



ICP Test Report Certification Packet

Company Name: Littelfuse, Inc.

Product Type: Surface Mount Varistors

Product Series: CH Series RoHS Compliant Models

Issue Date: May 18, 2012

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (Directive 2011/65/EU)-restricted substance nor such use, for materials to be used for unit parts, for packing/packaging materials, and for additives and the like in the manufacturing processes.

And it is certified by Littelfuse, Inc. that the series products listed above are compliant with LF Halogen Free Standard ( $Cl \leq 800\text{ppm}$ ,  $Br \leq 800\text{ppm}$ ,  $Cl+Br \leq 1000\text{ppm}$ ).

In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by: *David Huang*

<DGLF Environmental, Health & Safety Engineer >

(1) Parts, sub-materials and unit parts

This document covers CH Series RoHS compliant models manufactured by Littelfuse, Inc.

Please see Table 1 for raw materials used.

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1.

Remarks : Pb (lead) contained in glass of electronic components and is categorized as exempt under section 7(c)-I of the RoHS Annex.
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Table 1: List of Raw Materials covered by this report

<b>Total Parts</b>	<b>P/N</b>	<b>Raw Material Description</b>	<b>Page</b>
<b>1</b>	<b>N/A</b>	<b>BLACK CHIP CH</b>	<b>3-7</b>
<b>2</b>	<b>N/A</b>	<b>SILVER PASTE SP-A6PL</b>	<b>8-19</b>
<b>3</b>	<b>MS208</b>	<b>TERMINATIONS</b>	<b>20-28</b>
<b>4</b>	<b>MS202</b>	<b>BLUE SILICONE</b>	<b>29-37</b>



**Test Report**

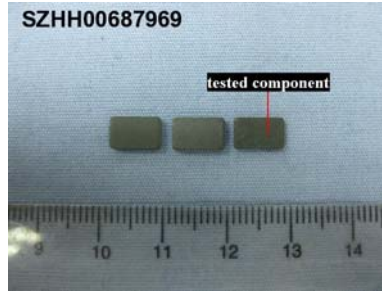
Number: SZHH00687969

Applicant: LITTELFUSE, INC  
8755 WEST HIGGINS ROAD SUITE  
500CHICAGO IL 60631 USA

Date: May 16, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:  
One (1) submitted sample said to be **black chip CH**.  
Tested component: black ceramic.



\*\*\*\*\*

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

\*\*\*\*\*

Conclusion:		
<u>Tested Samples</u>	<u>Standard</u>	<u>Result</u>
Submitted sample	Restriction of the use of certain hazardous substance in electrical electronic and equipment (RoHS Direction 2002/95/EC and supersedure 2011/65/EU)	Pass

\*\*\*\*\*

Authorized by:  
For Intertek Testing Services  
Shenzhen Ltd.


Ben N.L. Lin  
General Manager



**Test Report**

Number: SZHH00687969

Tests Conducted

RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND(<2)
Lead (Pb) Content (mg/kg)	ND(<2)
Mercury (Hg) Content (mg/kg)	ND(<2)
Chromium (VI)(Cr <sup>6+</sup> ) Content (mg/kg)	ND(<1)
Polybrominated Biphenyls (PBBs)(mg/kg)	
Monobromobiphenyl (MonoBB)	ND(<5)
Dibromobiphenyl (DiBB)	ND(<5)
Tribromobiphenyl (TriBB)	ND(<5)
Tetrabromobiphenyl (TetraBB)	ND(<5)
Pentabromobiphenyl (PentaBB)	ND(<5)
Hexabromobiphenyl (HexaBB)	ND(<5)
Heptabromobiphenyl (HeptaBB)	ND(<5)
Octabromobiphenyl (OctaBB)	ND(<5)
Nonabromobiphenyl (NonaBB)	ND(<5)
Decabromobiphenyl (DecaBB)	ND(<5)
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	
Monobromodiphenyl Ether (MonoBDE)	ND(<5)
Dibromodiphenyl Ether (DiBDE)	ND(<5)
Tribromodiphenyl Ether (TriBDE)	ND(<5)
Tetrabromodiphenyl Ether (TetraBDE)	ND(<5)
Pentabromodiphenyl Ether (PentaBDE)	ND(<5)
Hexabromodiphenyl Ether (HexaBDE)	ND(<5)
Heptabromodiphenyl Ether (HeptaBDE)	ND(<5)
Octabromodiphenyl Ether (OctaBDE)	ND(<5)
Nonabromodiphenyl Ether (NonaBDE)	ND(<5)
Decabromodiphenyl Ether (DecaBDE)	ND(<5)

Chemist: Wang Haijun/Zeng Guoliang

mg/kg = milligram per kilogram = ppm  
< = Less than  
ND = Not detected

\*\*\*\*\*

Tests Conducted

(B) RoHS Requirement:

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

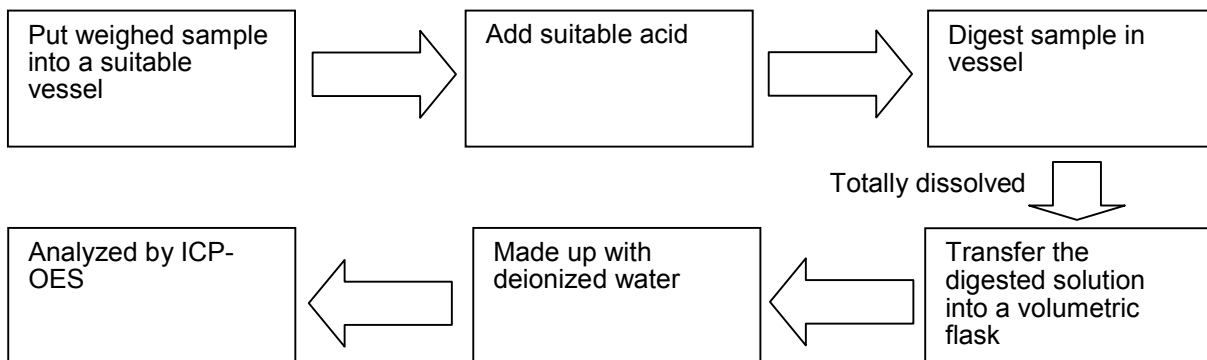
The above limits were quoted from 2002/95/EC and supersedure 2011/65/EU for homogeneous material.

