



## ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: 3AG Fuse

Product #: 312P Series

Issue Date: November 7, 2013

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (2011/65/EU – recast of EU Directive 2002/95/EC)-restricted substance nor such use, for materials to be used for unit parts, for packing/package materials, and for additives and the like in the manufacturing processes. In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/package materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by:   
JORDANUFF H. CABILAN

<Global EHS Engineer>

(1) Parts, sub-materials and unit parts

This document covers the 3AG Fuse RoHS-Compliant series products manufactured by Littelfuse, Inc.

< Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

**Remarks : The 10mA and the 31mA are Not RoHS Compliant nor Pb Free. The rest of the product series are RoHS compliant. 31mA is also obsolete.**

**Table 1: List of Raw Materials covered by this report**

<b>Total Parts</b>	<b>Raw Material Part Number</b>	<b>Raw Material Description</b>	<b>Page(s)</b>
1	910-005/ 910-282	Cap – Base Cap - Plating	3-6
2	909-002-002/ 909-195-002	Body (Soda Lime Glass)	7-11
3	917-268***	Element – Zinc Alloy	12-15
4	082xxx	Element – Ag Plated Cu	16-20
5	11-0803 (497xxx)	Wire – Ni42Fe58MCuMAg5%	21-26
6	YTWxxx (692535-003)	Solder	27-32
7	3M-3779-PG (087244)	HMA	33-39
8	425901	Ink-Red	40-50
9	425907	Ink-Green	51-61
10	425909	Ink-Grey	62-72
11	425911	Ink-Violet	73-83
12	425904	Ink- Blue	84-94
13	425906	Ink-Brown	95-105
14	425900	Ink-orange	106-116
15	425903	Ink-yellow	117-127
16	YTW206 (692529)	Solder	128-131
17	AIM230 Fastcore H RSA605 (692539-003)	Solder	132-136
18	10-1185 (4971**-001)	Element - Ni42Fe58MCuMSn	137-142
19	EP608 (087355)	Glue	143-146

# TEST REPORT

NO.: A002R130403070-1R02

Date: Apr.08, 2013

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:** Apr.03, 2013

**Testing period:** From Apr.03, 2013 to Apr.08, 2013

## Testing Requested

As specified by client, to determine the Lead, Cadmium, Mercury &amp; Hexavalent Chromium content in the submitted sample in accordance with Directive 2011/65/EU (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:

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

## Conclusion:

When tested as specified, the submitted sample complied with the requirements of Directive 2011/65/EU (RoHS).

\*\*\*\*\*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: Maggie

 Li Tingting, Maggie  
 Chemical Test Director

 Reviewed by: Weikin

 Wang Wexin, Weikin  
 Technical Director

 Approved by: Mickey

 Yuan Qi, Mickey  
 Lab Manager



# TEST REPORT

NO.: A002R130403070-1R02

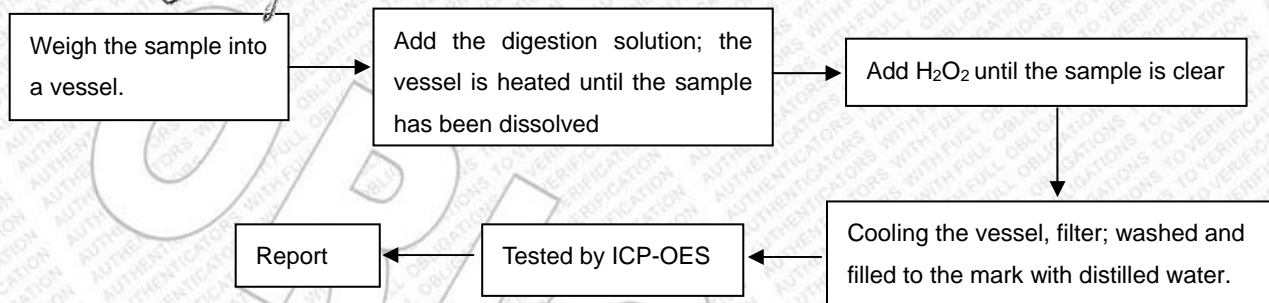
Date: Apr.08, 2013

Page 2 of 4

## Test Flow:

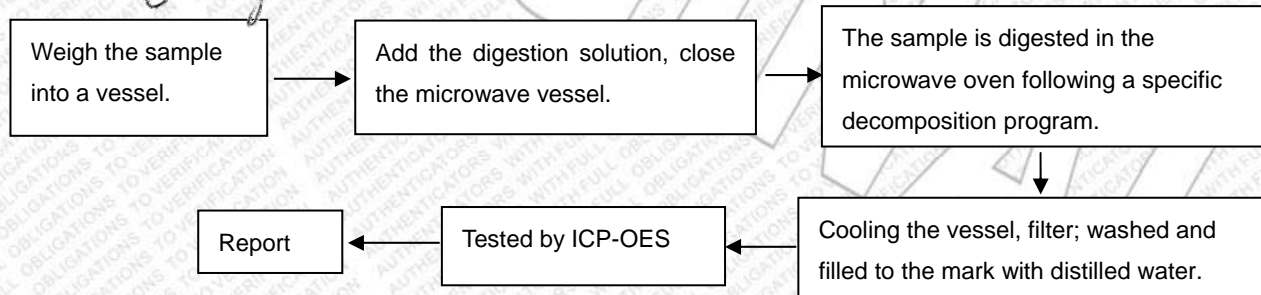
1. To Determine Lead, Cadmium Content: (Metal substrate)

Tested by: *Condy*



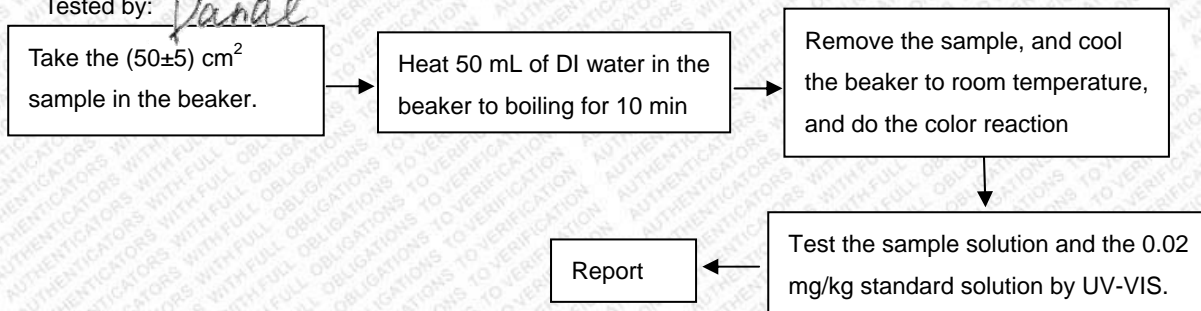
2. To Determine Mercury Content: (Metal substrate)

Tested by: *Condy*



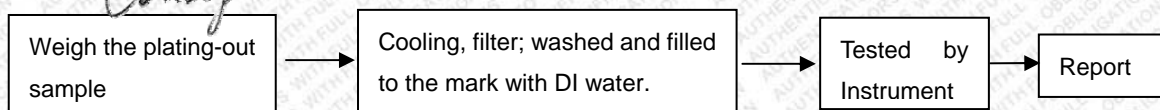
3. To Determine Hexavalent Chromium Content (boiling- water- extraction): (Metal substrate)

Tested by: *Danae*



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

Tested by: *Condy*





# TEST REPORT

NO.: A002R130403070-1R02

Date: Apr.08, 2013

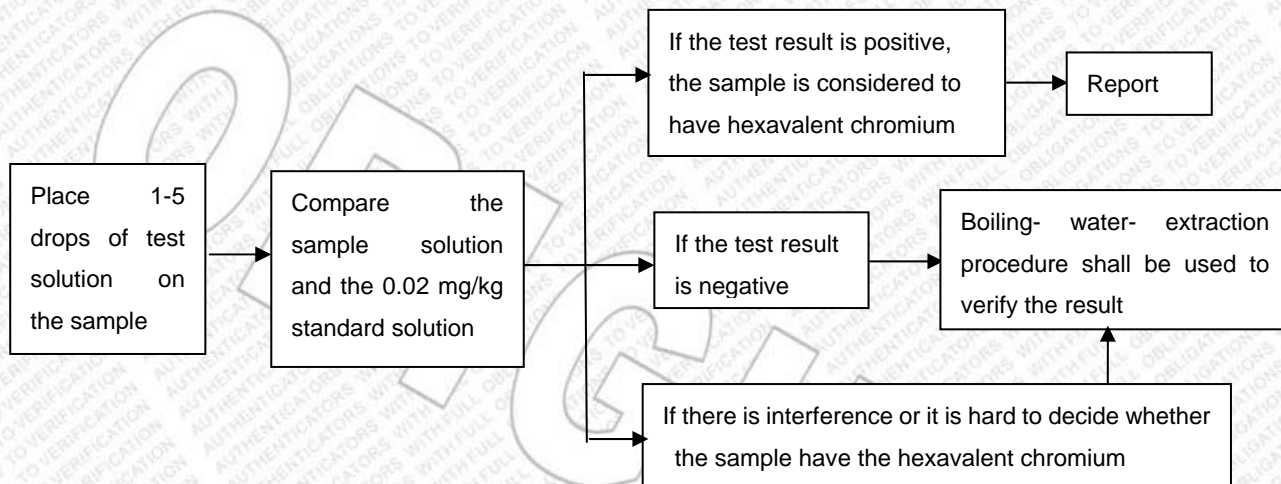
Page 3 of 4

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

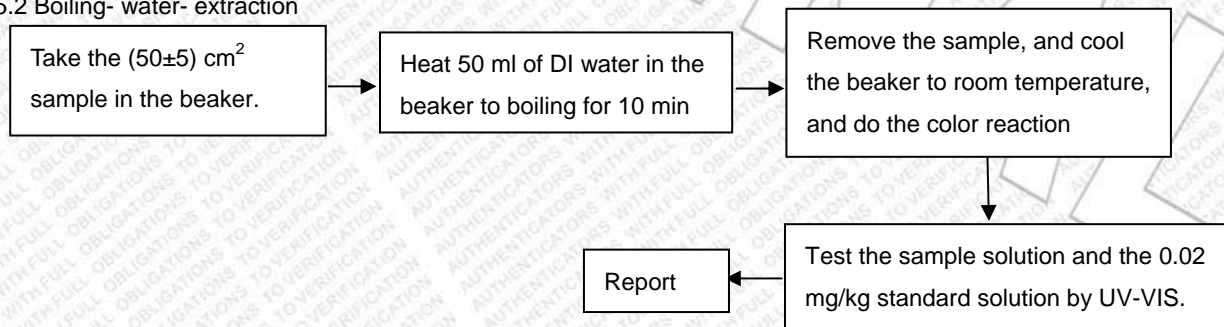
Tested by:

*Danale*

5.1 Spot-test



5.2 Boiling- water- extraction



## 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	12.0	N.D.
Cadmium (Cd)	mg/kg	100	2.1	N.D.
Mercury (Hg)	mg/kg	1000	N.D.	N.D.
Chromium (CrVI)	mg/kg	1000	Negative	Negative



# TEST REPORT

NO.: A002R130403070-1R02

Date: Apr.08, 2013

Page 4 of 4

## Note:

-Specimens, which requested to determine Lead, Cadmium and Mercury Content, have been dissolved completely.

-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. CANEC1309150301

Date: 24 Jun 2013

Page 1 of 5

XIAMEN LICHUN ELECTRONIC ELEMENT CO.,LTD

42-2 XINGLIN WEST RD,361022,JIMEI DISTRICT,XIAMEN,FUJIAN,P.R.C

The following sample(s) was/were submitted and identified on behalf of the clients as : Soda lime glass tube

SGS Job No. : XM14644726EC - XM

Date of Sample Received : 18 Jun 2013

Testing Period : 18 Jun 2013 - 24 Jun 2013

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.

Almay Gao  
Approved Signatory

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## Test Report

No. CANEC1309150301

Date: 24 Jun 2013

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Test Results :

### Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN13-091503.001	Transparent glass tube

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.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	142
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	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. CANEC1309150301

Date: 24 Jun 2013

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	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 the directive 2011/65/EU, Annex II

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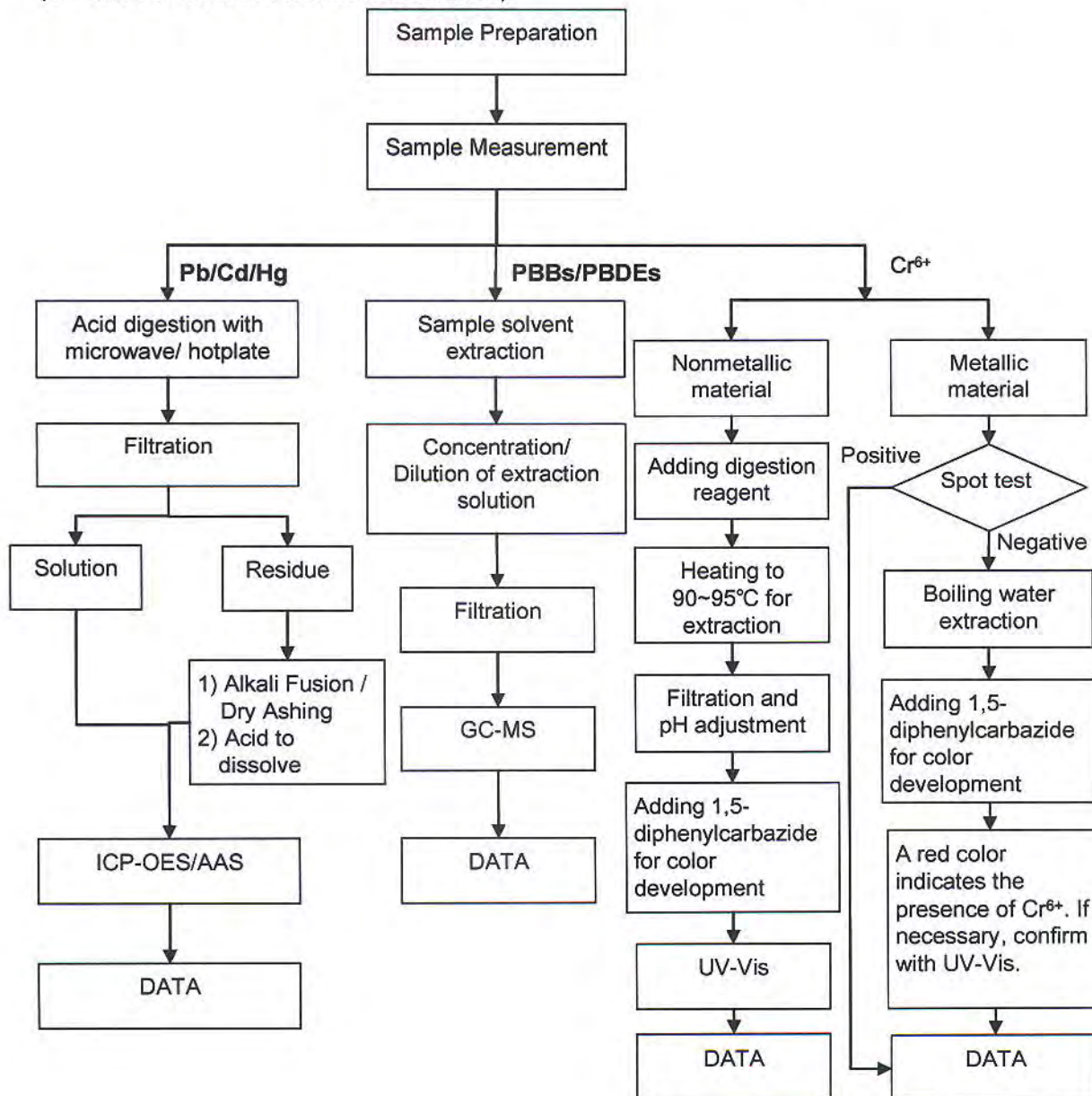
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## ATTACHMENTS

### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Michael Tso / Cutey Yu
- 2) Name of the person in charge of testing: Adams Yu / Yolanda Wei
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded).



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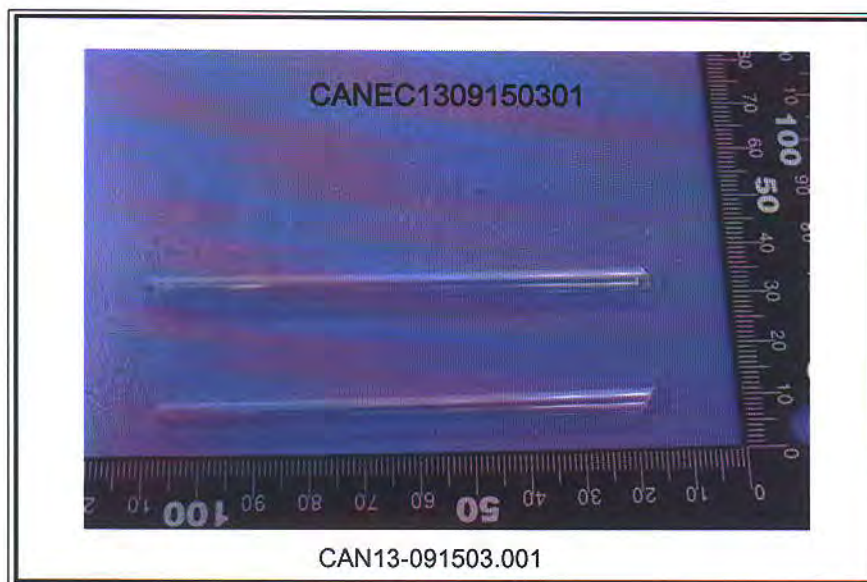
## Test Report

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Sample photo:



SGS authenticate the photo on original report only

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## 检测报告

报告编号: H01252016704D

日期: 2013.01.30

第 1 页, 共 4 页

委托单位: 苏州新吴光电科技有限公司

地址: 苏州吴江区松陵镇友谊开发区友谊路 368 号

委托单位提供样品信息如下:

样品名称: 锌带

买家: 苏州新吴光电科技有限公司

样品接收日期: 2013.01.25

样品检测日期: 2013.01.25 至 2013.01.30

检测要求: 参照 RoHS 2011/65/EU 指令附录 II 要求

检测方法: 依照 IEC62321 Edition 1.0 :2008 的方法: 电子电气产品中限用物质含量的测定程序

- (1) 用原子吸收光谱仪测定铅的含量
- (2) 用原子吸收光谱仪测定镉的含量
- (3) 用电感耦合等离子体原子发射光谱仪测定汞的含量
- (4) 用点测试法/沸水萃取法测定六价铬的含量
- (5) 用气相色谱-质谱仪测定多溴联苯和多溴联苯醚的含量

检测结果: 请参见下页

批准人:

Code: x3kb2mpj

本检测单位保证检测结果的公正性, 并对委托单位的商业秘密履行保密义务; 委托单位对样品的代表性和资料的真实性负责, 本检测单位仅对样品负责, 委托单位对于检测结果的使用、解释权、责任、法律后果及一切法律后果, 本检测单位不承担任何经济和法律责任; 本《检测报告》如无 PONY 专用章和批准人签字或被复制, 则无效; 任何对本《检测报告》未经授权的部分或全部转载、篡改、伪造或复制行为都是违法的, 将被追究民事、行政甚至刑事责任。

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& Hotline 400-819-5688

Add: 北京市海淀区苏州街 49-3 号

上海市徐汇区桂平路 680 号 35 号

深圳市南山区创业路中兴工业城 6

盈智大厦

楼 4 层

栋 1 层

Tel: (010) 82618116

(021) 64851999

(0755) 26050909

Fax: (010) 86219629

(021) 64856403

(0755) 26068336

E-mail: pony@ponytest.com

sh@ponytest.com

sz@ponytest.com





Pony Testing International Group

# 检测报告

报告编号: H01252016704D

日期: 2013.01.30

第 2 页, 共 4 页

检测结果 (单位: mg/kg)

