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)\*\*\*\*\*\*

Approved by

(Lab manager)

Project Leader
(Engineer)

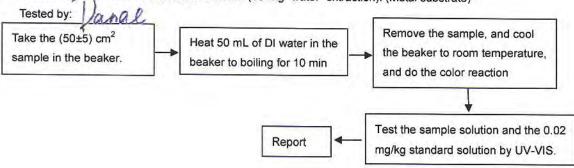
Inspected by
(Technical manager) Weikin

<sup>-\* 0.02</sup> mg/kg refers to the MQL of sample extraction liquid.

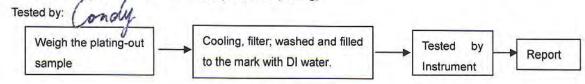


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Test Flow: 1. To Determine Lead, Cadmium Content: (Metal substrate) Tested by: Weigh the sample into Add the digestion solution: the Add H2O2 until the sample is clear vessel is heated until the sample a vessel. has been dissolved Cooling the vessel, filter; washed and Report Tested by ICP-OES filled to the mark with distilled water. 2. To Determine Mercury Content: (Metal substrate) Tested by:/ onoul Weigh the sample The sample is digested in the 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)



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



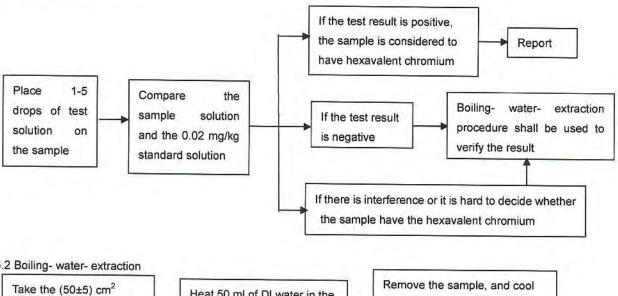


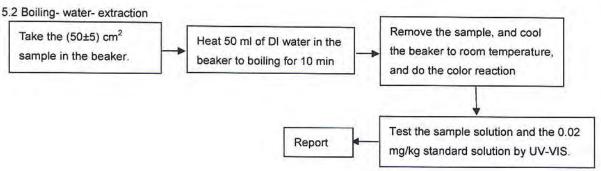


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5. To Determine Hexavalent Chromium Content in colorless and colored chromate coating on metals: (Plating)
Tested by:

5.1 Spot-test





#### Test Results:

Item	Unit	RoHS	Result		
		Limit	Substrate	Plating*	
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	





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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\*\*\*





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Date: JUN 24, 2011

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XIAMEN LICHUN ELECTRONIC ELEMENT CO., LTD 42-2 XINGLIN WEST RD, 361002 JIMEI DISTRICT, XIAMEN FUJIAN, P.R.C.

The following sample(s) was/were submitted and identified on behalf of the applicant as BOSI GLASS TUBE

SGS Job No.

: XM13205987EC

SGS Internal Reference No.

: 2.2

Date of Sample Received

: JUN 23, 2011

Testing Period

: JUN 23, 2011 TO JUN 24, 2011

Test Requested

: Selected test (s) as requested by client.

Test Method

: Please refer to next page(s).

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-CSTC Ltd.

Jenny Jiang

Approved Signatory

#### \$10663 | 1 (86-20) 82155555 | (86-20) 82075125 www.cn.ege.com 地区科学城科珠路198号 郝第: 510663 | 1 (86-20) 82155555 | (86-20) 82075125 e sgs.china@ege.com

Member of the SGS Group (SGS SA)



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Date: JUN 24, 2011

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Test Results:

Description for specimen 1 : Transparent glass tube

### RoHS Directive 2002/95/EC

Cadmium (Cd)	Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Lead (Pb)         mg/kg         IEC 62321: 2008, ICP-OES         N.D.         2 1000           Mercury (Hg)         mg/kg         IEC 62321: 2008, ICP-OES         N.D.         2 1000           Hexavalent Chromium (CrVI) by alkaline extraction         lEC 62321: 2008, UV-Vis         N.D.         2 1000           Sum of PBBs         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Monobromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Dibromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tribromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tetrabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Hexabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Hexabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Heptabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Nonabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Nonabromodiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D. <t< td=""><td></td><td>mg/kg</td><td>IEC 62321: 2008, ICP-OES</td><td>ND</td><td>2</td><td>100</td></t<>		mg/kg	IEC 62321: 2008, ICP-OES	ND	2	100
Mercury (Hg)		mg/kg				
Hexavalent Chromium (CrVI) by alkatine extraction						
Alkaline extraction	Hexavalent Chromium (CrVI) by					
Monobromobiphenyl	alkaline extraction		IEC 62321: 2008, UV-Vis	N.D.	2	1000
Monobromobiphenyl   mg/kg   IEC 62321: 2008, GC-MS   N.D.   5		mg/kg		ND		1000
Dibromobiphenyl			IEC 62321: 2008, GC-MS			1000
Tribromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tetrabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Pentabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Hexabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Heptabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Octabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Nonabromobiphenyl         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Sum of PBDEs         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Monobromodiphenyl ether         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tibromodiphenyl ether         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tetrabromodiphenyl ether         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Tetrabromodiphenyl ether         mg/kg         IEC 62321: 2008, GC-MS         N.D.         5           Pentabromodiphenyl ether         mg/kg         IEC 62321: 2008, GC-MS         N	Dibromobiphenyl				5	
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	Decabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	

#### Note:

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

開終点がRad/ScintathPart GangilouEnsenit A Technolog/Development District GuarginocClina 510663 1 (66-20) 82155555 1 (86-20) 82075125 www.cn.egs.com 中国・广州・经济技术开发区科学維科珠路198号 辞報: 510663 1 (66-20) 82155555 1 (86-20) 82075125 sp.c.china@sgs.com



No.: GZ1106081316/CHEM

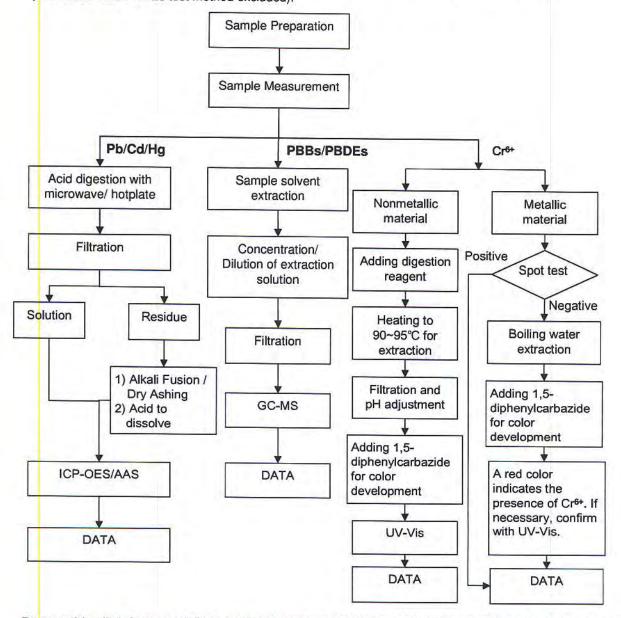
Date: JUN 24, 2011

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#### **ATTACHMENTS**

#### **RoHS Testing Flow Chart**

- 1) Name of the person who made testing: Bella Wang / Cutey Yu / Ross Zhan
- 2) Name of the person in charge of testing: Adams Yu / Ryan Yang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr6+ and PBBs/PBDEs test method excluded).



