ICP Test Report Certification Packet

Company Name: Littelfuse, Inc.

Product Type: Metal Oxide Varistors

Product Series: TMOV/ iTMOV Series RoHS Compliant Models

Issue Date: April 1, 2013

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (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.

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

Issued by: David Huang

< DGLF Environmental, Health & Safety Engineer >

(1) Parts, sub-materials and unit parts

This document covers the Metal Oxide Varistors TMOV-iTMOV compliant series products 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：

Table 1: List of Raw Materials covered by this report

Parts	P/N	Raw Material Description	Page
1	NA	Black disc, type including DD and DM	3-12
2	NA	Silver Paste	13-22
3	NA	Sold Paste	23-34
4	NA	Sold Wire	35-39
5	NA	Tinned Copper Wire	40-44
6	NA	Hotmelt	45-53
7	NA	Alumina Insulator	54-58
8	NA	Epoxy Resin, Red	59-62

Test Report Number: SZHH00699643

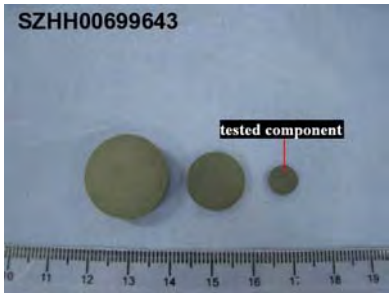
Applicant: LITTELFUSE, INC
8755 WEST HIGGINS ROAD SUITE
500CHICAGO IL 60631 USA

Date: Jun 19, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:

One (1) submitted sample said to be **DD black disc.**
Tested component: black solid material.



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Tests conducted:

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

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Conclusion:

Tested Samples	Standard	Result
Tested component of 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

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report Number: SZHH00699643

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^{6+}) Content (mg/kg)	10
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

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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^{6+})	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.

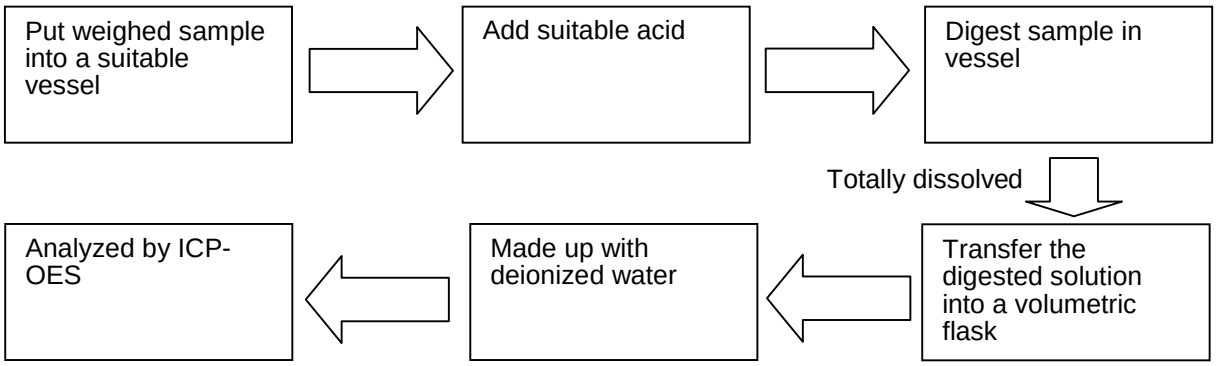
(C) Test Method:

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^{6+}) 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: Jun 09, 2012
Testing period: Jun 09, 2012 to Jun 16, 2012

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



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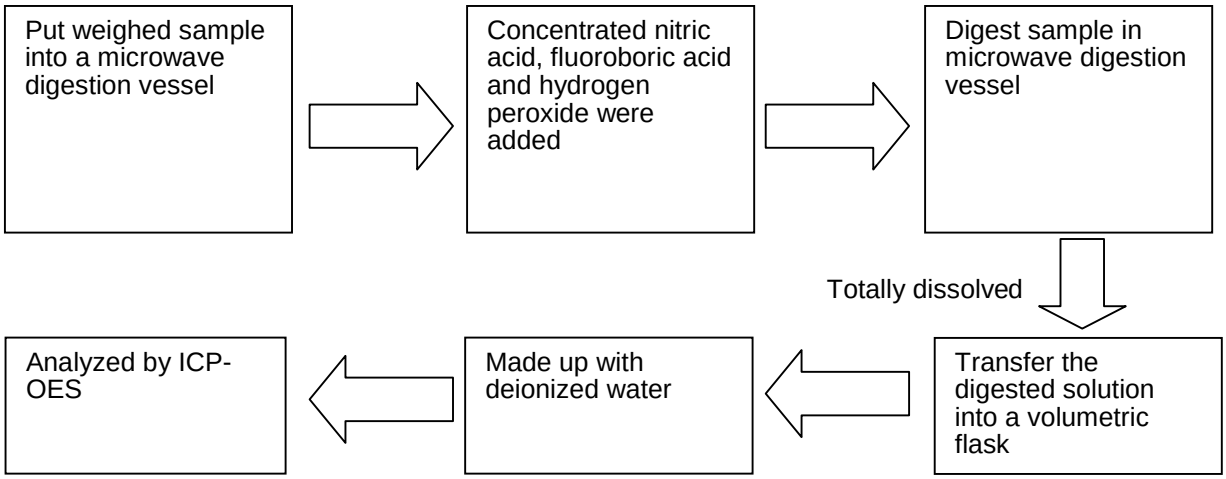
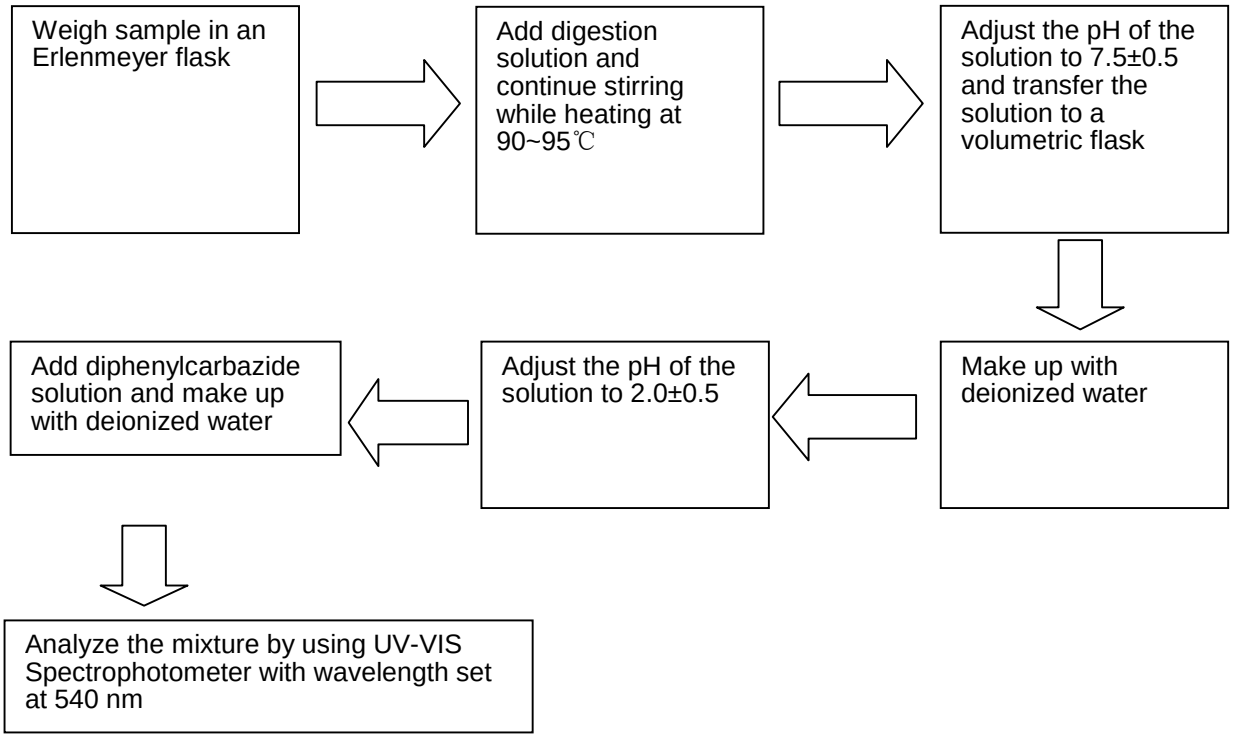
Tests Conducted

2. Test for Hg Content



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



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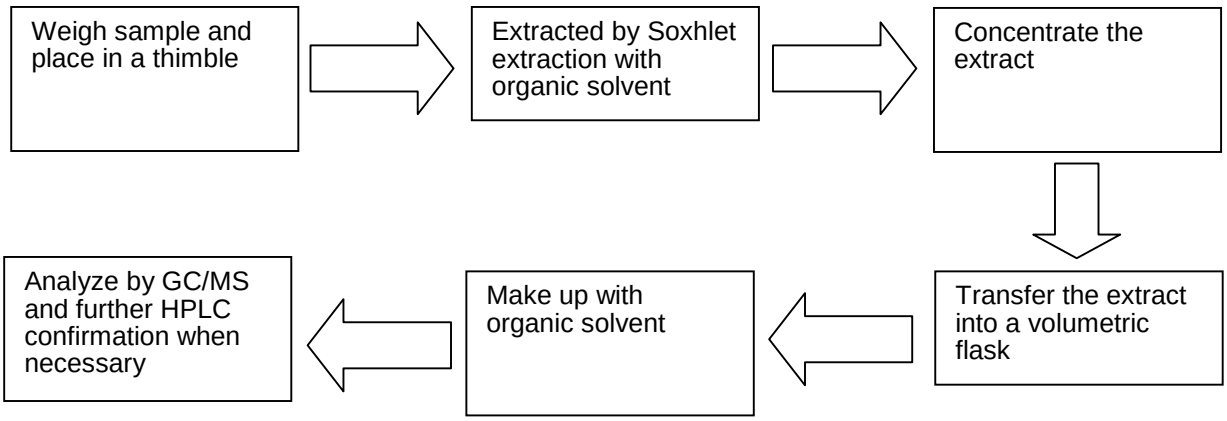
Tests Conducted

4. Test for PBBs/PBDEs Contents



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End of report

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Test Report Number: SZHH00699647

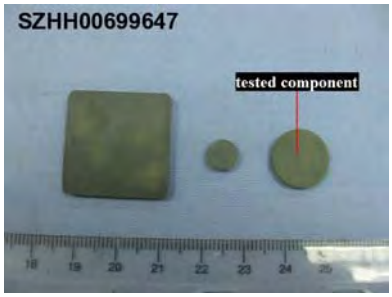
Applicant: LITTELFUSE, INC
8755 WEST HIGGINS ROAD SUITE
500CHICAGO IL 60631 USA

Date: Jun 19, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:

One (1) submitted sample said to be **DM black disc.**
Tested component: black solid material.