检测项目	方法检出限	检测结果	RoHS 限量
铅	1	7	1000
镉	1	24	100
汞	1	未检出	1000
六价铬	参见备注(5)	阴性	—
多溴联苯	—	—	1000
一溴	5	未检出	—
二溴	5	未检出	—
三溴	5	未检出	—
四溴	5	未检出	—
五溴	5	未检出	—
六溴	5	未检出	—
七溴	5	未检出	—
八溴	5	未检出	—
九溴	5	未检出	—
十溴	5	未检出	—
多溴联苯醚	—	—	1000
一溴	5	未检出	—
二溴	5	未检出	—
三溴	5	未检出	—
四溴	5	未检出	—
五溴	5	未检出	—
六溴	5	未检出	—
七溴	5	未检出	—
八溴	5	未检出	—
九溴	5	未检出	—
十溴	5	未检出	—

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Add: 北京市海淀区苏州街 49-3 号

盈智大厦

Tel: (010) 82618116

Fax: (010) 86219629

E-mail: [pony@ponytest.com](mailto:pony@ponytest.com)

上海市徐汇区桂平路 680 号 35 号

楼 4 层

(021) 64851999

(021) 64856403

[sh@ponytest.com](mailto:sh@ponytest.com)

深圳市南山区创业路中兴工业城 6

栋 1 层

(0755) 26050909

(0755) 26068336

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## 检测报告

报告编号: H01252016704D

日期: 2013.01.30

第 3 页, 共 4 页

备注: (1) mg/kg = ppm

(2) “—”= 未规定

(3) 最大允许限值引用 RoHS 指令 2011/65/EU 附录 II 的限值要求

(4) 未检出(<方法检出限)

(5) 点测试:

阴性=表层中不存在六价铬, 阳性=表层中存在六价铬;

(如果点测试的检测结果为阴性或不确定, 应进一步用沸水萃取法验证)

沸水萃取法:

阴性=表层中不存在六价铬, 阳性=表层中存在六价铬;

沸水萃取法中的检测浓度为每 50cm<sup>2</sup> 的测试面积等于或大于 0.02mg/kg

照片:



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**PONY 谱尼测试**  
Pony Testing International Group

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Add: 北京市海淀区苏州街 49-3 号

盈智大厦

Tel: (010) 82618116

Fax: (010) 86219629

E-mail: pony@ponytest.com

上海市徐汇区桂平路 680 号 35 号

楼 4 层

(021) 64851999

(021) 64856403

sh@ponytest.com

深圳市南山区创业路中兴工业城 6

栋 1 层

(0755) 26050909

(0755) 26068336

sz@ponytest.com





Pony Testing International Group

检测报告 报告编号: H01252016704D

日期: 2013.01.30

第 4 页, 共 4 页

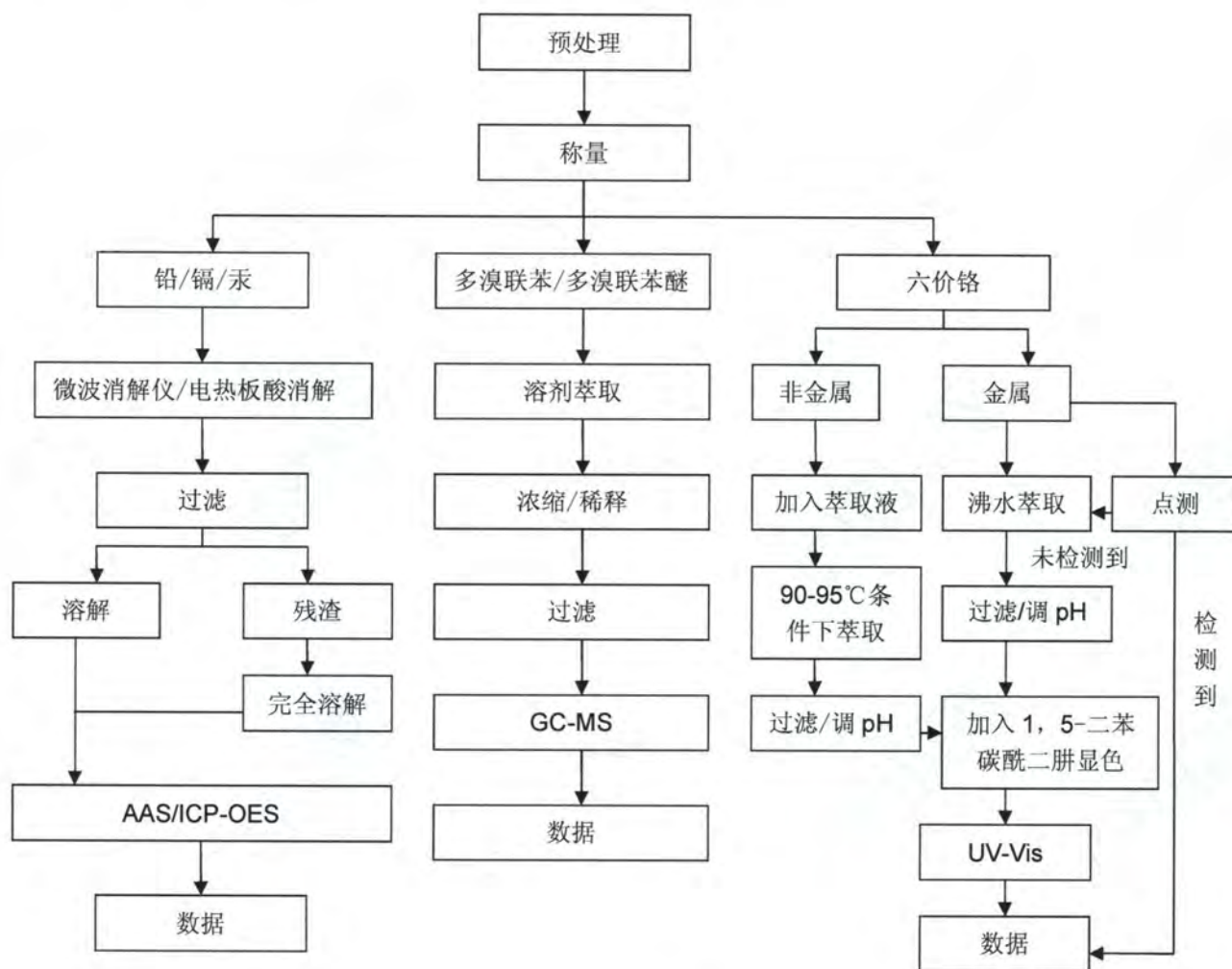
### 检测流程图

测试人员: 夏芳

审核人员: 张耀强

实验室负责人: 宋虹

样品按照下述流程被完全消解 (六价铬和多溴联苯/多溴联苯醚除外)。



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盈智大厦  
Tel: (010) 82618116  
Fax: (010) 86219629  
E-mail: pony@ponytest.com

上海市徐汇区桂平路 680 号 35 号  
楼 4 层  
(021) 64851999  
(021) 64856403  
sh@ponytest.com

深圳市南山区创业路中兴工业城 6  
栋 1 层  
(0755) 26050909  
(0755) 26068336  
sz@ponytest.com



**Test Report**

Number: SHAH00362270

Applicant: ELSCHUKOM ELEKTROSCHUTZKOMPONENTENBAU  
GMBH  
GEWERBESTRASSE 87,D-98669 VEILSDORF,  
GERMANY

Date: JAN 18, 2013

**Sample Description:**

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

(1) Substrate.

(2) Plating.

Item Name : Wire With Plating.

Item No. : 101.014-.-.- sliver plated copper wire Cu,Ag --%.

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





## Tests Conducted

## (A) Test result of RoHS Directive:

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

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

Remark: mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimeter

ND = not detected

## (B) RoHS Requirement:

<b>Restricted substances</b>	<b>Limits</b>
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>6+</sup> )	0.1% (1000 mg/kg)

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

## (C) Test method:

<b>Testing item</b>	<b>Testing method</b>	<b>Reporting limit</b>
Cadmium (Cd) 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
Lead (Pb) 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
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 <sup>6+</sup> ) 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 <sup>2</sup> (in testing solution)

Date sample received: Jan.14, 2013

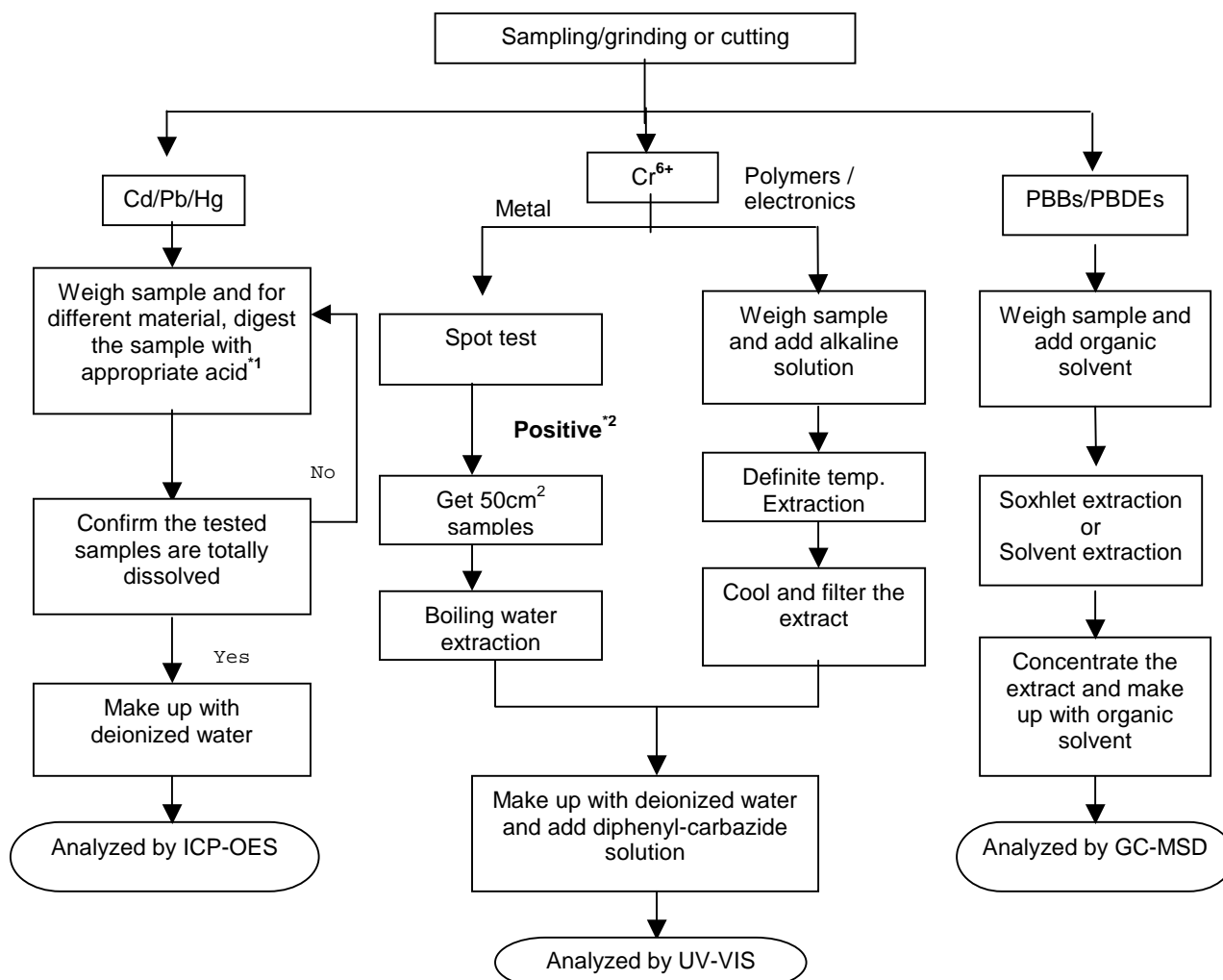
Testing period: Jan.14, 2013 To Jan.17, 2013

\*\*\*\*\*

To be continued

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:

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.

\*\*\*\*\*

To be continued

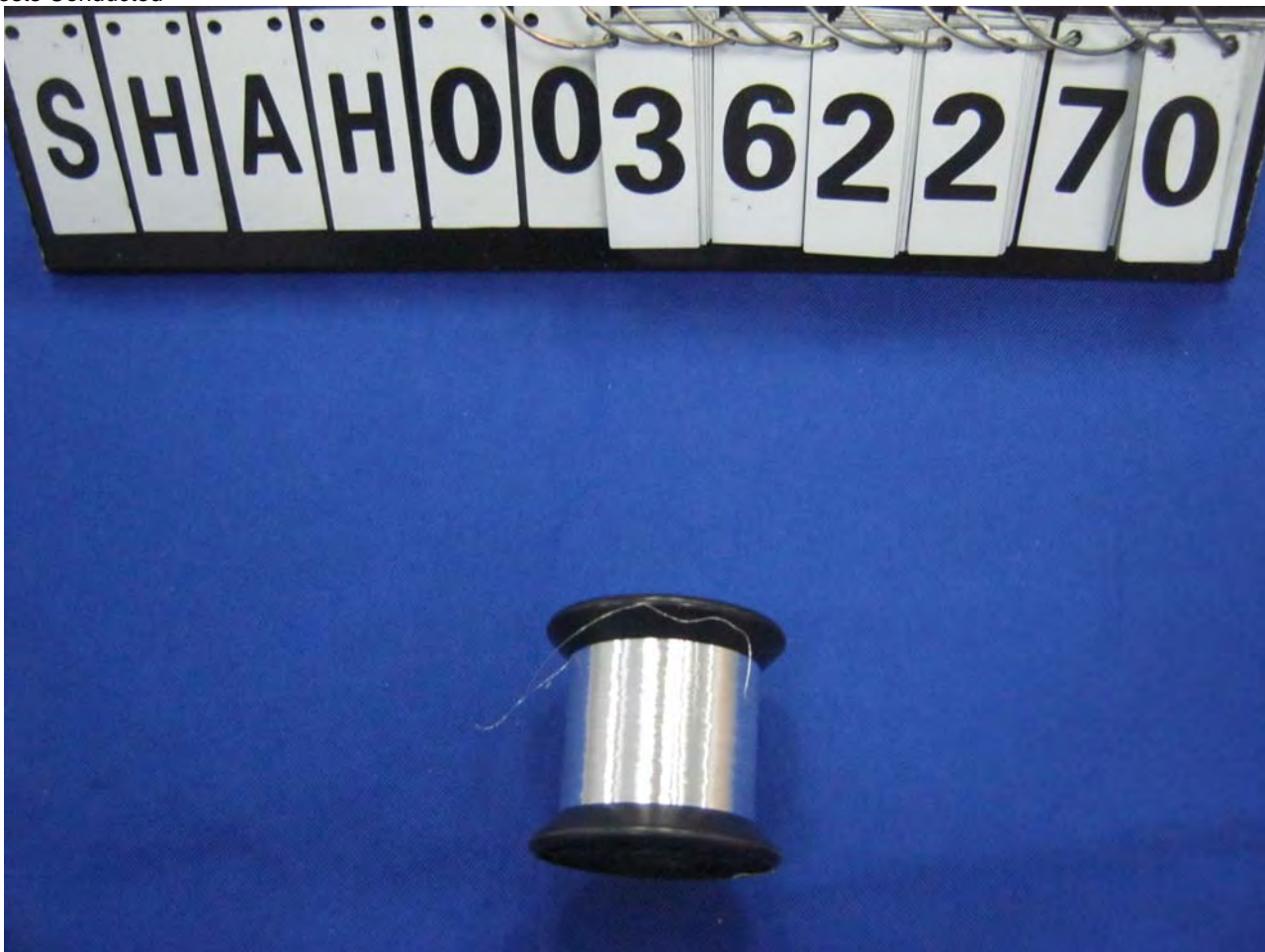


Tests Conducted



To be continued

Tests Conducted



End of report

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**Polyfil AG**  
Gina Gregorio  
Oberallmendstrasse 20A

**6300 Zug / Switzerland**

Fürth, 2012-12-19

## Test report No. FUHL1236937

### Testing of a material sample according to the RoHS directive 2011/65/EC

**Sample description:** Ni42Fe58MCuMAg wire; part no. HL26351

Arrival in lab: 2012-012-04; Period of XRF analysis incl. sample preparation and photo documentation: 2012-12-07 – 2012-12-10  
Head of Inorganic Lab: Claudia List

Copying this test report is permitted only in agreement with the contracted lab. The test results refer only to the tested item.  
This report consists of 6 page(s).  
The test methods signed with \* are not listed in the attachment of the accreditation certificate.

### Conclusion based on tested item

Test order	Status
testing according to the RoHS directive 2011/65/EC	conform <sup>°</sup>

<sup>°</sup> Please see overview of test results

- Test results see next pages -

**Sample description: Ni42Fe58MCuMAg wire; part no. HL26351**

**nM = non Metal**

**M = Metal**

**cM = composite Material**

**List of component parts:**

Sample No.	Part No.	Material	Description
236937	1	M	Ni42Fe58MCuMAg wire; part no. HL26351



**Sample description: Ni42Fe58MCuMAg wire; part no. HL26351**

**Comment**

LOD = Limit of Detection  
 BL = Below Limit  
 OL = Over Limit  
 X = Inconclusive, further test necessary  
 $\sigma$  = Standard deviation  
  
 CS = Composite sample

**Remark:**

Results were obtained by EDXRF for primary screening. Additional chemical testing using ICP (for Cd, Pb), AAS (for Hg), IC-UC/VIS (for CrVI) and GC/MS (for PBBs/PBDEs) are recommended, if the concentration exceeds the below warning value according to IEC 62321.