(C) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr <sup>6+</sup> ) Content	With reference to IEC 62321 Edition 1.0:2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1 mg/kg
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 Edition 1.0:2008, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg

Date sample received: May 08, 2012  
 Testing period: May 08, 2012 to May 16, 2012

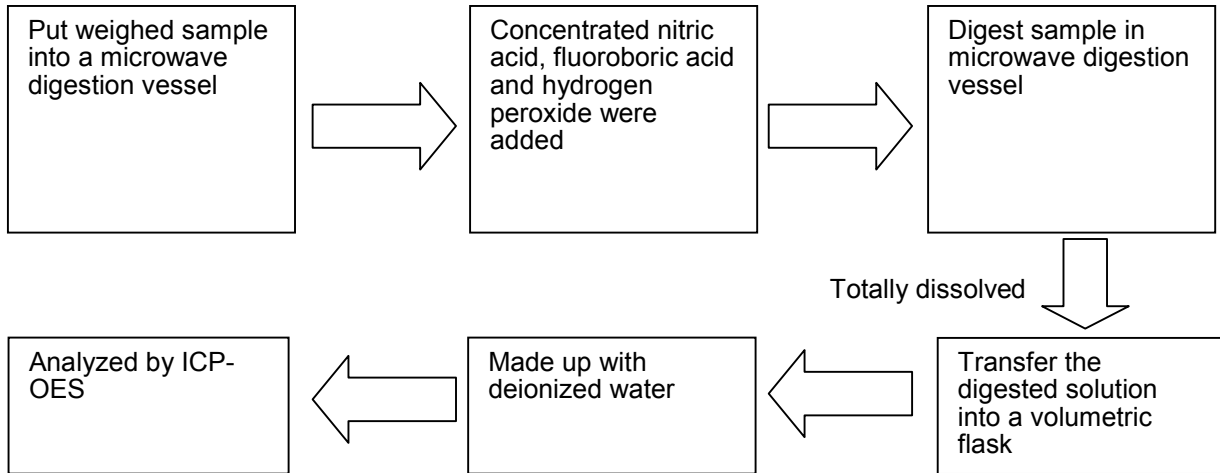
(D) Measurement Flowchart:  
 1. Test for Cd/Pb Contents



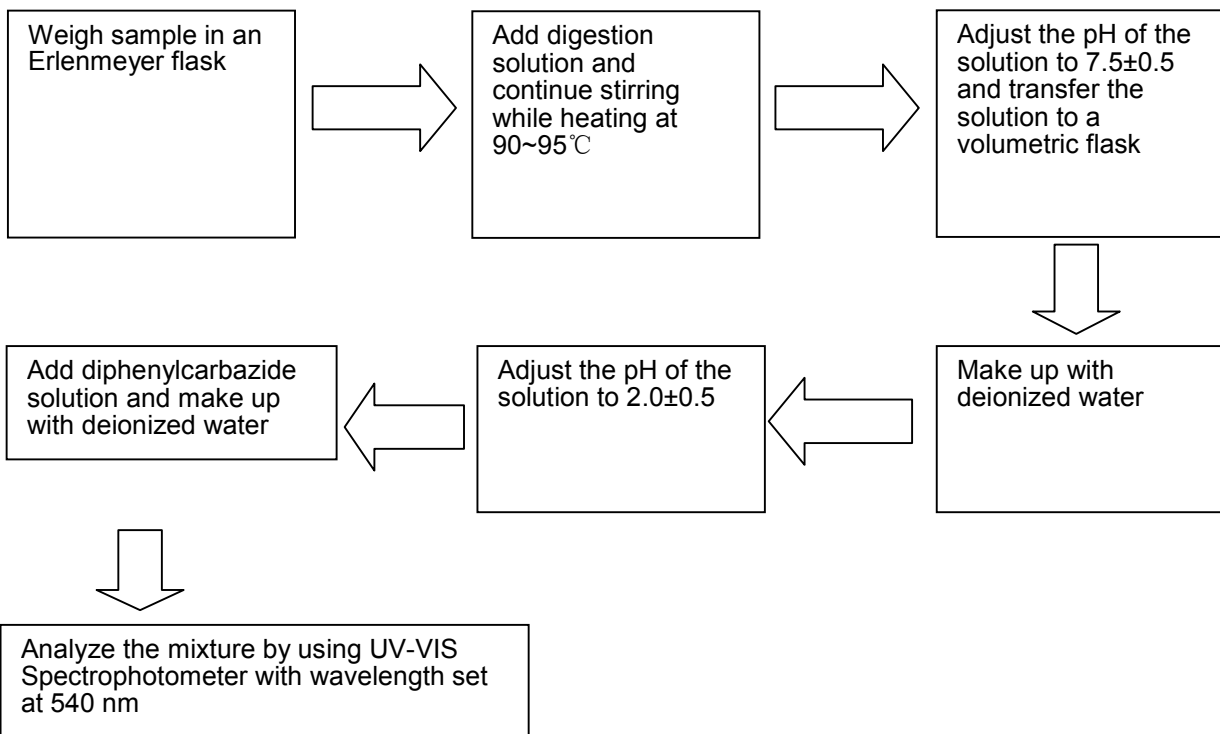
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Tests Conducted

2. Test for Hg Content



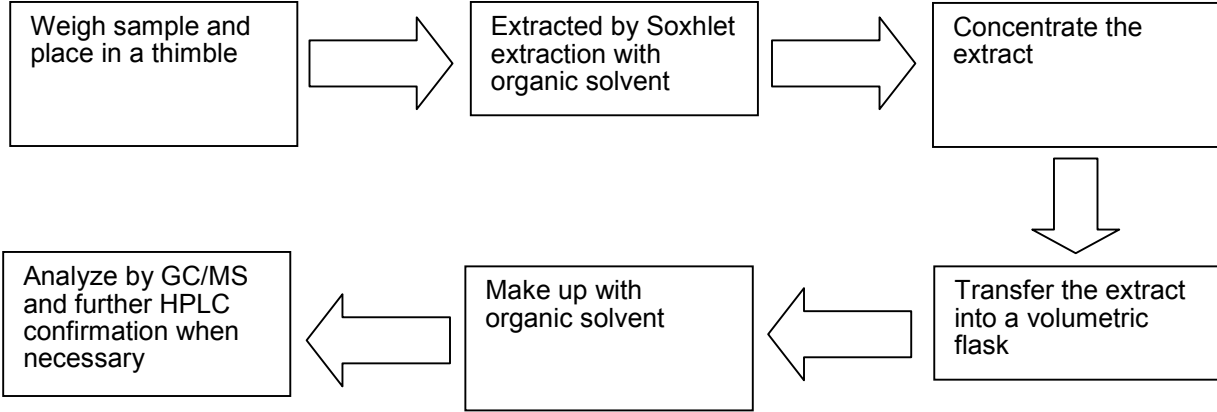
3. Test for Chromium (VI) (Cr<sup>6+</sup>) Content (Alkaline Digestion)



\*\*\*\*\*

Tests Conducted

4. Test for PBBs/PBDEs Contents



\*\*\*\*\*

End of report



## Test Report

No. SHAEC1201680106

Date: 21 Feb 2012

Page 1 of 6

SHIN-NIHON KAKIN CO.,LTD  
1-6,MIYAMOTO,ITABASHI,TOKYO.JAPAN

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

SGS Job No. : SP12-003156 - SH  
Model No. : SP-A6PL  
Date of Sample Received : 17 Feb 2012  
Testing Period : 17 Feb 2012 - 21 Feb 2012  
Test Requested : Selected test(s) as requested by client.  
Test Method : Please refer to next page(s).  
Test Results : Please refer to next page(s).  
Conclusion : Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of  
SGS-CSTC Ltd.

Fan Jingjie, JJ  
Approved Signatory

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SGS - 12 Standards Techno Service (Shanghai) Co. Ltd.  
Testing Services

3<sup>rd</sup> 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

1 E&E (86-21) 61402553 1 E&E (86-21) 64953679 www.cn.sgs.com  
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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-016801.006	Green paste

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected ( < MDL )
- (4) "-" = Not Regulated

**RoHS Directive 2011/65/EU**

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	006
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	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. SHAEC1201680106

Date: 21 Feb 2012

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>006</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) Result shown is of the total weight of wet sample.