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Tests conducted:

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

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Conclusion:

Tested Samples	Standard	Result
Tested component of 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

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Authorized by:
For Intertek Testing Services
Shenzhen Ltd.

Ben N.L. Lin
General Manager

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Test Report Number: SZHH00699647

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RoHS Chemical Test

(A) Test Result Summary:

Testing Item	Result
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Lead (Pb) Content (mg/kg)	ND(<2)
Mercury (Hg) Content (mg/kg)	ND(<2)
Chromium (VI)(Cr^{6+}) Content (mg/kg)	10
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)
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Chemist: Wang Haijun/Zeng Guoliang

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

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(B) RoHS Requirement:

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Chromium (VI) (Cr^{6+})	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
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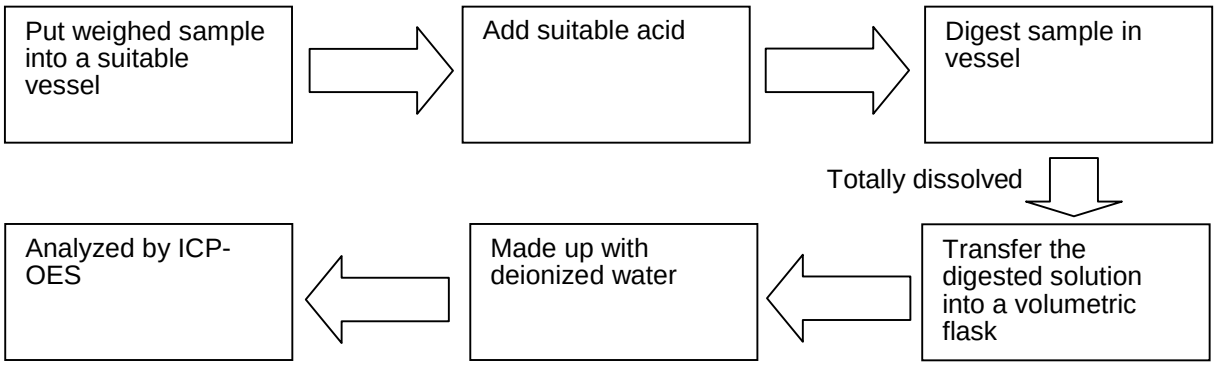
Mercury (Hg) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr^{6+}) Content	With reference to IEC 62321 Edition 1.0:2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1 mg/kg
Polybrominated Biphenyls (PBBs)& 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: Jun 09, 2012
Testing period: Jun 09, 2012 to Jun 16, 2012

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



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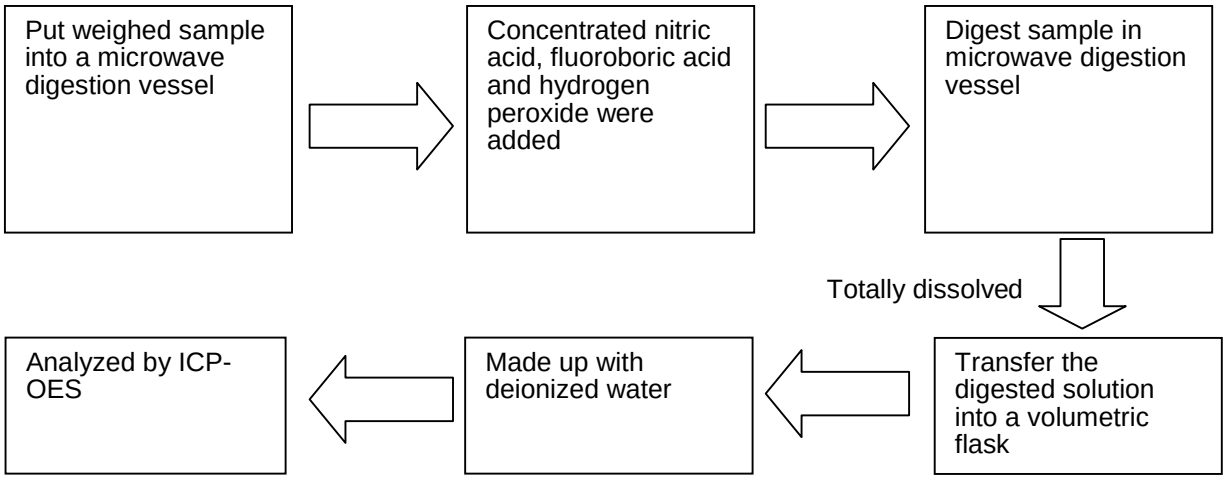
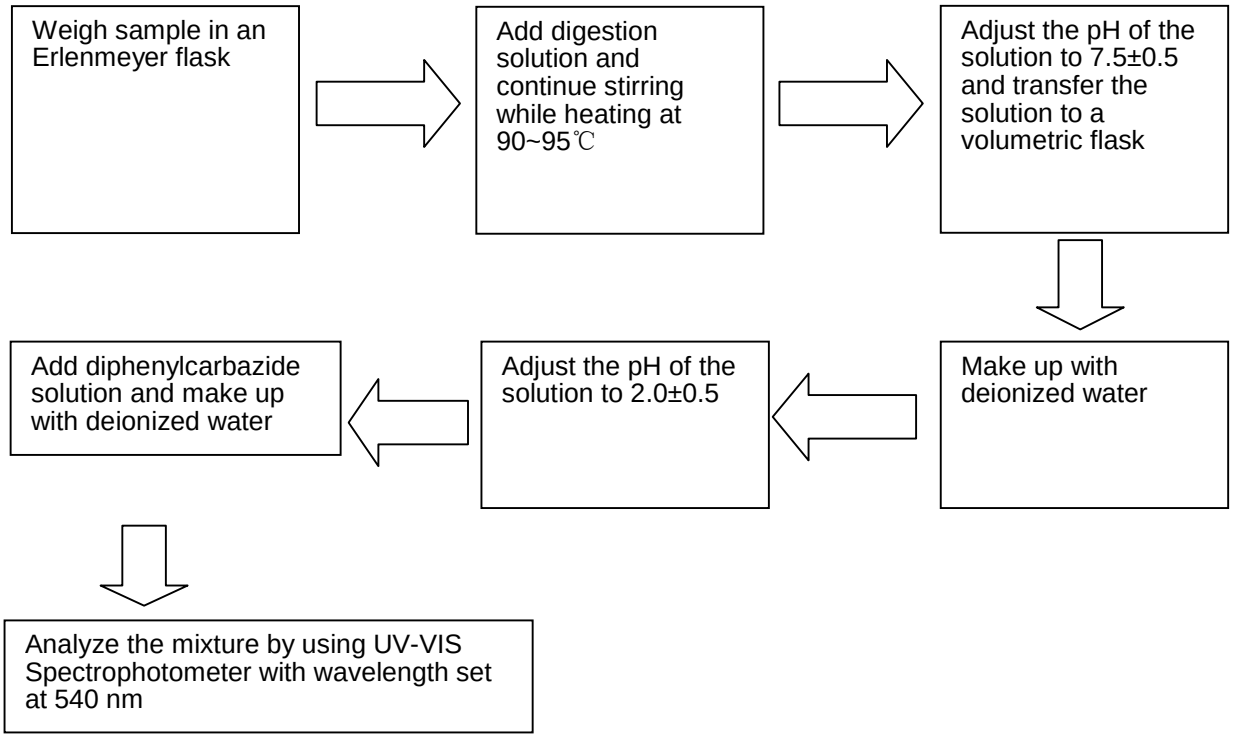
Tests Conducted

2. Test for Hg Content



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



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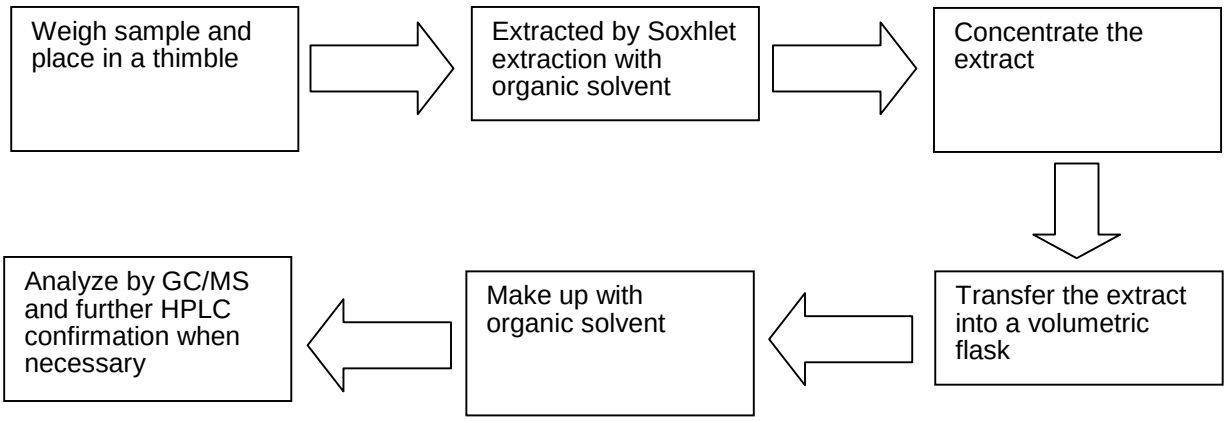
Tests Conducted

4. Test for PBBs/PBDEs Contents



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End of report

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report

No. SHAEC1303398301 Date: 15 Mar 2013

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 : SP-A6PL

SGS Job No. :	SP13-005972 - SH
Composition :	Silver Metal
Date of Sample Received :	11 Mar 2013
Testing Period :	11 Mar 2013 - 15 Mar 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

3"Building,No.889 Yishan Road Xuhui District,Shanghai China 200233 t E&E (86-21) 61402553 f E&E (86-21)64953679 www.cn.sgs.com
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233 tel: (86-21) 61402594 fax: (86-21)54500353 e sgs.china@sgs.com

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA13-033983.001	Gray mud

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

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

Element(s)

Test Method : With reference to US EPA Method 3052:1996, analysis was performed by ICP-OES.