Element	Unit	non - metal	metal
Cd	mg / kg	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$
Pb	mg / kg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$
Hg	mg / kg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$
Br	mg / kg	$BL \leq (300-3\sigma) < X$	--
Cr	mg / kg	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$

Element	Unit	composite material
Cd	mg / kg	$LOD < X < (150+3\sigma) \leq OL$
Pb	mg / kg	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	mg / kg	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	mg / kg	$BL \leq (250-3\sigma) < X$
Cr	mg / kg	$BL \leq (500-3\sigma) < X$

**Sample description: Ni42Fe58MCuMAg wire; part no. HL26351**

**1. XRF screening**

Method: XRF according to IEC 62321:2008\*

Sample No.	Part No.	Pb	Hg	Cd	Cr <sub>total</sub>	Br	Status
236937	1	BL	BL	BL	BL	--	conform

**Comment:**

Elements	RoHS-limit value
Lead (Pb)	1000 mg/kg
Mercury (Hg)	1000 mg/kg
Cadmium (Cd)	100 mg/kg
Chromium VI (Cr VI)	1000 mg/kg
Polybrominated Biphenyle (PBBs)	1000 mg/kg
Polybrominated Diphenyl ether (PBDEs)	1000 mg/kg

**Intertek Consumer Goods GmbH**



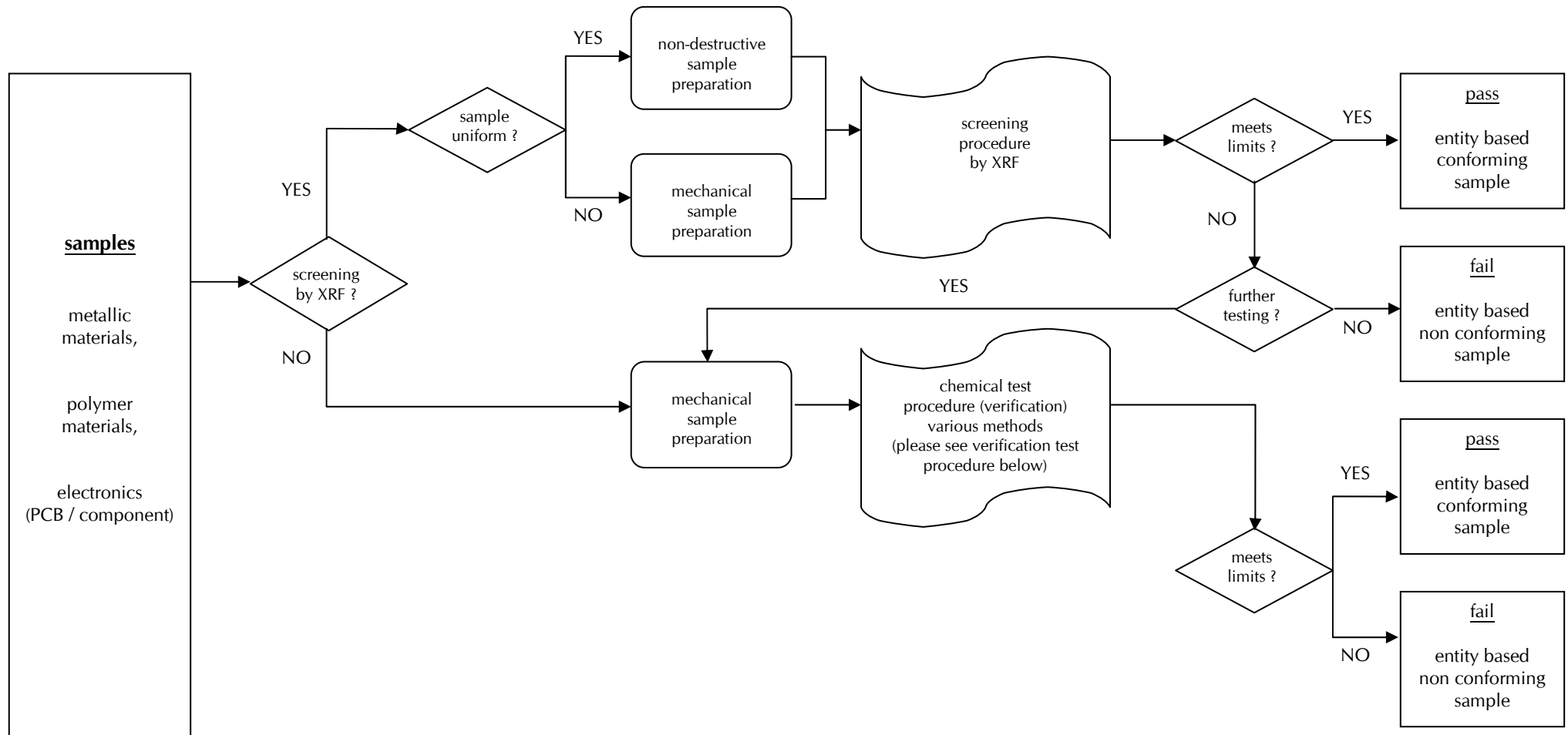
Prüfleitung / Lab Manager

☐ A. Breunig, ☐ K. Grönhardt, ☐ Dr. K. Laue-Schuler, ☒ C. List, ☐ D. Löw  
☐ R. Micolay, ☐ M. Neumeister, ☐ Dr. R. Rätze, ☐ K. Scharrer, ☐ M. Tutsch

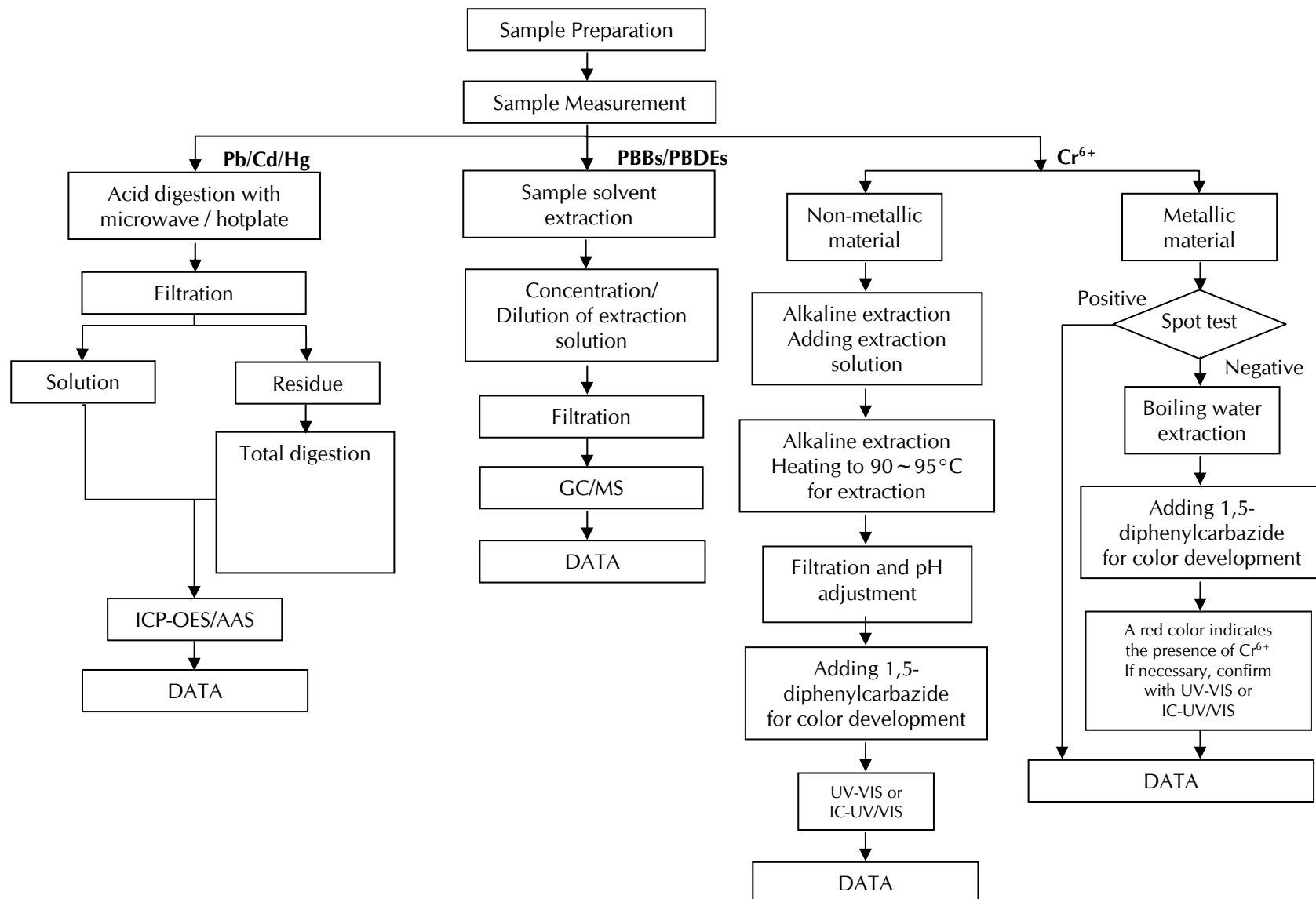
- Flow charts see next page(s) -



## Test procedure



## Verification test procedure



## Test Report

No. SHAEC1317518845

Date: 06 Sep 2013

Page 1 of 6

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. : SP13-026309 - SH  
 Model No. : YTW108 ( 692535-001、692535-003、693535-004 )  
 Composition : Sn3.0CuRE  
 Date of Sample Received : 03 Sep 2013  
 Testing Period : 03 Sep 2013 - 06 Sep 2013  
 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.



JJ Fan

Approved Signatory

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# Test Report

No. SHAEC1317518845

Date: 06 Sep 2013

Page 2 of 6

Test Results :

## Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA13-175188.038	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 :
- (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
  - (2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
  - (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
  - (4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by spot test / Colorimetric Method using UV-Vis.
  - (5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	038
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	129
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	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	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

No. SHAEC1317518845

Date: 06 Sep 2013

Page 3 of 6

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>038</u>
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	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 cm<sup>2</sup> sample surface area.

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

### Halogen

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

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>038</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	392
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

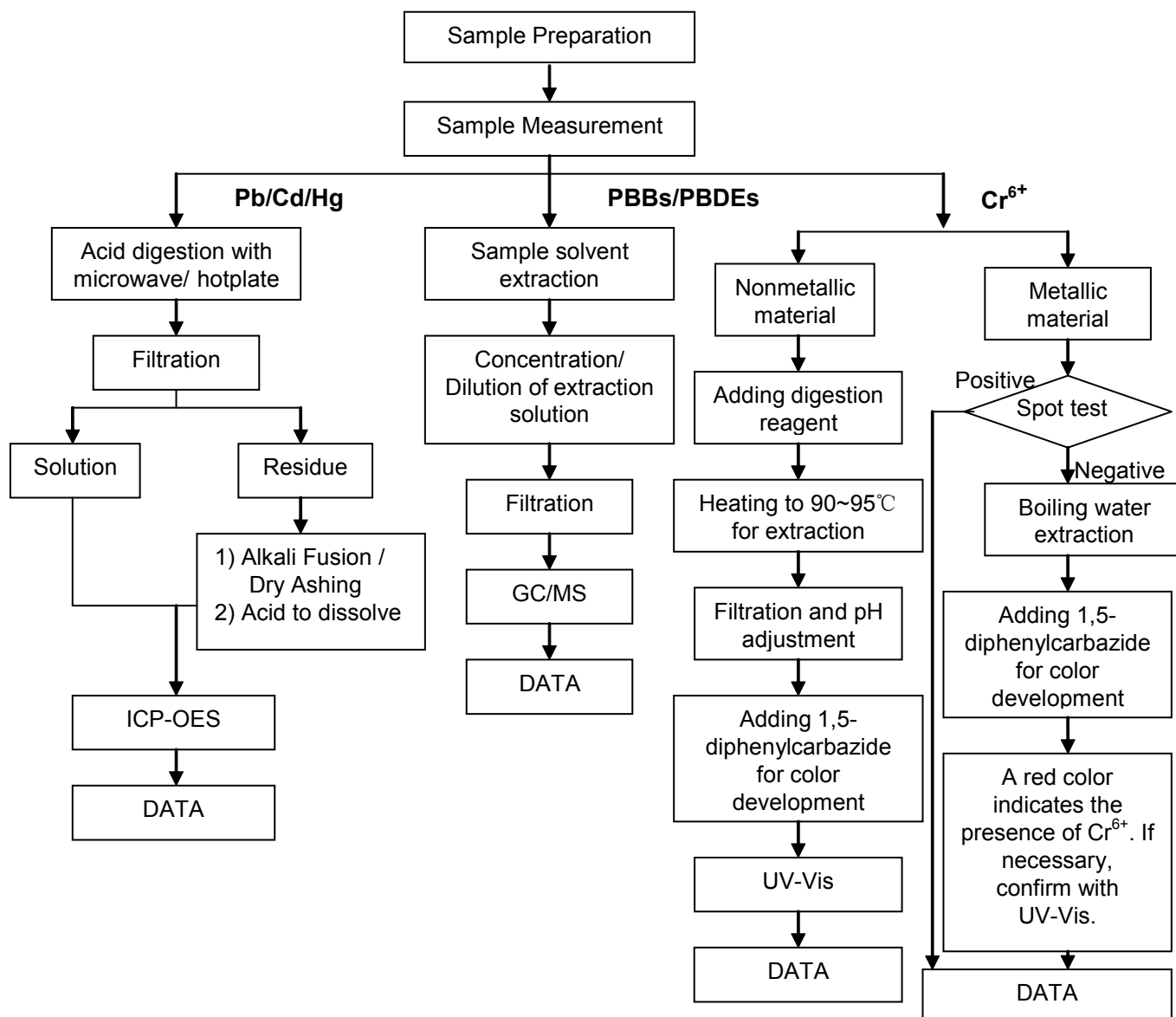
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## ATTACHMENTS

### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Jan Shi/Star Wang/Shara Wang/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Jessy Huang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. ( $\text{Cr}^{6+}$  and PBBs/PBDEs test method excluded)

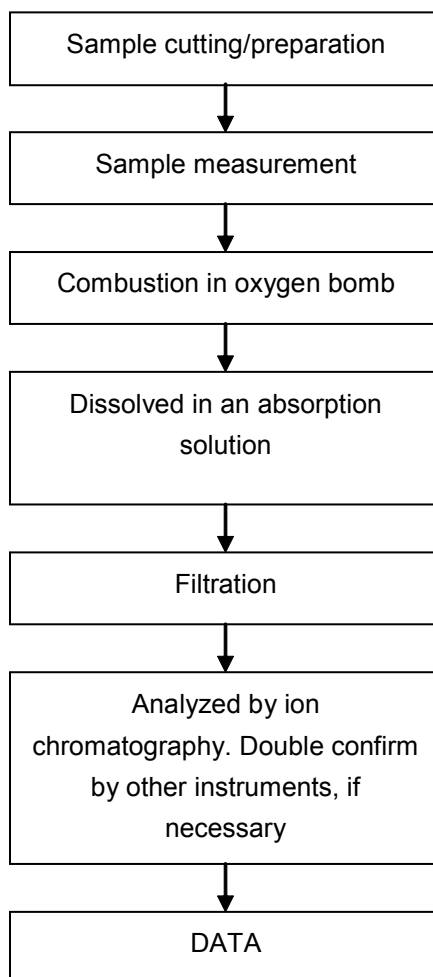


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### Halogen Testing (oxygen bomb) Flow Chart

- 1) Name of the person who made testing: Sisily Yin
- 2) Name of the person in charge of testing: Linda Li



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## Test Report

No. SHAEC1317518845

Date: 06 Sep 2013

Page 6 of 6

Sample photo:



SGS authenticate the photo on original report only

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

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## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

Page 1 of 7

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. : SP12-033081 - SH

Date of Sample Received : 14 Nov 2012

Testing Period : 14 Nov 2012 - 19 Nov 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.

JJ Fan  
Approved Signatory

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SGS  
Standard Technical Service  
Shanghai Co., Ltd.  
Testing Center (Shanghai)

J Building, No. 889 Yishan Road, Kujia District, Shanghai, China 200233  
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

TEL: (86-21) 61402553 FAX: (86-21) 61402553  
HL: (86-21) 61402594 HL: (86-21) 54500363  
www.cn.sgs.com  
e: sgs.china@sgs.com

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## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

Page 2 of 7

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-199754.001	Brown 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.

Test Item(s)	Limit	Unit	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	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	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	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

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Test Item(s)	Limit	Unit	MDL	001
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	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 the directive 2011/65/EU, Annex II

### Hexabromocyclododecane (HBCDD)

Test Method : Determination of HBCDD by GC-MS based on IEC 62321:2008.

Test Item(s)	Unit	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 : Determination of phthalates by GC-MS based on EN 14372:2004.

Test Item(s)	Unit	MDL	001
Dibutyl Phthalate (DBP)	%	0.003	ND
Benzylbutyl Phthalate (BBP)	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	%	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.

## Test Report

No. SHAEC1219975401

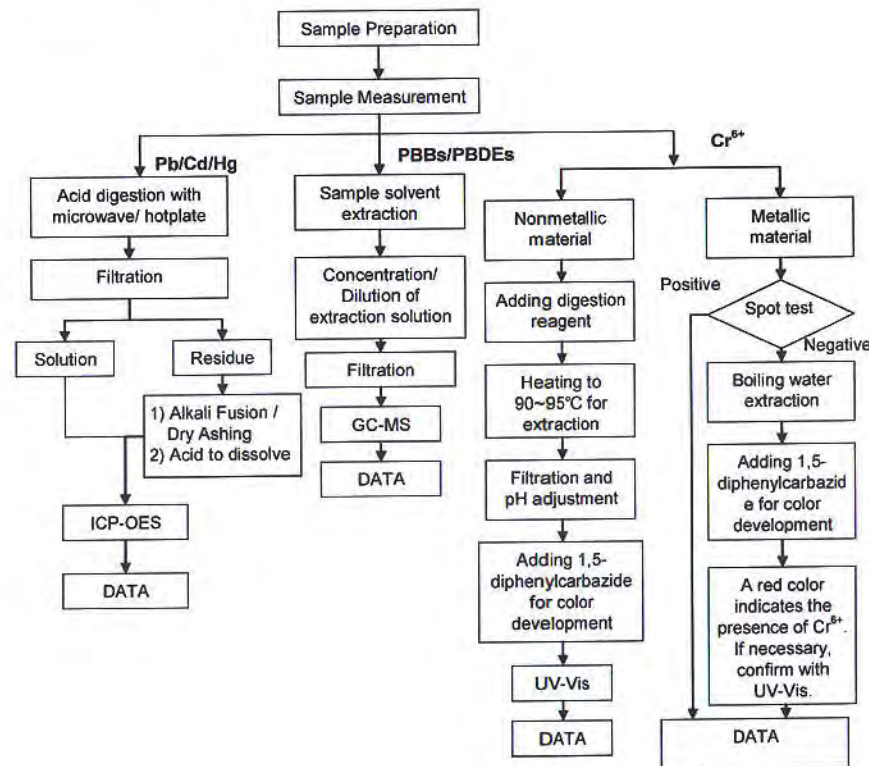
Date: 19 Nov 2012

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### ATTACHMENTS

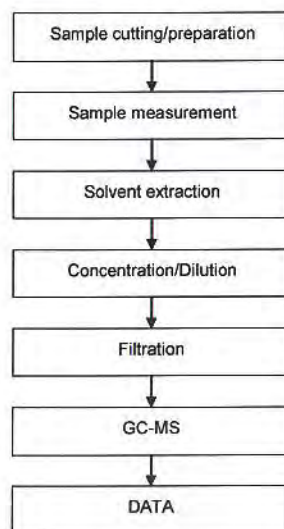
#### RoHS Testing Flow Chart

- 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
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)



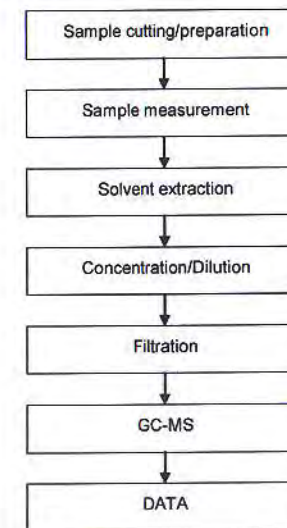
## Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Elyn Yao
- 2) Name of the person in charge of testing: Rachel Zhang



## HBCDD Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Jessy Huang



## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

Page 7 of 7

Sample photo:



SGS authenticate the photo on original report only

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3rd Building, No. 889 Yishan Road, Xuhui District, Shanghai, China 200233  
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

TELE (86-21) 61402553 FAX (86-21) 61402564  
HL: (86-21) 61402564 HL: (86-21) 64500363

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[sgs.china@sgs.com](mailto:sgs.china@sgs.com)

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# SGS

## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

Page 1 of 6

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. : SP12-033081 - SH

Date of Sample Received : 14 Nov 2012

Testing Period : 14 Nov 2012 - 19 Nov 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.