### 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>006</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

### Notes :

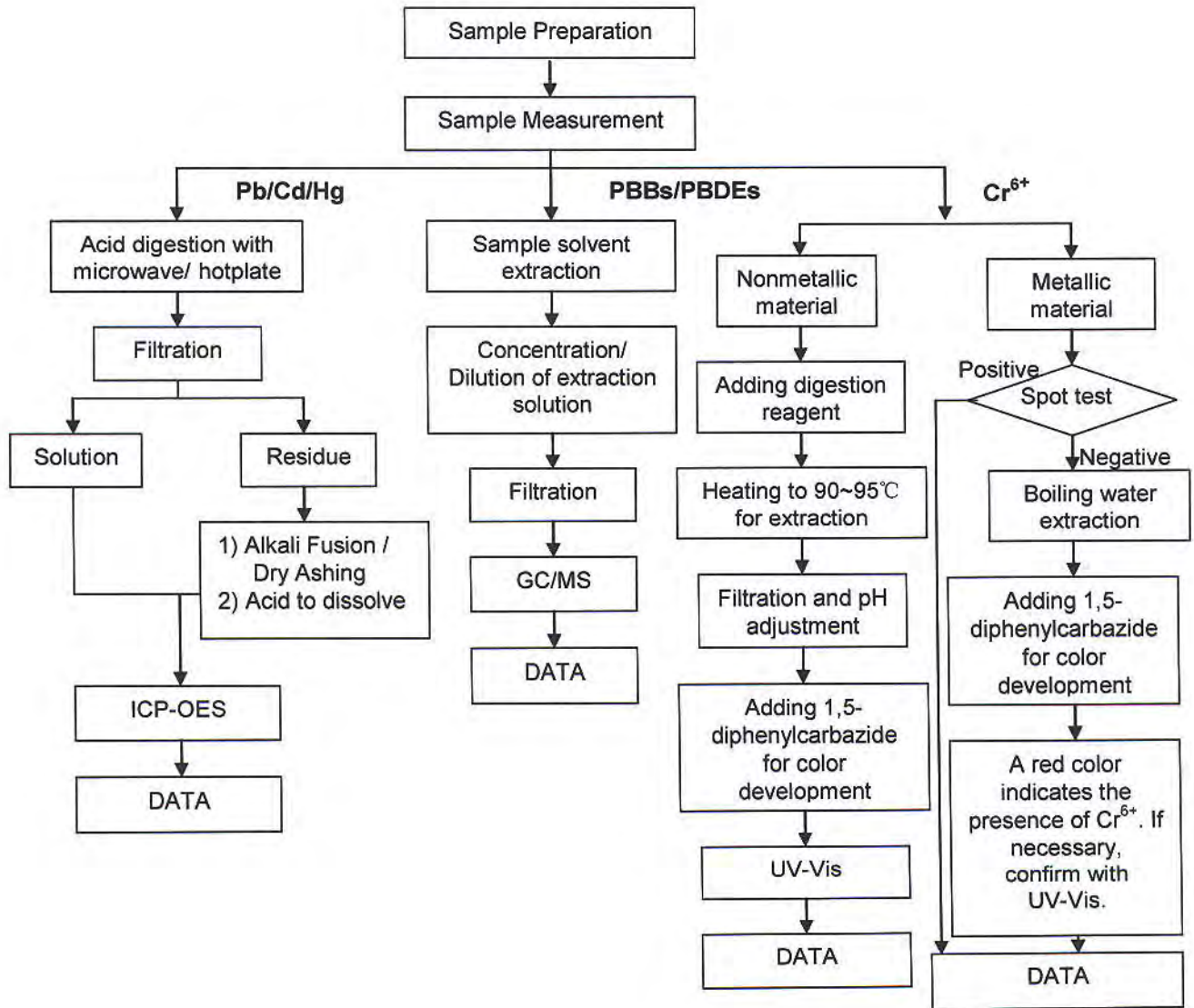
- (1) Result shown is of the total weight of wet sample.

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ATTACHMENTS

RoHS Testing Flow Chart

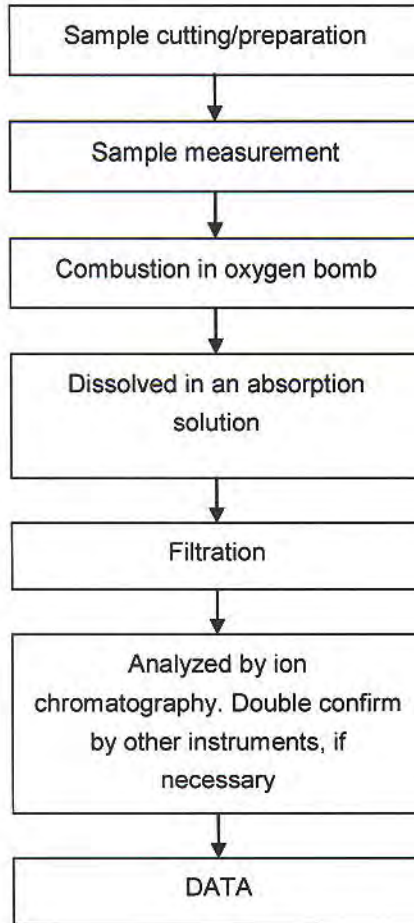
- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



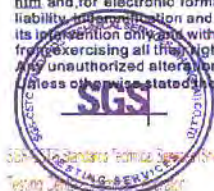
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### Halogen Testing Flow Chart

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



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Sample photo:



SGS authenticate the photo on original report only

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

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## Test Report

No. SHAEC1203840702

Date: 09 Apr 2012

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SHIN-NIHON KAKIN CO.,LTD.

1-6,MIYAMOTO, ITABASHI,TOKYO,JAPAN

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

SGS Job No. : SP12-007978 - SH  
Model No. : SP-A6PL  
Date of Sample Received : 05 Apr 2012  
Testing Period : 05 Apr 2012 - 09 Apr 2012  
Test Requested : Selected test(s) as requested by client.  
Test Method : Please refer to next page(s).  
Test Results : Please refer to next page(s).

Signed for and on behalf of  
SGS-CSTC Ltd.



Fan Jingjie, JJ  
Approved Signatory

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**Test Report**

No. SHAEC1203840702

Date: 09 Apr 2012

Page 2 of 6

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-038407.002	Ink green mud

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected ( < MDL )
- (4) "-" = Not Regulated

Phthalates

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

Test Item(s)	Unit	MDL	002
Bis-(2-ethylhexyl) Phthalate (DEHP)	%	0.003	ND
Benzylbutyl Phthalate (BBP)	%	0.003	ND
Dibutyl Phthalate (DBP)	%	0.003	ND

Notes :

- (1) DBP, BBP, DEHP Reference information: Entry 51 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC);
  - i) Shall not be used as substances or in mixtures, in concentrations greater than 0,1 % by weight of the plasticised material, in toys and childcare articles.
  - ii) Toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.
 Please refer to Regulation (EC) No 552/2009 to get more detail information

Hexabromocyclododecane (HBCDD)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	002
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

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Test Report

No. SHAEC1203840702

Date: 09 Apr 2012

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Remark: Result shown is of the total weight of wet sample.