Test Item(s)	Unit	MDL	*001*
Arsenic (As)	mg/kg	10	ND
Selenium (Se)	mg/kg	10	ND
Antimony (Sb)	mg/kg	10	ND
Barium (Ba)	mg/kg	10	442

Notes :

(1) Arsenic Reference Information: Entry 19 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2006/139/EC):
(i) Shall not be placed on the market, or used, as substances or in mixtures where the substance or mixture is intended for use to prevent the fouling by micro-organisms, plants or animals of:
— the hulls of boats,
— cages, floats, nets and any other appliances or equipment used for fish or shellfish farming,
— any totally or partly submerged appliances or equipment.
(ii) Shall not be placed on the market, or used, as substances or in mixtures where the substance or mixture is intended for use in the treatment of industrial waters, irrespective of their use.
(iii) Shall not be used in the preservation of wood. Furthermore, wood so treated shall not be placed on the market.
Please refer to Regulation (EC) No 552/2009 to get more detail information

Halogen

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

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

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 :

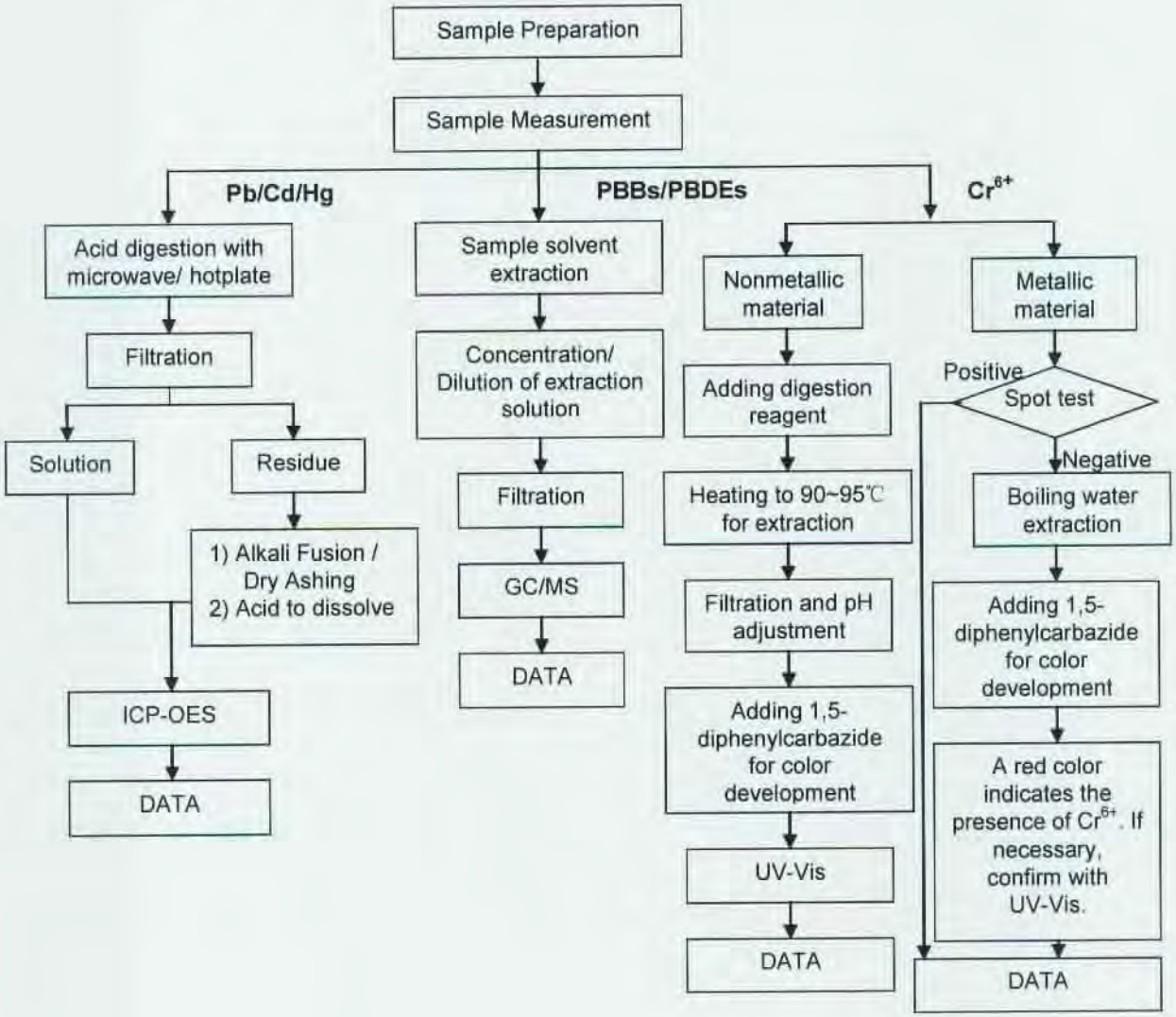
(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

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

ATTACHMENTS

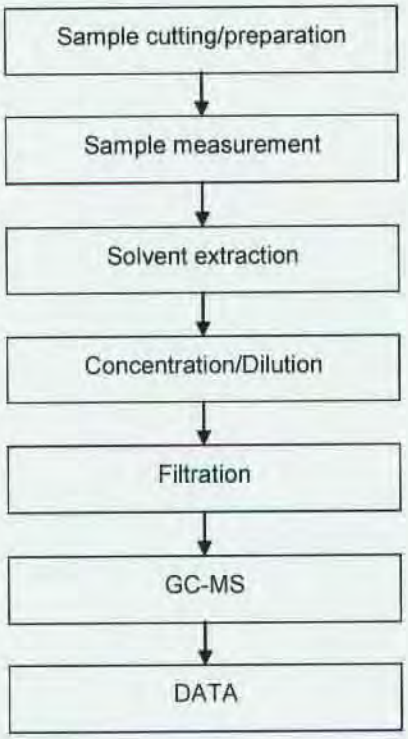
RoHS Testing Flow Chart

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^{6+} 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: Myra Ma



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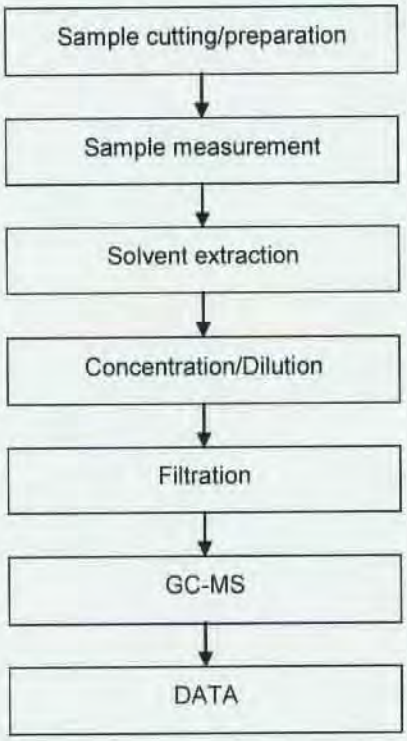
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233 tel: (86-21) 61402594 fax: (86-21)54500353 e sgs.china@sgs.com

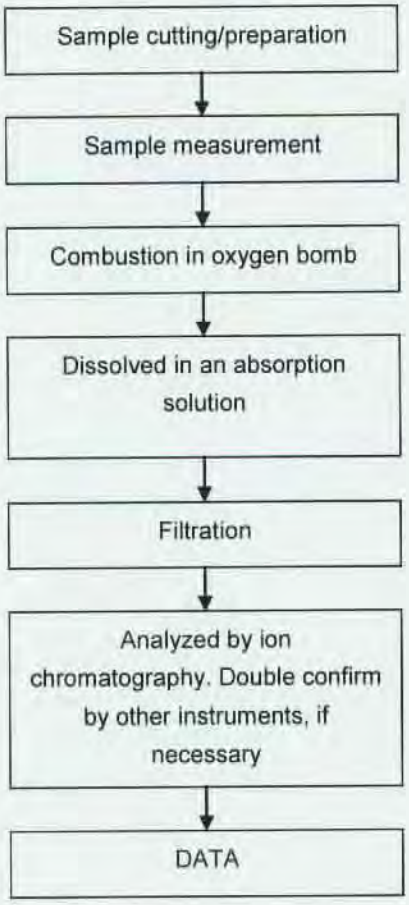
HBCDD Testing Flow Chart

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



Halogen Testing 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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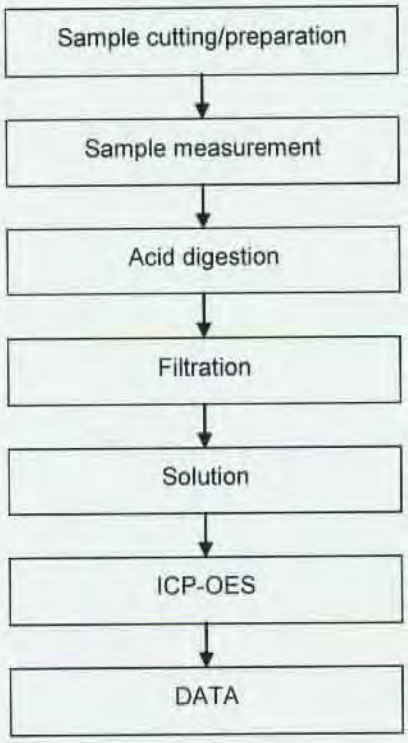
Elements Testing Flow Chart

1) Name of the person who made testing: Yoyo Wang/ Jan Shi
2) Name of the person in charge of testing: Jeff Zhang



3"Building,No.889 Yishan Road Xuhui District,Shanghai China 200233 t E&E (86-21) 61402553 f E&E (86-21)64953679 www.cn.sgs.com
中国·上海·徐汇区宜山路889号3号楼 邮编: 200233 HL: (86-21) 61402594 HL: (86-21)54500353 e sgs.china@sgs.com

Sample photo:

SHA13-033983.001

SGS authenticate the photo on original report only

*** End of Report ***

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CTI 华测检测

Test Report

Report No. RLSZE001191100004

Applicant DONGGUAN QIHANG XIYE MANUFACTURING CO.,LTD
Address NO.1 INDUSTRIAL AREA XIAGANG ,CHANG'AN TOWN ,DONGGUAN CITY

Report on the submitted sample(s) said to be

Sample Name	LEAD-FREE SOLDER PASTE
Sample Description	Gray paste
Part No.	MIXTURE OF QH#LF96, QH#LF97, QH#LF98, QH#LF658, QH#LF601, QH#LT658, QH#LT601, QH#LT658C, QH#LF96H, QH#LF97H, QH#LF98H, QH#LF658H, QH#LF601H, QH#LT658H, QH#LT601H, QH#LT658CH
Color	Silver
Sample Received Date	Mar. 3, 2012
Testing Period	Mar. 3, 2012 to Mar. 8, 2012

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

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

Conclusion:

Tested Sample	According to directive	Result
Submitted Sample	2011/65/EU*	Pass

*=July 1, 2011, the EU Official Journal (OJ) released the directive 2011/65/EU which as a new version of RoHS Directive (2002/95/EC). The revised directive has entered into force on the twentieth day after its publication in the OJ.

Tested by Rick Inspected by Vargas

Approved by Technical Manager Date Mar. 8, 2012

CENTRE TESTING INTERNATIONAL CTI SZ03

No. 11363955

Test Report

Report No. RLSZE001191100004

Test Result(s)

Tested Item(s)	Content
Lead(Pb)	55 mg/kg
Cadmium (Cd)	N.D.
Mercury(Hg)	N.D.
Hexavalent Chromium(Cr(VI))	N.D.