JJ Fan

Approved Signatory

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中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

TEL: (86-21) 61402553 FAX: (86-21) 64853679 www.cn.sgs.com  
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# SGS

## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

Page 2 of 6

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-199754.001	Brown solid

Remarks :

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected ( &lt; MDL )

(4) "-" = Not Regulated

### Halogen

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

Test Item(s)	Unit	MDL	001
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

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## Test Report

No. SHAEC1219975401

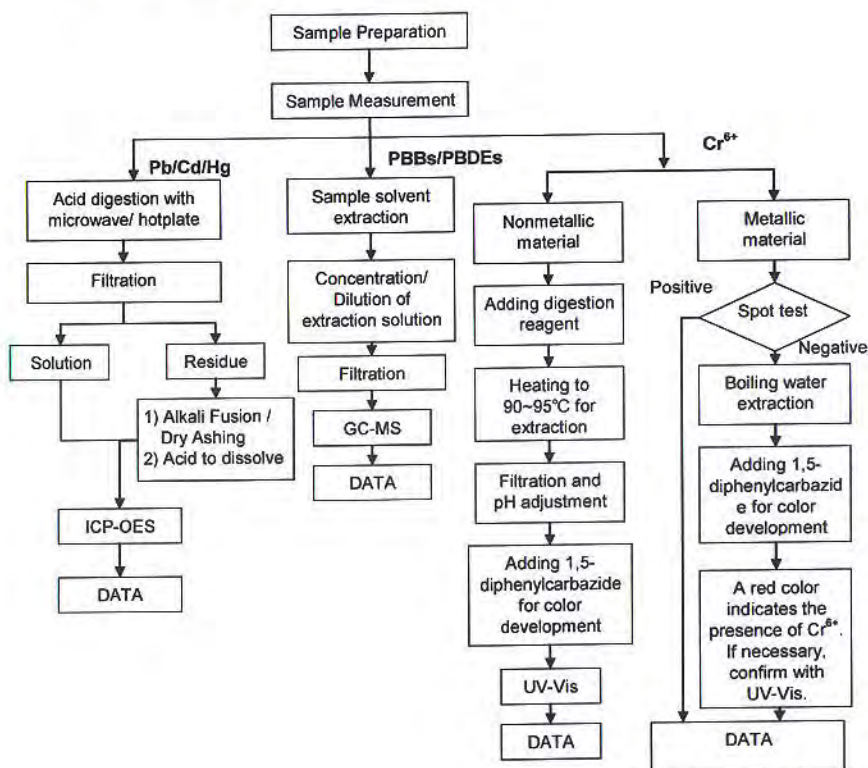
Date: 19 Nov 2012

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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
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)



## Test Report

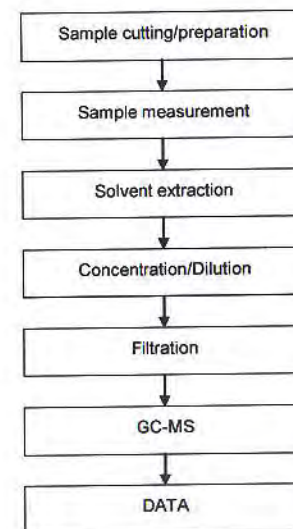
No. SHAEC1219975401

Date: 19 Nov 2012

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### Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Elyn Yao
- 2) Name of the person in charge of testing: Rachel Zhang



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## Test Report

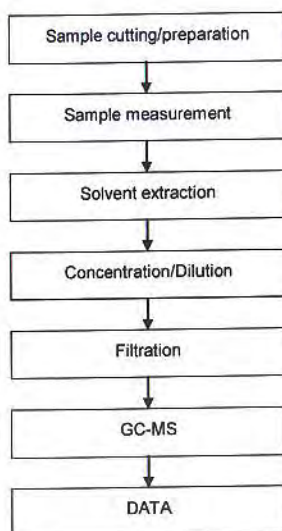
No. SHAEC1219975401

Date: 19 Nov 2012

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### HBCDD Testing Flow Chart

- 1) Name of the person who made testing: Gary Xu
- 2) Name of the person in charge of testing: Jessy Huang



## Test Report

No. SHAEC1219975401

Date: 19 Nov 2012

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Sample photo:



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**Test Report**

**Number: 131000457SHA-007**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Red ink**  
Part Description : INK - RED  
Part Number : 425901

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager

**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	850
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

\*\*\*\*\*  
To be continued

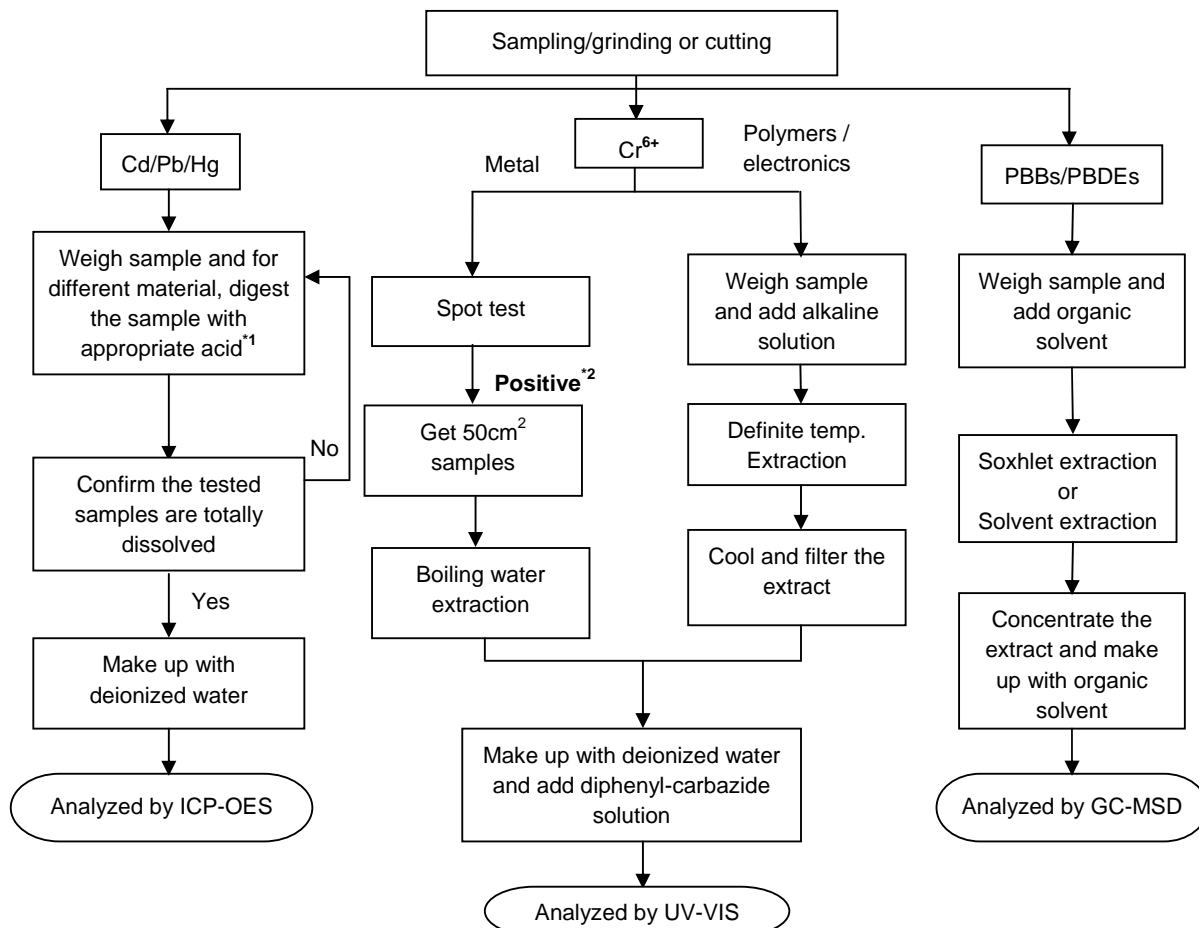


Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

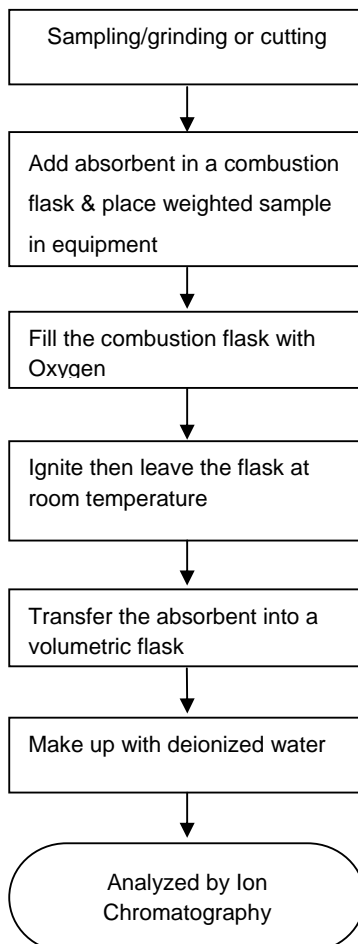
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-007**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

\*\*\*\*\*

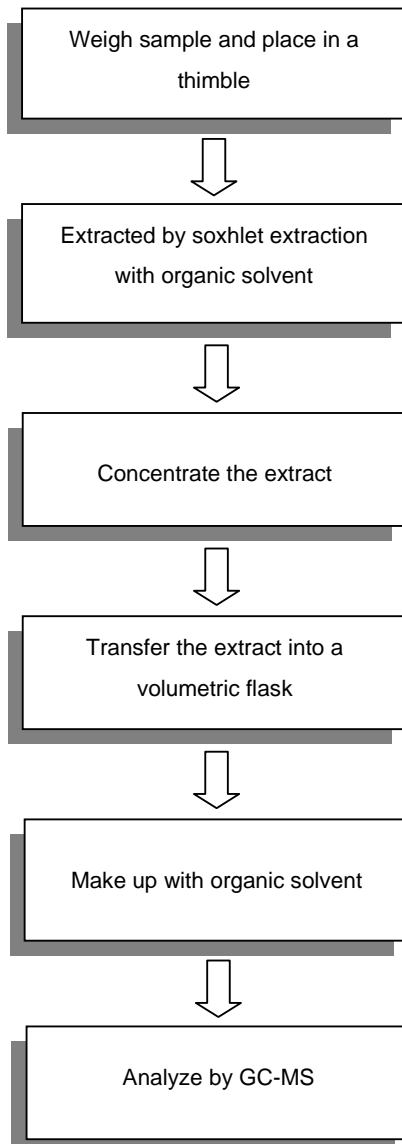
To be continued



Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-007**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

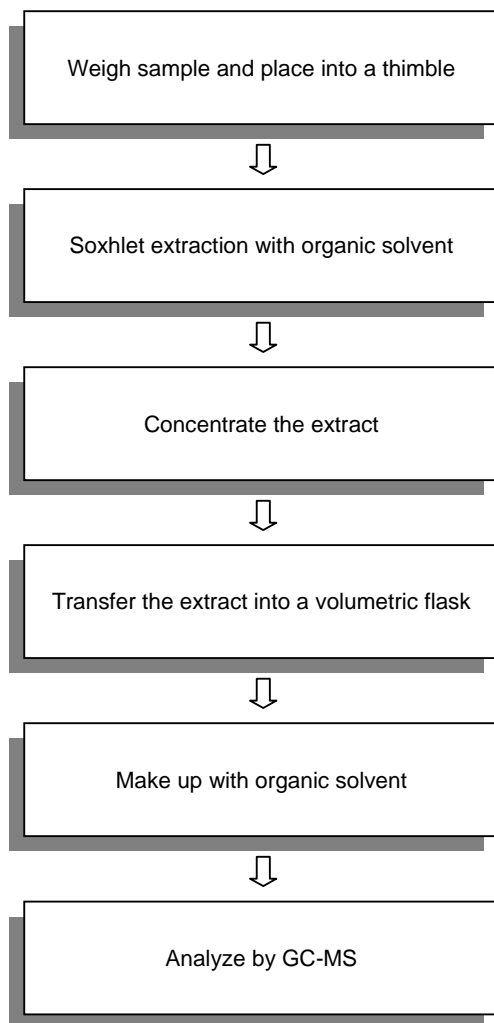
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued





**Test Report**

**Number: 131000457SHA-007**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-004**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Green ink**  
Part Description : INK - GREEN  
Part Number : 425907

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager



**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	700
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

\*\*\*\*\*

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

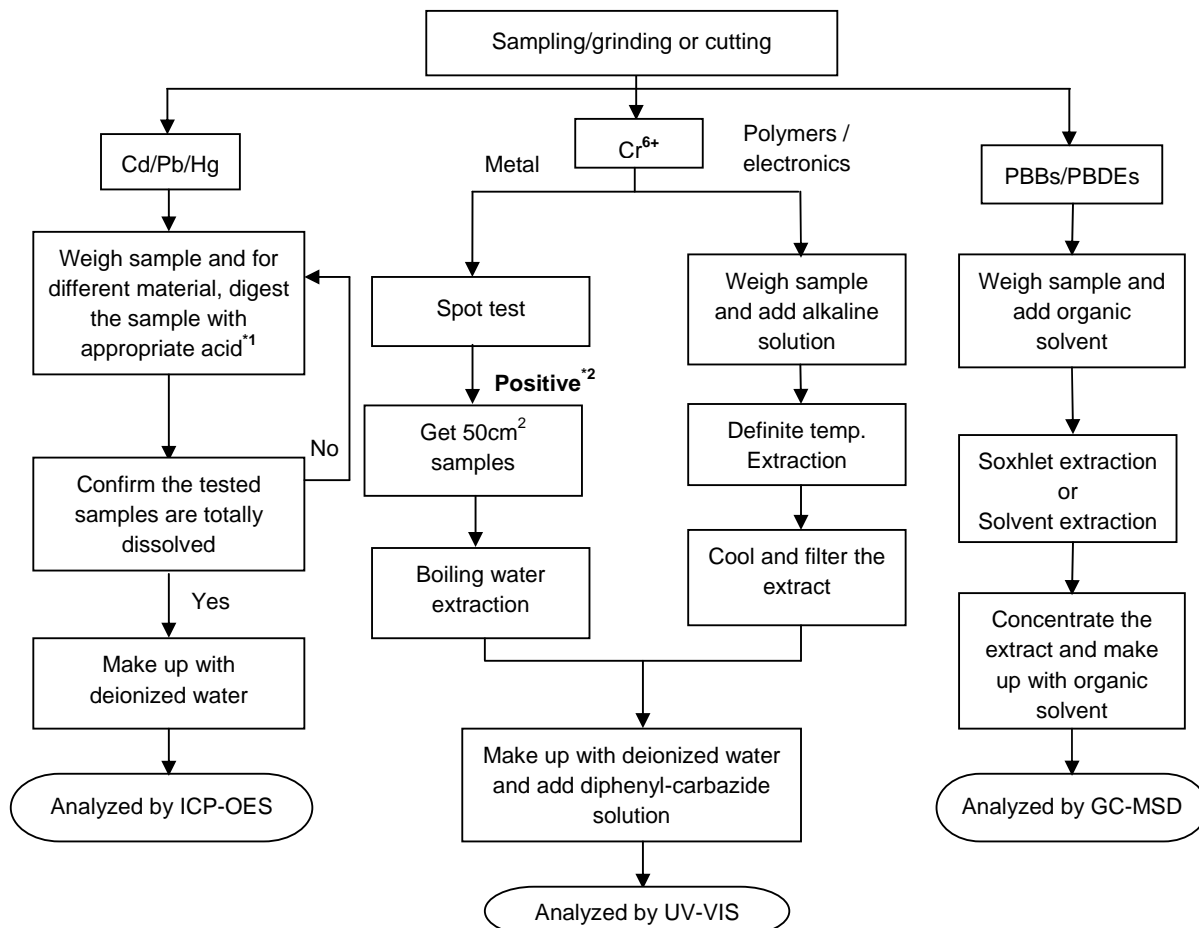
\*\*\*\*\*  
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

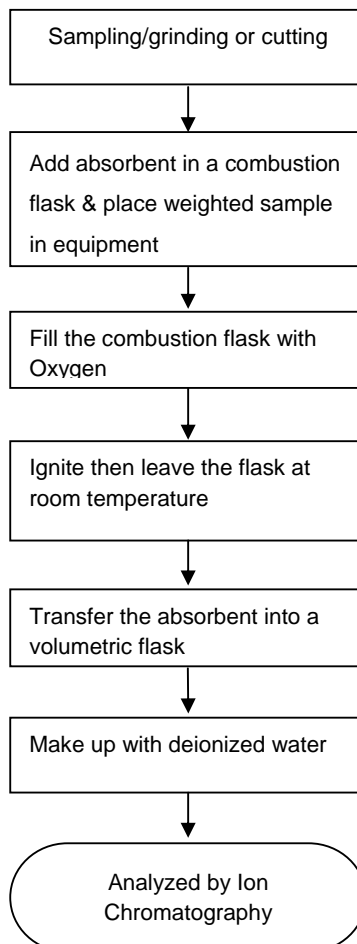
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



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To be continued





**Test Report**

**Number: 131000457SHA-004**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

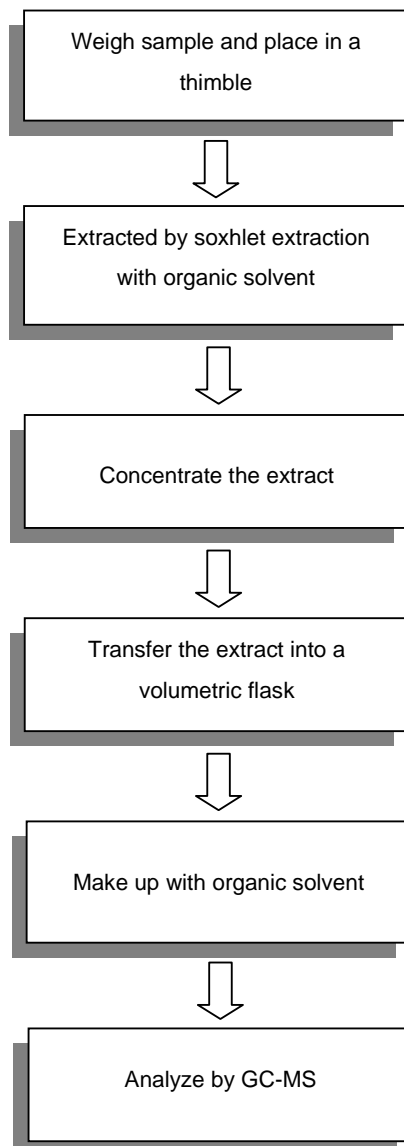
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To be continued

Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-004**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

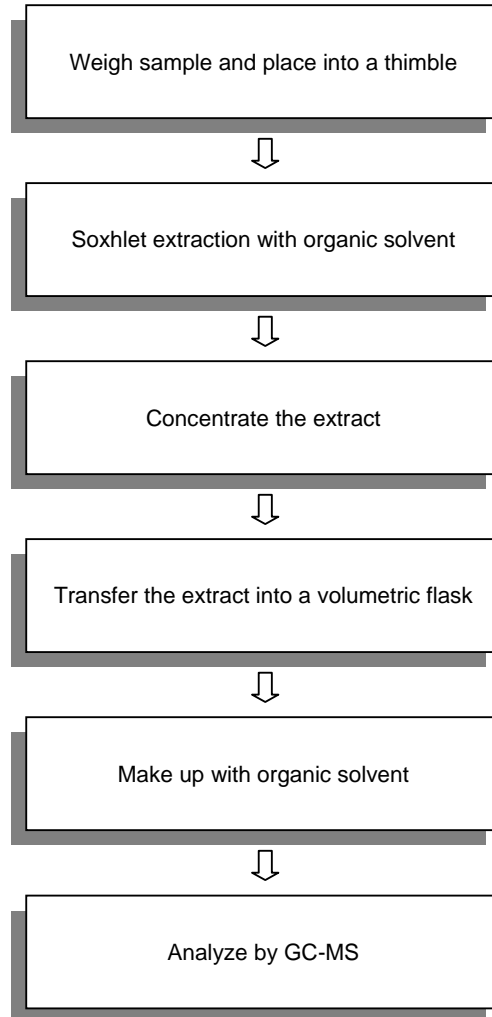
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To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued





**Test Report**

**Number: 131000457SHA-004**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-005**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Grey ink**  
Part Description : INK - GREY  
Part Number : 425909