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中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

T E&E (86-21) 61402553 F E&E (86-21) 64953679 [www.cn.sgs.com](http://www.cn.sgs.com)  
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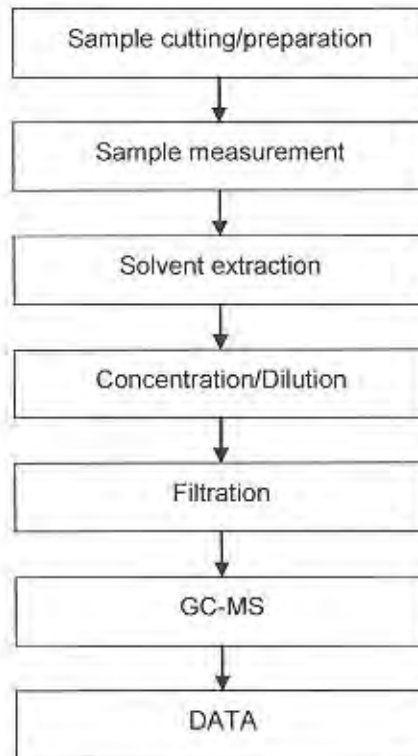
Member of the SGS Group (SGS SA)



## ATTACHMENTS

### 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

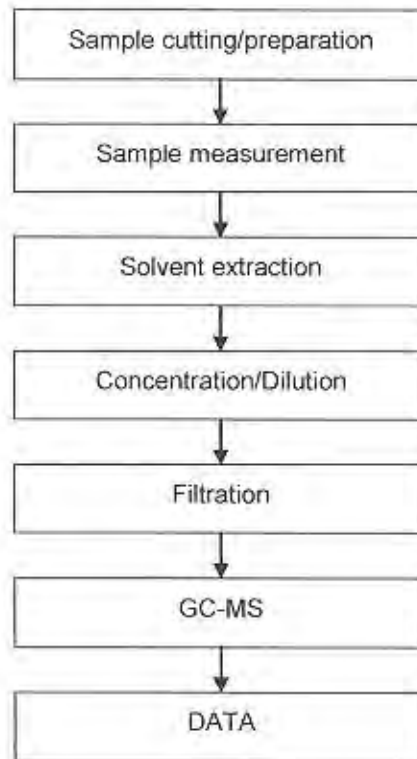


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## HBCDD Testing Flow Chart

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



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Sample photo:



SGS authenticate the photo on original report only

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

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**Test Report**

Number: SZHH00687971

Applicant: LITTELFUSE, INC  
8755 WEST HIGGINS ROAD SUITE  
500CHICAGO IL 60631 USA

Date: May 15, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

**Sample Description:**

One (1) submitted sample said to be **silver-grey paste (terminations)**.

Part No. : MS208.



\*\*\*\*\*

**Tests conducted:**

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

\*\*\*\*\*

To be continued

Authorized by:  
For Intertek Testing Services  
Shenzhen Ltd.



Ben N.L. Lin  
General Manager



**Test Report**

Number: SZHH00687971

Conclusion:

Tested Samples  
Submitted sample

Standard  
Restriction of the use of certain hazardous substance in electrical electronic and equipment (RoHS Direction 2002/95/EC and supersedure 2011/65/EU)

Result  
**Fail**

Phthalates content requirement in Annex XVII Items 51 & 52 of the REACH Regulation (EC) No. 1907/2006 & Amendment No. 552/2009 (formerly known as Directive 2005/84/EC) (DEHP, DBP & BBP)

Pass

Test Item  
Hexabromocyclododecane Content

See Test Conducted

Halogen (F, Cl, Br, I) Content

See Test Conducted

\*\*\*\*\*

Authorized by:  
For Intertek Testing Services  
Shenzhen Ltd.



Ben N.L. Lin  
General Manager



**Test Report**

Number: SZHH00687971

Tests Conducted

1 RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND(<2)
Lead (Pb) Content (mg/kg)	<b>1940*</b>
Mercury (Hg) Content (mg/kg)	ND(<2)
Chromium (VI)(Cr <sup>6+</sup> ) Content (mg/kg)	ND(<1)
Polybrominated Biphenyls (PBBs)(mg/kg)	
Monobromobiphenyl (MonoBB)	ND(<5)
Dibromobiphenyl (DiBB)	ND(<5)
Tribromobiphenyl (TriBB)	ND(<5)
Tetrabromobiphenyl (TetraBB)	ND(<5)
Pentabromobiphenyl (PentaBB)	ND(<5)
Hexabromobiphenyl (HexaBB)	ND(<5)
Heptabromobiphenyl (HeptaBB)	ND(<5)
Octabromobiphenyl (OctaBB)	ND(<5)
Nonabromobiphenyl (NonaBB)	ND(<5)
Decabromobiphenyl (DecaBB)	ND(<5)
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	
Monobromodiphenyl Ether (MonoBDE)	ND(<5)
Dibromodiphenyl Ether (DiBDE)	ND(<5)
Tribromodiphenyl Ether (TriBDE)	ND(<5)
Tetrabromodiphenyl Ether (TetraBDE)	ND(<5)
Pentabromodiphenyl Ether (PentaBDE)	ND(<5)
Hexabromodiphenyl Ether (HexaBDE)	ND(<5)
Heptabromodiphenyl Ether (HeptaBDE)	ND(<5)
Octabromodiphenyl Ether (OctaBDE)	ND(<5)
Nonabromodiphenyl Ether (NonaBDE)	ND(<5)
Decabromodiphenyl Ether (DecaBDE)	ND(<5)

Chemist: Wang Haijun/Zeng Guoliang

mg/kg = milligram per kilogram based on dry weight of sample = ppm

< = Less than

ND = Not detected

\* = **Failed item**

\*\*\*\*\*



**Test Report**

Number: SZHH00687971

Tests Conducted

(B) RoHS Requirement:

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

The above limits were quoted from 2002/95/EC and supersedure 2011/65/EU for homogeneous material.

(C) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr <sup>6+</sup> ) Content	With reference to IEC 62321 Edition 1.0:2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1 mg/kg
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 Edition 1.0:2008, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg

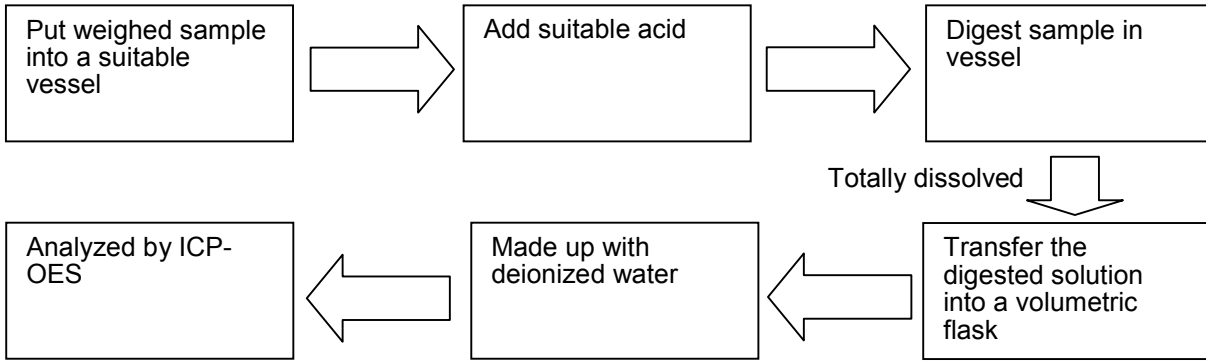
Date sample received: May 09, 2012  
Testing period: May 09, 2012 to May 11, 2012