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The document is attention results shown in this test report refer only to the sample(5) tested. This document cannot be reproduced except in full, without prior approval of the Company.

Spandards Technical Marcs Co., Ltd.

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Sample photo:



SGS authenticate the photo on original report only

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

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Validity unknown
For Question
Please Contact with SGS
www.tw.sgs.com

**Test Report** 

No.: CE/2011/B4958

Date: 2011/12/01

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POLYFIL AG

OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND

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

Sample Description

: Ni99.9

Buyer/Order No.

: 4-1357

Sample Receiving Date

: 2011/11/25

Testing Period

: 2011/11/25 TO 2011/12/01

\_\_\_\_

Test Result(s)

Please refer to next page(s).



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No.: CE/2011/B4958

Date: 2011/12/01

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POLYFIL AG

OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND

#### Test Result(s)

PART NAME No.1

SILVER COLORED METAL WIRE

Test Item(s)	Unit	nit Method		Result
rest item(s)	Unit	Metriou	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)	**	With reference to IEC 62321: 2008 and performed by Boiling water extraction Method.#	#	Negative
Sum of PBBs			-	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl			5	n.d.
Tribromobiphenyl			5	n.d.
Tetrabromobiphenyl			5	n.d.
Pentabromobiphenyl			5	n.d.
Hexabromobiphenyl			5	n.d.
Heptabromobiphenyl			5	n.d.
Octabromobiphenyl		1	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.	Q.	n.d.
Monobromodiphenyl ether			5	n.d.
Dibromodiphenyl ether			5	n.d.
Tribromodiphenyl ether		I E	5	n.d.
Tetrabromodiphenyl ether		1 - [	5	n.d.
Pentabromodiphenyl ether		1 [	5	n.d.
Hexabromodiphenyl ether			5	n.d.
Heptabromodiphenyl ether			5	n.d.
Octabromodiphenyl ether		7.		n.d.
Nonabromodiphenyl ether			5	n.d.
Decapromodiphenyl ether	T		5	n.d.

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No.: CE/2011/B4958

Date: 2011/12/01

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POLYFIL AG OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND

Test Item(s)	Unit	Method	MDL	Result No.1
Halogen				NO.1
Halogen-Fluorine (F) (CAS No.: 14762-94-8)				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.
Halog <mark>e</mark> n-Iodine (I) (CAS No.: 14362-44-8)			50	n.d.

#### Note:

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected
- 3. MDL = Method Detection Limit
- 4. " " = Not Regulated
- 5. \*\* = Qualitative analysis (No Unit)
- 6. # = a. Positive means the presence of CrVI on the tested areas
  - b. Negative means the absence of CrVI on the tested areas

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> tested areas.

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Onless briefwase stated the results shown in this test report earlier only to the samplest result was report carried to explosive except in such and print which the company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms\_and\_conditions htm and for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms\_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or faisification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



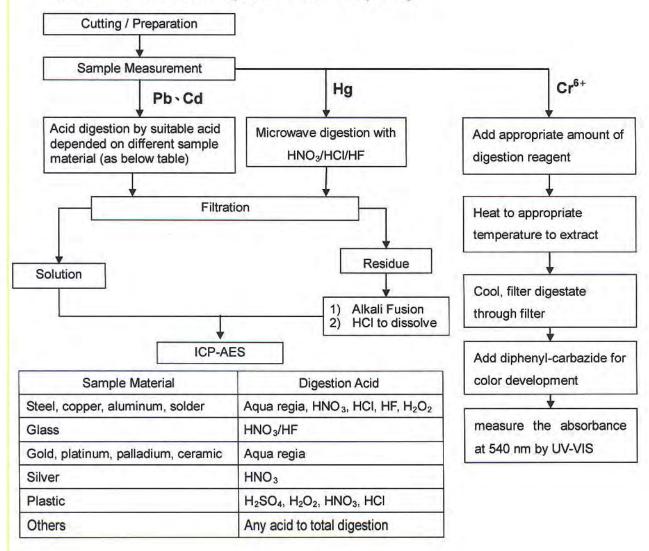
No.: CE/2011/B4958

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POLYFIL AG
OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND

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



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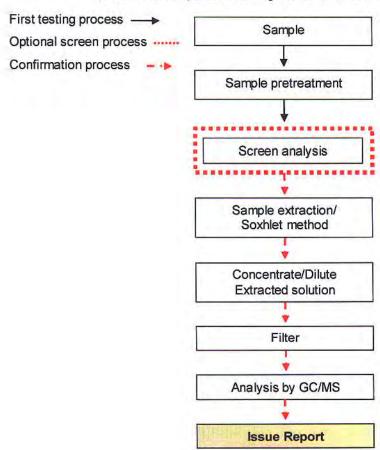
Date: 2011/12/01

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POLYFIL AG OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND

## 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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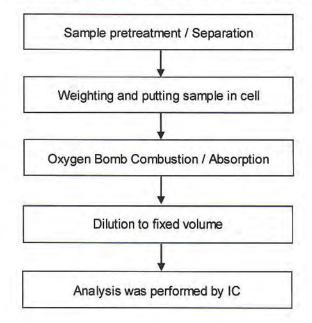
Page: 6 of 7

POLYFIL AG OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND



### 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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POLYFIL AG OBERALLMENDSTRASSE 20A, CH-6300 ZUG / SWITZERLAND



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

CE/2011/B4958



\*\* End of Report \*\*

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Test Report Number: TWNC00249179

Applicant: Littelfuse Philippines Inc.