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager

**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	ND
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

To be continued



**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

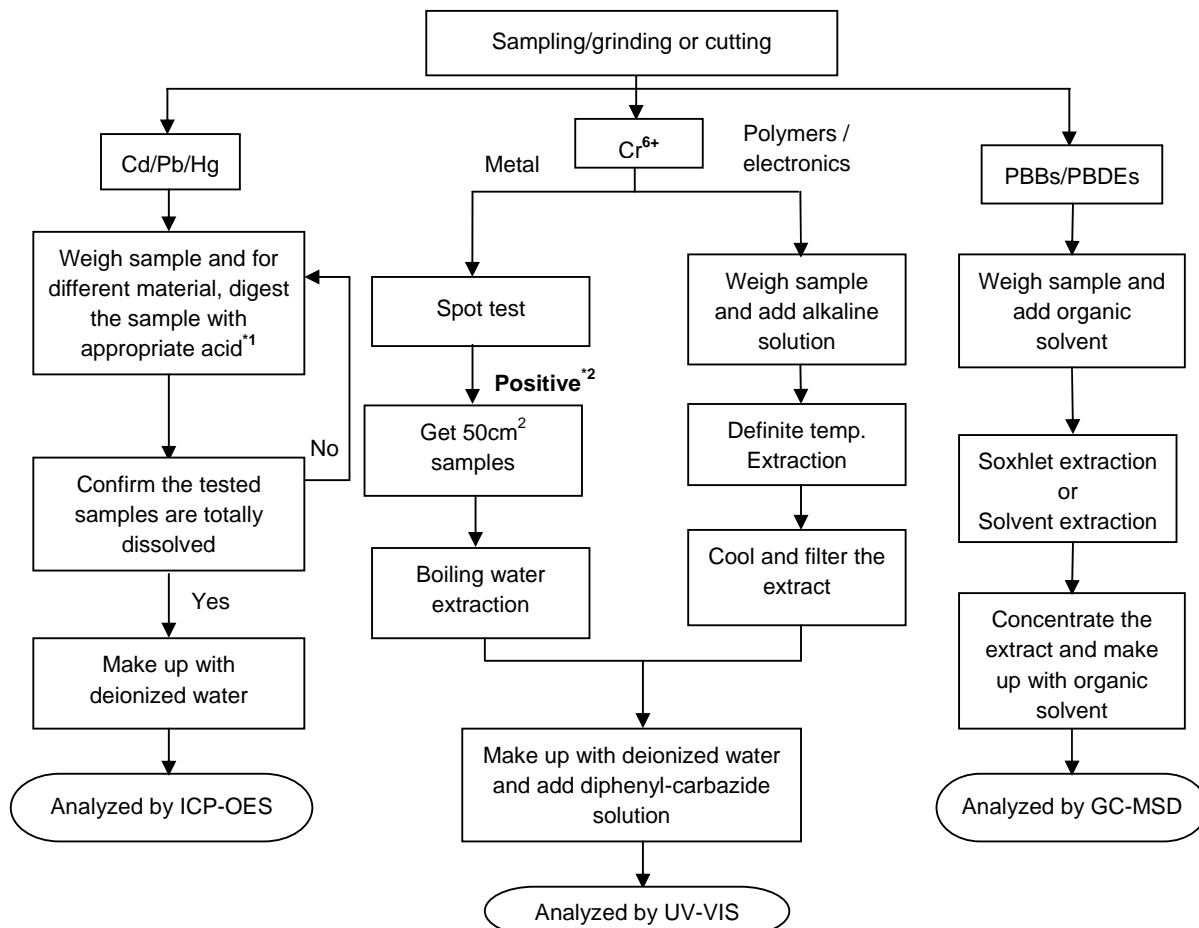
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To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

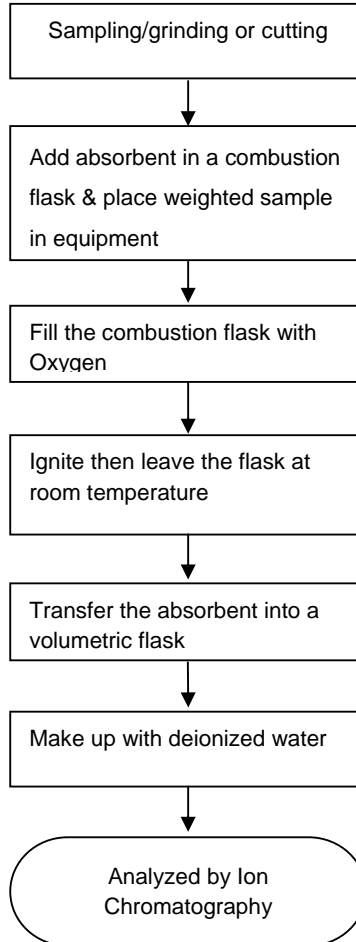
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-005**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

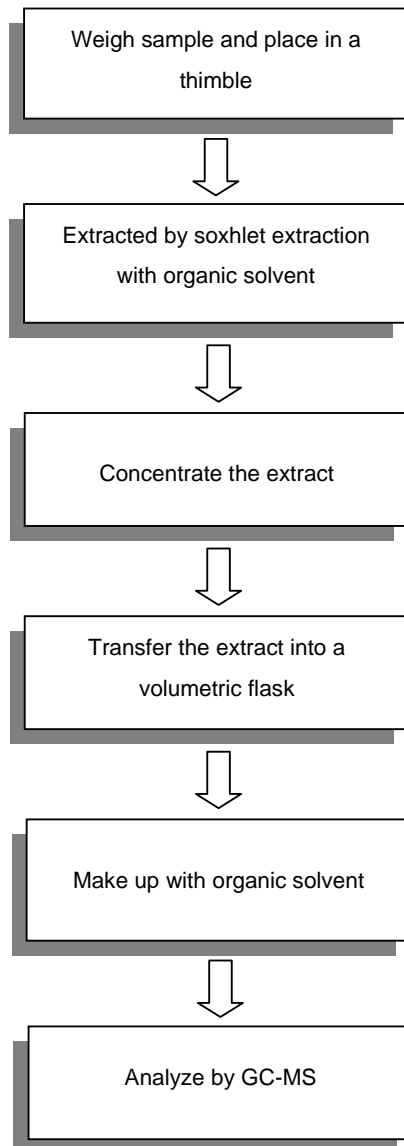
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*

To be continued





**Test Report**

**Number: 131000457SHA-005**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

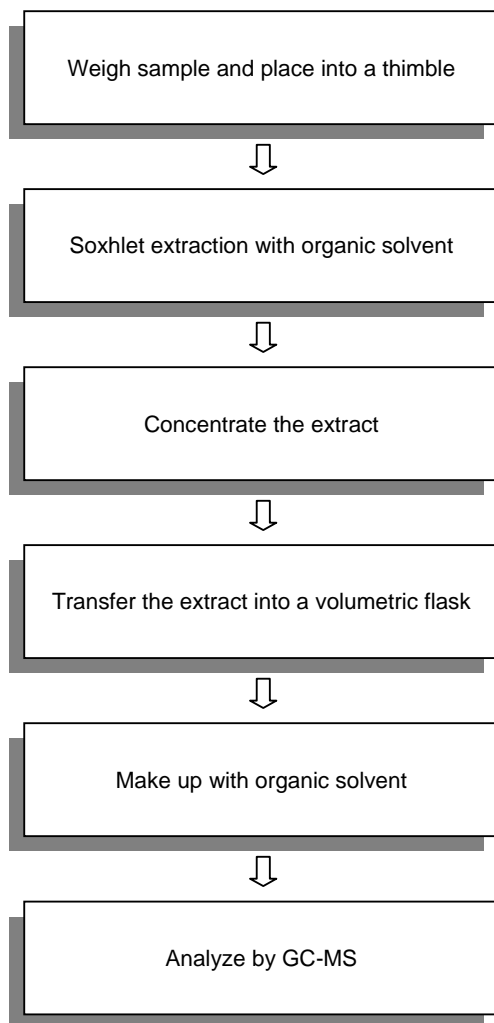
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-005**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-008**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Violet ink**  
Part Description : INK - VIOLET  
Part Number : 425911

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager



**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	7600
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

\*\*\*\*\*

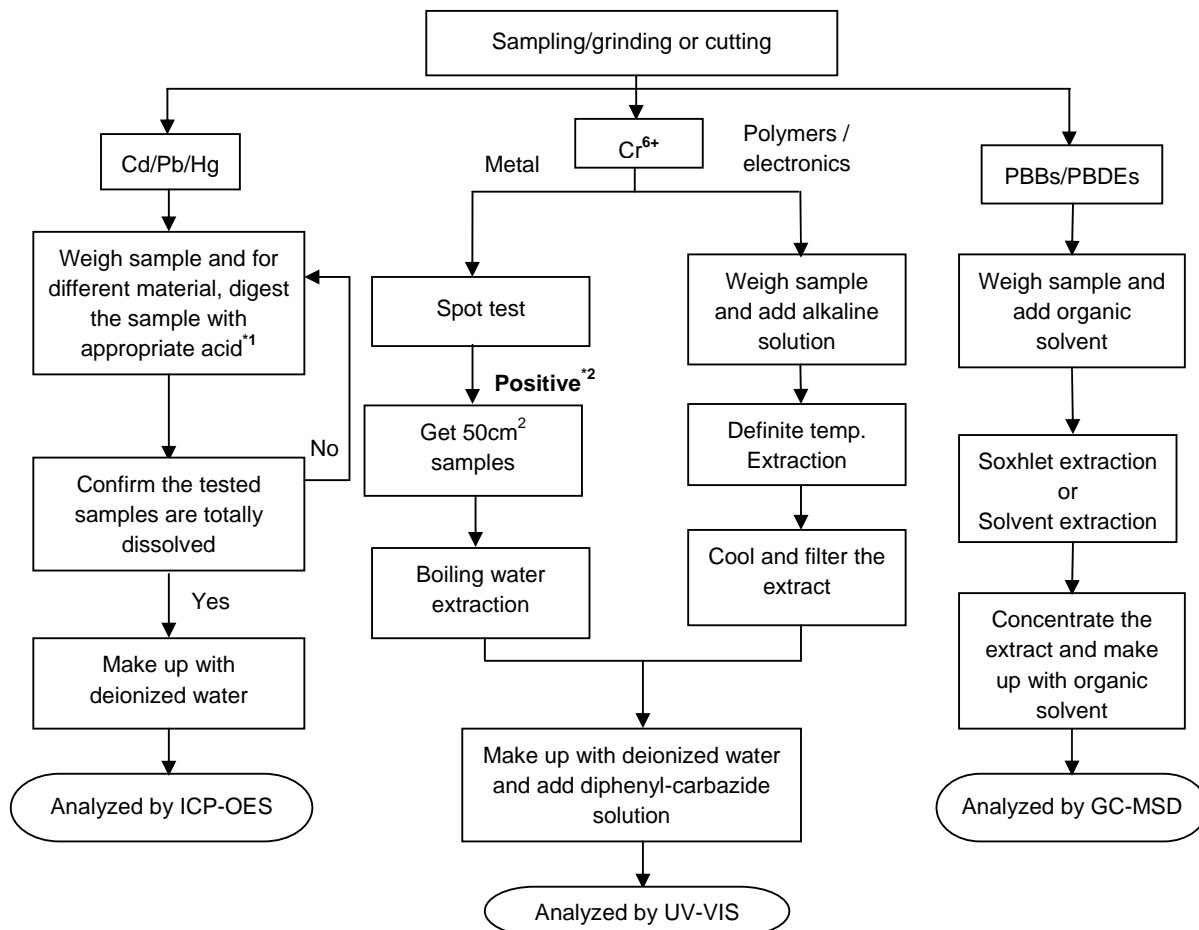
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

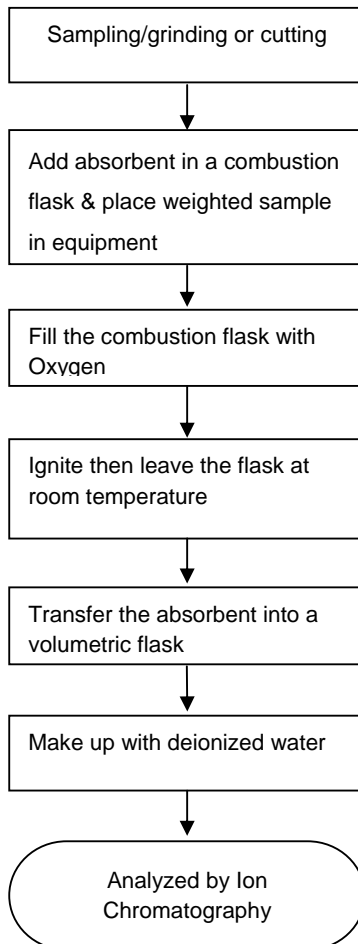
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-008**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

\*\*\*\*\*

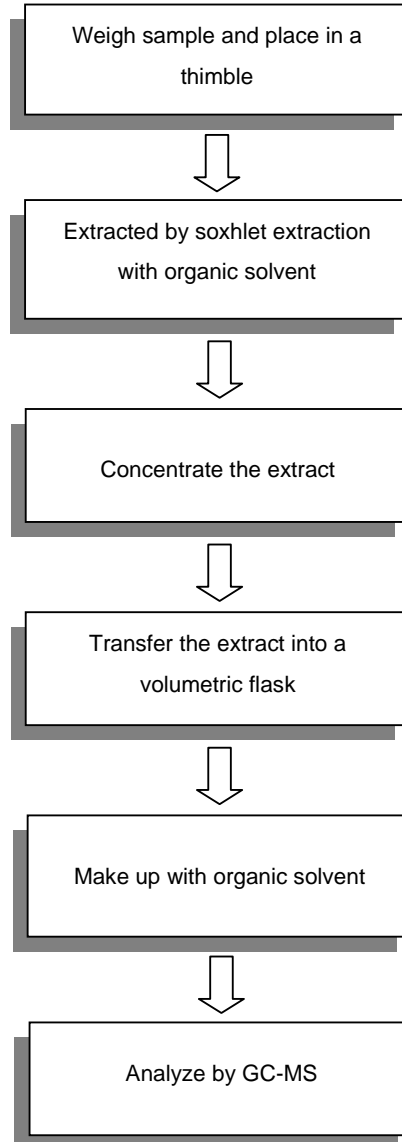
To be continued



Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*  
To be continued



**Test Report**

**Number: 131000457SHA-008**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

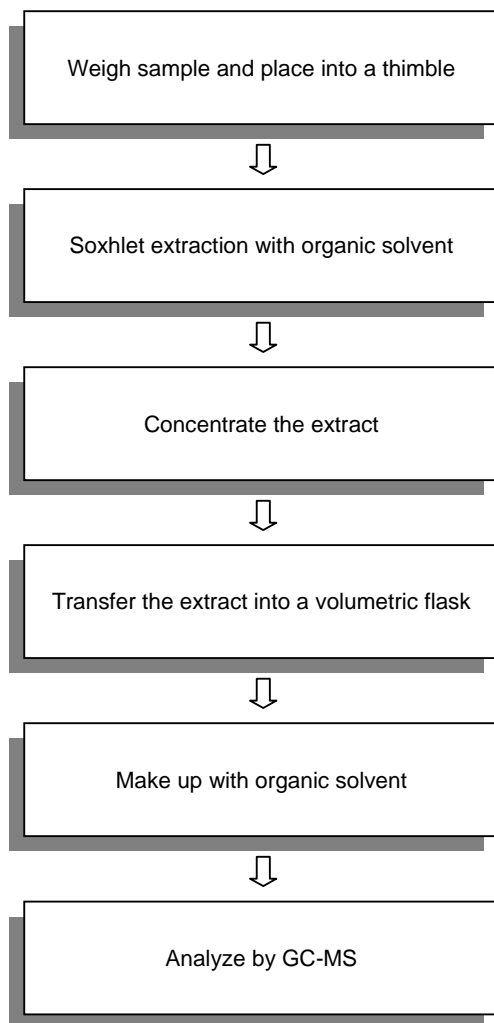
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-008**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-002**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Blue ink**  
Part Description : INK - BLUE  
Part Number : 425904

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager

**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	300
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

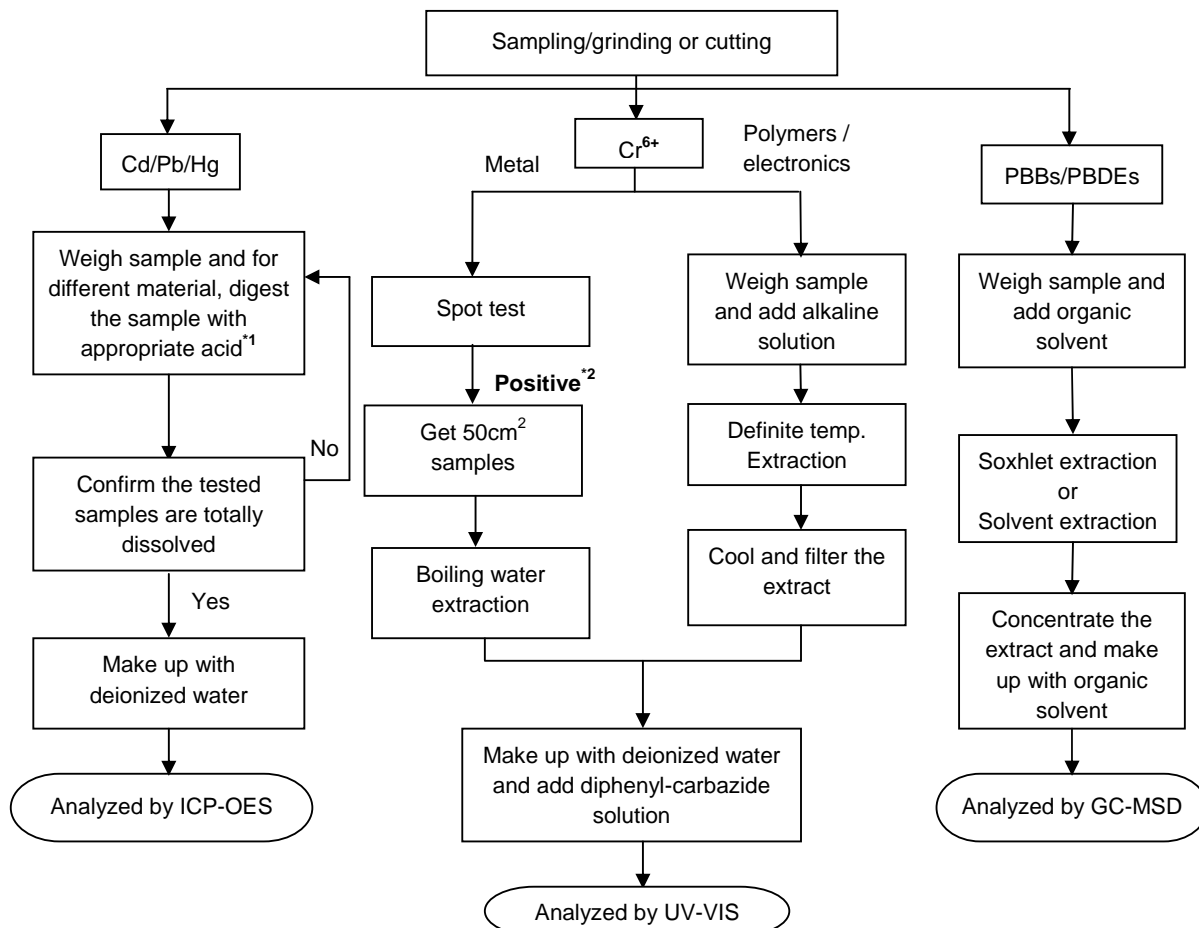
\*\*\*\*\*  
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

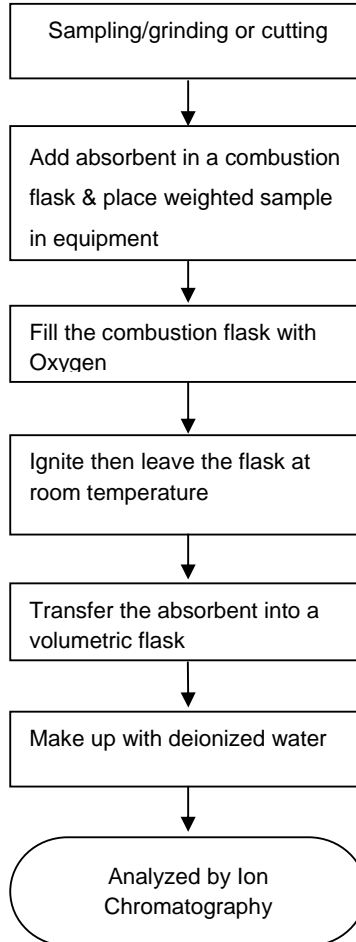
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-002**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