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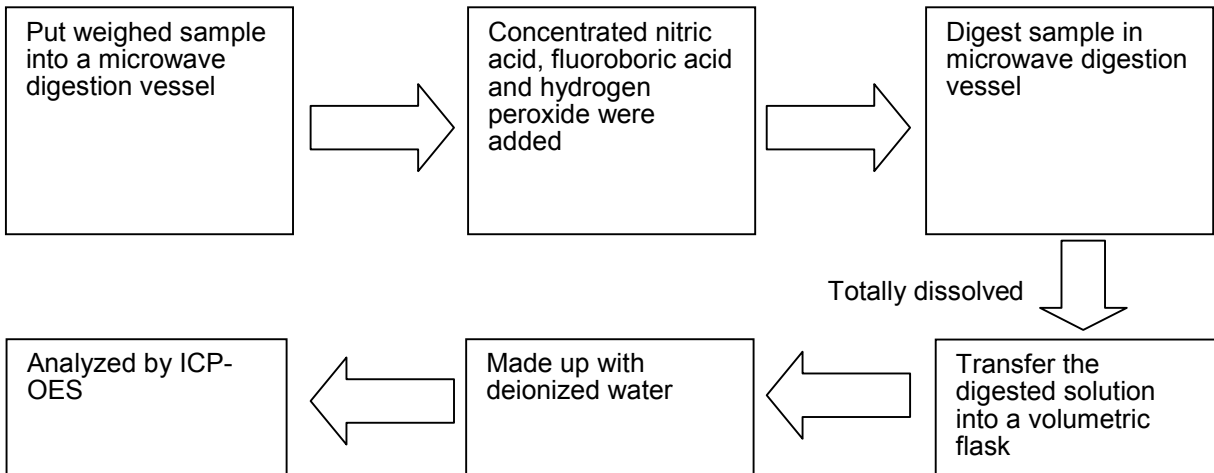
Tests Conducted

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content

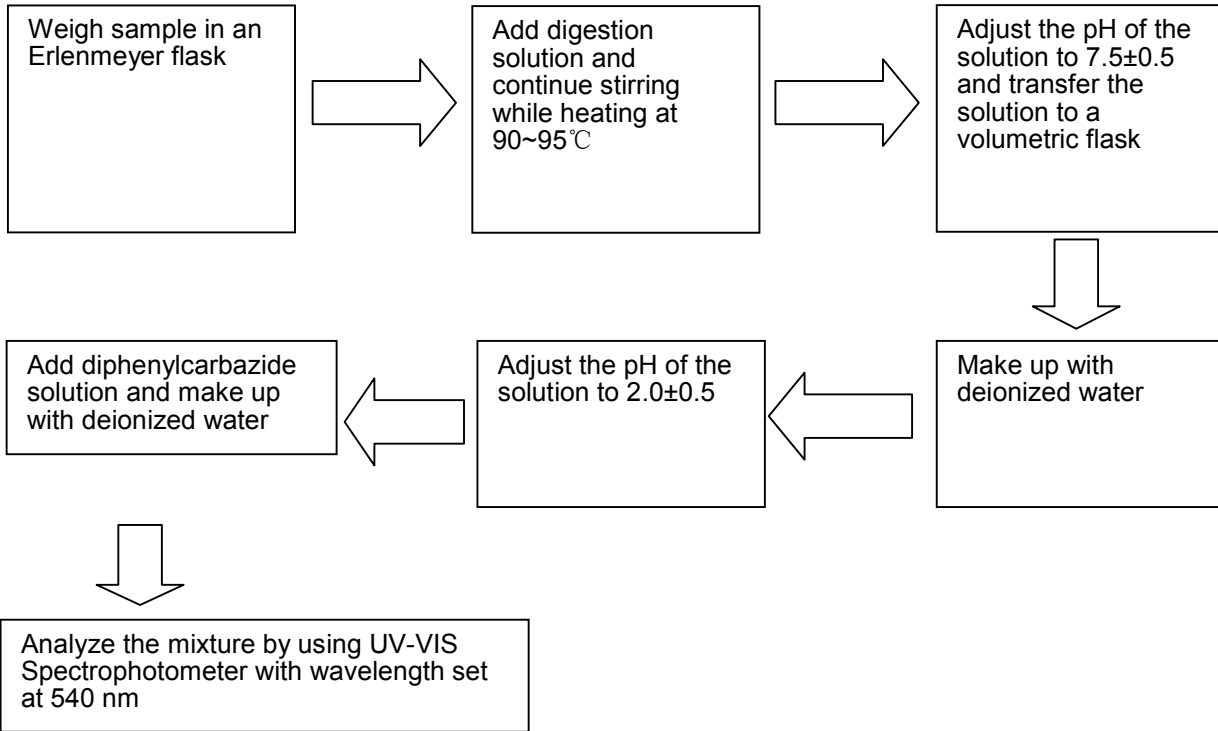


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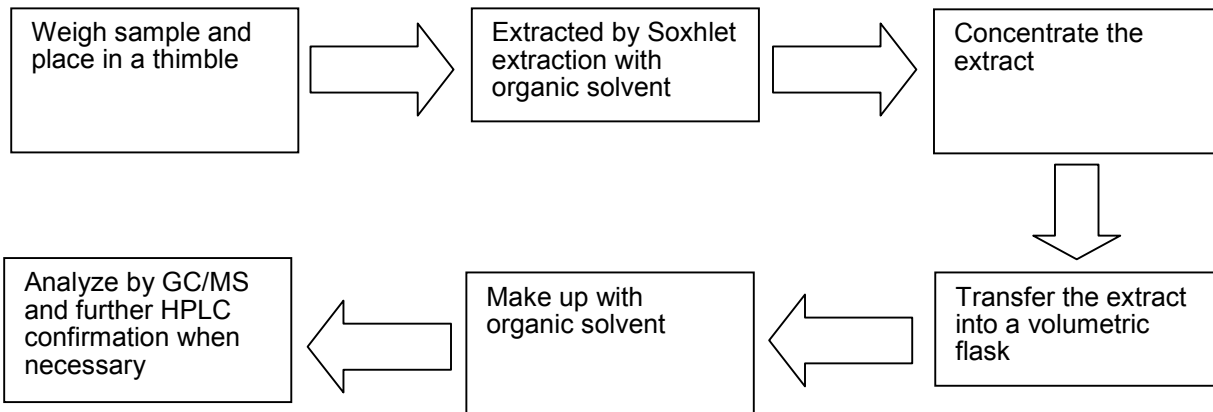


Tests Conducted

3. Test for Chromium (VI) ( $Cr^{6+}$ ) Content (Alkaline Digestion)



4. Test for PBBs/PBDEs Contents



\*\*\*\*\*



**Test Report**

Number: SZHH00687971

Tests Conducted

2 Phthalate Content

With reference to EN14372, by Gas chromatographic-Mass Spectrometric (GC-MS) analysis.

	<u>Result (%)</u>
Dibutyl phthalate (DBP)	<0.01
Di-(2-ethyl hexyl) phthalate (DEHP)	<0.01
Benzyl butyl phthalate (BBP)	<0.01
Sum of three phthalates	<0.01
Limit	0.1 %

The above limit was quoted according to Annex XVII Items 51 & 52 of the REACH Regulation (EC) No. 1907/2006 & Amendment No. 552/2009(formerly known as Directive 2005/84/EC) for phthalate content in toys and children articles.

< = Less than

As per client's request, only DBP, DEHP and BBP were tested for the submitted sample.

Tested sample : Silver-grey paste (terminations).