LIMA Technology Center, Lipa City,

Malvar, Batangas

Sample Description:

Date Test Started

One (1) group of submitted samples said to be : Part Description : Silver plated Wire

Part Number : DRAGxxx
Date Sample Received : Mar 22, 2012

Test Conducted:

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

: Mar 22, 2012

Authorized By: On Behalf Of Intertek Testing Services Taiwan Limited



K. Y. Liang
Director

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Date : Mar 28, 2012

Page 1 of 5



Number: TWNC00249179

#### Test Conducted

#### ( I ) Test Result Summary :

Test Item	Result (ppm)
<u>lesc item</u>	Submitted Samples
Heavy Metal	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI ( $Cr^{6+}$ ) content ( $mg/kg$ with $50cm^2$ )	Negative (< 0.02)

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

ND = Not detected
< = Less than</pre>

mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimetre Negative = A negative test result indicated positive observation was not found at the time of Test.

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

Date Sample Received : Mar 22, 2012

Test Period : Mar 22, 2012 To Mar 27, 2012

### ( ${\rm II}$ ) RoHS Requirement:

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 <sup>6+</sup> ) Content	0.1% (1000ppm)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.



Number : TWNC00249179

#### Test Conducted

#### (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	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
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr <sup>6+</sup> ) content	With reference to IEC 62321 edition 1.0:2008 in annex B, by boiling water extraction and determined by UV-Vis Spectrophotometer.	0.02 mg/kg with 50cm <sup>2</sup>

Remark: Reporting limit = Quantitation limit of analyte in sample

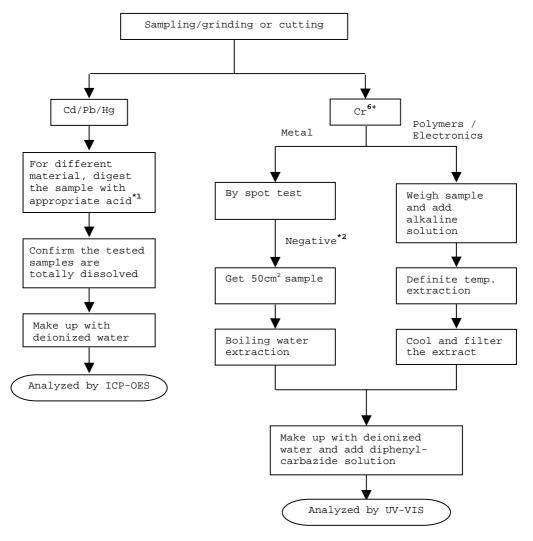


Number: TWNC00249179

#### Test Conducted

#### (IV) Measurement Flowchart:

Test For Cd/Pb/Hg/Chromium (VI)
Reference Standard: IEC 62321 edition 1.0:2008



# Remarks:

#### \*1: List Of Appropriate Acid:

Libe of Impropriate flora	
Material	Acid Added For Digestion
Polymers	HNO <sub>3,</sub> HCl,HF,H <sub>2</sub> O <sub>2,</sub> H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3,</sub> HCl,HF
Electronics	HNO <sub>3</sub> ,HCl,H <sub>2</sub> O <sub>2</sub> ,HBF <sub>4</sub>

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

End of Report

Page 4 of 5

### Intertek Testing Services Taiwan Ltd.



Number: TWNC00249179

Test Conducted

#### Photo







Test Report No. SHAEC1116009840 Date: 14 Oct 2011 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.: SP11-030781 - SH

Model No.: YTW206

Composition: Sn0.3Ag0.7CuCe

Date of Sample Received: 09 Oct 2011

Testing Period: 09 Oct 2011 - 13 Oct 2011

Test Requested: Selected test(s) as requested by client.

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

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

Conclusion: Based on the performed tests on submitted samples, the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ Approved Signatory

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No. SHAEC1116009840

Date: 14 Oct 2011

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Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

SHA11-160098.035

Silvery metal wire

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected ( < MDL)

(4) "-" = Not Regulated

#### RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

(1) Determination of Cadmium by ICP-OES.

(2) Determination of Lead by ICP-OES.

(3) Determination of Mercury by ICP-OES.

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

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

Test Item(s)	<u>Limit</u>	Unit	MDL	035
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	41
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	4	77.	$\Diamond$	Negative
Sum of PBBs	1,000	mg/kg	- 15	ND
Monobromobiphenyl	1 7 2	mg/kg	5	ND
Dibromobiphenyl	74	mg/kg	5	ND
Tribromobiphenyl	14	mg/kg	5	ND
Tetrabromobiphenyl		mg/kg	5	ND
Pentabromobiphenyl	-4	mg/kg	5	ND
Hexabromobiphenyl		mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Report	No. SHAEC1116009840		Date: 14 Oct 2011		Page 3 of 5
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>035</u>	
Dibromodiphenyl ether	1.21	mg/kg	5	ND	
Tribromodiphenyl ether	-	mg/kg	5	ND	
Tetrabromodiphenyl ether	9	mg/kg	5	ND	
Pentabromodiphenyl ether	4	mg/kg	5	ND	
Hexabromodiphenyl ether	12	mg/kg	5	ND	
Heptabromodiphenyl ether	76	mg/kg	5	ND	
Octabromodiphenyl ether	i i	mg/kg	5	ND	
Nonabromodiphenyl ether	9	mg/kg	5	ND	
Decabromodiphenyl ether	4	mg/kg	5	ND	

#### Notes:

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

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

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

◇ Boiling-water-extraction:

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

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 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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The company of the sample(s) tested.



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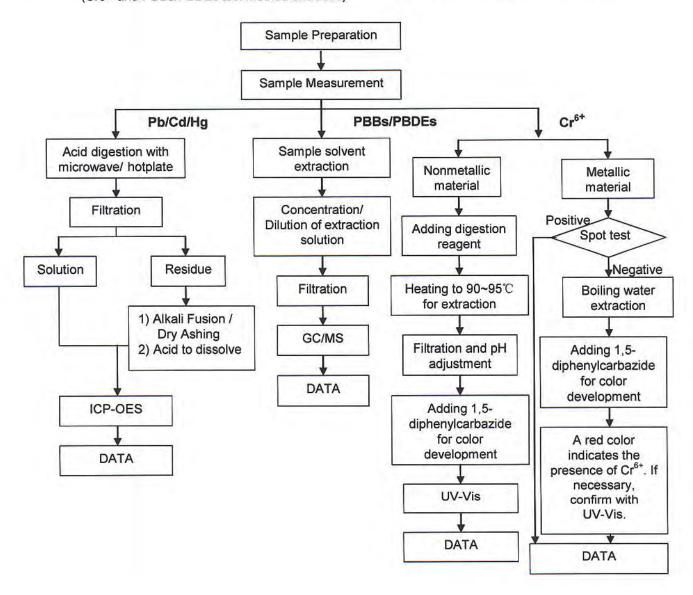
Date: 14 Oct 2011

Page 4 of 5

#### **ATTACHMENTS**

### **RoHS Testing Flow Chart**

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 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:



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No. SHAEC1116009838

Date: 14 Oct 2011

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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.: SP11-030781 - SH

Model No.: YTW102(692535-001,692535-002,692535-003)

Composition : Sn2.0CuRE

Date of Sample Received : 09 Oct 2011

Testing Period: 09 Oct 2011 - 13 Oct 2011

Test Requested: Selected test(s) as requested by client.