\*\*\*\*\*

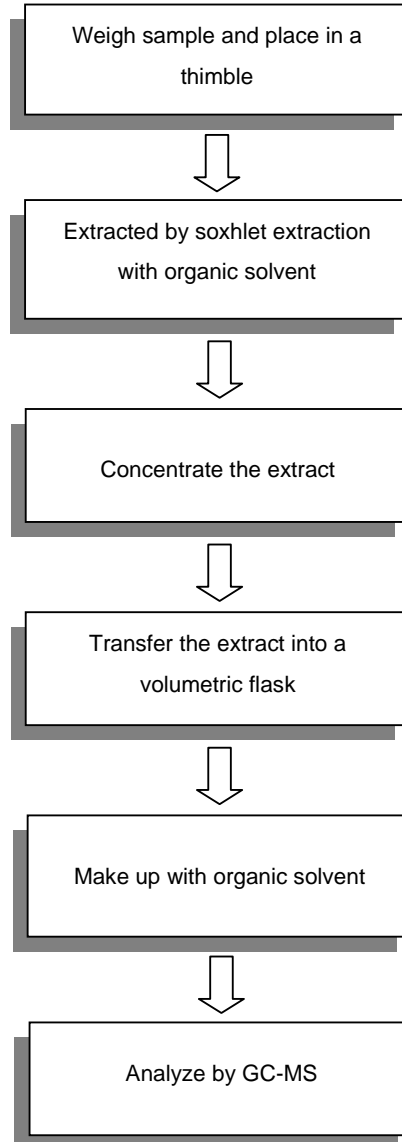
To be continued



Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*  
To be continued



**Test Report**

**Number: 131000457SHA-002**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

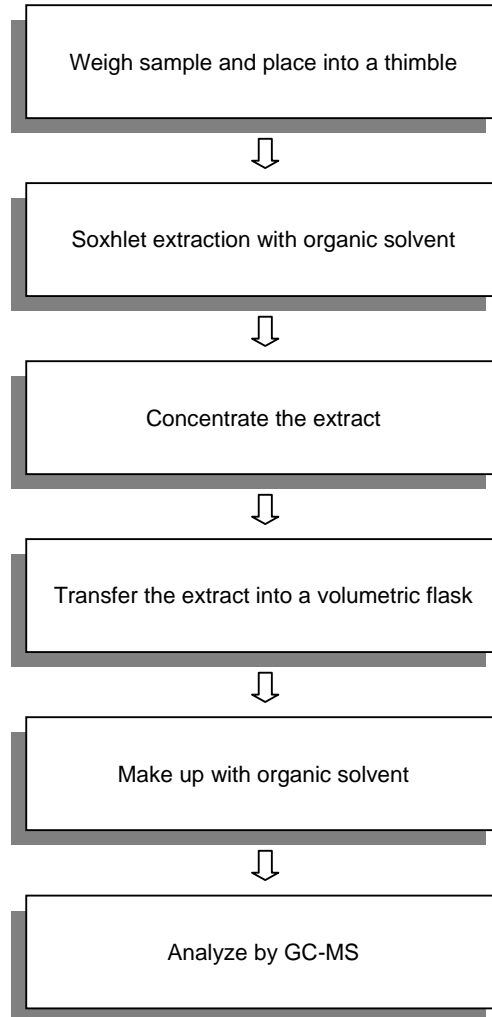
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-002**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-003**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Brown ink**  
Part Description : INK - BROWN  
Part Number : 425906

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager



**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	9800
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

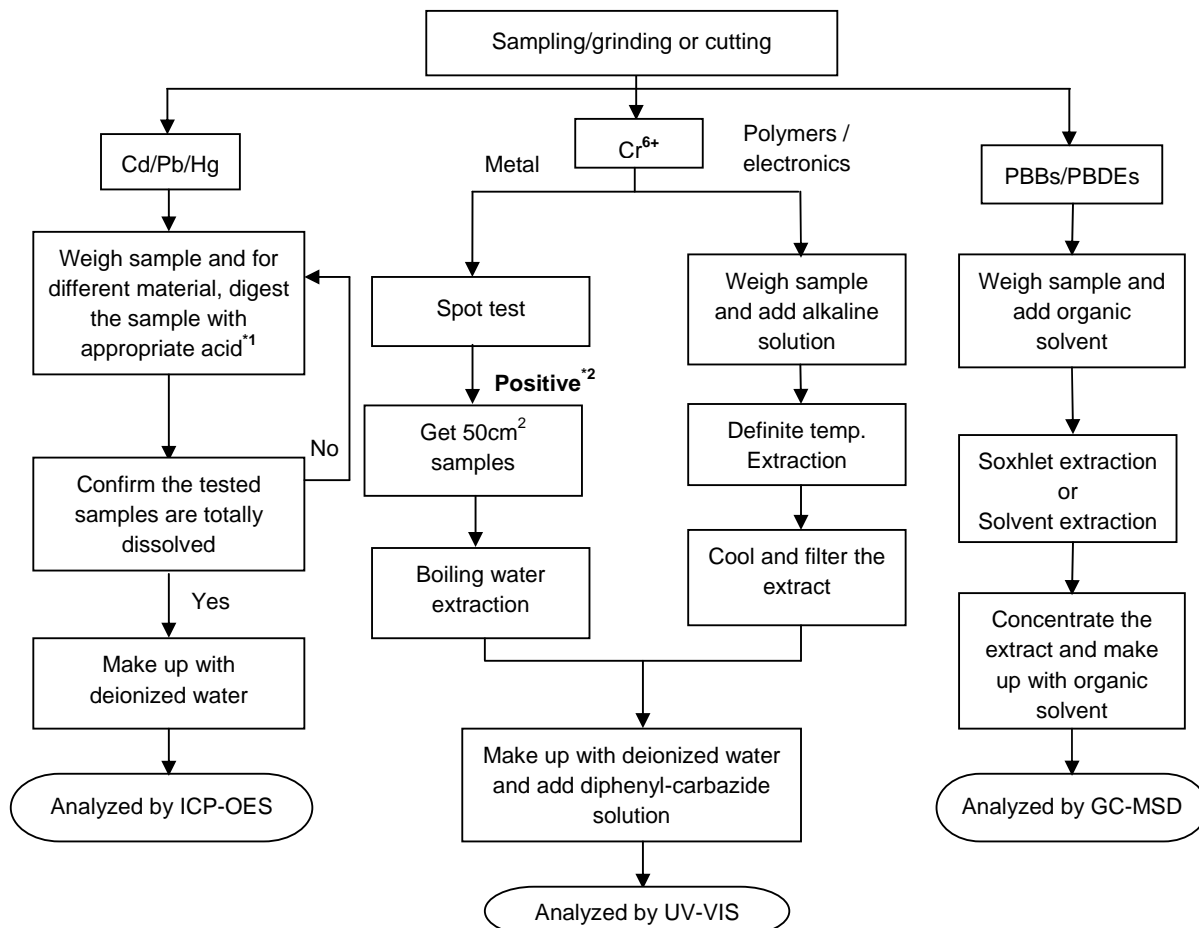
\*\*\*\*\*  
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

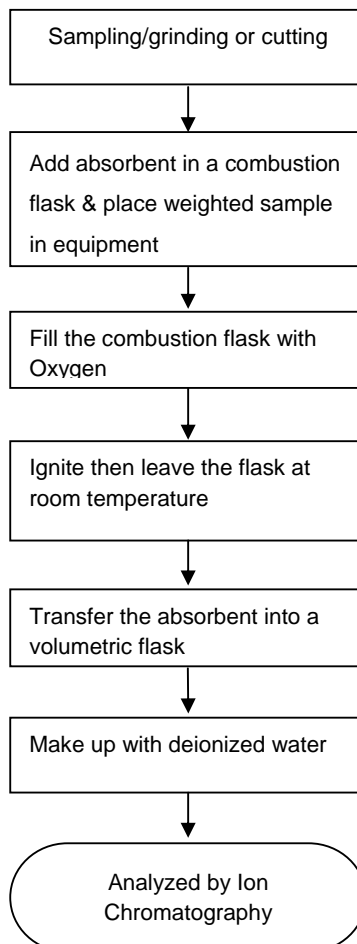
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-003**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

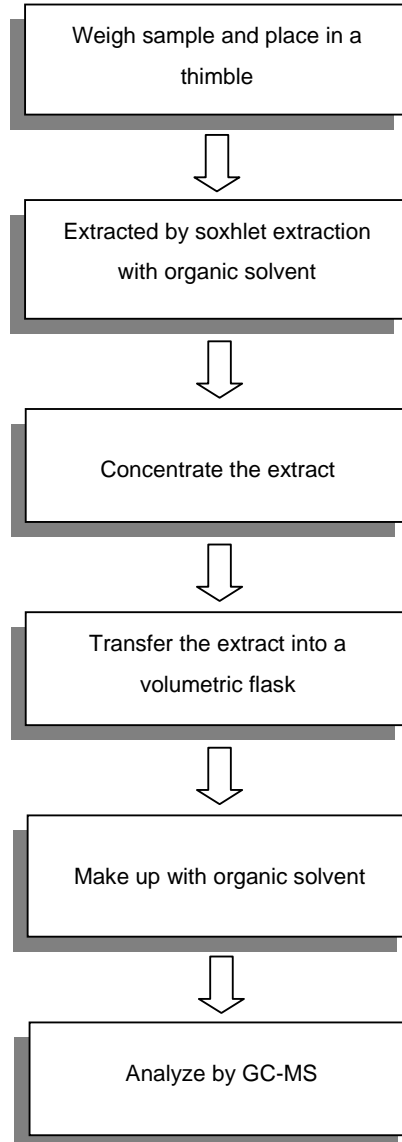
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*  
To be continued





**Test Report**

**Number: 131000457SHA-003**

Tests Conducted

3. HBCDD content

( I )Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

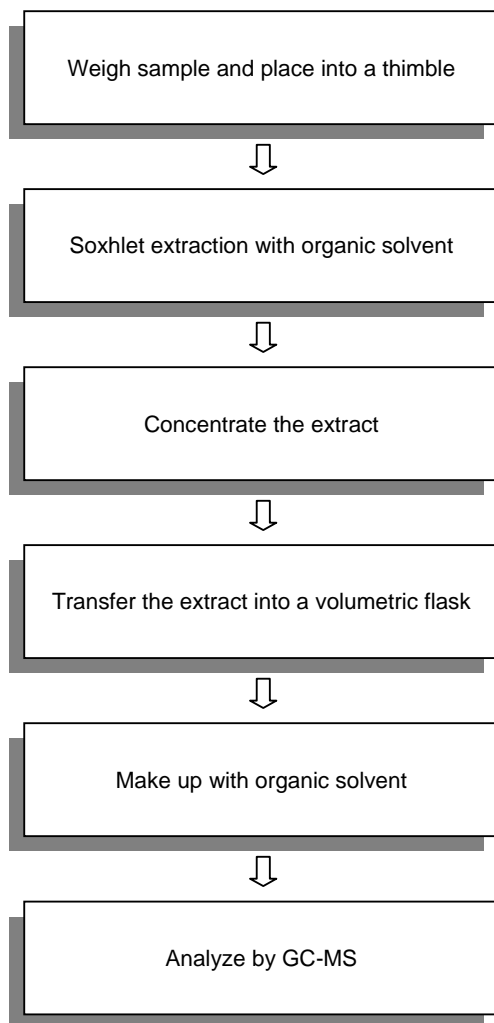
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-003**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

End of report

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**Test Report**

**Number: 131000457SHA-006**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Orange ink**  
Part Description : INK - ORANGE  
Part Number : 425900

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager

**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	63900
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

\*\*\*\*\*

To be continued



**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

\*\*\*\*\*

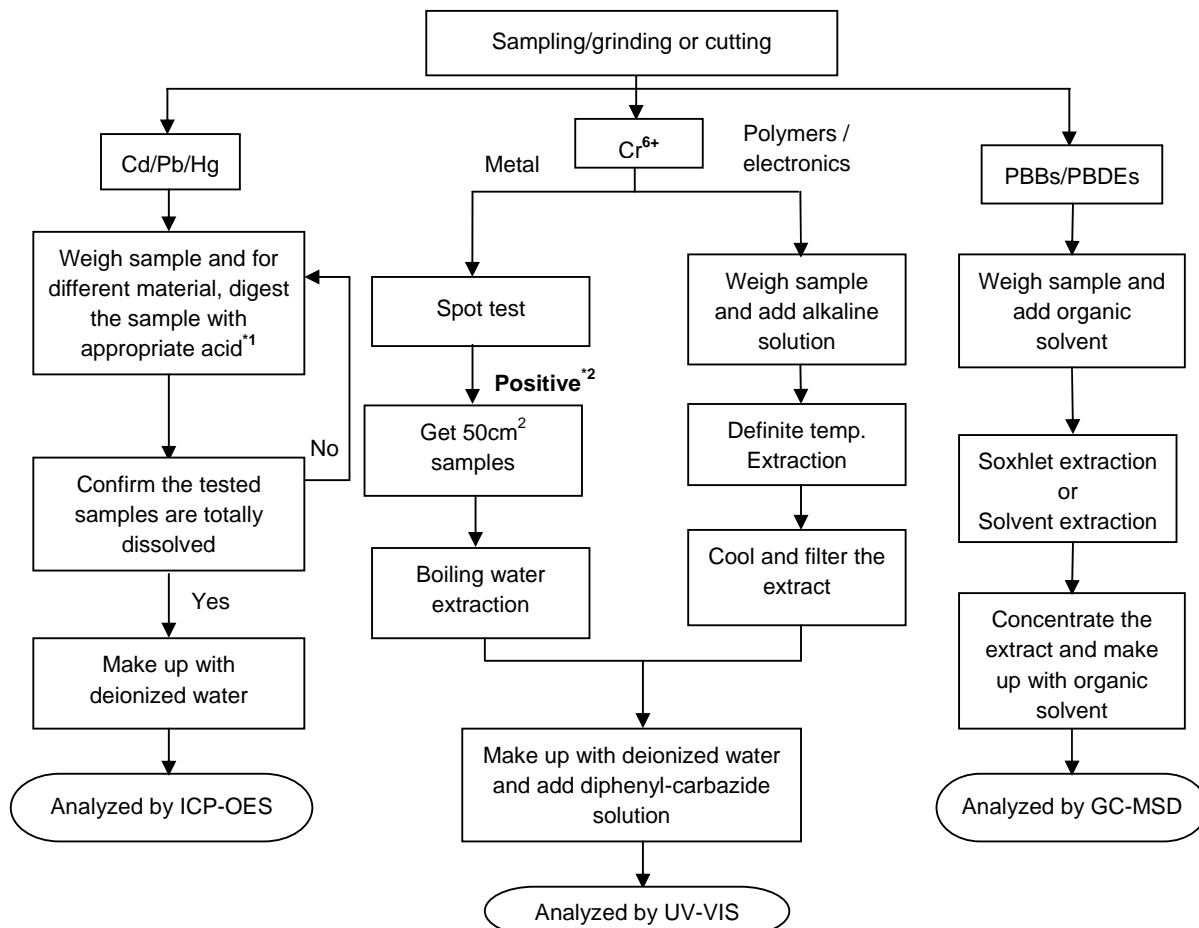
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

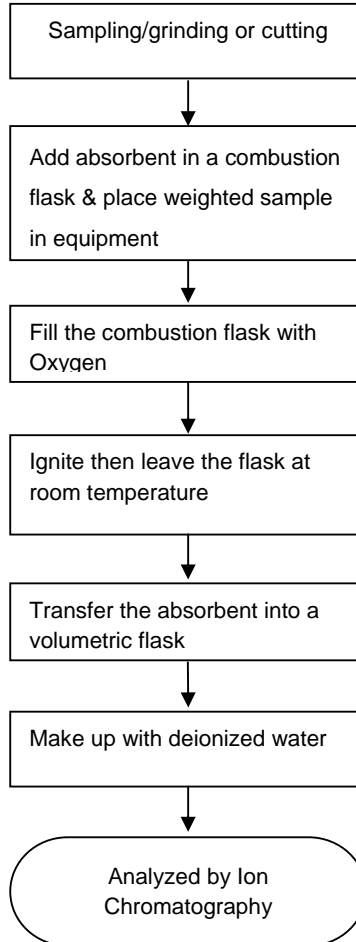
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-006**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

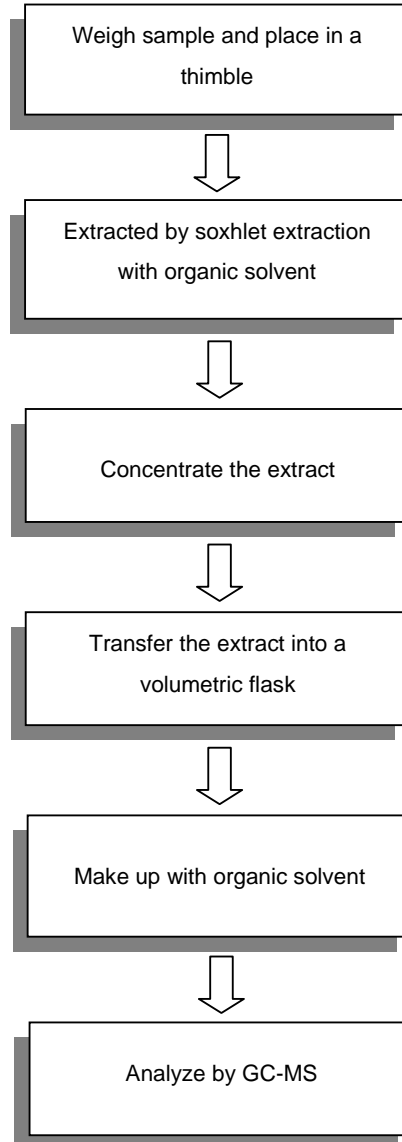
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*  
To be continued



**Test Report**

**Number: 131000457SHA-006**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

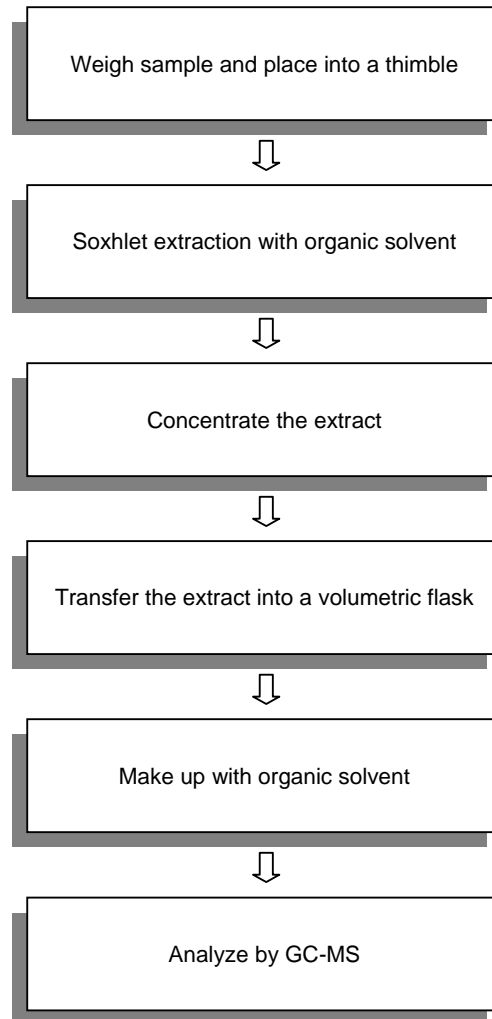
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued





**Test Report**

**Number: 131000457SHA-006**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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**Test Report**

**Number: 131000457SHA-009**

Applicant: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
DES PLAINES, IL 60016  
ATTN: J. CABILAN / A. CESISTA JR

