ICP Test Report Certification Packet

Company Name: Littelfuse, Inc.

Product Type: High Energy Industrial Varistor

Product Series: HA, HB, HC, HF, HG, DHB Varistor Series RoHS Models

Issue Date: June 21, 2012

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.

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

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 Metal Oxide Varistors HA, HB, HC, HF, HG, DHB Varistor 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 :

Table 1: List of Raw Materials covered by this report

Total Parts	P/N	Raw Material Description	Page
1	N/A	Black disc, type DD	3-7
2	N/A	Silver Paste	8-19
3	N/A	Pb-free Sold Paste	20-31
4	N/A	Terminal	32-35
5	N/A	Halogen Free Red Epoxy Resin	36-41

Test Report Number: SZHH00699643

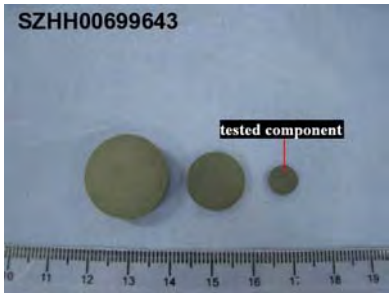
Applicant: LITTELFUSE, INC
8755 WEST HIGGINS ROAD SUITE
500CHICAGO IL 60631 USA

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

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

Test Report Number: SZHH00699643

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.

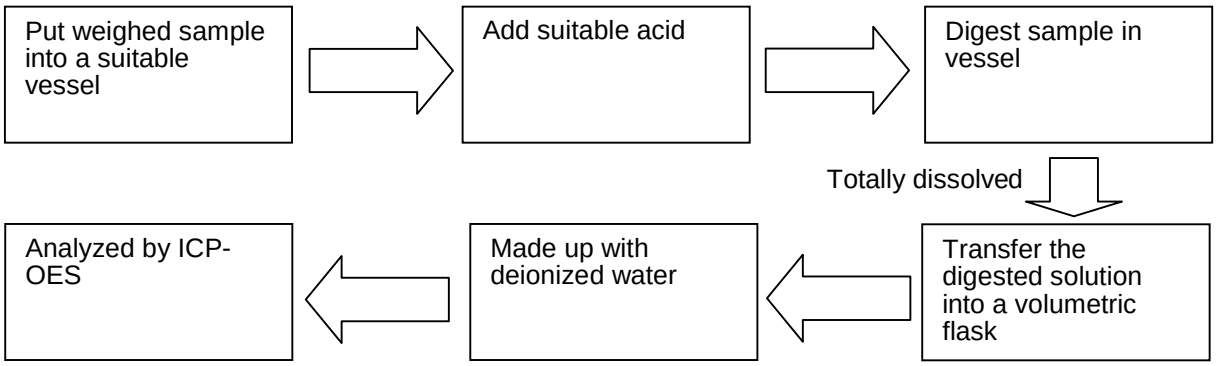
(C) Test Method:

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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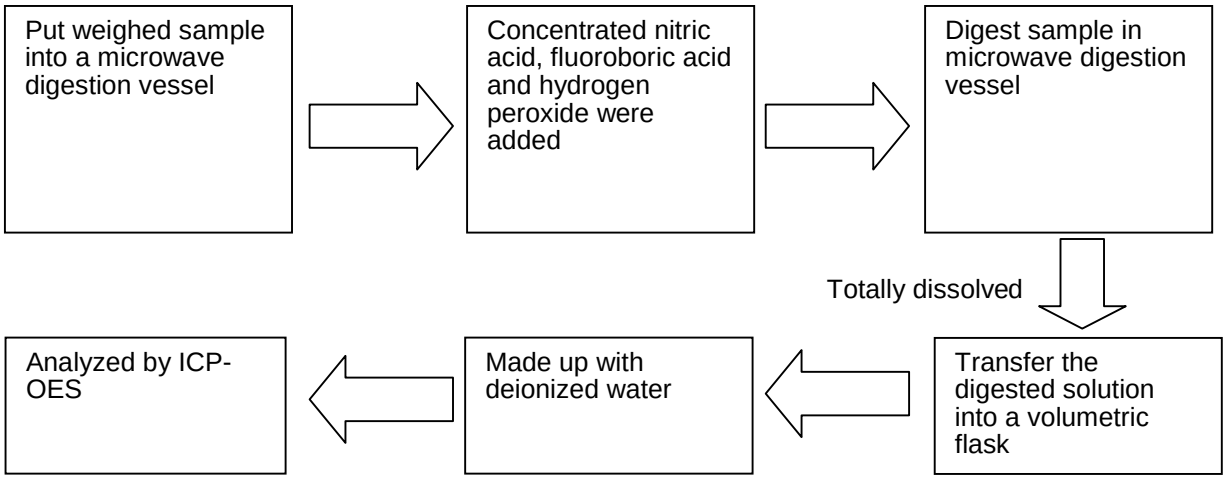
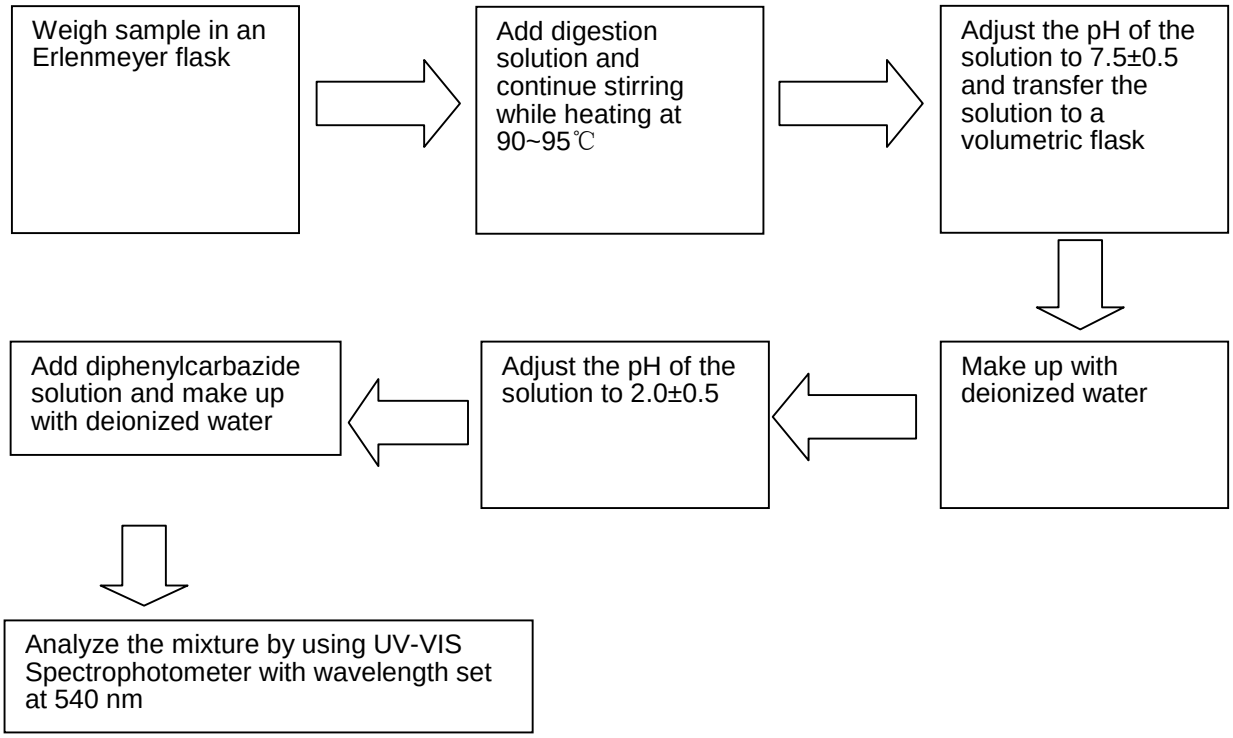
Tests Conducted