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

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

Conclusion: Based on the performed tests on submitted samples, the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ Approved Signatory

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No. SHAEC1116009838

Date: 14 Oct 2011

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Test Results:

Test Part Description:

Specimen No. SGS Sample ID

Description

1

SHA11-160098.033

Silvery metal wire

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected ( < MDL )

(4) "-" = Not Regulated

### RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

(1) Determination of Cadmium by ICP-OES.

(2) Determination of Lead by ICP-OES.

(3) Determination of Mercury by ICP-OES.

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

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

Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	033
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	167
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	$\Diamond$	Negative
Sum of PBBs	1,000	mg/kg		ND
Monobromobiphenyl	•	mg/kg	5	ND
Dibromobiphenyl	+	mg/kg	5	ND
Tribromobiphenyl	1 - 2	mg/kg	5	ND
Tetrabromobiphenyl		mg/kg	5	ND
Pentabromobiphenyl	(45)	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	1 <del>2</del>	mg/kg	5	ND
Nonabromobiphenyl		mg/kg	5	ND
Decabromobiphenyl		mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	- 1	mg/kg	5	ND

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Test Report	No. SHAEC1116009838		Date: 14 Oct 2011		Page 3 of 5
Test Item(s)	Limit	<u>Unit</u>	MDL	<u>033</u>	
Dibromodiphenyl ether		mg/kg	5	ND	
Tribromodiphenyl ether	, P	mg/kg	5	ND	
Tetrabromodiphenyl ether	194.9	mg/kg	5	ND	
Pentabromodiphenyl ether	0.0	mg/kg	5	ND	
Hexabromodiphenyl ether	-	mg/kg	5	ND	
Heptabromodiphenyl ether		mg/kg	5	ND	
Octabromodiphenyl ether	w.	mg/kg	5	ND	
Nonabromodiphenyl ether	( ( <del>)</del>	mg/kg	5	ND	
Decabromodiphenyl ether	-	mg/kg	5	ND	

#### Notes:

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

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

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

Boiling-water-extraction:

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

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 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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No. SHAEC1116009838

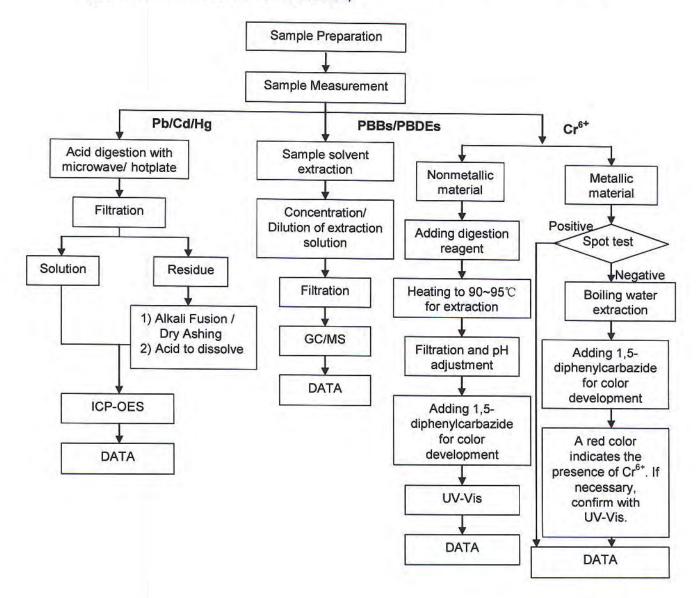
Date: 14 Oct 2011

Page 4 of 5

#### **ATTACHMENTS**

### **RoHS Testing Flow Chart**

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 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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No. SHAEC1116009838

Date: 14 Oct 2011

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Sample photo:



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No. SHAEC1119525001

Date: 07 Dec 2011

Page 1 of 5

3M CHINA LIMITED

222# TIAN LIN ROAD, SHANGHAI (200233)

The following sample(s) was/were submitted and identified on behalf of the clients as: 3M 3779-PG

SGS Job No.: SP11-036760 - SH

Date of Sample Received: 03 Dec 2011

Testing Period: 03 Dec 2011 - 07 Dec 2011

Test Requested: Selected test(s) as requested by client.

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

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

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ Approved Signatory

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No. SHAEC1119525001

Date: 07 Dec 2011

Page 2 of 5

Test Results:

**Test Part Description:** 

Specimen No.

SGS Sample ID

Description

1

SHA11-195250.001

Yellow solid

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 Colorimetric Method using UV-Vis.

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

<u>Limit</u>	<u>Unit</u>	MDL	001
100	mg/kg	2	ND
1,000	mg/kg	2	ND
1,000	mg/kg	2	ND
1,000	mg/kg	2	ND
1,000	mg/kg	1,21	ND
-	mg/kg	5	ND
2	mg/kg	5	ND
9.	mg/kg	5	ND
0.0	mg/kg	5	ND
4	mg/kg	5	ND
4	mg/kg	5	ND
4	mg/kg	5	ND
16	mg/kg	5	ND
0.40	mg/kg	5	ND
φ.	mg/kg	5	ND
1,000		-	ND
(a)	mg/kg	5	ND
	100 1,000 1,000 1,000 - - - - - -	100 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg - mg/kg	100 mg/kg 2 1,000 mg/kg -

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Test Report	No. SHAEC1119525001 Date: 07 Dec 2011		Page 3 of 5		
Test Item(s)	Limit	<u>Unit</u>	MDL	001	
Dibromodiphenyl ether		mg/kg	5	ND	
Tribromodiphenyl ether	( <del>4</del> 1	mg/kg	5	ND	
Tetrabromodiphenyl ether	r kêr n	mg/kg	5	ND	
Pentabromodiphenyl ether	A)	mg/kg	5	ND	
Hexabromodiphenyl ether	4	mg/kg	5	ND	
Heptabromodiphenyl ether	4.	mg/kg	5	ND	
Octabromodiphenyl ether	O.	mg/kg	5	ND	
Nonabromodiphenyl ether	2	mg/kg	5	ND	
Decabromodiphenyl ether	1947	mg/kg	5	ND	