Date: Oct. 29, 2013

**Sample Description:**

One (1) submitted sample said to be: **Yellow ink**  
Part Description : INK - YELLOW  
Part Number : 425903

**Tests conducted:**

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

**Conclusion:**

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	Pass

To be continued

Prepared and check by:  
For Intertek Testing Services Ltd., Shanghai

Authorized by:  
For Intertek testing services Ltd., Shanghai

Joy Zhou

Jonny Jing  
Manager

**Tests Conducted**
**1. RoHS testing and Halogen content**
**(I) Test Result Summary:**

Testing Item	Result (ppm)
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	7050
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = parts per million = mg/kg  
ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu

\*\*\*\*\*

To be continued

**Tests Conducted**
**(II) RoHS Requirement:**

<u>Restricted Substances</u>	<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)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

**(III) Test Method:**

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
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
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

Remark: Reporting limit = Quantitation Limit of Analyze in Sample

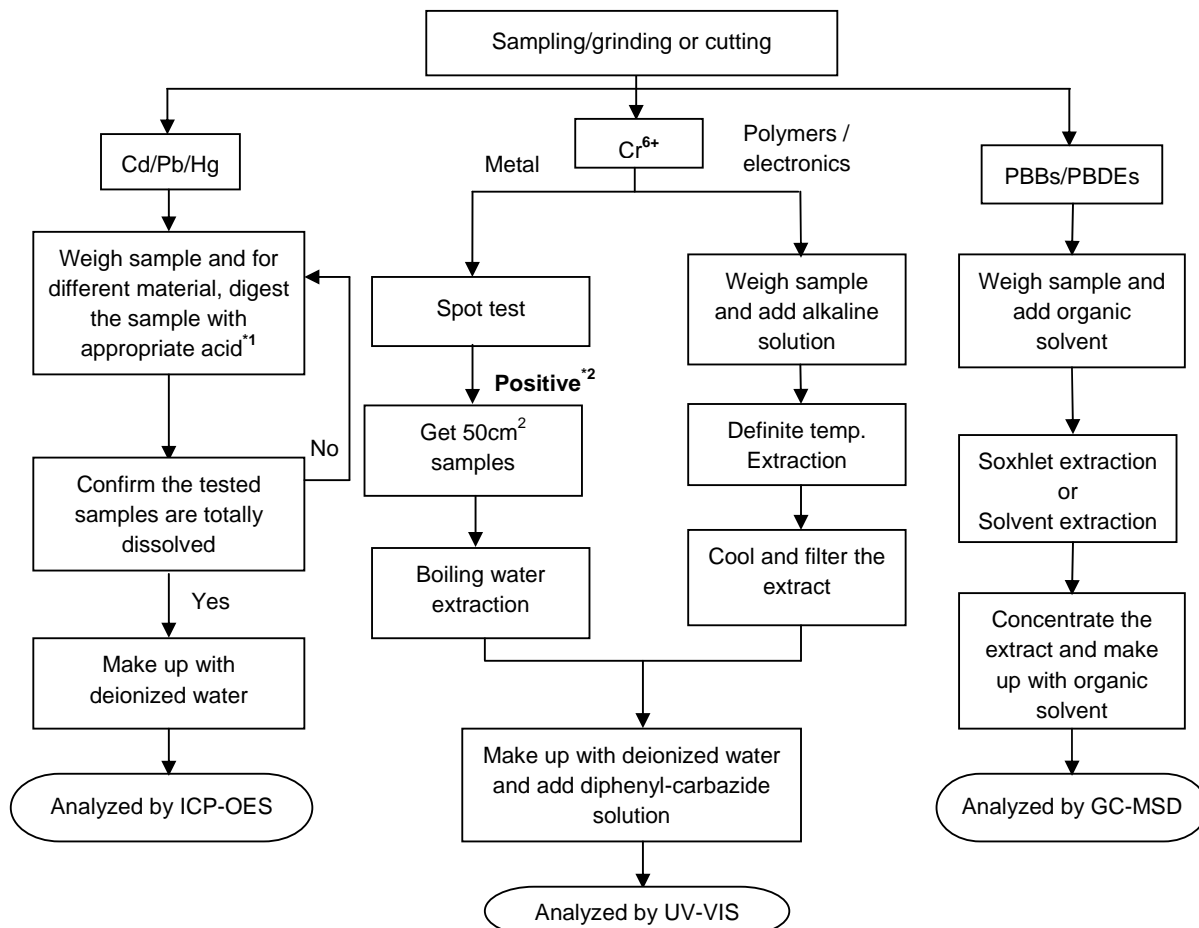
\*\*\*\*\*  
To be continued

Tests Conducted

(IV) 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:

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.

\*\*\*\*\*

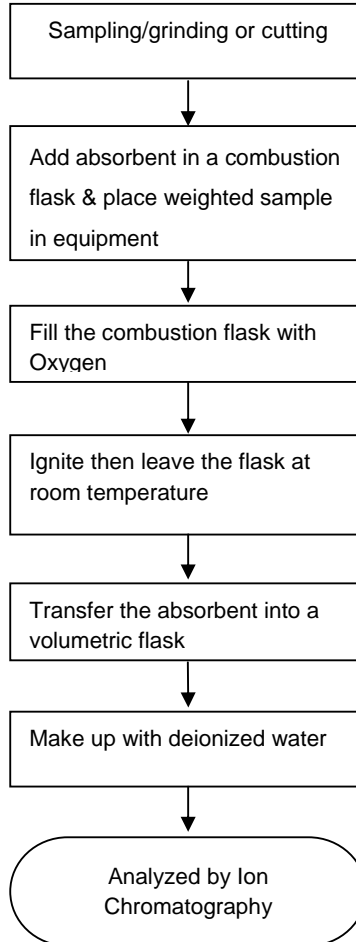
To be continued

Tests Conducted

(V) Measurement flowchart:

Test or Halogen content

Reference standard: EN 14582



\*\*\*\*\*

To be continued





**Test Report**

**Number: 131000457SHA-009**

Tests Conducted

2. Phthalate content test

With reference to EN 14372 by Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

<u>Tested Compound</u>	<u>Result (% w/w)</u>	<u>Client' requirement (% w/w)</u>
Di-butyl phthalate (DBP)	ND	-
Di(2-ethyl hexyl) phthalate(DEHP)	ND	-
Benzyl butyl phthalate (BBP)	ND	-
Sum of three phthalates	ND	0.1
Di-iso-butyl phthalate (DIBP)	ND	0.1

Remark : Detection Limit = 0.01%(w/w)

ND = Not Detected

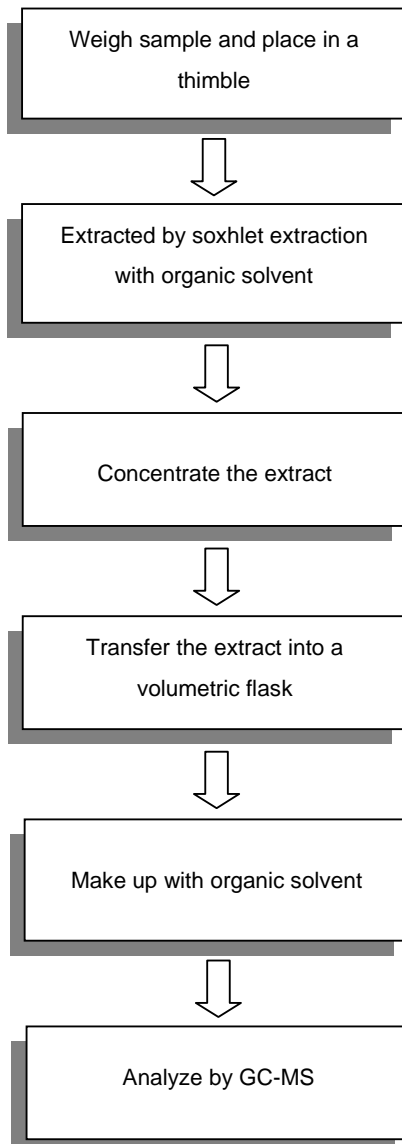
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for **phthalate** content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-009**

Tests Conducted

3. HBCDD content

( I ) Test result summary:

<u>Testing item</u>	<u>Result (ppm)</u>
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg  
ND = Not detected

( II ) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm

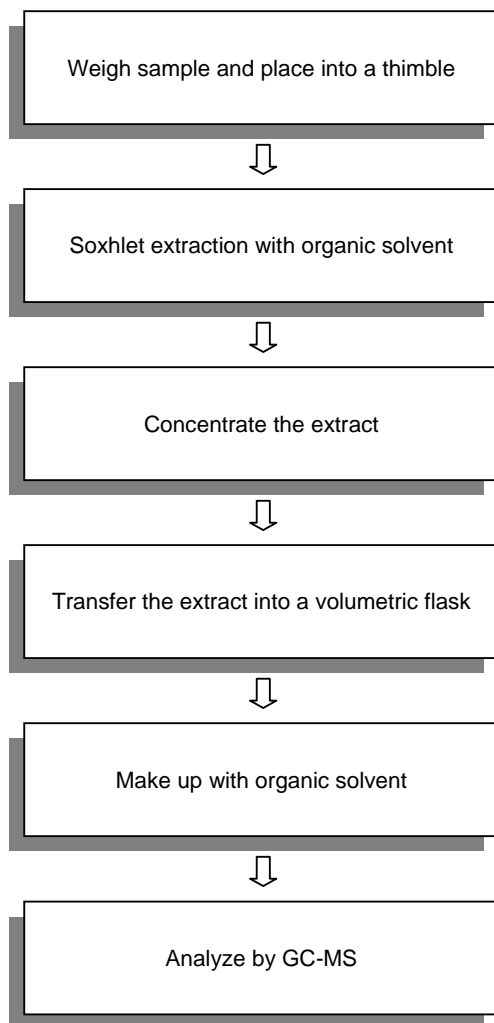
\*\*\*\*\*

To be continued

Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content



\*\*\*\*\*

To be continued



**Test Report**

**Number: 131000457SHA-009**

Tests Conducted

4. Total Antimony (Sb) Content

As per client's request, acid digestion method was used and total Antimony content was determined by Inductively Coupled Argon Plasma Spectrometry.

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

Testing period: Oct. 16, 2013 To Oct. 29, 2013

\*\*\*\*\*

To be continued

Tests Conducted



Picture was provided by applicant

\*\*\*\*\*

**End of report**

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## Test Report

No. CANEC1309341001

Date: 25 Jun 2013

Page 1 of 4

AIM SOLDER (SHEN ZHEN) CO.,LTD.

NO.264 XIANGSHAN ROAD,LUOTIAN VILLAGE,SONGGANG TOWN,BAOAN DISTRICT,SHENZHEN CITY  
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : SOLDER WIRE AIM 230  
FAST CORE H RSA605

SGS Job No. : CP13-031878 - SZ

Date of Sample Received : 20 Jun 2013

Testing Period : 20 Jun 2013 - 25 Jun 2013

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 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.



Trophy Zhang  
Approved Signatory

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## Test Report

No. CANEC1309341001

Date: 25 Jun 2013

Page 2 of 4

Test Results :

### Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN13-093410.001	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.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	127
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	-	-	◇	Negative

Notes :

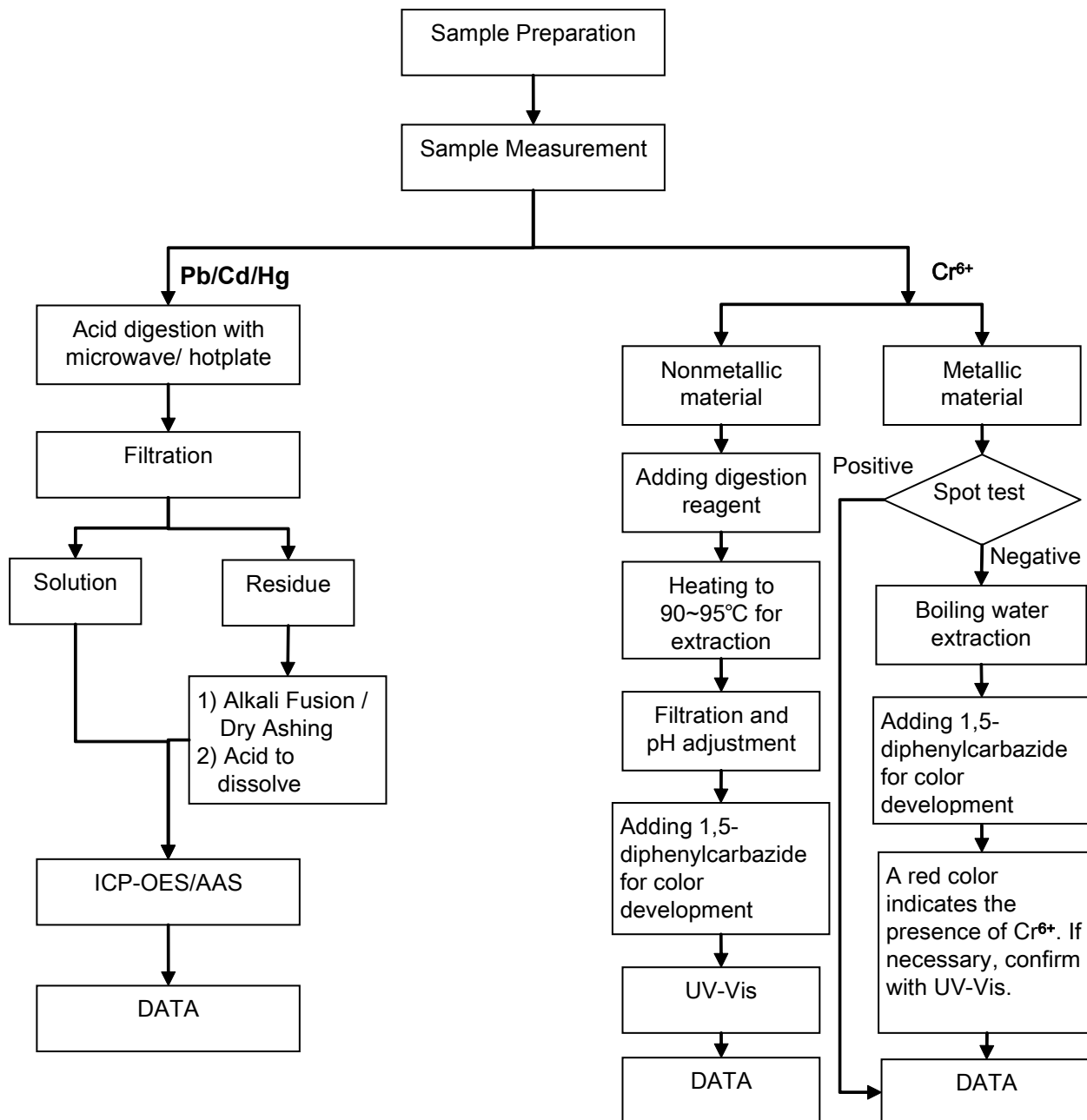
- (1) The maximum permissible limit is quoted from the directive 2011/65/EU, Annex II
- (2) ◇Spot-test:  
Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;  
(The tested sample should be further verified by boiling-water-extraction method if the spot test result is Negative or 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 cm<sup>2</sup> sample surface area.  
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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### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Michael Tso
- 2) Name of the person in charge of testing: Adams Yu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr6+ test method excluded).



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## Test Report

No. CANEC1309341001

Date: 25 Jun 2013

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Sample photo:



SGS authenticate the photo on original report only

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

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## Test Report

No. CANEC1208305601

Date: 02 Jul 2012

Page 1 of 5

AIM SOLDER (SHEN ZHEN) CO.,LTD.

BLOCK 69,THIRD INDUSTRIAL ZONE,LUOTIAN VILLAGE,SONGGANG TOWN,BAOAN DISTRICT,SZ  
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : SOLDER WIRE AIM230  
FAST CORE H RSA605

SGS Job No. : CP12-030363 - SZ

Date of Sample Received : 26 Jun 2012

Testing Period : 26 Jun 2012 - 02 Jul 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.



Kenny Wang

Approved Signatory

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## Test Report

No. CANEC1208305601

Date: 02 Jul 2012

Page 2 of 5

Test Results :

### Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN12-083056.001	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)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	78
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	-	-	◇	Negative
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	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. CANEC1208305601

Date: 02 Jul 2012

Page 3 of 5

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	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 the 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 cm<sup>2</sup> sample surface area.

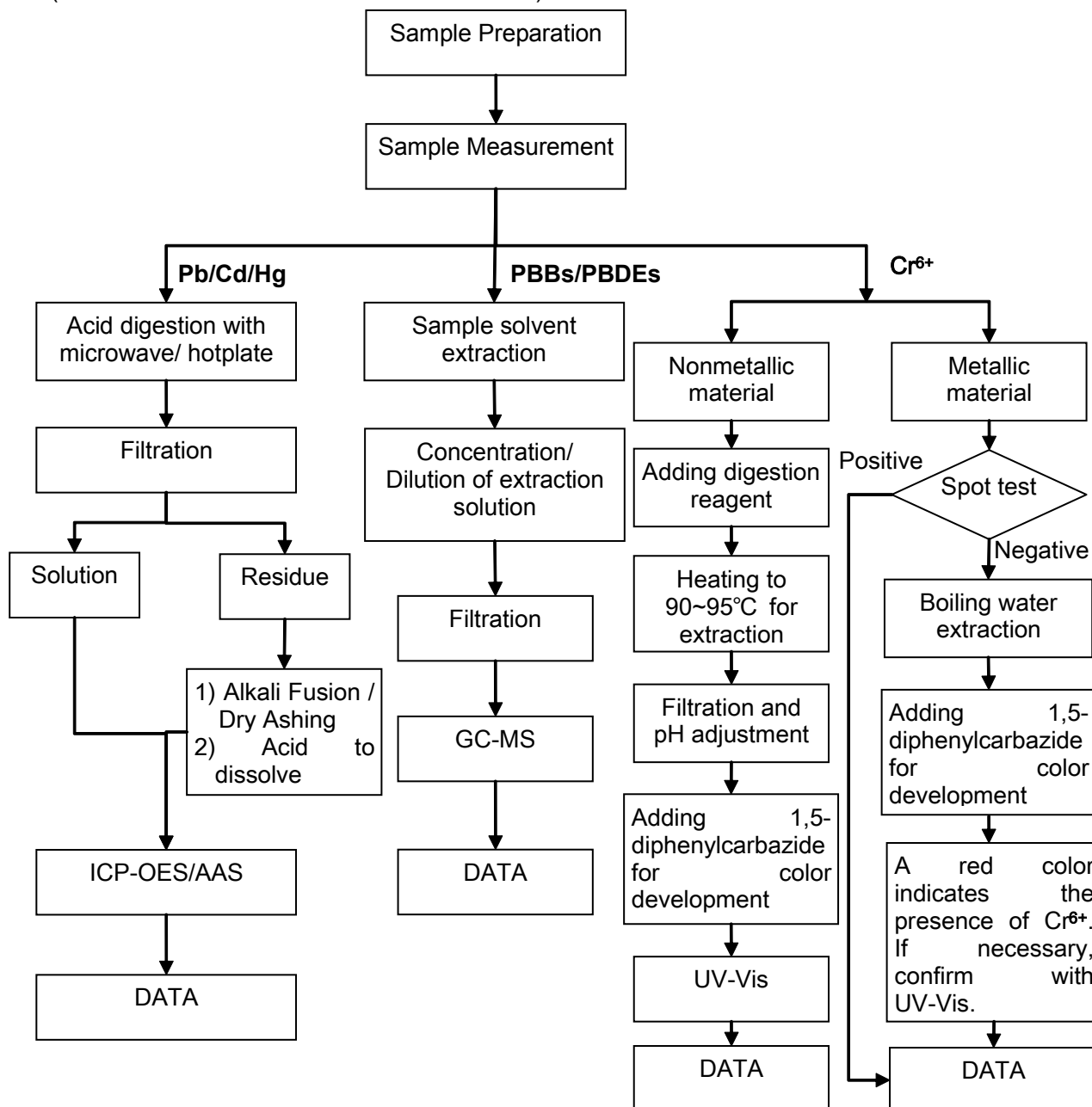
For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

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### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bella Wang / Cutey Yu
- 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 (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded).