Tested Item(s)	Content
Polybrominated Biphenyls (PBBs)	
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)	Content
Polybrominated Diphenyl Ethers (PBDEs)	
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.

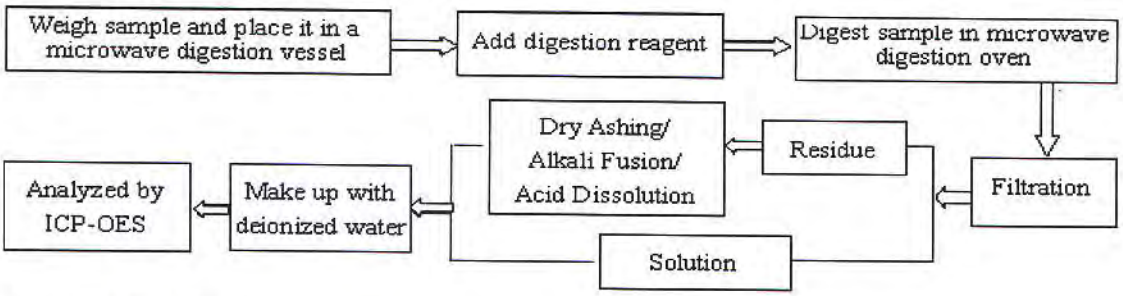
Note: **The sample had been dissolved totally tested for Lead, Cadmium, Mercury.**
-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL)
-mg/kg = ppm = parts per million

Test Report

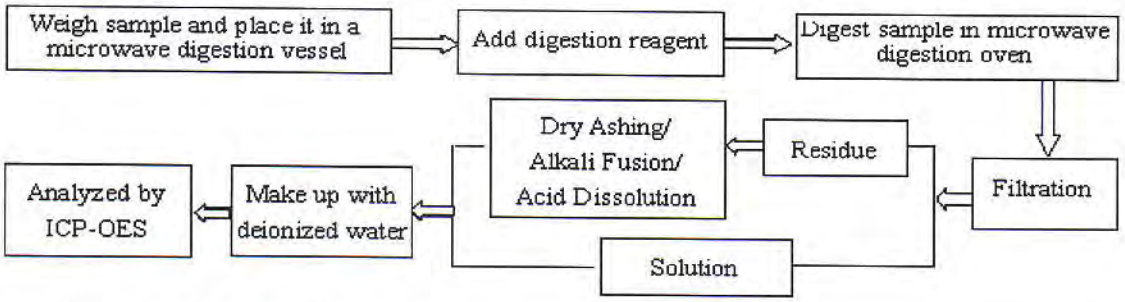
Report No. RLSZE001191100004

Test Process

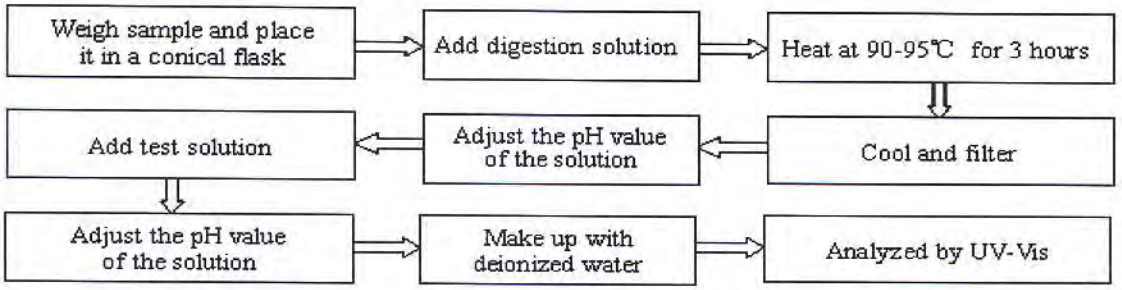
1. Lead(Pb), Cadmium(Cd)



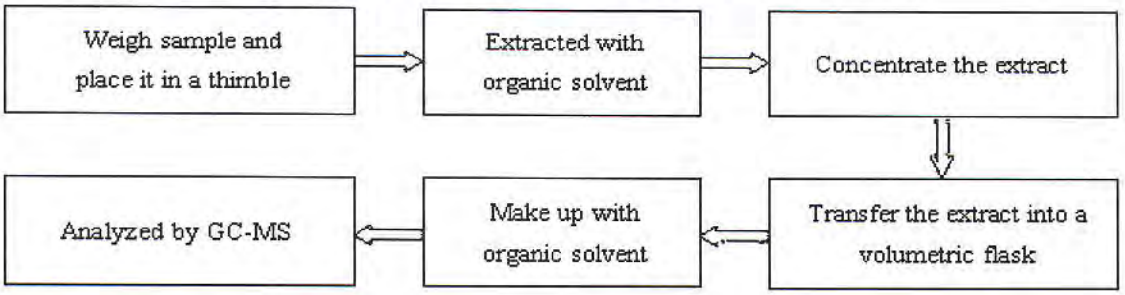
2. Mercury(Hg)



3. Hexavalent Chromium(Cr(VI))



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



Test Report

Report No. RLSZE001191100004

Photo(s) of the sample(s)

*** End of report ***

CTI 华测检测

Test Report

Report No. RLSZE001296390001 Page 1 of 3

Applicant DONGGUAN QIHANG XIYE MANUFACTURING CO.,LTD
Address NO.1 INDUSTRIAL AREA XIAGANG ,CHANG'AN TOWN ,DONGGUAN CITY

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

Sample Name	LEAD-FREE SOLDER PASTE
COLOR	silver
Material	TIN
Sample Received Date	May. 25, 2012
Testing Period	May. 25, 2012 to May. 29, 2012

Test Requested As specified by client, to test Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I) in the submitted sample(s).

Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Fluorine(F)	Refer to BS EN 14582:2007	IC	10 mg/kg
Chlorine(Cl)	Refer to BS EN 14582:2007	IC	10 mg/kg
Bromine(Br)	Refer to BS EN 14582:2007	IC	10 mg/kg
Iodine(I)	Refer to BS EN 14582:2007	IC	10 mg/kg

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

Tested by Rick Li Reviewed by Vargas He

Approved by Danny Liu Technical Manager Date May. 29, 2012

CENTRE TESTING INTERNATIONAL CTI SZ03

No. 38791053

Test Report

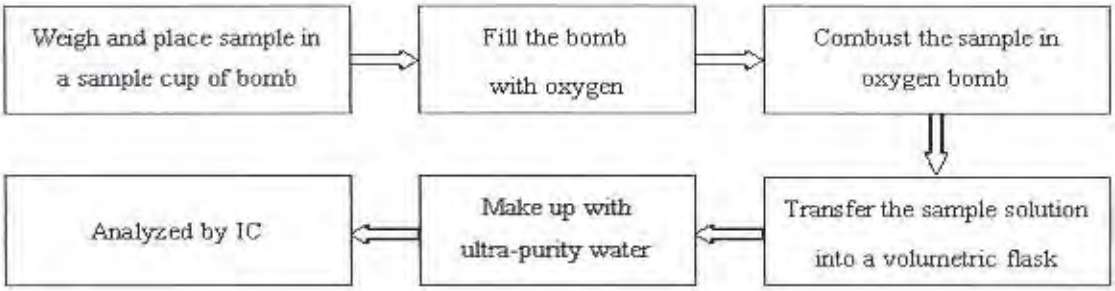
Test Result(s)

Tested Item(s)	Content
Halogen(s)	
Fluorine (F)	N.D.
Chlorine (Cl)	N.D.
Bromine (Br)	N.D.
Iodine (I)	N.D.

Tested Sample/Part Description Gray paste

Note: -MDL = Method Detection Limit
-N.D. = Not Detected (<MDL)
-mg/kg = ppm = parts per million

Test Process



Test Report

Report No. RLSZE001296390001

Photo(s) of the sample(s)

*** End of report ***

Test Report

No. CANEC1204755001 Date: 27 Apr 2012 Page 1 of 5

DONGGUAN QI HANG XI YE MANUFACTURING CO.,LTD

NO.1 INDUSTRUAL PARK,XIAGANG,CHANGAN TOWN,DONGGUAN CITY
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : Lead Free Solder Paste

SGS Job No. :	CP12-017386 - GZ
Date of Sample Received :	23 Apr 2012
Testing Period :	23 Apr 2012 - 27 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.

Silva Zhou
Approved Signatory

198 Kezhu Road,Scientech Park Guangzhou Economic & Technological Development District, China 510663 t (86-20) 82155555 f (86-20) 82075113 www.cn.sgs.com
中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075113 e sgs.china@sgs.com

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN12-047550.001	Grey paste

Remarks :

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

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)	% (w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	% (w/w)	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	% (w/w)	0.003	ND

Notes :

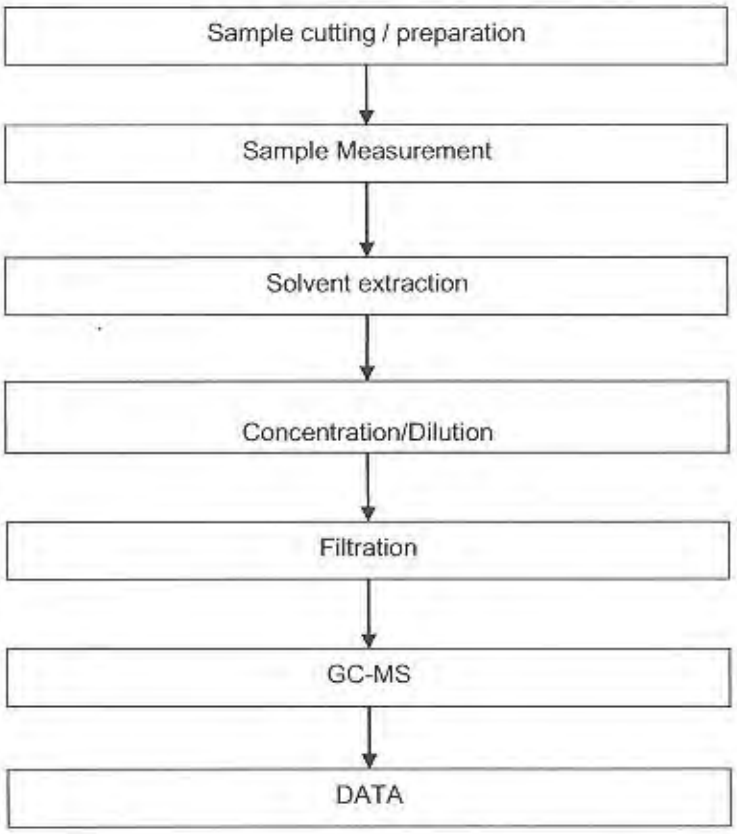
(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

Remark : The result(s) shown is/are of the total weight of wet sample.