#### Notes:

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

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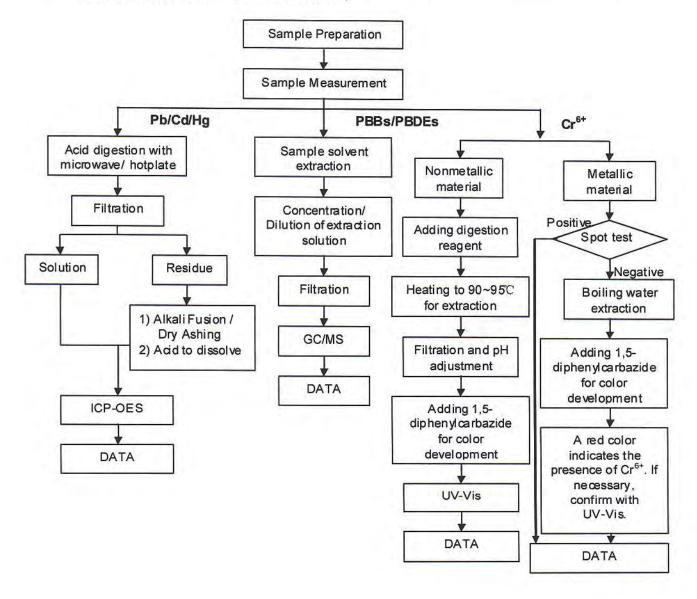
Date: 07 Dec 2011

Page 4 of 5

#### **ATTACHMENTS**

### **RoHS Testing Flow Chart**

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



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No. SHAEC1119525001

Date: 07 Dec 2011

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Sample photo:



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t E&E (86-21) 61402553 f E&E (86-21)64953679 HL: (86-21) 61402594 HL: (86-21)54500353



No. SHAEC1119525002

Date: 07 Dec 2011

Page 1 of 4

3M CHINA LIMITED 222# TIAN LIN ROAD, SHANGHAI (200233)

The following sample(s) was/were submitted and identified on behalf of the clients as: 3M 3779-PG

SGS Job No. : SP11-036760 - SH

Date of Sample Received: 03 Dec 2011

Testing Period: 03 Dec 2011 - 07 Dec 2011

Test Requested: Selected test(s) as requested by client.

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

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

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ

Approved Signatory

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www.cn.sgs.com e sgs.china@sgs.com



No. SHAEC1119525002

Date: 07 Dec 2011

Page 2 of 4

Test Results:

Test Part Description:

Specimen No. SGS Sample ID

Description

1

SHA11-195250.001

Yellow solid

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected ( < MDL )

(4) "-" = Not Regulated

#### Halogen

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

Test Item(s)	<u>Unit</u>	MDL	001
Fluorine (F)	mg/kg	50	ND
Chlorine (CI)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
lodine (I)	mg/kg	50	ND

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No. SHAEC1119525002

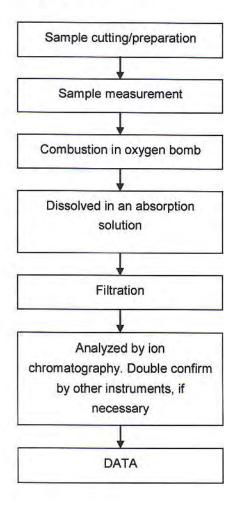
Date: 07 Dec 2011

Page 3 of 4

#### **ATTACHMENTS**

### **Halogen Testing Flow Chart**

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



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No. SHAEC1119525002

Date: 07 Dec 2011

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Sample photo:



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No. TSNEC1200272601

Date: 09 Apr 2012

Page 1 of 8

BEIJING HYSTIC NEW MATERIALS CO., LTD. 5 SHUANGYUAN ROAD, BADACHU HIGH-TECH ZONE, BEIJING. 100041, CHINA

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

SGS Job No.:

TP12-004950 - TJ

Model No.:

**EP608** 

Date of Sample Received:

31 Mar 2012

Testing Period:

31 Mar 2012 - 09 Apr 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.

Aimy Wang

Approved Signatory

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No. TSNEC1200272601

Date: 09 Apr 2012

Page 2 of 8

Test Results:

#### Test Part Description:

Specimen No. SGS Sample ID Description 1

TSN12-002726.001 ivory-white paste

#### 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

With reference to IEC 62321:2008 Test Method:

- (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 Colorimetric Method using UV-Vis.
- (5) Determination of PBBs / PBDEs content by GC-MS.

Test Item(s)	<b>Limit</b>	<u>Unit</u>	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	2	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	4	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	(a)	mg/kg	5	ND
Tetrabromobiphenyl	4	mg/kg	5	ND
Pentabromobiphenyl	100	mg/kg	5	ND
Hexabromobiphenyl		mg/kg	5	ND
Heptabromobiphenyl		mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	1 2	mg/kg	5	ND
Decabromobiphenyl	4	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	- 2	ND
Monobromodiphenyl ether	1.5	mg/kg	5	ND

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Test Report	No. TSNEC120027260	01	Date: 09	Apr 2012	Page 3 of 8
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	001	
Dibromodiphenyl ether		mg/kg	5	ND	
Tribromodiphenyl ether	-	mg/kg	5	ND	
Tetrabromodiphenyl ether	40	mg/kg	5	ND	
Pentabromodiphenyl ether	-	mg/kg	5	ND	
Hexabromodiphenyl ether	ė.	mg/kg	5	ND	
Heptabromodiphenyl ether	000	mg/kg	5	ND	
Octabromodiphenyl ether	-	mg/kg	5	ND	
Nonabromodiphenyl ether	18	mg/kg	5	ND	
Decabromodiphenyl ether	ů.	mg/kg	5	ND	

#### Notes:

### Hexabromocyclododecane (HBCDD)

Test Method: With reference to IEC 62321:2008, analysis was performed by GC-MS.

Test Item(s)	<u>Unit</u>	MDL	001
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

#### Notes:

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

#### **Phthalates**

Test Method: With reference to EN14372: 2004, analysis was performed by GC-MS.