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## Test Report

No. CANEC1208305601

Date: 02 Jul 2012

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Sample photo:



SGS authenticate the photo on original report only

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**Polyfil AG**  
Gina Gregorio  
Oberallmendstrasse 20A

**6300 Zug / Switzerland**

Fürth, 2012-12-19

## Test report No. FUHL1236938

### Testing of a material sample according to the RoHS directive 2011/65/EC

**Sample description:** Ni42Fe58MCuMSn wire; part no. 4500237197; batch 0380.6025

Arrival in lab: 2012-012-04; Period of XRF analysis incl. sample preparation and photo documentation: 2012-12-07 – 2012-12-10  
Head of Inorganic Lab: Claudia List

Copying this test report is permitted only in agreement with the contracted lab. The test results refer only to the tested item.  
This report consists of 6 page(s).  
The test methods signed with \* are not listed in the attachment of the accreditation certificate.

### Conclusion based on tested item

Test order	Status
testing according to the RoHS directive 2011/65/EC	conform <sup>°</sup>

<sup>°</sup> Please see overview of test results

- Test results see next pages -

**Sample description:** Ni42Fe58MCuMSn wire; part no. 4500237197; batch 0380.6025

**nM = non Metal**

**M = Metal**

**cM = composite Material**

**List of component parts:**

Sample No.	Part No.	Material	Description
236938	1	M	Ni42Fe58MCuMSn wire; part no. 4500237197; batch 0380.6025

**Sample description: Ni42Fe58MCuMSn wire; part no. 4500237197; batch 0380.6025**

**Comment**

LOD = Limit of Detection  
 BL = Below Limit  
 OL = Over Limit  
 X = Inconclusive, further test necessary  
 $\sigma$  = Standard deviation  
  
 CS = Composite sample

**Remark:**

Results were obtained by EDXRF for primary screening. Additional chemical testing using ICP (for Cd, Pb), AAS (for Hg), IC-UC/VIS (for CrVI) and GC/MS (for PBBs/PBDEs) are recommended, if the concentration exceeds the below warning value according to IEC 62321.

Element	Unit	non - metal	metal
Cd	mg / kg	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$
Pb	mg / kg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$
Hg	mg / kg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$
Br	mg / kg	$BL \leq (300-3\sigma) < X$	--
Cr	mg / kg	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$

Element	Unit	composite material
Cd	mg / kg	$LOD < X < (150+3\sigma) \leq OL$
Pb	mg / kg	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	mg / kg	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	mg / kg	$BL \leq (250-3\sigma) < X$
Cr	mg / kg	$BL \leq (500-3\sigma) < X$

**Sample description:** Ni42Fe58MCuMSn wire; part no. 4500237197; batch 0380.6025

## 1. XRF screening

Method: XRF according to IEC 62321:2008\*

Sample No.	Part No.	Pb	Hg	Cd	Cr <sub>total</sub>	Br	Status
236938	1	BL	BL	BL	BL	--	conform

## Comment:

Elements	RoHS-limit value
Lead (Pb)	1000 mg/kg
Mercury (Hg)	1000 mg/kg
Cadmium (Cd)	100 mg/kg
Chromium VI (Cr VI)	1000 mg/kg
Polybrominated Biphenyle (PBBs)	1000 mg/kg
Polybrominated Diphenyl ether (PBDEs)	1000 mg/kg

**Intertek Consumer Goods GmbH**

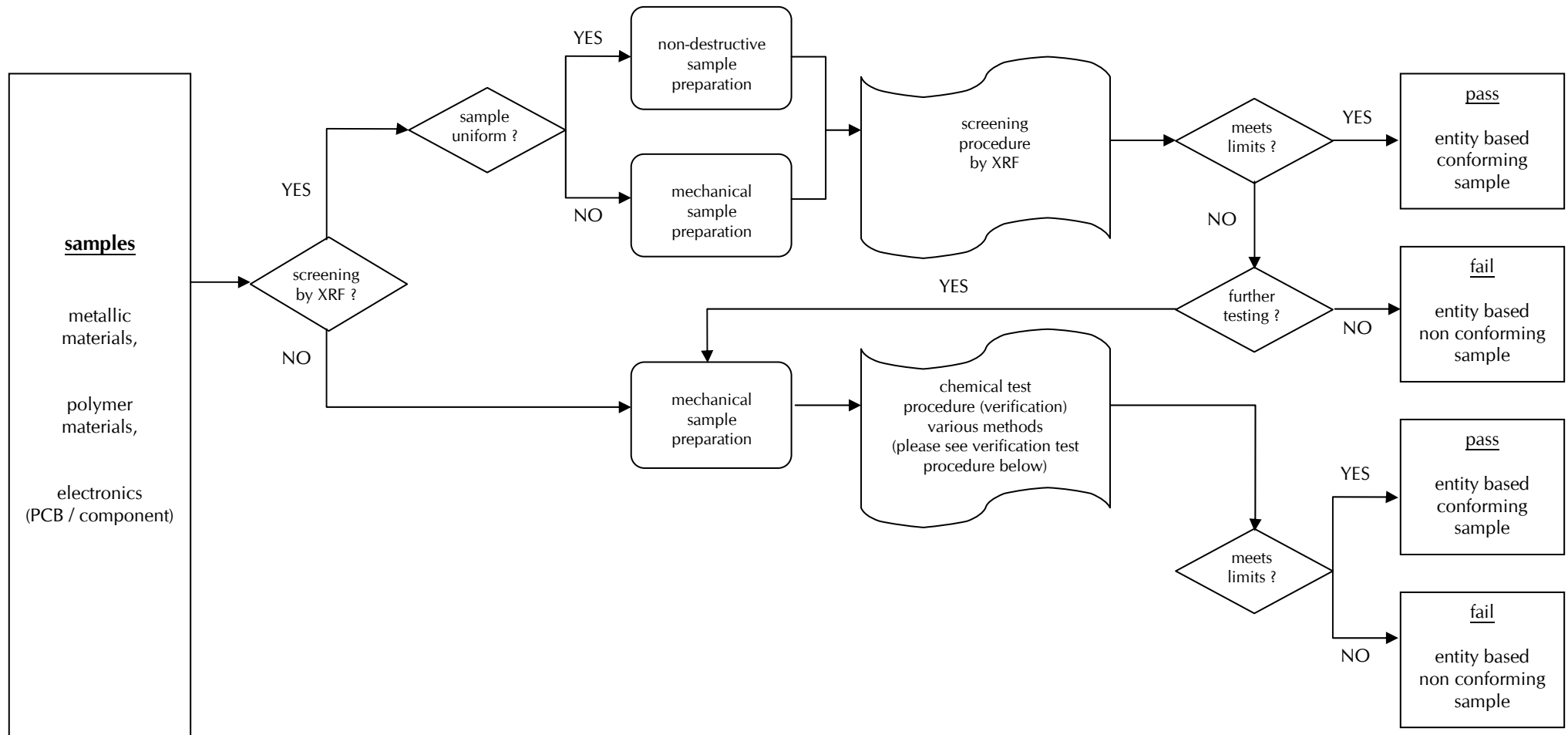


Prüfleitung / Lab Manager

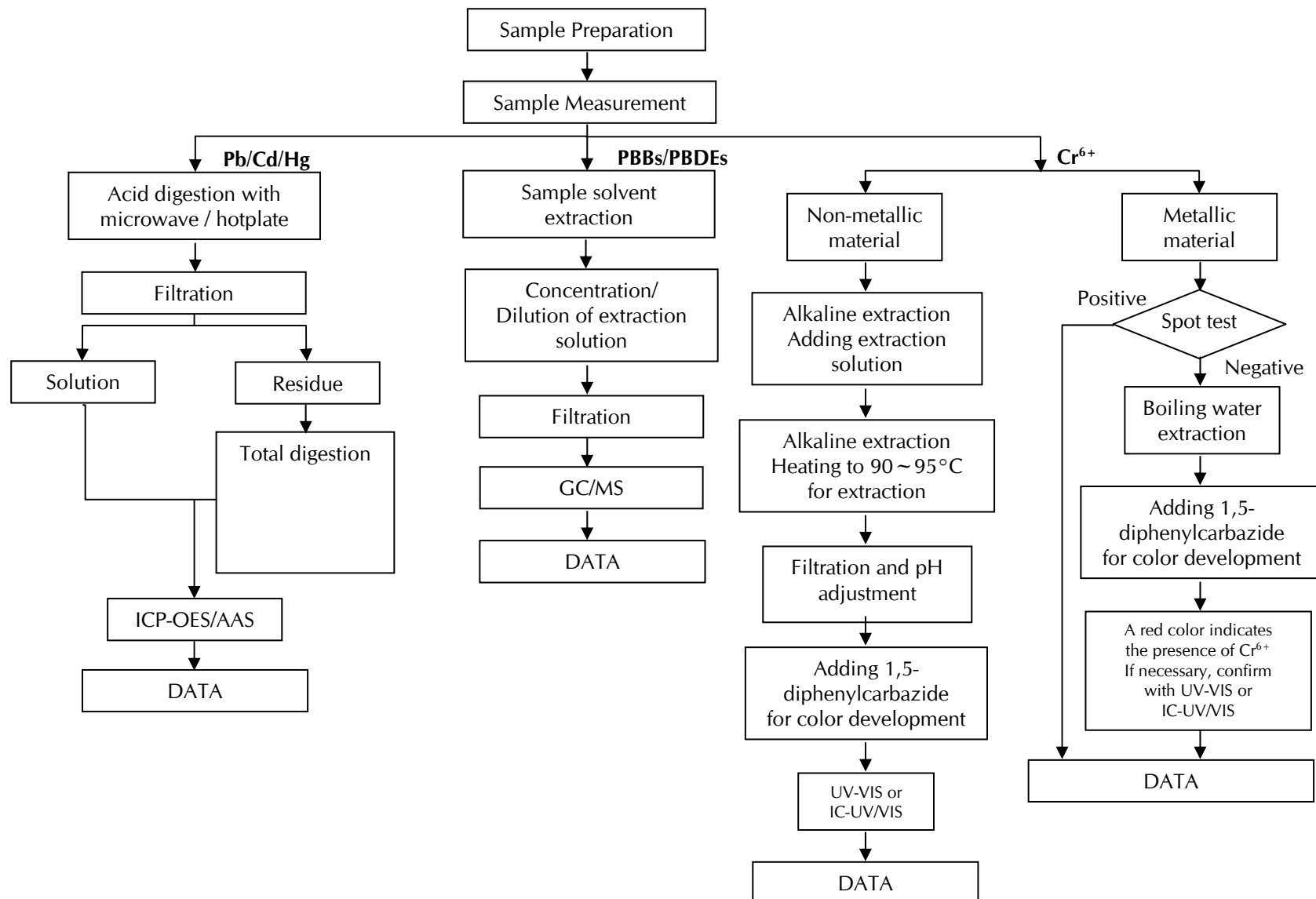
☐ A. Breunig, ☐ K. Grönhardt, ☐ Dr. K. Laue-Schuler, ☒ C. List, ☐ D. Löw  
☐ R. Micolay, ☐ M. Neumeister, ☐ Dr. R. Rätze, ☐ K. Scharrer, ☐ M. Tutsch

- Flow charts see next page(s) -

## Test procedure



## Verification test procedure





# Test Report

Report No. RLTJF000099660001

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Applicant BEIJING HYSTIC NEW MATERIALS CO., LTD

Address 7 ZH5 SHUANGYUAN ROAD, BADACHU HIGH-TECH ZONE, BEIJING. 100041, CHINA

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

Sample Name EPOXY ADHESIVE

Part No. 3162

Item/Lot No. EP625, EP652, EP425, EP162, EP162L, EP209, EP210, EP211, EP229, EP313, EP315, EP100-EP199, EP200-EP299, EP300-EP399, EP400-EP499, EP500-EP599, EP600-EP699

Sample Received Date Mar. 22, 2013

Testing Period Mar. 22, 2013 to Mar. 26, 2013

Test Requested As specified by client, to test Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs) in the submitted sample(s).

## Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Lead(Pb)	IEC 62321:2008 Ed.1 Sec.10	ICP-OES	2mg/kg
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.10	ICP-OES	2mg/kg
Mercury(Hg)	IEC 62321:2008 Ed.1 Sec.7	ICP-OES	2mg/kg
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex C	UV-Vis	2mg/kg
Polybrominated Biphenyls(PBBs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5mg/kg
Polybrominated Diphenyl Ethers(PBDEs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5mg/kg

Test Result(s) Please refer to the following page(s).

Tested by

*Allen Wang*

Reviewed by

*Andy Chang*

Approved by

*Allen Wang*

Date

Mar. 26, 2013

Allen Wang  
Technical Manager

No. 1428642654

Centre Testing International (Tianjin) Co., Ltd.

No.99, Xianfeng East Road, Dongli District, Tianjin, China

# Test Report

Report No. RLTJF000099660001

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## Test Result(s)

Tested Item(s)	Result
Lead(Pb)	N.D.
Cadmium(Cd)	N.D.
Mercury(Hg)	N.D.
Hexavalent Chromium(Cr(VI))	N.D.

Tested Item(s)	Result
<b>Polybrominated Biphenyls(PBBs)</b>	
Monobromobiphenyl	N.D.
Dibromobiphenyl	N.D.
Tribromobiphenyl	N.D.
Tetrabromobiphenyl	N.D.
Pentabromobiphenyl	N.D.
Hexabromobiphenyl	N.D.
Heptabromobiphenyl	N.D.
Octabromobiphenyl	N.D.
Nonabromobiphenyl	N.D.
Decabromobiphenyl	N.D.

Tested Item(s)	Result
<b>Polybrominated Diphenyl Ethers(PBDEs)</b>	
Monobromodiphenyl ether	N.D.
Dibromodiphenyl ether	N.D.
Tribromodiphenyl ether	N.D.
Tetrabromodiphenyl ether	N.D.
Pentabromodiphenyl ether	N.D.
Hexabromodiphenyl ether	N.D.
Heptabromodiphenyl ether	N.D.
Octabromodiphenyl ether	N.D.
Nonabromodiphenyl ether	N.D.
Decabromodiphenyl ether	N.D.

**Tested Sample/Part Description** Bluck glue

**Note:** The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.  
 -MDL = Method Detection Limit  
 -N.D. = Not Detected (<MDL )  
 -mg/kg = ppm = parts per million



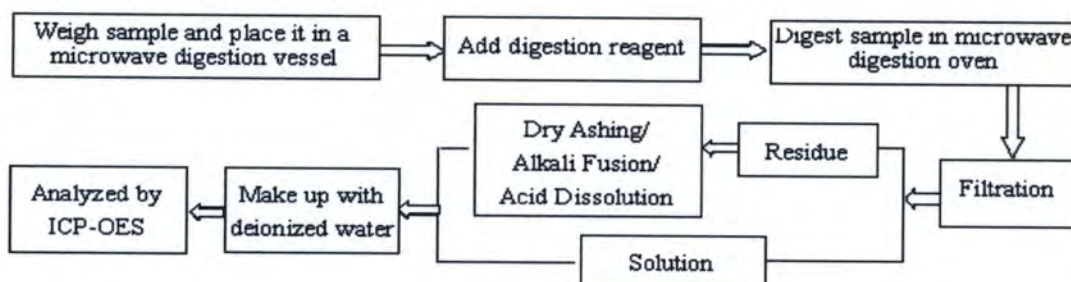
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Report No. RLTJF000099660001

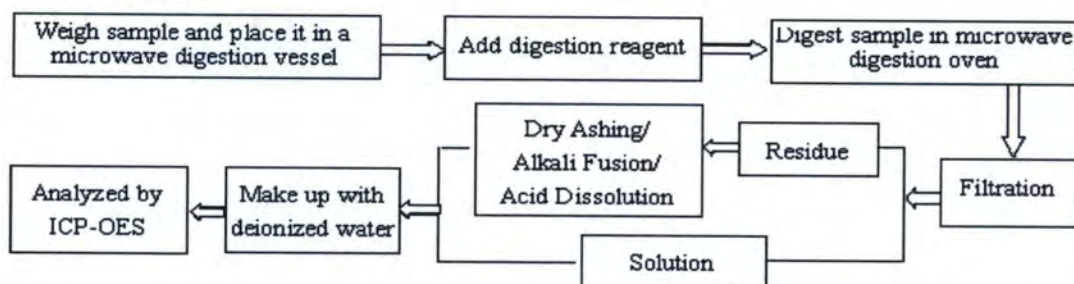
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## Test Process

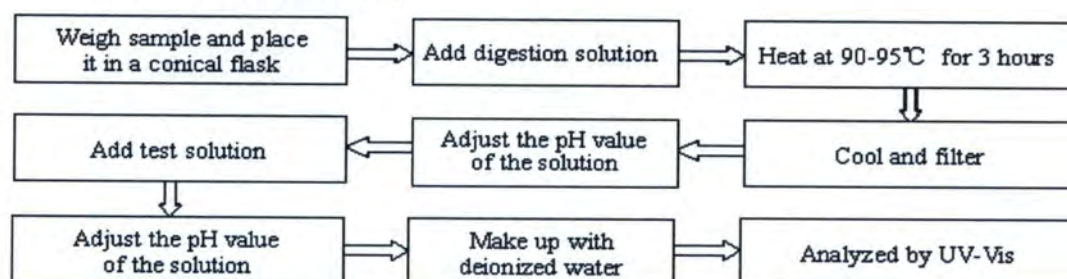
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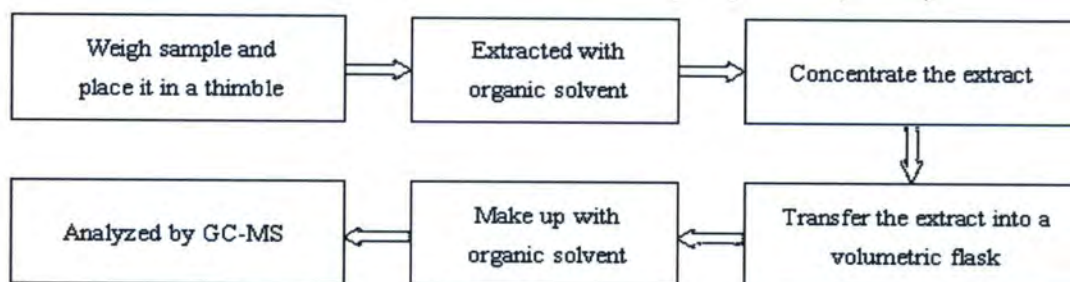
### 2. Mercury(Hg)



### 3. Hexavalent Chromium(Cr(VI))



### 4. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs)

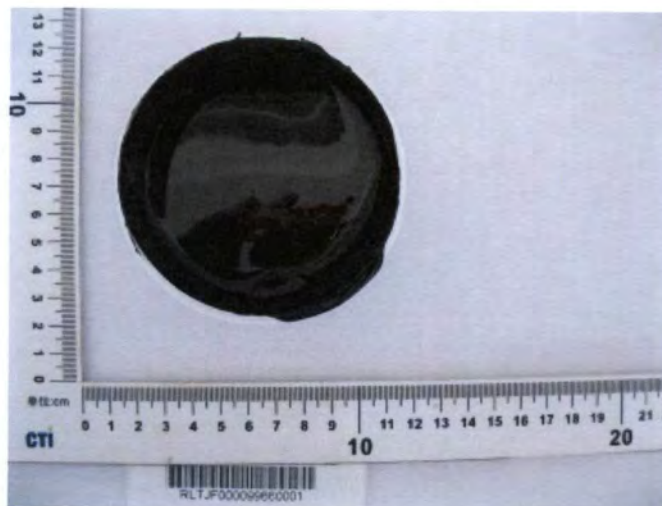


## Test Report

Report No. RLTJF000099660001

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### Photo(s) of the sample(s)



\*\*\* End of report \*\*\*

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