2. Test for Hg Content



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



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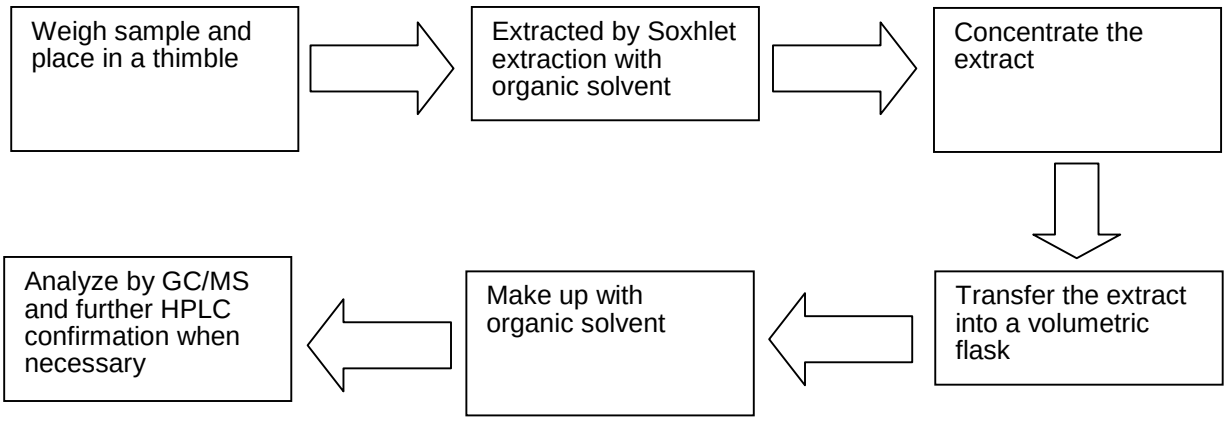
Tests Conducted

4. Test for PBBs/PBDEs Contents



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End of report

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. SHAEC1201680106 Date: 21 Feb 2012

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

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
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
t E&E (86-21) 61402553 f 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

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Service Certification
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Test Item(s)	Limit	Unit	MDL	*006*
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).