Test Item(s)	<u>Unit</u>	MDL	001
Dibutyl Phthalate (DBP)	% (w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	% (w/w)	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	% (w/w)	0.003	ND
Notes:			

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

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



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Date: 09 Apr 2012

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Result shown is of the total weight of wet sample

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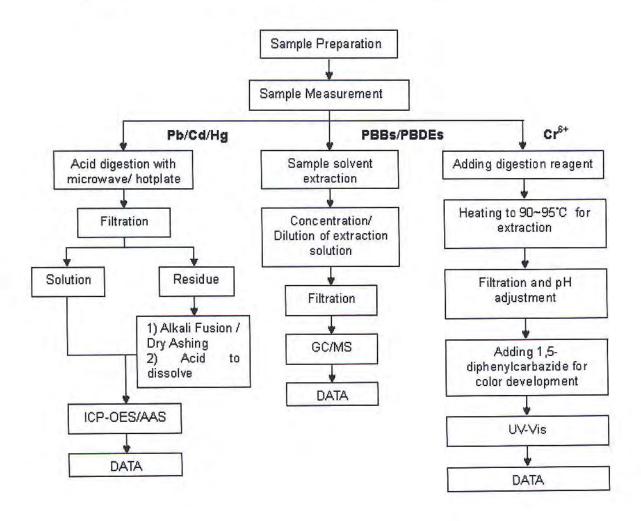
Date: 09 Apr 2012

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#### **ATTACHMENTS**

### Cd/Pb/Hg/Cr<sup>S+</sup>/PBBs&PBDEs Flow Chart

- 1) Name of the person who made testing: Aaron Wang/Jason Li /Angell Yao
- 2) Name of the person in charge of testing: Cindy Yin/Rex Zhu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr8+ and PBBs/PBDEs test method excluded)



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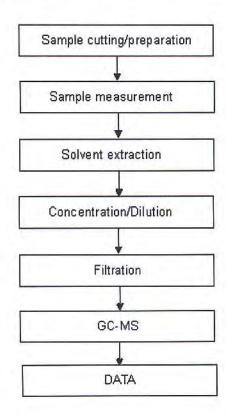
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#### **ATTACHMENTS**

#### **HBCDD Testing Flow Chart**

- 1) Name of the person who made testing: Marina Sun
- 2) Name of the person in charge of testing: Rex Zhu



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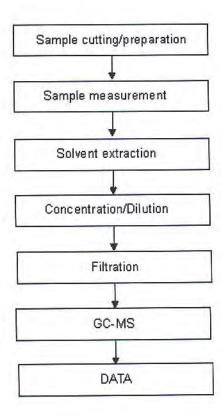
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#### **ATTACHMENTS**

#### Phthalate Testing Flow Chart

1) Name of the person who made testing: Marina Sun

2) Name of the person in charge of testing: Rex Zhu



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No. TSNEC1200272602

Date: 09 Apr 2012

Page 1 of 4

BEIJING HYSTIC NEW MATERIALS CO., LTD. 5 SHUANGYUAN ROAD, BADACHU HIGH-TECH ZONE, BEIJING. 100041, CHINA

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

SGS Job No.:

TP12-004950 - TJ

Model No.:

**EP608** 

Date of Sample Received:

31 Mar 2012

Testing Period:

31 Mar 2012 - 09 Apr 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).

Signed for and on behalf of SGS-CSTC Ltd.

Aimy Wang

Approved Signatory

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Date: 09 Apr 2012

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Test Results:

#### Test Part Description:

Specimen No.

SGS Sample ID

Description

TSN12-002726.002

ivory-white paste

#### Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected ( < MDL )

(4) "-" = Not Regulated

#### Halogen

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

<u>Unit</u>	MDL	002
mg/kg	50	57
mg/kg	50	7557
mg/kg	50	ND
mg/kg	50	ND
	mg/kg mg/kg mg/kg	mg/kg 50 mg/kg 50 mg/kg 50

Result shown is of the total weight of wet sample

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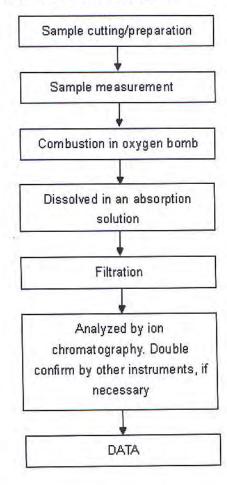
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#### **ATTACHMENTS**

#### Halogen Testing Flow Chart

- 1) Name of the person who made testing: Angell Yao
- 2) Name of the person in charge of testing: Rex Zhu



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NO.: A002E11121307-2R02 Date: Dec.15, 2011 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: Fuses copper shell

Model: /

Item/Lot No.: / Material: / Description: /

Buyer: / Supplier: / Manufacturer: /

Sample received date: Dec.13,2011

Testing period: From Dec.13,2011 to Dec.15,2011

#### **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*

#### 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)\*\*\*\*\*\*

Approved by

Project Leader Muggie
(Engineer)

Inspected by
(Technical manager) Weikin

(Lab manager)



<sup>-\* 0.02</sup> mg/kg refers to the MQL of sample extraction liquid.



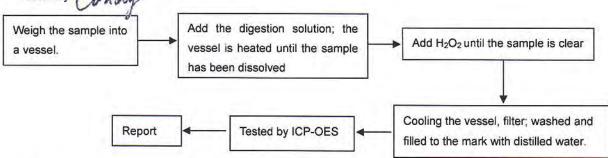
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Date: Dec.15, 2011

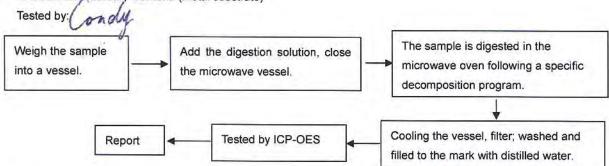
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#### Test Flow:

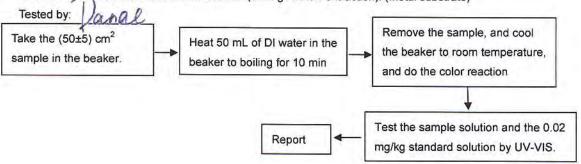
To Determine Lead, Cadmium Content: (Metal substrate)
 Tested by:



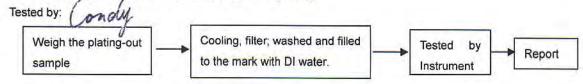
2. To Determine Mercury Content: (Metal substrate)



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



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



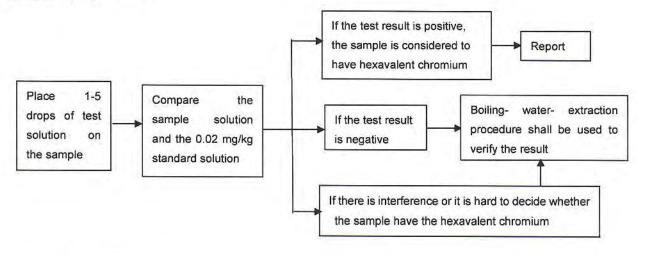


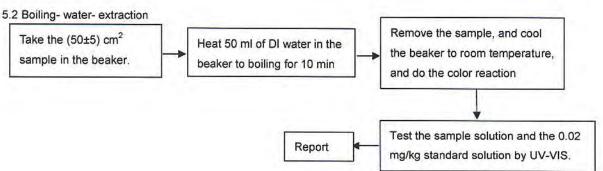


NO.: A002E11121307-2R02 Date: Dec.15, 2011 Page 3 of 4

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

5.1 Spot-test





#### Sample description:

Code	Sample name	Code	Sample name
2-1	Lead wire substrate	2-3	Copper shell substrate
2-2	Lead wire Plating	2-4	Copper shell Plating