ATTACHMENTS

HBCDD Testing Flow Chart

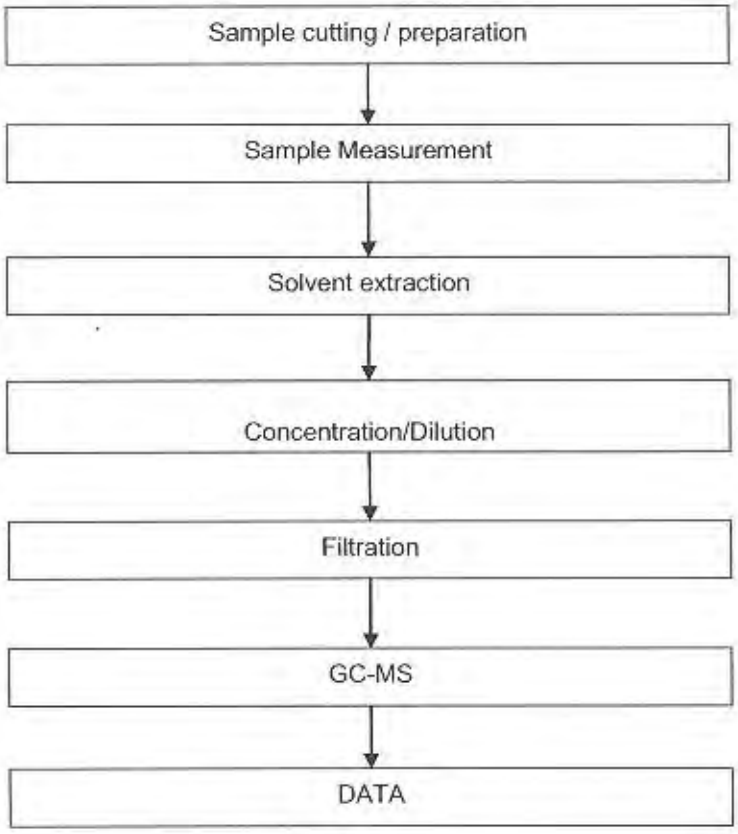
1) Name of the person who made testing: Cutey Yu
2) Name of the person in charge of testing: Ryan Yang



ATTACHMENTS

Phthalates Testing Flow Chart

1) Name of the person who made testing: Tina Zhao
2) Name of the person in charge of testing: Ryan Yang



Sample photo:

CAN12-047550.001

SGS authenticate the photo on original report only

*** End of Report ***

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中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075113 e sgs.china@sgs.com

Test Report

No. CTSSA/01561/13 **Date: 25/01/2013**
CTS Ref. CTSSA/13/0261/Henkel

HENKEL (MALAYSIA) SDN BHD
LOT 62049, JALAN PORTLAND, TASEK INDUSTRIAL ESTATE
31400 IPOH, PERAK DARUL EHSAN

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

Sample Description	:	96SC C400 Solder Wire
Batch Number	:	O53A996895
Sample Receiving Date	:	18/01/2013
Testing Period	:	18/01/2013 to 25/01/2013

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).
Analysts	:	Ng Jing Wei, Cho Kar Yen, Tan Li Wei & Choong Lap Kit

SGS LABORATORY SERVICES (M) SDN. BHD.

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

Test Report

Test results:

Test Part Description :

Sample Description : 96SC C400 Solder Wire
Batch Number : O53A996895

RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Results	MDL
Cadmium(Cd)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	223	2
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, and performed by ICP-OES	N.D.	2
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional) #	---	With reference to IEC 62321:2008	Negative	-
Sum of PBBs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

SGS LABORATORY SERVICES (M) SDN. BHD.

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

Sum of PBDEs	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	-
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, and performed by GC-MS	N.D.	5

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)
(b) N.D. = Not Detected
(c) MDL = Method Detection Limit
(d) # = **Spot-Test:**
a. Negative means the absence of Cr(VI) on the tested areas
b. Positive means the presence of Cr(VI) on the tested areas
(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:
a. Negative means the absence of Cr(VI) on the tested areas
b. Positive means the presence of Cr(VI) on the tested areas;
The detected concentration in 50 mL boiling water extraction solution is equal or greater than 0.02 mg/kg with 50 cm^2 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.
(e) - = Not regulated

SGS LABORATORY SERVICES (M) SDN. BHD.

for

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

Test Part Description :

Sample Description	:	96SC C400 Solder Wire
Batch Number	:	O53A996895

HENKEL (MALAYSIA) SDN BHD
CTSSA/01561/13

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SGS LABORATORY SERVICES (M) SDN. BHD.

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

1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321 2008

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

2. DETERMINATION OF LEAD CONTENT BY IEC 62321 2008

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

3. DETERMINATION OF MERCURY CONTENT BY IEC 62321 2008

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

4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321 2008

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

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

Cut sample in small pieces
↓
Weight sample (0.5-4.0g) into extraction thimble
↓
Soxhlet Extraction with Toluene
↓
Filter through 0.45 um membrane filter
↓
Analyses by GC-MS (with appropriate dilution)

**** End of Report ****

SGS LABORATORY SERVICES (M) SDN. BHD.

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

The following sample(s) was/were submitted and identified on behalf of the clients as : TIN-COATED COPPER WIRE

SGS Job No. :	TP12-009027 - TJ
Main Substance :	Cu
Date of Sample Received :	11 Oct 2012
Testing Period :	11 Oct 2012 - 16 Oct 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.

Reabeca Zhou
Approved Signatory

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	TSN12-009488.001	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)	1000	mg/kg	2	ND
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

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 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^2 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.

SGS-CSTC Standards Technical Services (Tianjin) Co., Ltd.
Chemical Testing Service

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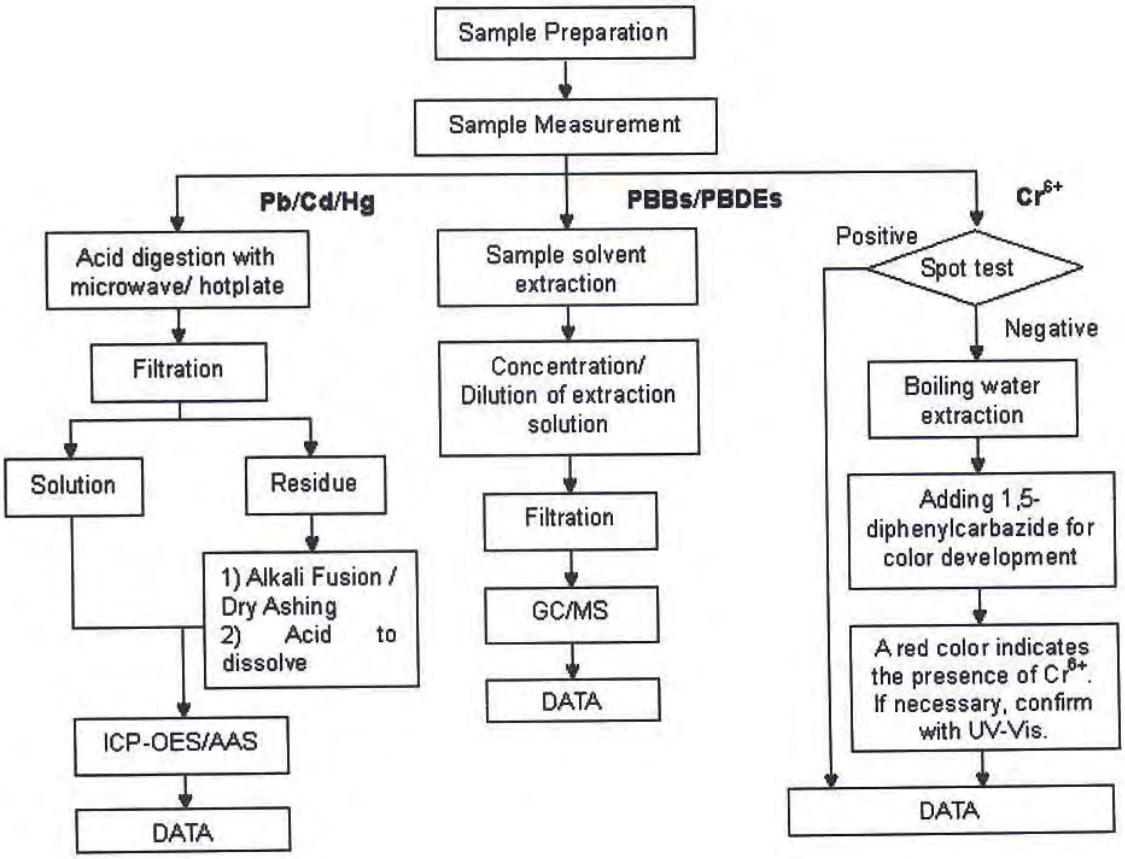
中国·天津市经济技术开发区第五大街41号SGS大厦 邮编: 300457 t (86-22) 65288000 f (86-22) 25295252 e sgs.china@sgs.com

ATTACHMENTS

Cd/Pb/Hg/Cr^{6+}/PBBs&PBDEs Testing Flow Chart

1) Name of the person who made testing: Aaron Wang/Jason Li/Angell Yao
2) Name of the person in charge of testing: Cindy Yin/Rex Zhu
3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} and PBBs/PBDEs test method excluded)



SGS-CSTC Standards Technical Services (Tianjin) Co., Ltd.
Chemical Testing Service
SGS Mansion, No.41, The 5th Avenue TEDA, Tianjin, China 300457 t (86-22) 65288000 f (86-22) 25295252 www.cn.sgs.com
中国·天津市经济技术开发区第五大街41号SGS大厦 邮编: 300457 t (86-22) 65288000 f (86-22) 25295252 e sgs.china@sgs.com
Member of the SGS Group (SGS SA)

Sample photo:

TSN12-009488.001

SGS authenticate the photo on original report only

*** End of Report ***

SGS-CSTC Standards Technical Services (Tianjin) Co.,Ltd
Chemical Laboratory
SGS Mansion,No.41,The 5th Avenue TEDA,Tianjin,China 300457 t (86-22) 65288000 f (86-22) 25295252 www.cn.sgs.com
中国·天津市经济技术开发区第五大街41号SGS大厦 邮编: 300457 t (86-22) 65288000 f (86-22) 25295252 e sgs.china@sgs.com

Test Report Number: SZHH0071859103

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

Date: Aug 16, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:
One (1) submitted sample said to be **transparent yellow glue (hot melt).**
Part No. : MS267.