Test Item(s)	Unit	MDL	*006*
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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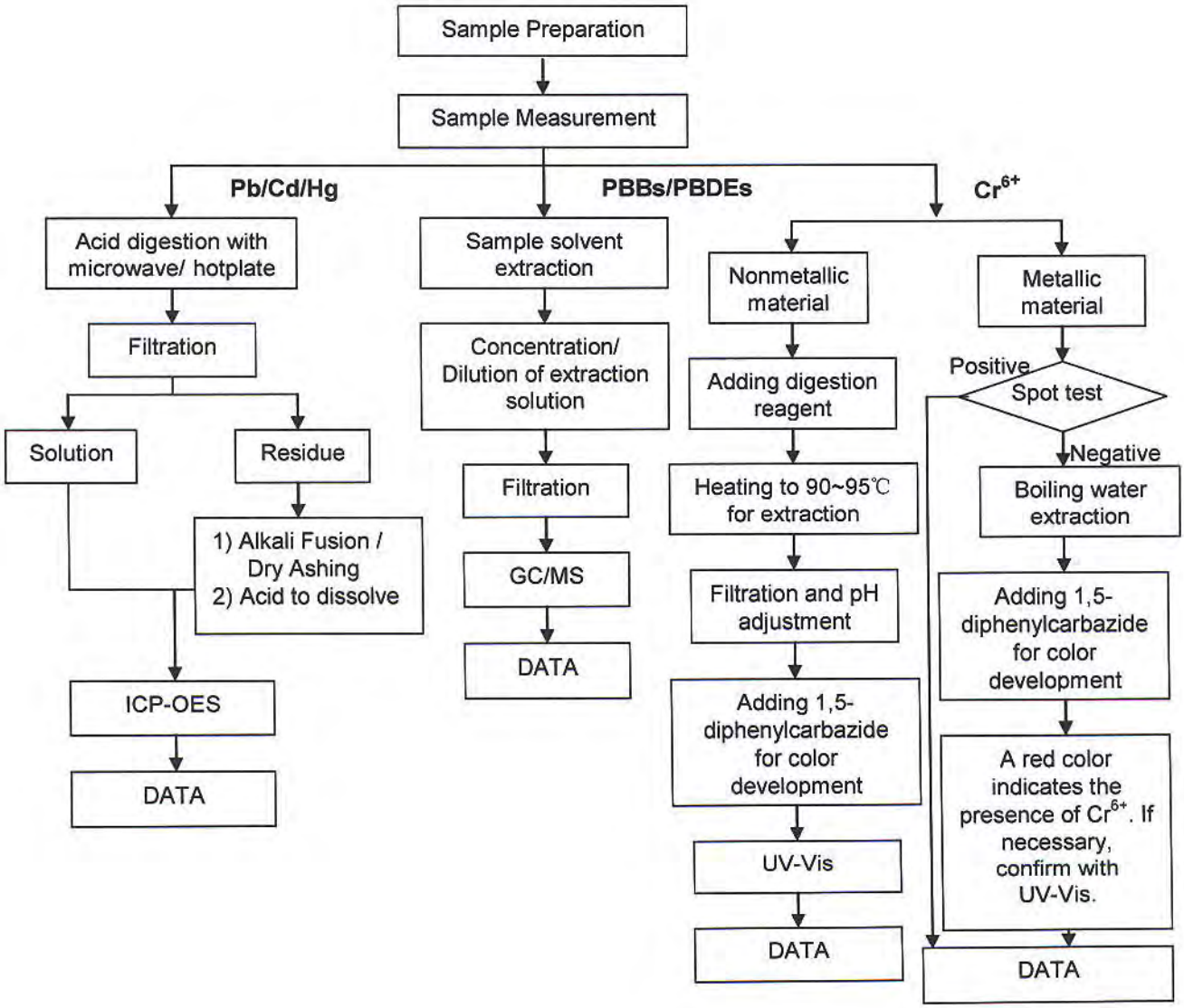
ATTACHMENTS

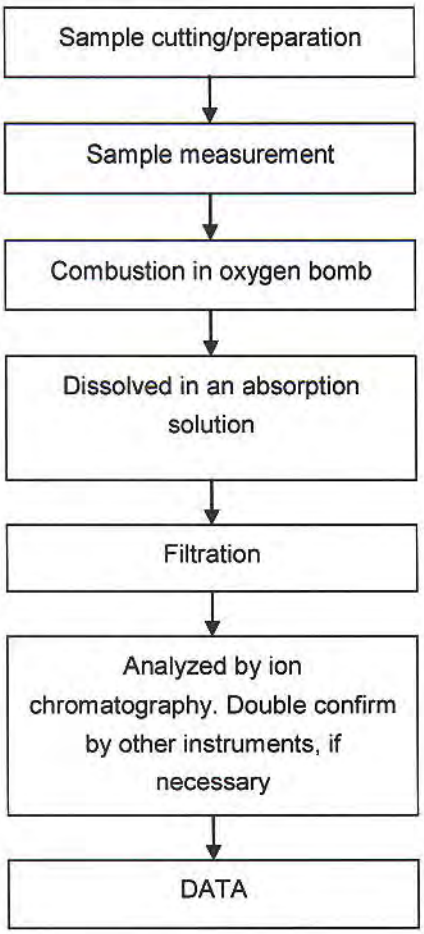
RoHS Testing Flow Chart

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)



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:

SHA12-016801.006

SGS authenticate the photo on original report only

*** End of Report ***

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Test Report

No. SHAEC1203840702 Date: 09 Apr 2012

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 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

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

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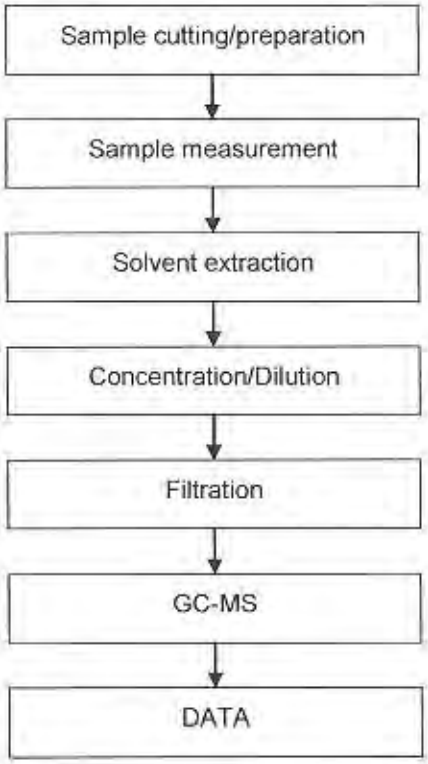
ATTACHMENTS