#### Test Results:

Item	Unit	RoHS		Re	esult	
		Limit	2-1	2-2*	2-3	2-4*
Lead (Pb)	mg/kg	1000	N.D.	2.5	40.0	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.: A002E11121307-2R02

Date: Dec.15, 2011

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#### Note:

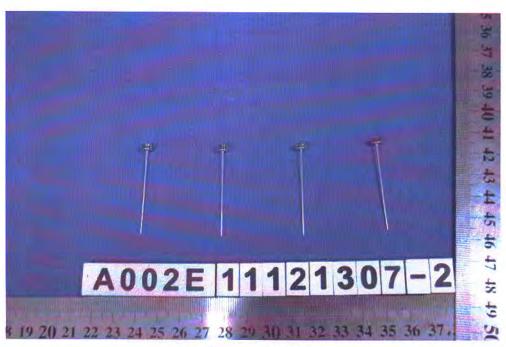
- -The new RoHS directive 2011/65/EU, on Jul. 21, 2011 come into force, on Jan. 03, 2013 the formal implementation, Directive 2002/95/EC shall be repealed simultaneously.
- -Specimens, which requested to determine Lead, Cadmium and Mercury Content, have been dissolved completely.
- -mg/kg=ppm
- -N.D.=not 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



Fuses copper shell

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





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TEST REPORT

NUMBER: SHAH00287571

APPLICANT: LITTELFUSE, INC.

DATE: NOV 01, 2011

800 E. NORTHWEST HWY

ATTN: A. CESISTA/ K. BACILA

SAMPLE DESCRIPTION:

One (1) submitted sample said to be Green ink.

: Ink - green. Part Description

Part Number : 425907.

Date Sample Received : Oct.25, 2011. : Oct.25, 2011. Date Test Started

TESTS CONDUCTED:

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S) 

TO BE CONTINUED

PREPARED AND CHECKED BY: FOR INTERTEK TESTING SERVICES LTD., SHANGHAI

MYRA LV CHEMICAL LAB SENIOR MANAGER AUTHORIZED BY:

FOR INTERTEK TESTING SERVICES LTD., SHANGHAI

STEPHEN TSANG GENERAL MANAGER



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TEST REPORT NUMBER: SHAH00287571

TESTS CONDUCTED

#### 1 PHTHALATE CONTENT TEST

WITH REFERENCE TO EN14372, BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY (GC-MS) ANALYSIS.

TESTED COMPOUND	RESULT (%,W/W)	LIMIT(%,W/W)
		(MAX.)
DIBUTYL PHTHALATE (DBP)	ND	
DI(2-ETHYL HEXYL) PHTHALATE(DEHP)	ND	
BENZYL BUTYL PHTHALATE (BBP)	ND	
SUM OF THREE PHTHALATES	ND	0.1

REMARK: THE ABOVE LIMIT WAS QUOTED ACCORDING TO ANNEX XVII ITEMS 51 & 52 OF THE REACH REGULATION (EC) NO. 1907/2006 & AMENDENT NO.552/2009 (FORMERLY KNOWN AS DIRECTIVE 2005/84/EC) FOR PHTHALATE CONTENT IN TOYS AND CHILDREN CARE ARTICLES.

DETECTION LIMIT = 0.01%(W/W)

ND = NOT DETECTED

% = PERCENTAGE BASED ON DRY WEIGHT OF SAMPLE/COMPONENT

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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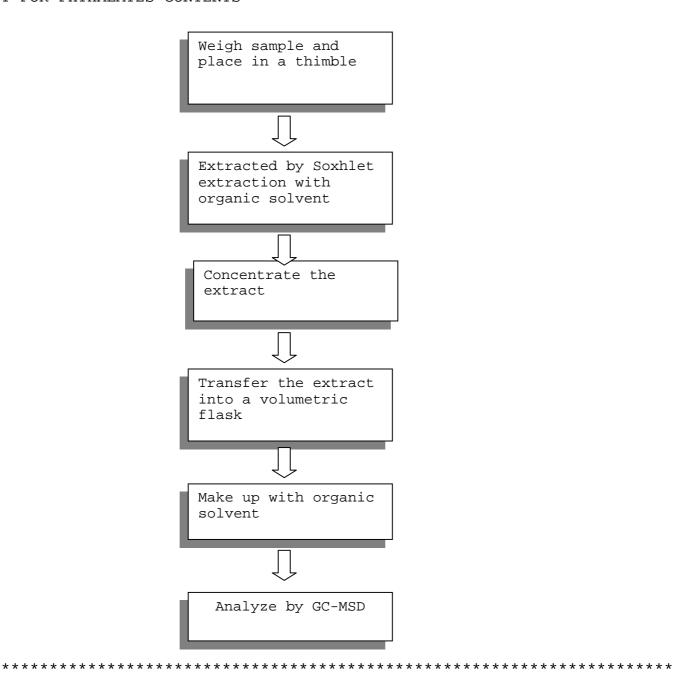
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#### TEST REPORT

TESTS CONDUCTED
MEASUREMENT FLOWCHART:

TEST FOR PHTHALATES CONTENTS





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TEST REPORT NUMBER: SHAH00287571

TESTS CONDUCTED

### 2 (I) Test Result Summary:

Testing Item	Result (ppm)
Halogen Content	•
Fluorine (F)	ND
Chlorine (Cl)	400
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 : Ken He

#### (II) Test Method:

Testing Item	Testing Method	Reporting Limit
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by ion chromatography	50 ppm



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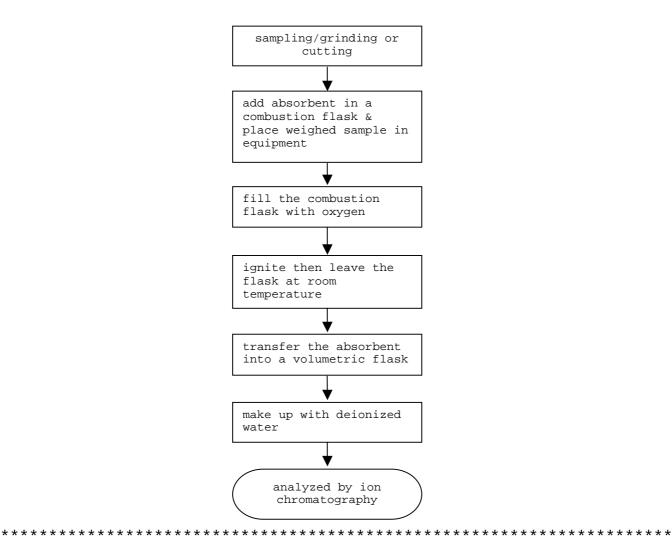
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### TEST REPORT