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

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Conclusion:

Tested Sample	Standard	Result
Submitted sample	Restriction of the use of certain hazardous substance in electrical and electronic equipment (RoHS Directive 2002/95/EC and superseding 2011/65/EU)	See test conducted
	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

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report Number: SZHH0071859103

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^{6+}) 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

****

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Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

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^{6+})	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 superseding 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^{6+}) 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

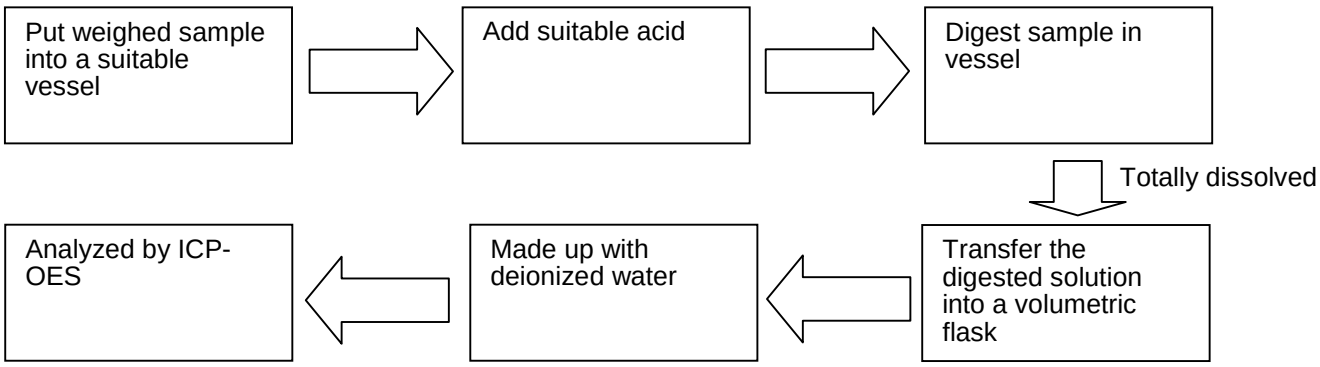
Date sample received: Aug 10, 2012
Testing period: Aug 10, 2012 to Aug 13, 2012
****

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

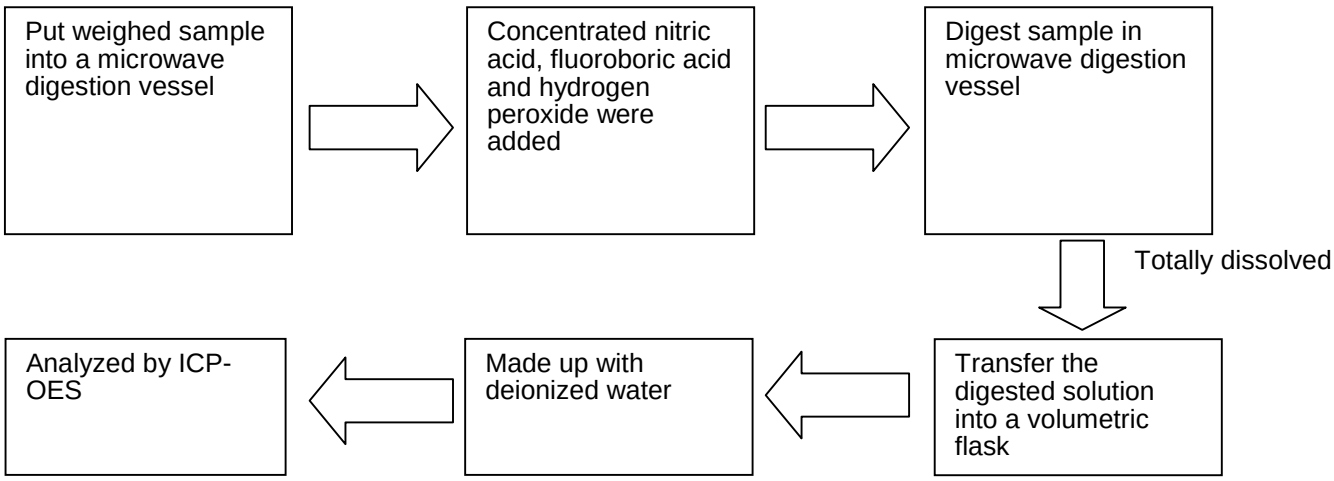
Tests Conducted

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



2. Test for Hg Content



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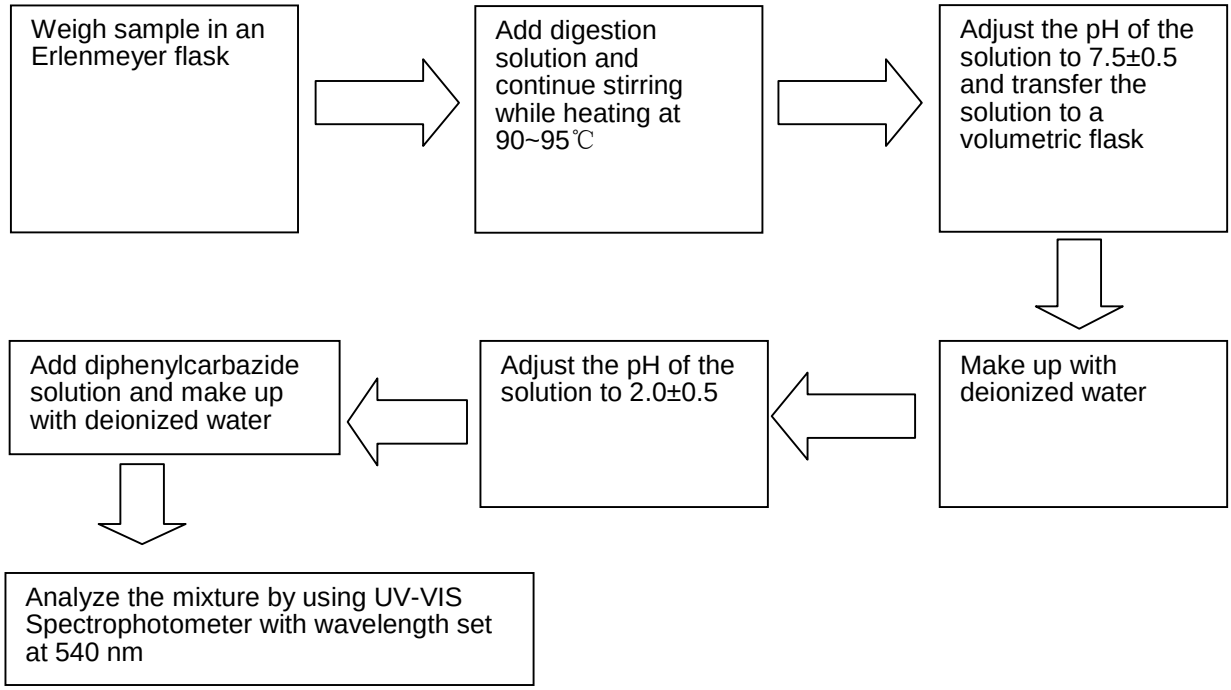
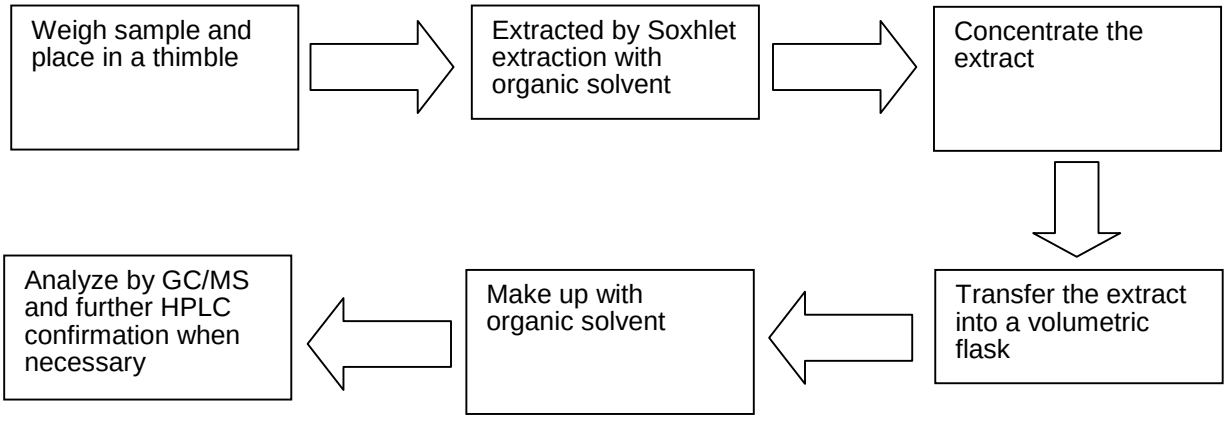
Tests Conducted

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



4. Test for PBBs/PBDEs Contents



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Tests Conducted

2 Phthalate Content

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

	Result (%)
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

Date sample received :Aug 10, 2012
Testing period :Aug 10, 2012 to Aug 15, 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: Aug 10, 2012
Testing period: Aug 10, 2012 to Aug 14, 2012

****

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Tests Conducted

4 Halogen Content

(Ⅰ) Test Result Summary:

Testing Item	Result (mg/kg)
Fluorine (F) Content	ND
Chlorine (Cl) Content	1130
Bromine (Br) Content	ND
Iodine (I) Content	ND

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

(Ⅱ) Test Method:

Testing Item	Testing Method	Reporting Limit
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 :Aug 10, 2012
Testing period :Aug 10, 2012 to Aug 14, 2012

****

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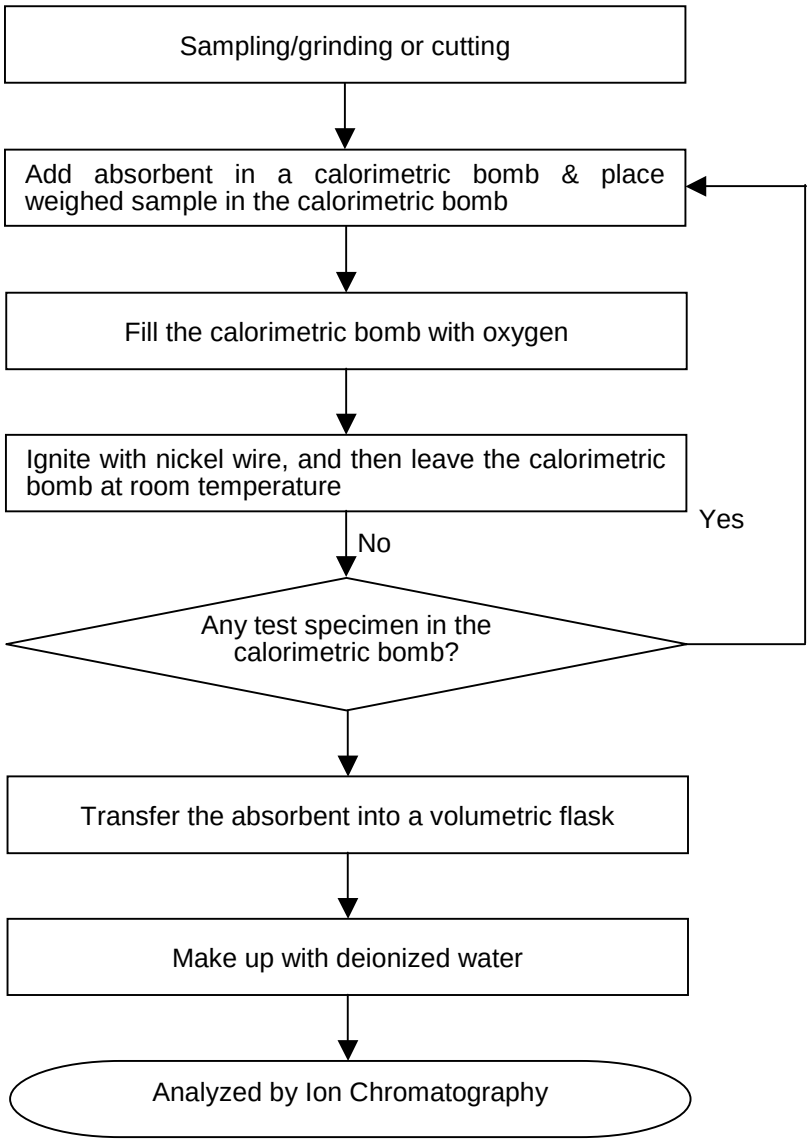
Tests Conducted