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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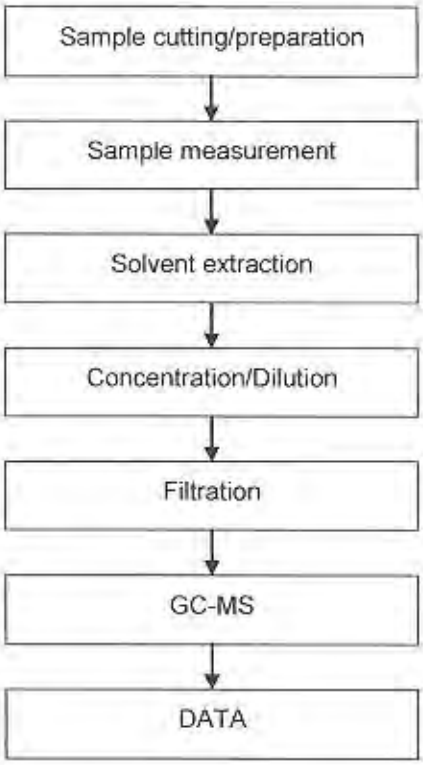
HBCDD Testing Flow Chart

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:

SHA12-038407.002

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.

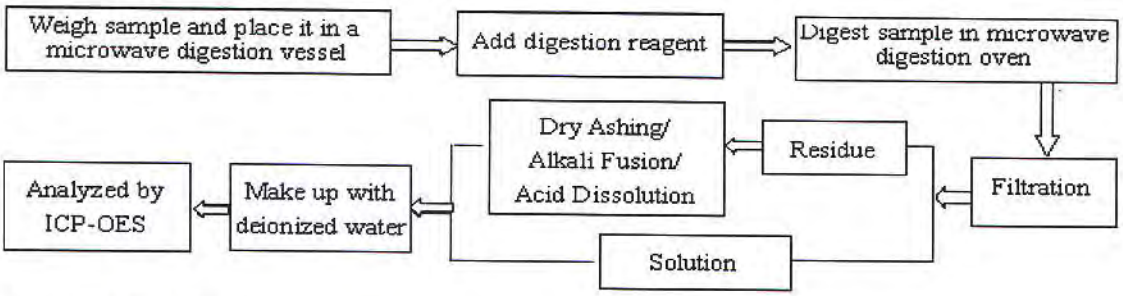
Note: **The sample had been dissolved totally tested for Lead, Cadmium, Mercury.**
-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL)
-mg/kg = ppm = parts per million

Test Report

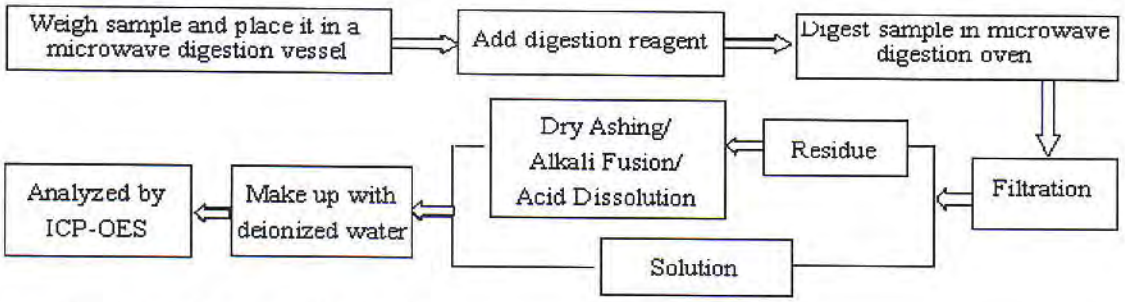
Report No. RLSZE001191100004

Test Process

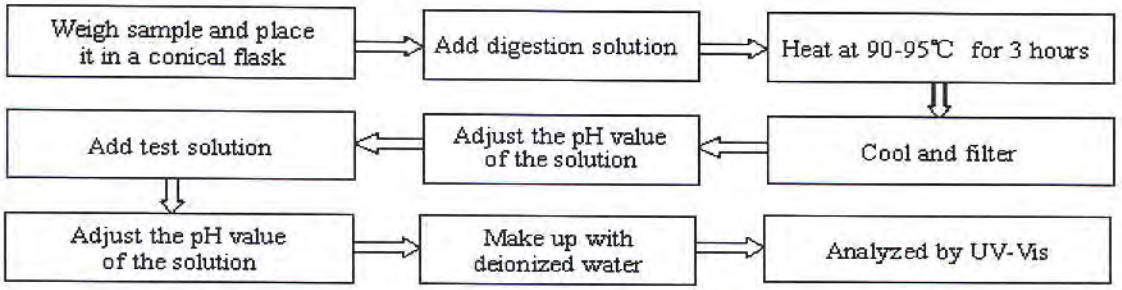
1. Lead(Pb), Cadmium(Cd)



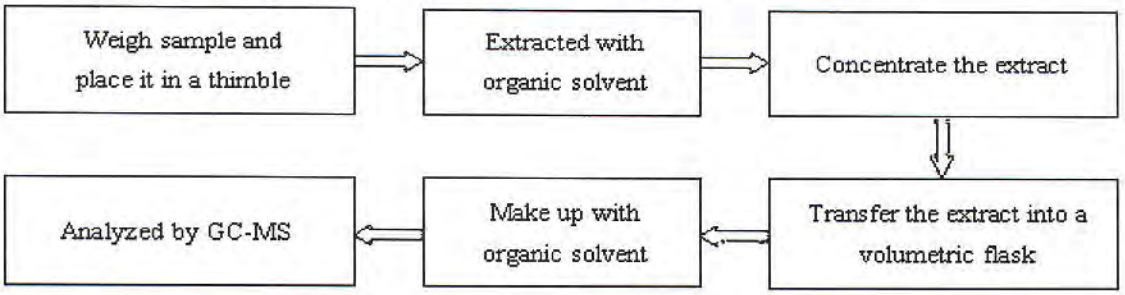
2. Mercury(Hg)



