

ICP Test Report Certification Packet

Company Name: Littelfuse, Inc. Product Type: Metal Oxide Varistors Product Series: ZA Series RoHS models Issue Date: Feb. 28, 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. David Huang Issued by: < DGLF Environmental, Health & Safety Engineer > (1) Parts, sub-materials and unit parts This document covers Metal Oxide Varistors ZA 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 including DD,DM,DP and DV	3-22
2	N/A	Silver Paste	23-28
3	N/A	Pb-free Solder Bar	29-37
4	N/A	Tinned Copper Wire	38-42
5	N/A	Epoxy, type including red ,black and blue	43-67



Date:

Jun 19, 2012

Result

Pass

Applicant: LITTELFUSE, INC

8755 WEST HIGGINS ROAD SUITE

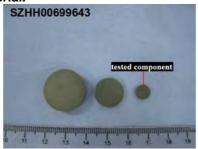
500CHICAGO IL 60631 USA

KRISTEEN BACILA/ARSENIO CESISTA JR. Attn:

Sample Description:

One (1) submitted sample said to be DD black disc.

Tested component: black solid material.



Tests conducted:

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

Conclusion:

Tested Samples Tested component of 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)

Authorized by:

For Intertek Testing Services

Shenzhen Ltd.

Ben N.L. Lin General Manager



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



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:

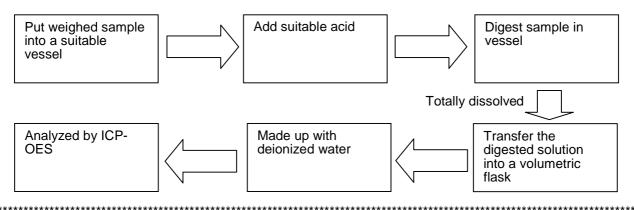
Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	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:

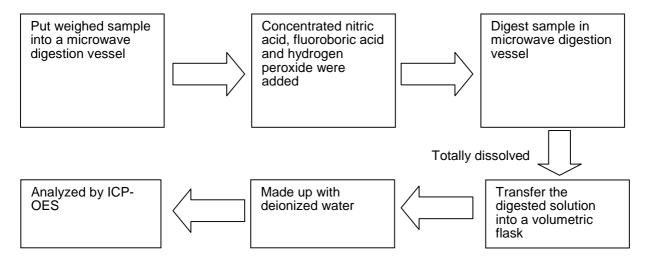
1. Test for Cd/Pb Contents



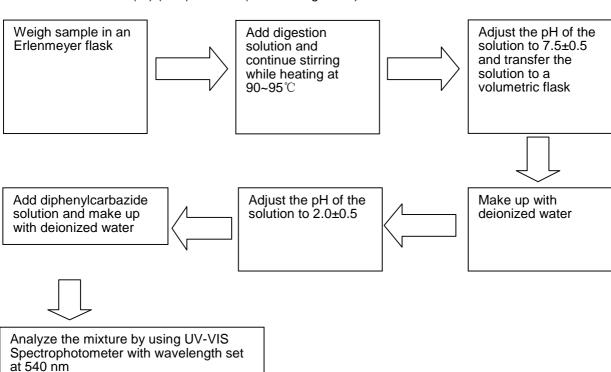


Tests Conducted

2. Test for Hg Content



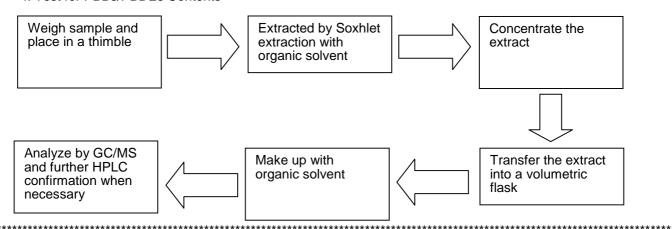
3. Test for Chromium (VI) (Cr⁶⁺) Content (Alkaline Digestion)





Tests Conducted

4. Test for PBBs/PBDEs Contents



End of report



Date:

Jun 19, 2012

Applicant: LITTELFUSE, INC

8755 WEST HIGGINS ROAD SUITE

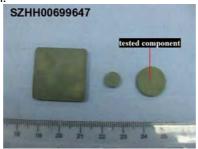
500CHICAGO IL 60631 USA

KRISTEEN BACILA/ARSENIO CESISTA JR. Attn:

Sample Description:

One (1) submitted sample said to be **DM black disc.**

Tested component: black solid material.



Tests conducted:

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

Conclusion:

Tested Samples Tested component of 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

Authorized by: For Intertek Testing Services

Shenzhen Ltd.