Date sample received :May 08, 2012

Testing period :May 08, 2012 to May 12, 2012

3 Hexabromocyclododecane (HBCDD) Content:

By solvent extraction followed by Gas Chromatographic - Mass Spectrometric (GC-MS) analysis.

Result : Less than 10 mg/kg

mg/kg = milligram per kilogram

Tested Component : Silver-grey paste (terminations).

Date sample received : May 08, 2012

Testing period : May 08, 2012 to May 10, 2012

\*\*\*\*\*



**Test Report**

Number: SZHH00687971

Tests Conducted

4 Halogen Content

( I ) Test Result Summary:

<u>Testing Item</u>	<u>Result (mg/kg)</u>
Fluorine (F) Content	ND
Chlorine (Cl) Content	89
Bromine (Br) Content	ND
Iodine (I) Content	ND

mg/kg = milligram per kilogram based on dry weight of sample = ppm  
ND = Not detected

( II ) Test Method:

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
Halogen (F, Cl, Br, I) Content	With reference to BS EN 14582:2007, by calorimetric bomb and determined by Ion Chromatography	50 mg/kg

Reporting limit = Quantitation limit of analyte in sample

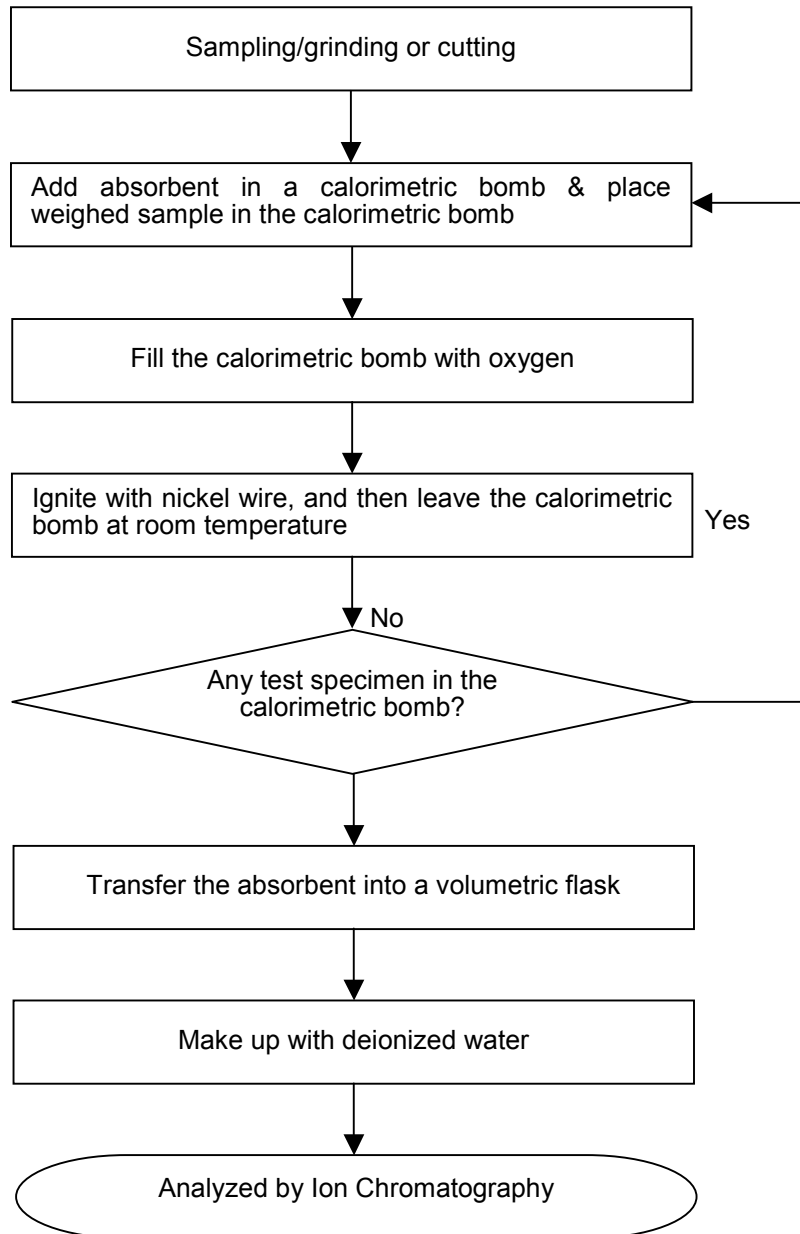
Date sample received: May 08, 2012  
Testing period: May 08, 2012 to May 11, 2012

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Tests Conducted

(III) Measurement Flowchart:

Test for Halogen Content (Reference Method: BS EN 14582:2007)



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



**Test Report**

Number: SZHH00687976

Applicant: LITTELFUSE, INC  
8755 WEST HIGGINS ROAD SUITE  
500CHICAGO IL 60631 USA

Date: May 15, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:  
One (1) submitted sample said to be **blue paste (blue silicone)**.  
Part No. : MS202.



\*\*\*\*\*

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

\*\*\*\*\*

To be continued

Authorized by:  
For Intertek Testing Services  
Shenzhen Ltd.



Ben N.L. Lin  
General Manager



**Test Report**

Number: SZHH00687976

Conclusion:

Tested Samples  
Submitted sample

Standard  
Restriction of the use of certain hazardous substance in electrical electronic and equipment (RoHS Direction 2002/95/EC and supersedure 2011/65/EU)

Result  
Pass

Phthalates content requirement in Annex XVII Items 51 & 52 of the REACH Regulation (EC) No. 1907/2006 & Amendment No. 552/2009 (formerly known as Directive 2005/84/EC) (DEHP, DBP & BBP)

Pass

Test Item  
Hexabromocyclododecane Content

See test conducted

Halogen (F, Cl, Br, I) Content

See test conducted

\*\*\*\*\*

Authorized by:  
For Intertek Testing Services  
Shenzhen Ltd.



Ben N.L. Lin  
General Manager



**Test Report**

Number: SZHH00687976

Tests Conducted

1 RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND(<2)
Lead (Pb) Content (mg/kg)	ND(<2)
Mercury (Hg) Content (mg/kg)	ND(<2)
Chromium (VI)(Cr <sup>6+</sup> ) Content (mg/kg)	ND(<1)
Polybrominated Biphenyls (PBBs)(mg/kg)	
Monobromobiphenyl (MonoBB)	ND(<5)
Dibromobiphenyl (DiBB)	ND(<5)
Tribromobiphenyl (TriBB)	ND(<5)
Tetrabromobiphenyl (TetraBB)	ND(<5)
Pentabromobiphenyl (PentaBB)	ND(<5)
Hexabromobiphenyl (HexaBB)	ND(<5)
Heptabromobiphenyl (HeptaBB)	ND(<5)
Octabromobiphenyl (OctaBB)	ND(<5)
Nonabromobiphenyl (NonaBB)	ND(<5)
Decabromobiphenyl (DecaBB)	ND(<5)
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	
Monobromodiphenyl Ether (MonoBDE)	ND(<5)
Dibromodiphenyl Ether (DiBDE)	ND(<5)
Tribromodiphenyl Ether (TriBDE)	ND(<5)
Tetrabromodiphenyl Ether (TetraBDE)	ND(<5)
Pentabromodiphenyl Ether (PentaBDE)	ND(<5)
Hexabromodiphenyl Ether (HexaBDE)	ND(<5)
Heptabromodiphenyl Ether (HeptaBDE)	ND(<5)
Octabromodiphenyl Ether (OctaBDE)	ND(<5)
Nonabromodiphenyl Ether (NonaBDE)	ND(<5)
Decabromodiphenyl Ether (DecaBDE)	ND(<5)