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

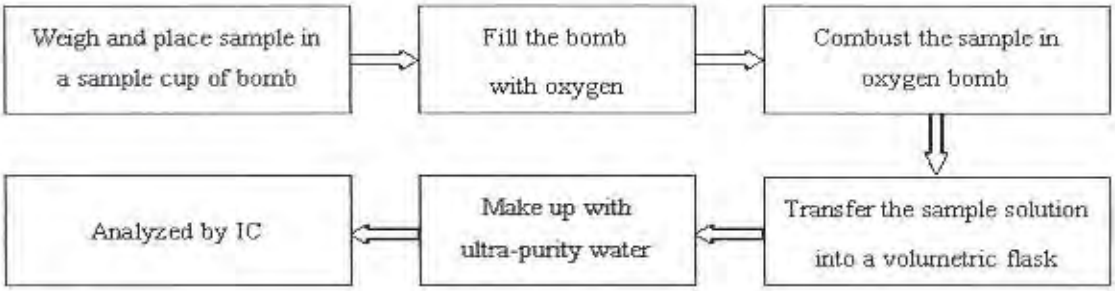
Test Result(s)

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 :

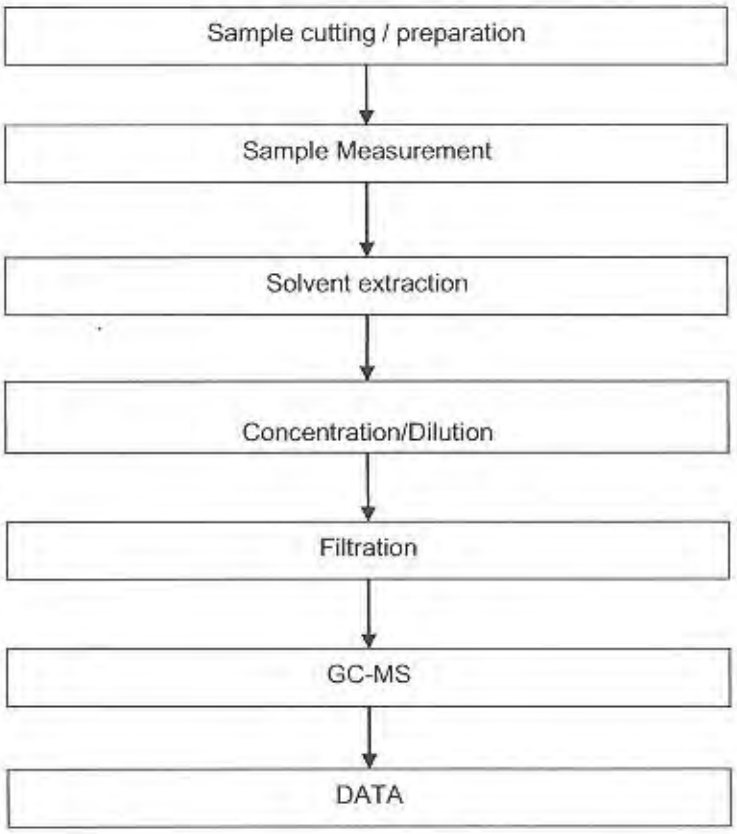
(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

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

ATTACHMENTS

HBCDD Testing Flow Chart

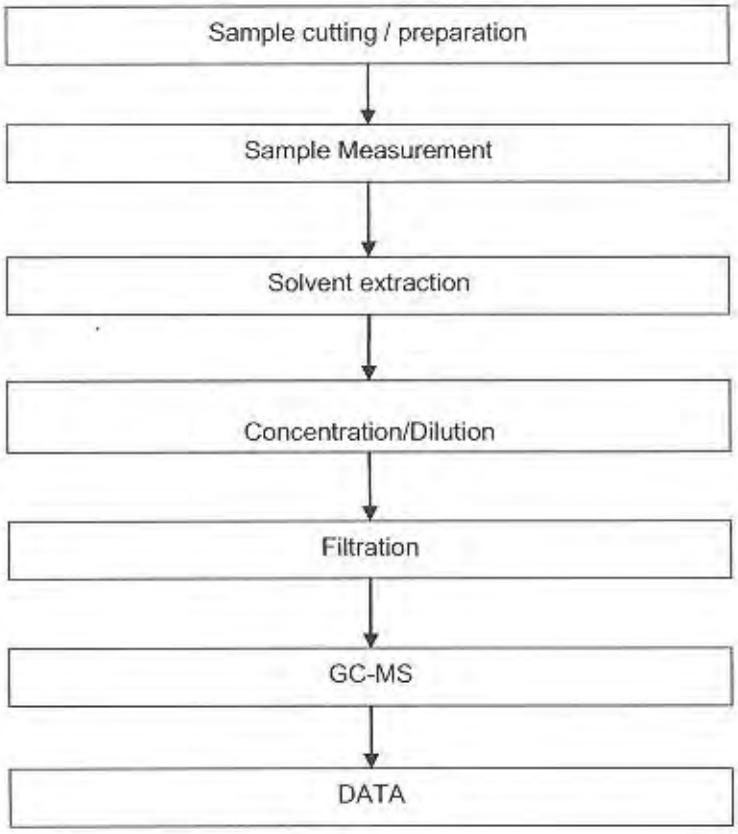
1) Name of the person who made testing: Cutey Yu
2) Name of the person in charge of testing: Ryan Yang



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

SGS

DONGGUAN TONGXING COPPER CO., LTD
NO.133 S358 SHENG DAO CHANG AN TOWN DONG GUAN CITY
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : C2600

SGS Job No. :	13416245 - GZ
Internal Reference No. :	GC111022062
Date of Sample Received :	11 Oct 2011
Testing Period :	11 Oct 2011 - 14 Oct 2011
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).
Conclusion :	Based on the performed tests on selected part of submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium comply with the limits in RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of
SGS-CSTC Ltd.