Ben N.L. Lin General Manager



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



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:

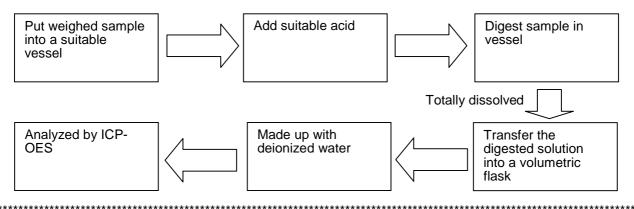
Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	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:

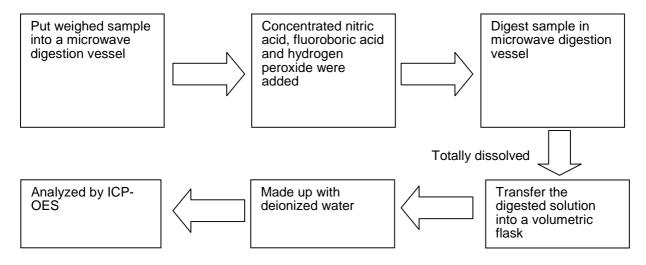
1. Test for Cd/Pb Contents



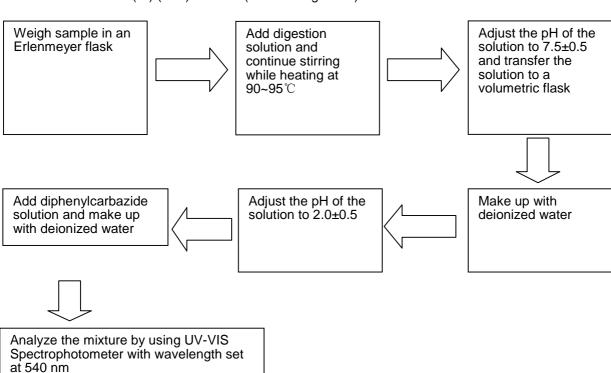


Tests Conducted

2. Test for Hg Content



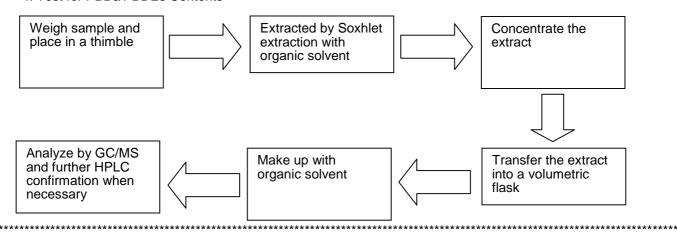
3. Test for Chromium (VI) (Cr⁶⁺) Content (Alkaline Digestion)





Tests Conducted

4. Test for PBBs/PBDEs Contents



End of report



Date:

Jun 19, 2012

Applicant: LITTELFUSE, INC

8755 WEST HIGGINS ROAD SUITE

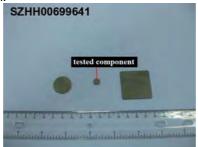
500CHICAGO IL 60631 USA

KRISTEEN BACILA/ARSENIO CESISTA JR. Attn:

Sample Description:

One (1) submitted sample said to be **DP black disc.**

Tested component: black solid material.



Tests conducted:

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

Conclusion:

Tested Samples Tested component of 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)

Authorized by:

For Intertek Testing Services

Shenzhen Ltd.

Ben N.L. Lin General Manager Result

Pass



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)	26
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 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:

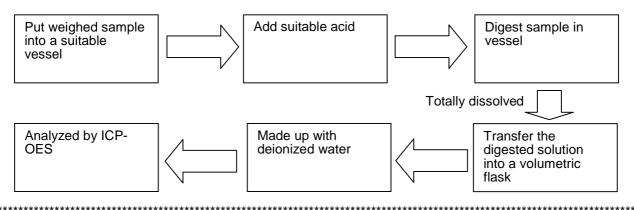
Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	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:

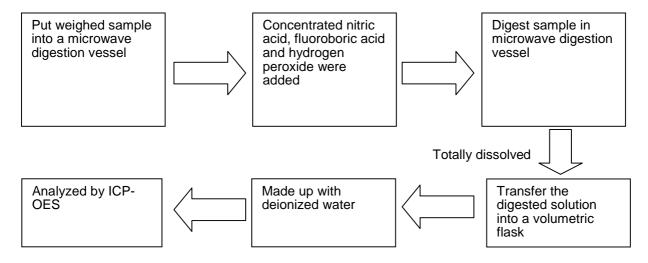
1. Test for Cd/Pb Contents



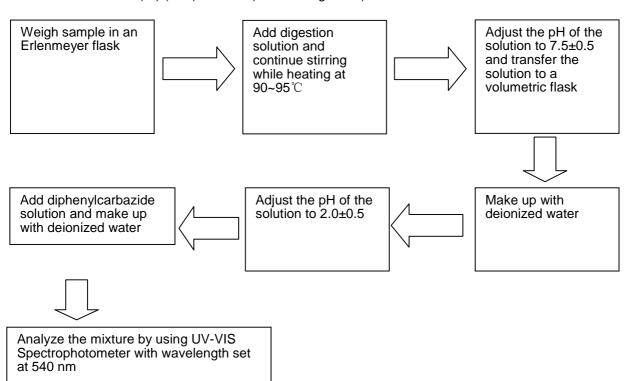


Tests Conducted

2. Test for Hg Content



3. Test for Chromium (VI) (Cr⁶⁺) Content (Alkaline Digestion)

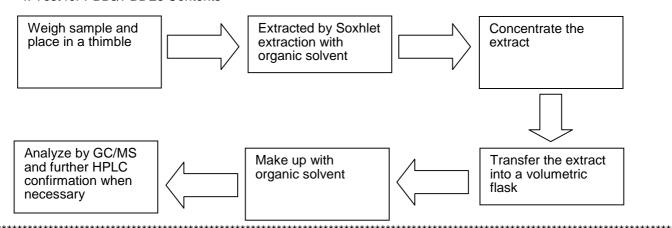


Page 4 of 5



Tests Conducted

4. Test for PBBs/PBDEs Contents



End of report



Date:

Jun 18, 2012

Result

Pass

Applicant: LITTELFUSE, INC

8755 WEST HIGGINS ROAD SUITE

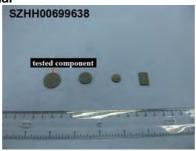
500CHICAGO IL 60631 USA

KRISTEEN BACILA/ARSENIO CESISTA JR. Attn:

Sample Description:

One (1) submitted sample said to be **DV black disc.**

Tested component: black solid material



Tests conducted:

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

Conclusion:

Tested Samples Tested component of 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)

Authorized by:

For Intertek Testing Services

Shenzhen Ltd.

Ben N.L. Lin General Manager



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

Page 2 of 5



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:

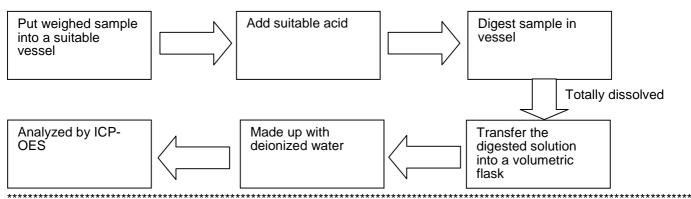
Testing Item	Testing Item Testing Method	
Cadmium (Cd) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321 Edition 1.0:2008, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	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 14, 2012

(D) Measurement Flowchart:

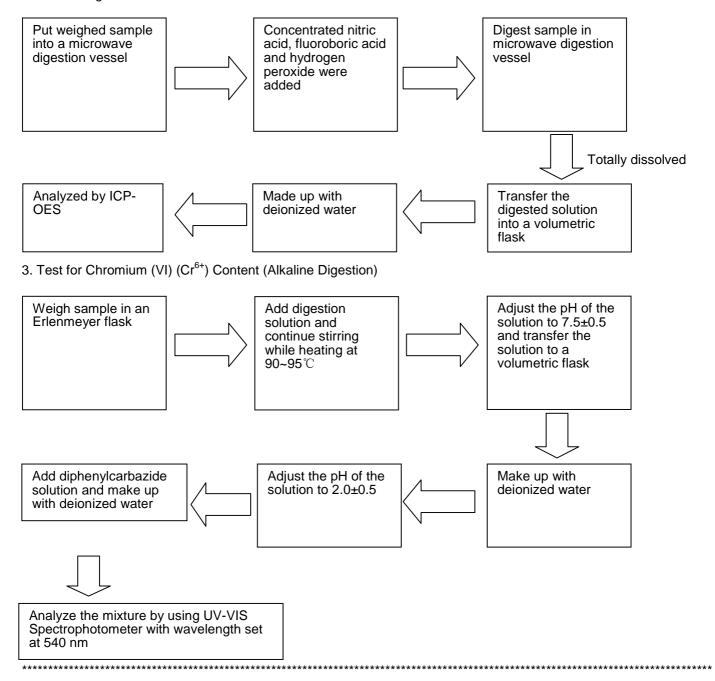
1. Test for Cd/Pb Contents





Tests Conducted

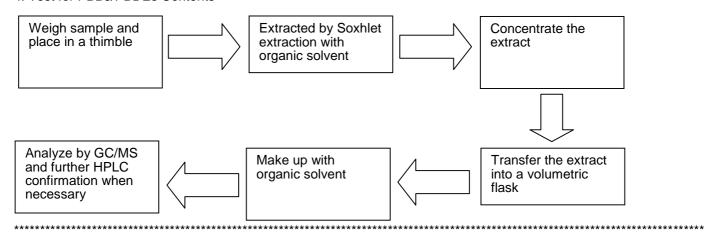
2. Test for Hg Content





Tests Conducted

4. Test for PBBs/PBDEs Contents



End of report



No. SHAEC1220155601

Date: 20 Nov 2012

Page 1 of 6

HERAEUS MATERIALS TECHNOLOGY SHANGHAI LTD 1 GUANGZHONG ROAD, ZHUANQIAO TOWN, MINHANG DISTRICT, SHANGHAI 201108, R.P.CHINA

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

SGS Job No.:

SP12-033347 - SH

Model No.:

DT1766

Date of Sample Received:

16 Nov 2012

Testing Period:

16 Nov 2012 - 20 Nov 2012

Test Requested:

Selected test(s) as requested by client.

Test Method:

Please refer to next page(s).

Test Results:

Please refer to next page(s).

Conclusion:

Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

JJ Fan

Approved Signatory

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No. SHAEC1220155601

Date: 20 Nov 2012

Page 2 of 6

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description
1 SHA12-201556.001 Grey 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	11-2	ND
Monobromobiphenyl	4	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	9.1	mg/kg	5	ND
Nonabromobiphenyl	7,5	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	14	mg/kg	5	ND

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Test Report	No. SHAEC1220155601		Date: 20 Nov 2012		Page 3 of 6
Test Item(s)	<u>Limit</u>	Unit	MDL	001	
Dibromodiphenyl ether		mg/kg	5	ND	
Tribromodiphenyl ether	÷	mg/kg	5	ND	
Tetrabromodiphenyl ether		mg/kg	5	ND	
Pentabromodiphenyl ether	4	mg/kg	5	ND	
Hexabromodiphenyl ether	3	mg/kg	5	ND	
Heptabromodiphenyl ether	-	mg/kg	5	ND	
Octabromodiphenyl ether	9.	mg/kg	5	ND	
Nonabromodiphenyl ether	12.1	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

Halogen

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

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

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

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No. SHAEC1220155601

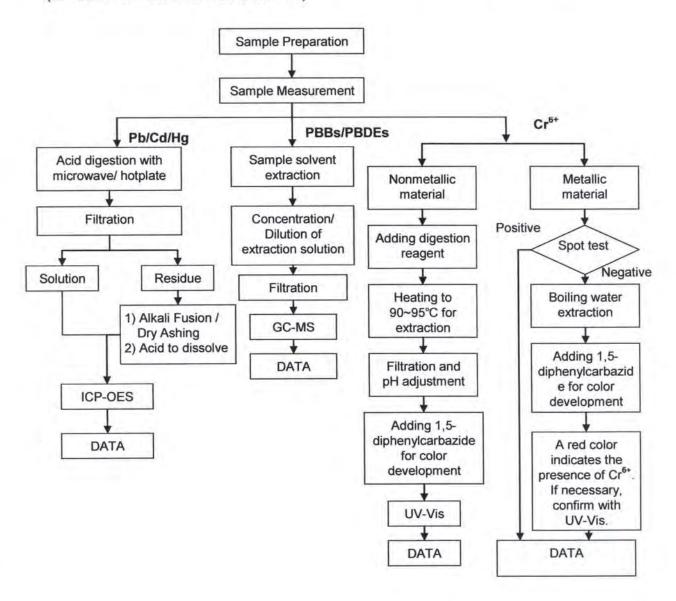
Date: 20 Nov 2012

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ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
- 2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Linda Li
- 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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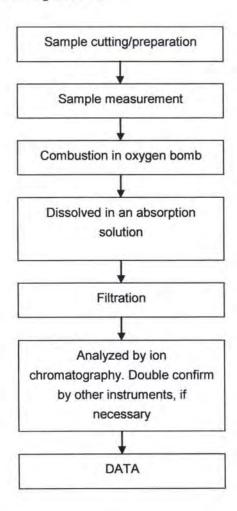
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Halogen Testing Flow Chart