Chemist: Wang Haijun/Zeng Guoliang

mg/kg = milligram per kilogram based on dry weight of sample = ppm

< = Less than

ND = Not detected

\*\*\*\*\*

Tests Conducted

(B) RoHS Requirement:

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

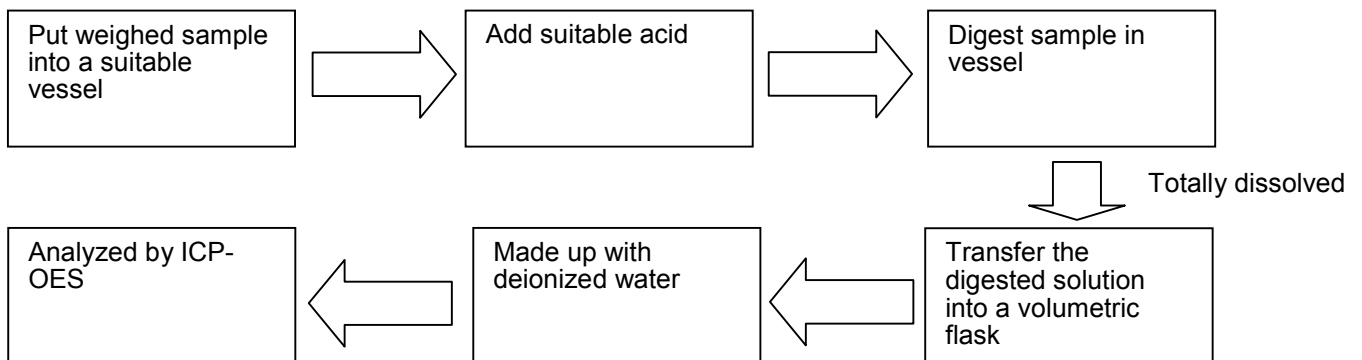
The above limits were quoted from 2002/95/EC and supersedure 2011/65/EU for homogeneous material.

(C) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr <sup>6+</sup> ) Content	With reference to IEC 62321 Edition 1.0:2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1 mg/kg
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 Edition 1.0:2008, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg

Date sample received: May 08, 2012  
 Testing period: May 08, 2012 to May 11, 2012

(D) Measurement Flowchart:  
 1. Test for Cd/Pb Contents

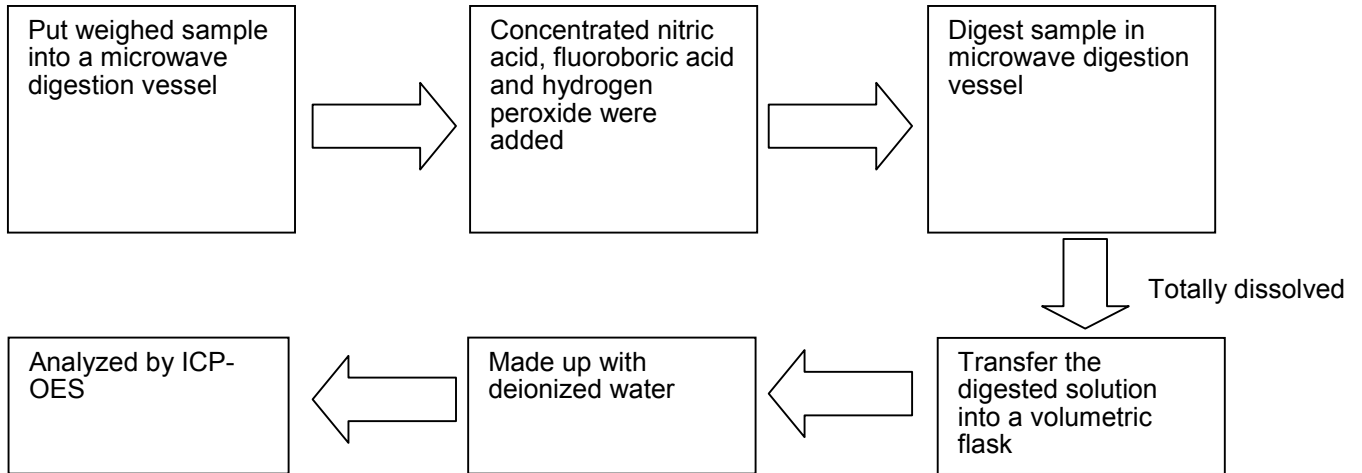


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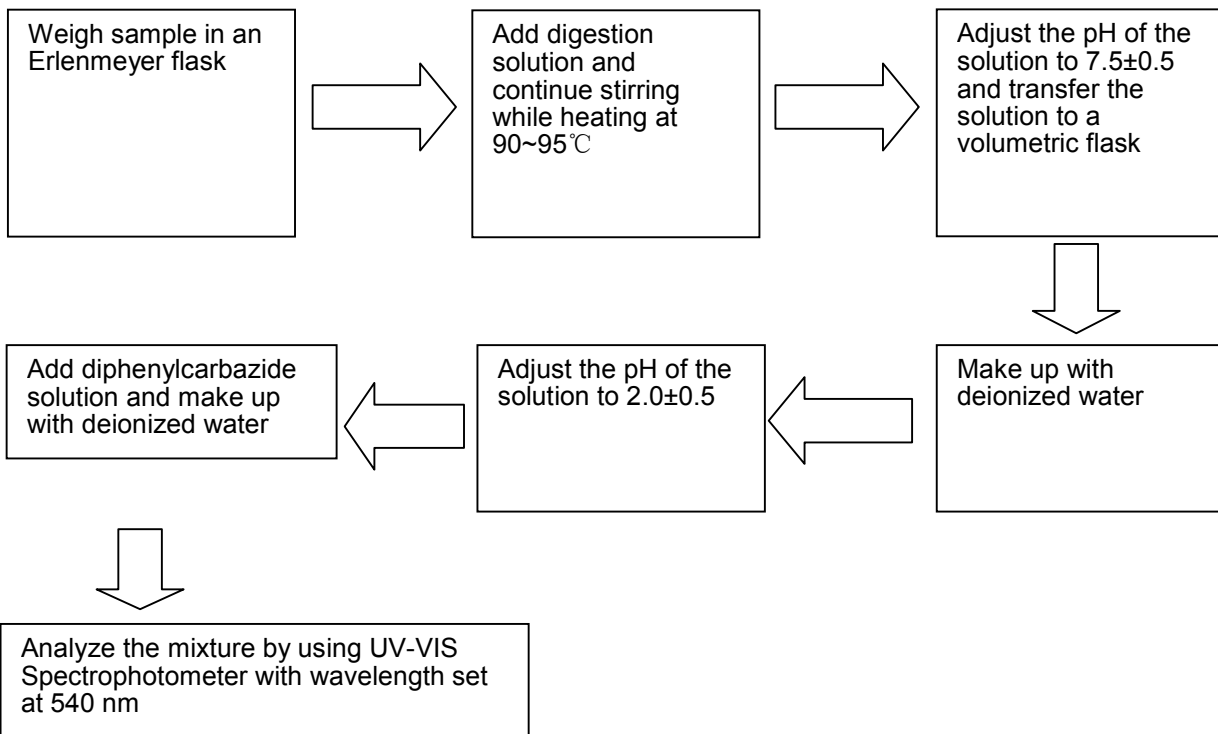