Almay

Almay Gao
Approved Signatory

SGS-CSTC STANDARDS TECHNICAL SERVICES CO., LTD. TESTING SERVICES

5563445

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN11-101582.004	Brassy metal sheet

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	004
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	35
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

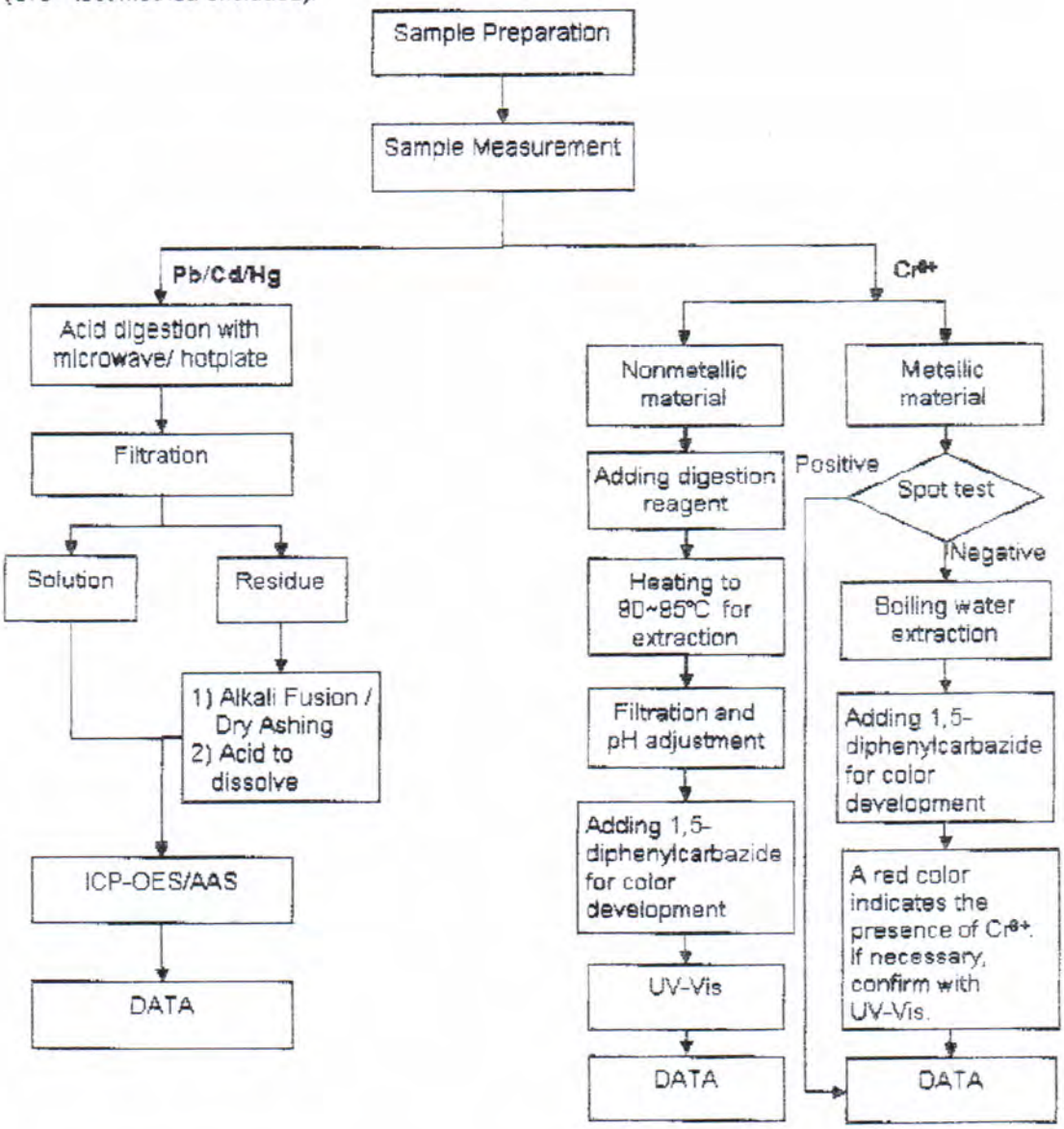
The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm^2 sample surface area.