(III) Measurement Flowchart:

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



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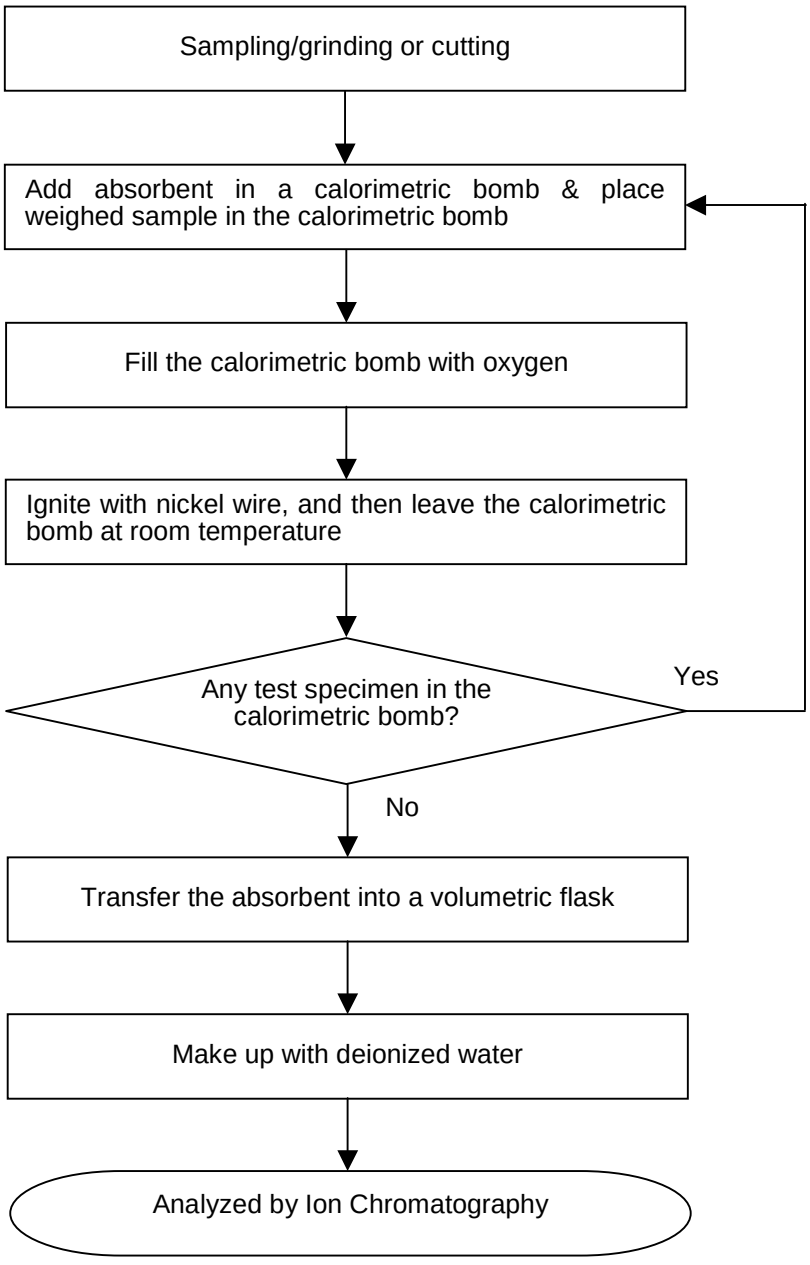
End of report

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Tests Conducted

(Ⅲ) Measurement Flowchart:

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



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End of report

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report Number: SZHH00699671

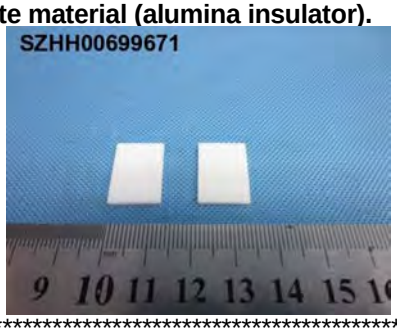
Applicant: LITTELFUSE, INC
8755 WEST HIGGINS ROAD SUITE
500CHICAGO IL 60631 USA

Date: Jun 19, 2012

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:

One (1) submitted sample said to be **white material (alumina insulator).**



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Tests conducted:

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

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Conclusion:

Tested Samples	Standard	Result
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

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report Number: SZHH00699671

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^{6+}) 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

****

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

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^{6+})	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.

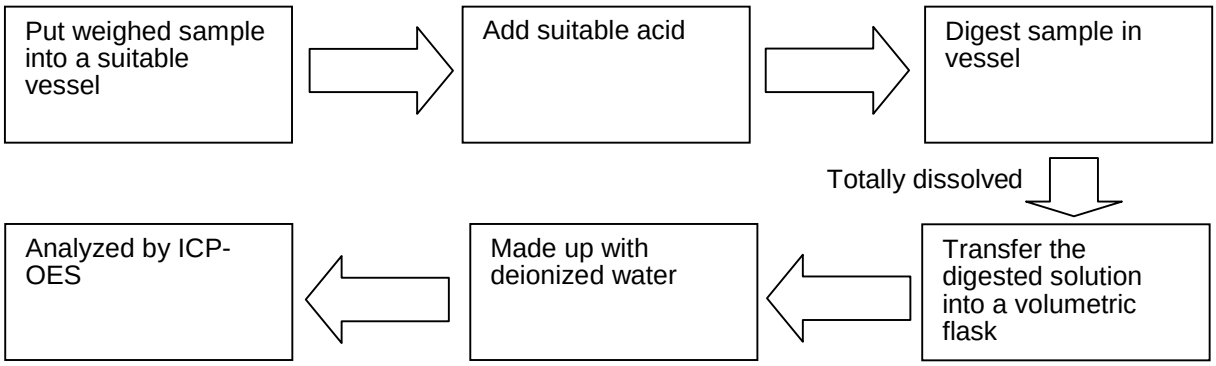
(C) Test Method:

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^{6+}) 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: Jun 09, 2012
Testing period: Jun 09, 2012 to Jun 16, 2012

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents



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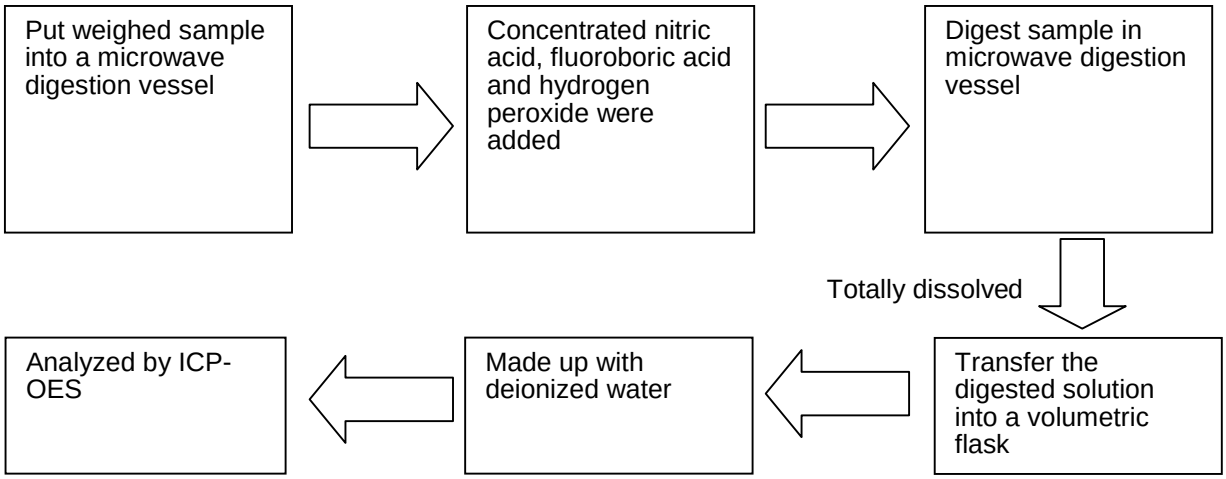
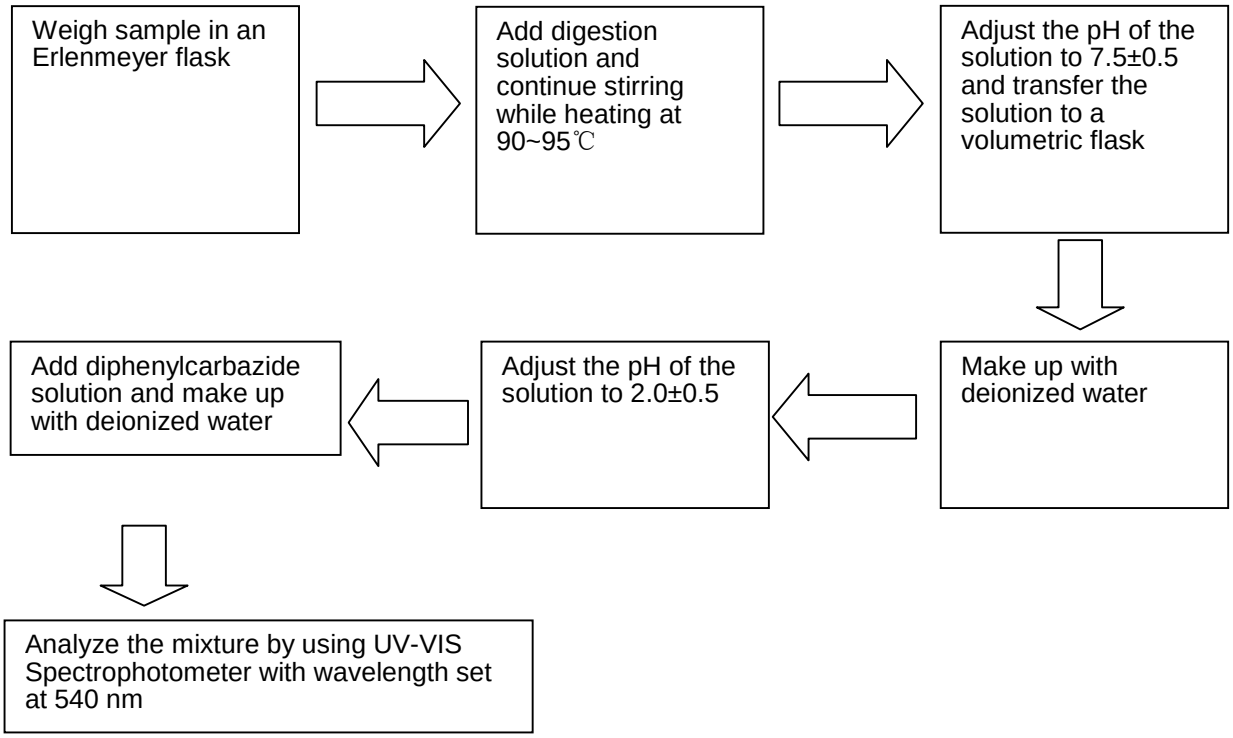
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Tests Conducted