TESTS CONDUCTED

#### (III) Measurement Flowchart:

Test For Halogen Content Reference Standard: EN 14582





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### TEST REPORT NUMBER: SHAH00287571

TESTS CONDUCTED

### 3 (I) Test Result Summary:

Testing Item	Result (ppm)		
Heavy Metal			
Cadmium (Cd) content	ND		
Lead (Pb) content	ND		
Mercury (Hg) content	ND		
Chromium VI (Cr <sup>6+</sup> ) 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		

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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#### TEST REPORT

NUMBER: SHAH00287571

TESTS CONDUCTED

Remarks: ppm = Parts per million = mg/kg

ND = Not detected

Responsibility Of Chemist : Dent Fang / Ken He

#### (II) RoHS Requirement:

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

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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#### TEST REPORT

NUMBER: SHAH00287571

TESTS CONDUCTED

#### (III) Test Method:

Testing Item	Testing 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	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
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr <sup>6+</sup> ) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm



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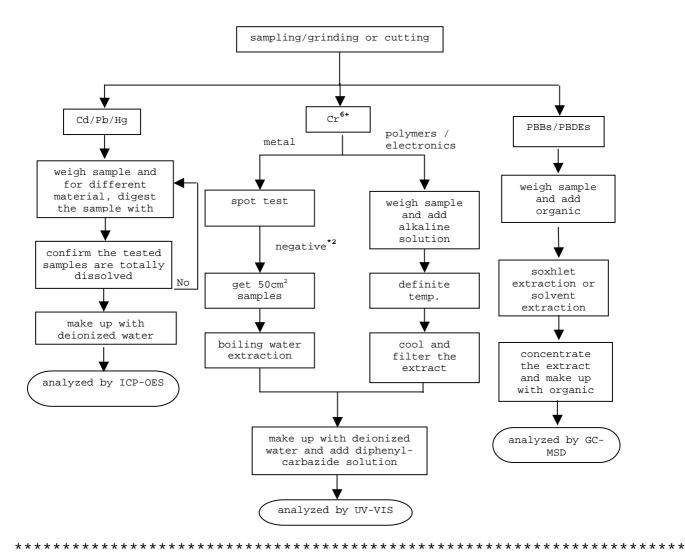
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NUMBER: SHAH00287571

#### TEST REPORT

TESTS CONDUCTED (IV) Measurement Flowchart:

Test For Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Contents Reference Standard: IEC 62321 edition 1.0:2008





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#### **REMARKS:**

\*1: List of appropriate acid:

<u>Material</u>	Acid added for digestion
Polymers	HNO <sub>3</sub> ,HCl,HF,H <sub>2</sub> O <sub>2</sub> ,H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3,</sub> HCl,HF
Electronics	HNO <sub>3</sub> ,HCl,H <sub>2</sub> O <sub>2</sub> ,HBF <sub>4</sub>

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

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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#### 4 PHTHALATE CONTENT TEST

WITH REFERENCE TO ASTM D3421, BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY (GC-MS) ANALYSIS.

	RESULT (%, w/w)	LIMIT (%, w/w)
		(MAX.)
DIBUTYL PHTHALATE (DBP)	ND	0.1
DI(2-ETHYL HEXYL) PHTHALATE (DEHP)	ND	0.1
BENZYL BUTYL PHTHALATE (BBP)	ND	0.1

REMARK: THE ABOVE LIMIT WAS QUOTED ACCORDING TO US CONSUMER PRODUCT SAFETY IMPROVEMENT ACT 2008 FOR PROHIBITION ON SALE OF CERTAIN PRODUCTS CONTAINING SPECIFIED PHTHALATES.

DETECTION LIMIT = 0.01% (w/w)

ND = NOT DETECTED

% = PERCENTAGE BASED ON DRY WEIGHT OF SAMPLE/COMPONENT.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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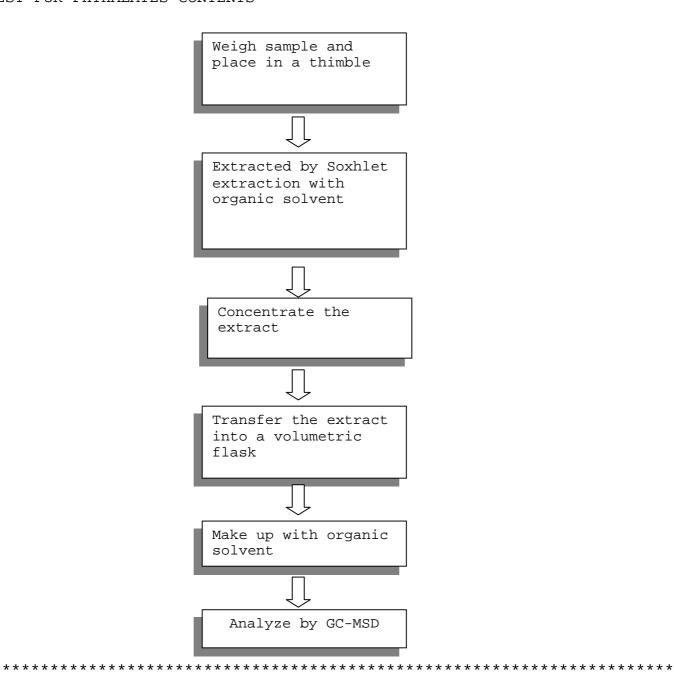
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#### TEST REPORT

TESTS CONDUCTED
MEASUREMENT FLOWCHART:

TEST FOR PHTHALATES CONTENTS





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5 (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT(ppm)
HBCDD (HEXABROMOCYCLODODECANE)	ND

#### **REMARKS:**

ppm = PARTS PER MILLION = mg/kg

ND = NOT DETECTED

#### (B) TEST METHOD:

	TESTING ITEM	TESTING METHOD	REPORTING LIMIT
HBCDD (	HEXABROMOCYCLODODECANE)	WITH REFERENCE TO USEPA 3540C, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS	10 ppm

DATE SAMPLE RECEIVED : OCT.25, 2011

TESTING PERIOD : OCT.25, 2011 TO OCT.28, 2011

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*



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#### TEST REPORT

TESTS CONDUCTED

MEASUREMENT FLOWCHART:

TEST FOR HBCDD (Hexabromocyclododecane) CONTENT

Weigh sample and place into a thimble

Soxhlet extraction with organic solvent

Concentrate the extract

Transfer the extract into a volumetric flask

Make up with organic solvent

Analyze by GC-MSD

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TEST REPORT

TESTS CONDUCTED



END OF REPORT