Tests Conducted

2. Test for Hg Content



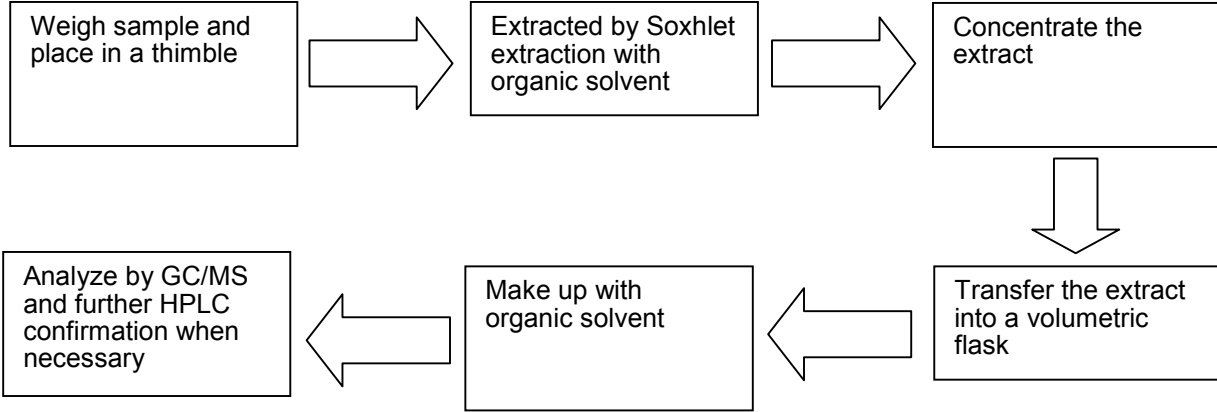
3. Test for Chromium (VI) (Cr<sup>6+</sup>) Content (Alkaline Digestion)



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Tests Conducted

4. Test for PBBs/PBDEs Contents



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**Test Report**

Number: SZHH00687976

Tests Conducted

2 Phthalate Content

With reference to EN14372, by Gas chromatographic-Mass Spectrometric (GC-MS) analysis.

	<u>Result (%)</u>
Dibutyl phthalate (DBP)	<0.01
Di-(2-ethyl hexyl) phthalate (DEHP)	<0.01
Benzyl butyl phthalate (BBP)	<0.01
Sum of three phthalates	<0.01
Limit	0.1 %

The above limit was quoted according to Annex XVII Items 51 & 52 of the REACH Regulation (EC) No. 1907/2006 & Amendment No. 552/2009(formerly known as Directive 2005/84/EC) for phthalate content in toys and children articles.

< = Less than

% = Percentage based on dry weight of sample

As per client's request, only DBP, DEHP and BBP were tested for the submitted sample.

Date sample received :May 08, 2012

Testing period :May 08, 2012 to May 12, 2012

3 Hexabromocyclododecane (HBCDD) Content:

By solvent extraction followed by Gas Chromatographic - Mass Spectrometric (GC-MS) analysis.

Result : Less than 10 mg/kg

mg/kg =milligram per kilogram

Date sample received: May 08, 2012

Testing period: May 08, 2012 to May 12, 2012

\*\*\*\*\*



**Test Report**

Number: SZHH00687976

Tests Conducted

4 Halogen Content

( I ) Test Result Summary:

<u>Testing Item</u>	<u>Result (mg/kg)</u>
Fluorine (F) Content	ND
Chlorine (Cl) Content	373
Bromine (Br) Content	ND
Iodine (I) Content	ND

mg/kg= milligram per kilogram = ppm  
ND= Not detected

( II ) Test Method:

<u>Testing Item</u>	<u>Testing Method</u>	<u>Reporting Limit</u>
Halogen (F, Cl, Br, I) Content	With reference to BS EN 14582:2007, by calorimetric bomb and determined by Ion Chromatography	50 mg/kg

Reporting limit = Quantitation limit of analyte in sample

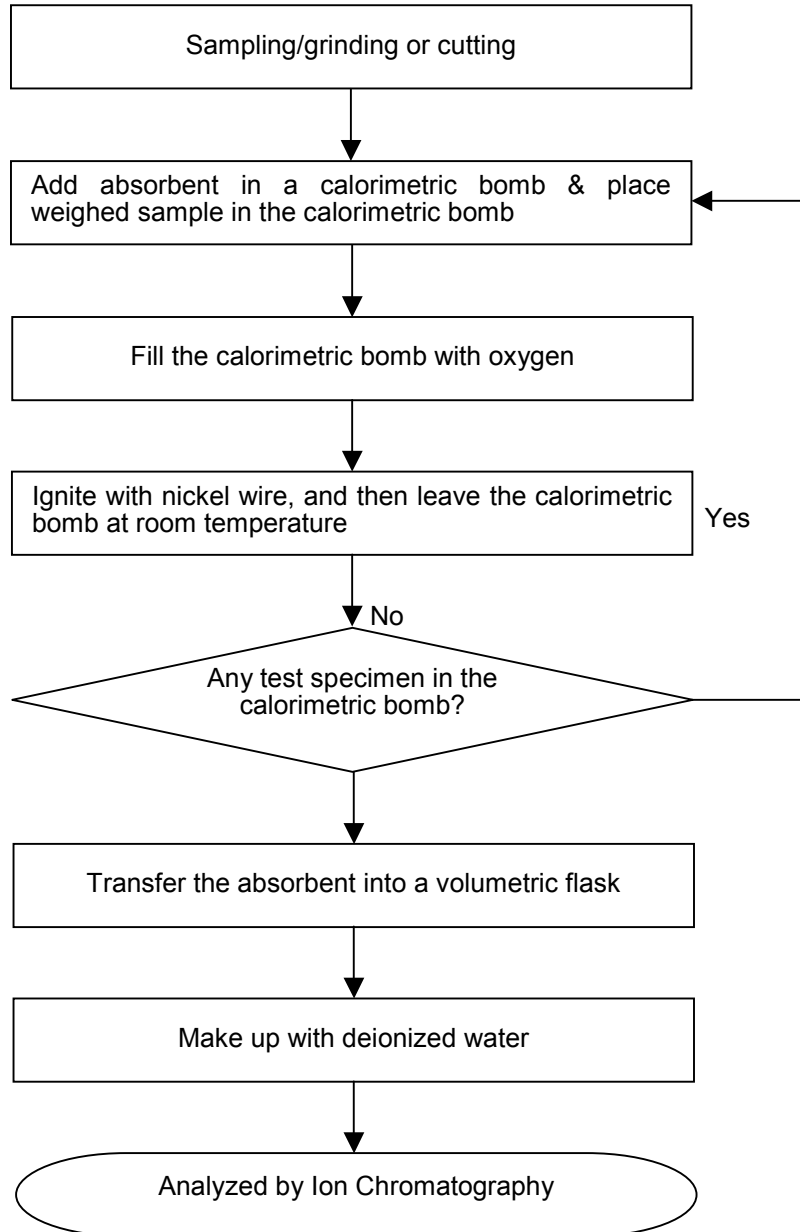
Date sample received : May 08, 2012  
Testing period : May 08, 2012 to May 11, 2012

\*\*\*\*\*

Tests Conducted

(III) Measurement Flowchart:

Test for Halogen Content (Reference Method: BS EN 14582:2007)



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