2. Test for Hg Content



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



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Intertek Testing Services Shenzhen Ltd.-TFH Division
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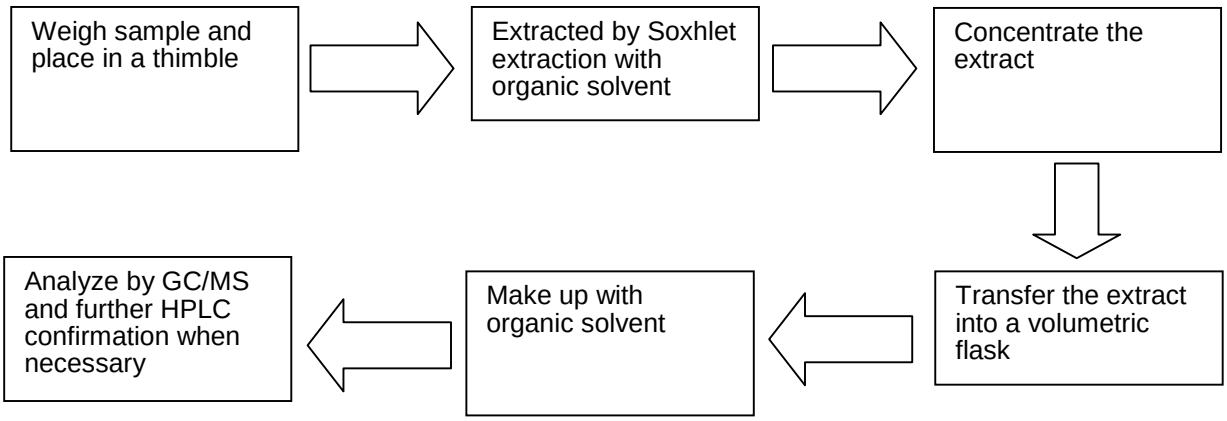
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

Test Report Number: SZHH00699671

Tests Conducted

4. Test for PBBs/PBDEs Contents



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End of report

Intertek Testing Services Shenzhen Ltd.-TFH Division
7/F., ShekouTechnology Main Building, Industrial 7th Road,Shekou,Shenzhen, China
Tel: (86-755) 2602 0111 Fax: (86-755) 2683 7118/9 Postcode: 518067

CTI 华测检测

Test Report

Report No. RLSZF001541970001 Page 1 of 4

Applicant DONGGUAN DAEJOO ELECTRONIC MATERIALS CO.,LTD.
Address XIANCONG INDUSTRIAL ZONE WANJIANG DIATRICT DONGGUAN GUANGDONG CHINA

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

Sample Name 9544B
Sample Received Date Jan. 5, 2013
Testing Period Jan. 5, 2013 to Jan. 8, 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	2 mg/kg
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.10	ICP-OES	2 mg/kg
Mercury(Hg)	IEC 62321:2008 Ed.1 Sec.7	ICP-OES	2 mg/kg
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex C	UV-Vis	2 mg/kg
Polybrominated Biphenyls(PBBs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5 mg/kg
Polybrominated Diphenyl Ethers(PBDEs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5 mg/kg

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

Tested by Rick Li Reviewed by Vangen He

Approved by Danny Liu Date Jan. 8, 2013

Technical Manager

CENTRE TESTING INTERNATIONAL CTI SZ03

No. 14983822

CTI 华测检测
CENTRE TESTING INTERNATIONAL

Test Report

Report No. RLSZF001541970001

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
Polybrominated Biphenyls(PBBs)	
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
Polybrominated Diphenyl Ethers(PBDEs)	
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.

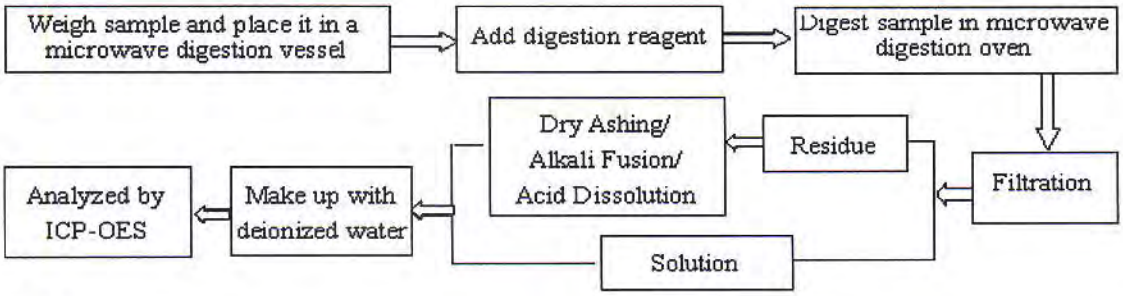
Tested Sample/Part Description Red solid

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

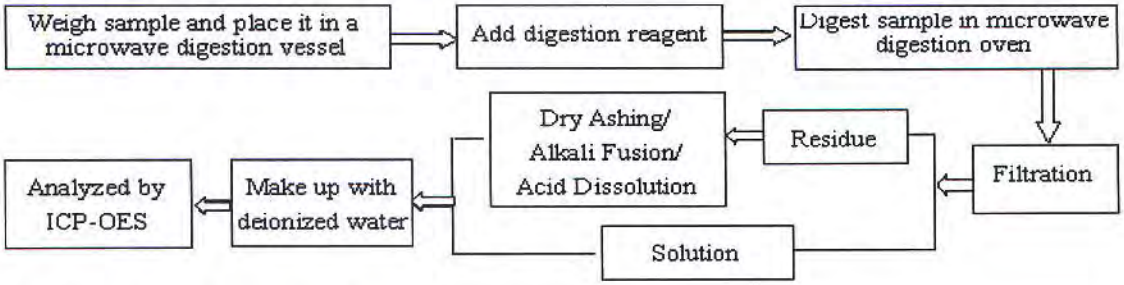
Test Report

Test Process

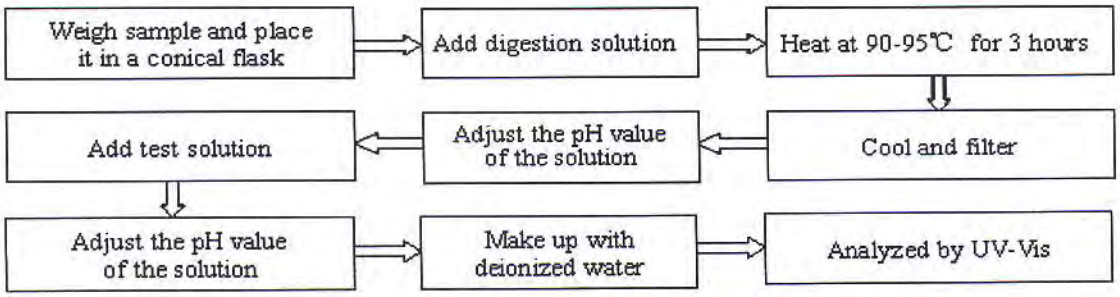
1. Lead(Pb), Cadmium(Cd)



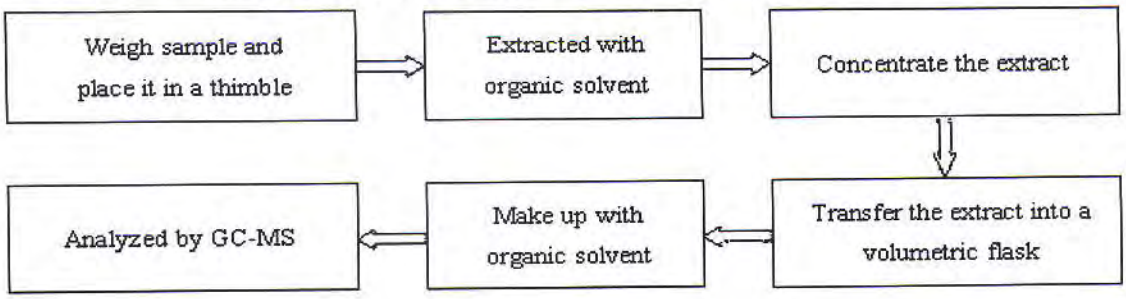
2. Mercury(Hg)



3. Hexavalent Chromium(Cr(VI))



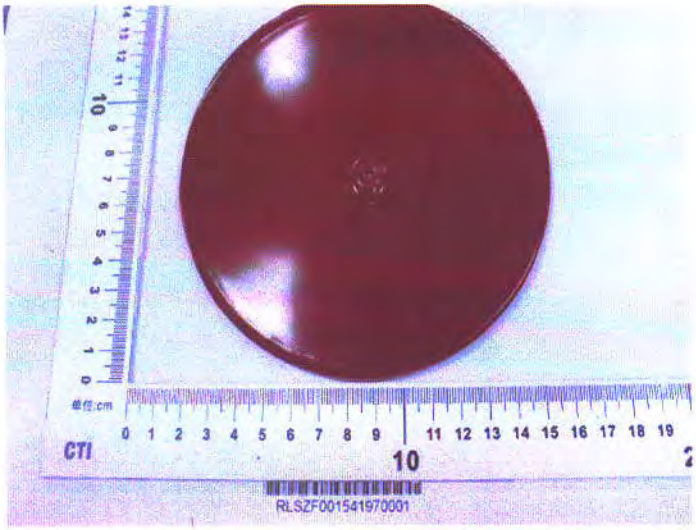
4. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs)



Test Report

Report No. RLSZF001541970001

Photo(s) of the sample(s)



*** End of report ***