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

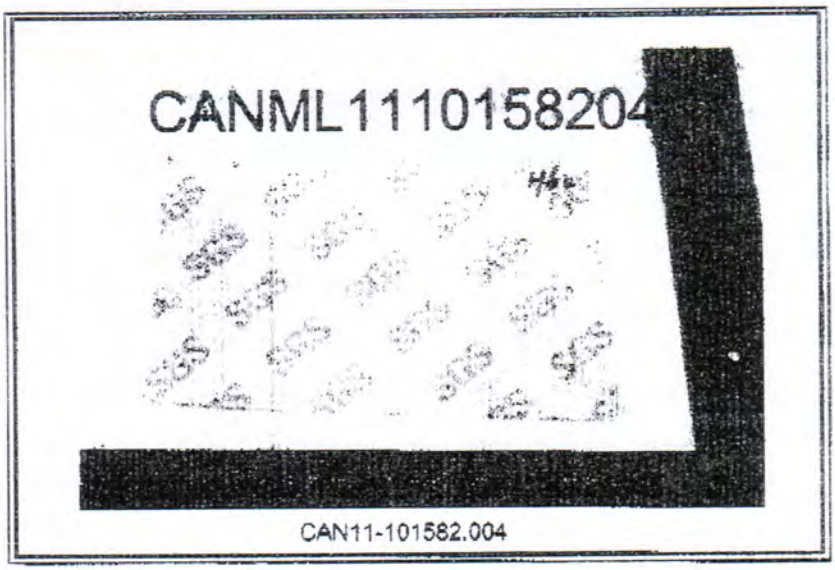
ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Bella Wang / Ross Zhan
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).



Sample photo:



CAN11-101582.004

SGS authenticate the photo on original report only

*** End of Report ***

5563448

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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

Member of the SGS Group (SGS SA)

CTI 华测检测

Test Report

Report No. RLSZE001200320001

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

Report on the submitted sample(s) said to be

Sample Name	CP-930-1 HF
Sample Description	Red solid
Sample Received Date	Mar. 9, 2012
Testing Period	Mar. 9, 2012 to Mar. 13, 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), Hexabromocyclododecane(HBCDD), Three Phthalates (DBP,BBP,DEHP), Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I) in the submitted sample(s).

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

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

Tested by Rick Inspected by Vargas

Approved by Technical Manager Date Mar. 13, 2012

CENTRE TESTING INTERNATIONAL SZ03

No. 11363070

Test Report

Report No. RLSZE001200320001

Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Hexabromocyclododecane(HBCDD)	Refer to US EPA 3540C:1996	GC-MS	5 mg/kg
Three Phthalates (DBP,BBP,DEHP)	Refer to EN 14372:2004	GC-MS	50 mg/kg
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
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)

Tested Item(s)	**Content**
Hexabromocyclododecane (HBCDD)	N.D.

Tested Item(s)	**Content**
Lead(Pb)	N.D.
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.

Test Report

Report No. RLSZE001200320001

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.

Tested Item(s)	Content
Halogen(s)	
Fluorine (F)	N.D.
Chlorine (Cl)	195 mg/kg
Bromine (Br)	N.D.
Iodine (I)	N.D.

Tested Item(s)	CAS No.	EC No.	Content
Three Phthalates			
Dibutyl phthalate(DBP)	84-74-2	201-557-4	N.D.
Benzylbutyl phthalate(BBP)	85-68-7	201-622-7	N.D.
Di-2-ethylhexyl phthalate(DEHP)	117-81-7	204-211-0	N.D.

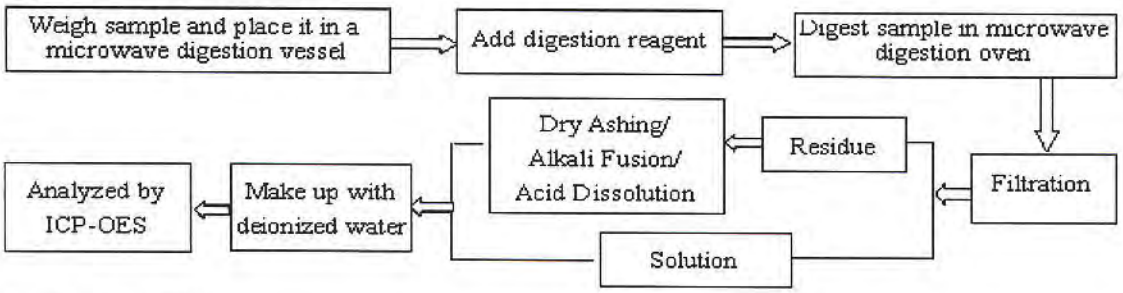
Note: **The sample had been dissolved totally tested for Lead, Cadmium, Mercury.**
-MDL = Method Detection Limit
-N.D. = Not Detected (<MDL)
-mg/kg = ppm = parts per million

Test Report

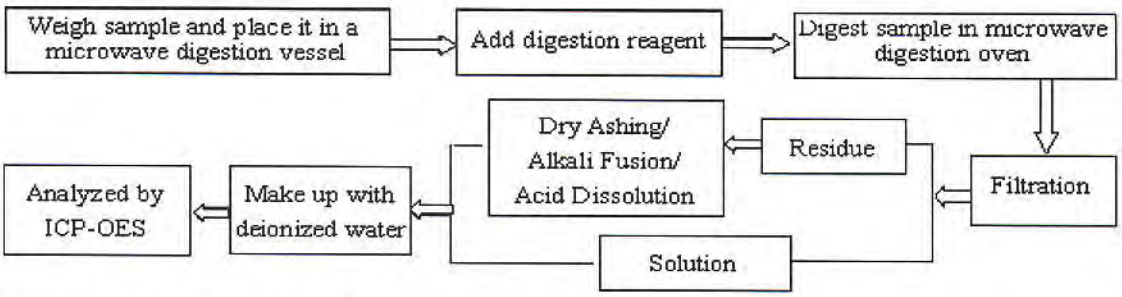
Report No. RLSZE001200320001

Test Process

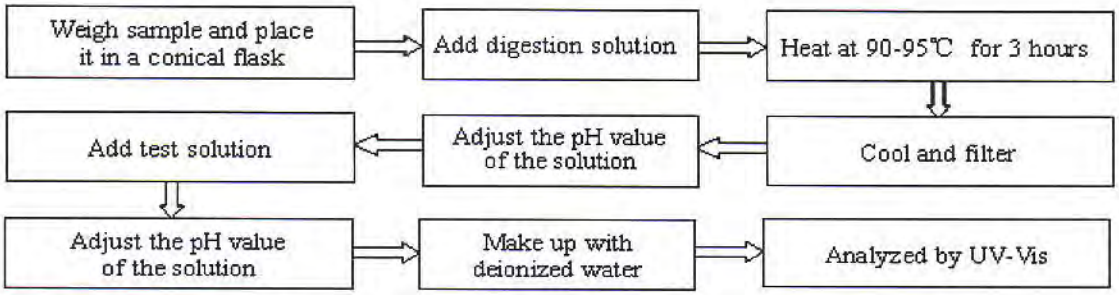
1. Lead(Pb), Cadmium(Cd)



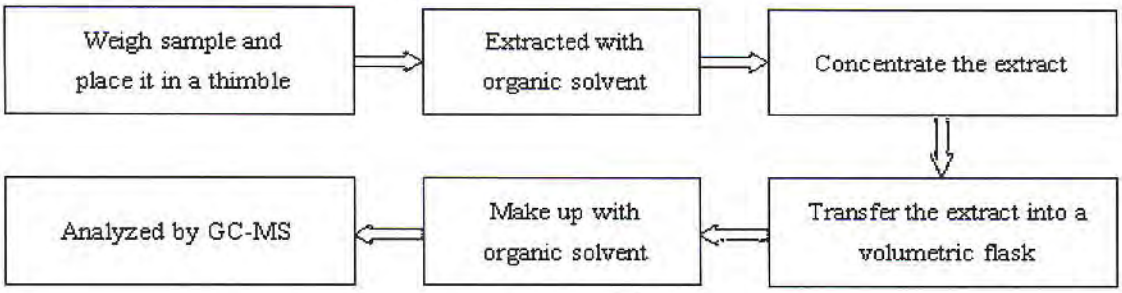
2. Mercury(Hg)



3. Hexavalent Chromium(Cr(VI))

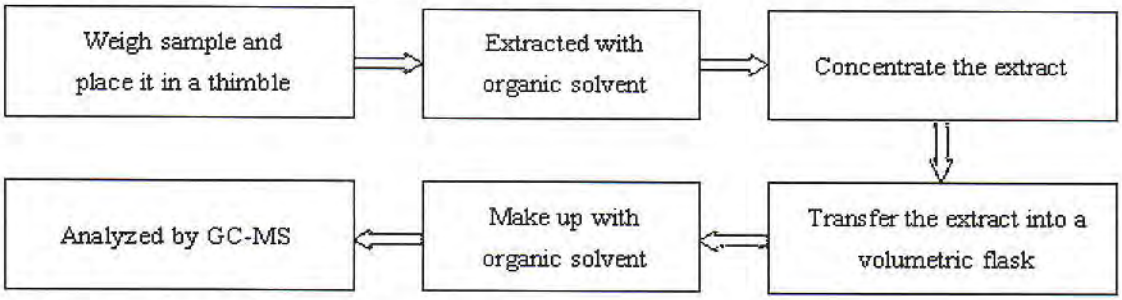


4. Three Phthalates (DBP,BBP,DEHP)

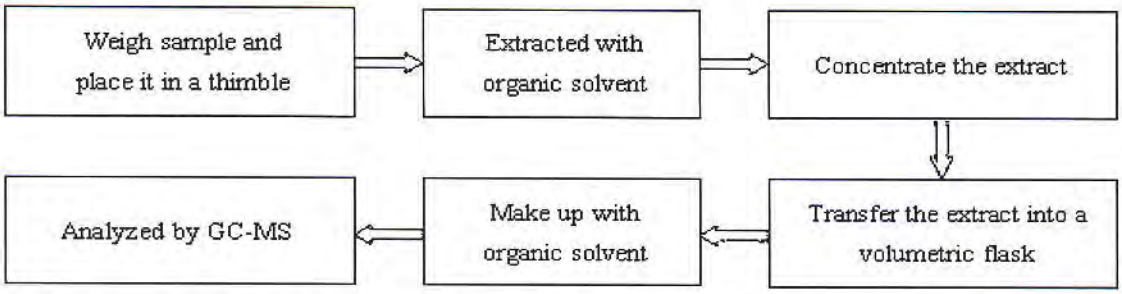


Test Report

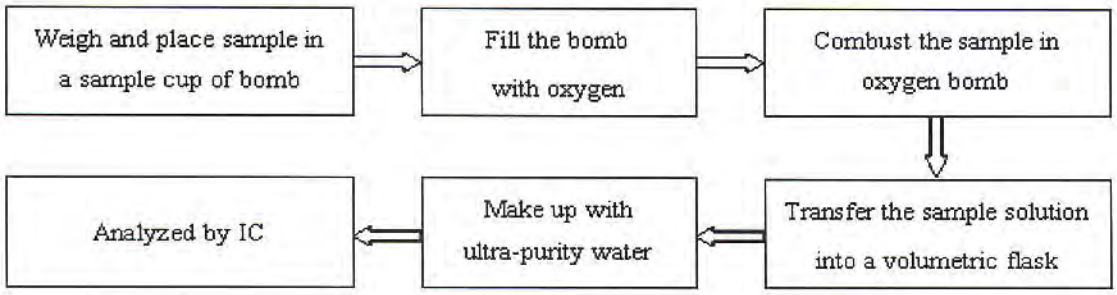
5. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs)



6. Hexabromocyclododecane(HBCDD)



7. Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I)



Test Report

Photo(s) of the sample(s)

*** End of report ***