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



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Sample photo:



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*** End of Report ***

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Date: 07 Aug 2012

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ANSON SOLDER & TIN PRUDUCTS MADE LTD
CHANG HONG RIDGE INDUSTRIAL PARK DAIL NANHAI GUANGDONG

This report is to supersede test report CANAUTO1210273201

The following sample(s) was/were submitted and identified on behalf of the applicant as Lead-free Solder SnAgCu

SGS Job No. : SCATR1207000558-1

Date of Sample Received : 30 Jul 2012

Testing Period : 30 Jul 2012 - 03 Aug 2012

Test Requested: A: As requested by client, SVHC screening is performed according to:

(i) Specified substances in the Candidate List of Substances of Very High Concern (SVHC) for authorization published by European Chemicals Agency (ECHA) on and before Jun 18,

2012 regarding Regulation (EC) No 1907/2006 concerning the REACH.

B: Selected test (s) as requested by client.

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

Summary:

A: According to the specified scope and analytical techniques,

concentrations of tested SVHC are ≤ 0.1% (w/w) in the

submitted sample.

PASS

Conclusion:

B: Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium comply with the limits as set by RoHS Directive

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

Signed for and on behalf of SGS-CSTC Ltd.

Jenny Jiang J

Approved Signatory

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Test Sample:

1

Sample Description:

Specimen No. SGS Sample ID

Description

CAN12-102732.001

Silvery metal

A: SVHC

Remark:

(1) The chemical analysis of specified SVHC is performed by means of currently available analytical techniques against the following SVHC related documents published by ECHA:

http://echa.europa.eu/web/guest/candidate-list-table

These lists are under evaluation by ECHA and may subject to change in the future.

(2) Concerning article(s):

In accordance with Regulation (EC) No 1907/2006, any EU producer or importer of articles shall notify ECHA, in accordance with paragraph 4 of Article 7, if a substance meets the criteria in Article 57 and is identified in accordance with Article 59(1) of the Regulation, if (a) the substance in the Candidate List is present in those articles in quantities totaling over one tonne per producer or importer per year; and (b) the substance in the Candidate List is present in those articles above a concentration of 0.1% weight by weight (w/w).

Article 33 of Regulation (EC) No 1907/2006 requires supplier of an article containing a substance meeting the criteria in Article 57 and identified in accordance with Article 59(1) in a concentration above 0.1% weight by weight (w/w) shall provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance in the Candidate List.

SGS adopts the interpretation of ECHA for SVHC in article unless indicated otherwise. Detail explanation is available at the following link: http://webstage.contribute.sgs.net/corpreach/documents/SGS-CTS_SVHC-paper-EN-11.pdf

(3) Concerning material(s):

Test results in this report are based on the tested sample. This report refers to testing result of tested sample submitted as homogenous material(s). In case such material is being used to compose an article, the results indicated in this report may not represent SVHC concentration in such article. If this report refers to testing result of composite material group by equal weight proportion, the material in each composite test group may come from more than one article.

If the sample is a substance or mixture, and it directly exports to EU, client has the obligation to comply with the supply chain communication obligation under Article 31 of Regulation (EC) No. 1907/2006 and the conditions of Authorization of substance of very high concern included in the Annex XIV of the Regulation (EC) No. 1907/2006.

(4) Concerning substance and preparation:

If a SVHC is found over 0.1% (w/w) and/or the specific concentration limit which is set in Regulation (EC) No 1272/2008 and No 790/2009, client is suggested to prepare a Safety Data Sheet (SDS) against the

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SVHC to comply with the supply chain communication obligation under Regulation (EC) No 1907/2006, in which:

- a substance that is classified as hazardous under the CLP Regulation (EC) No 1272/2008.
- a mixture that is classified as dangerous according Dangerous Preparations Directive 1999/45/EC or classified as hazardous under the CLP Regulation (EC) No 1272/2008, when their concentrations are equal to, or greater than, those defined in the Article 3(3) of 1999/45/EC or the lower values given in Part 3 of Annex VI of Regulation (EC) No. 1272/2008; or
- a mixture is not classified as dangerous under Directive 1999/45/EC, but contains either:
- (a) a substance posing human health or environmental hazards in an individual concentration of \geq 1 % by weight for mixtures that are solid or liquids (i.e., non-gaseous mixtures) or \geq 0.2 % by volume for gaseous mixtures; or
- (b) a substance that is PBT, or vPvB in an individual concentration of ≥ 0.1 % by weight for mixtures that are solid or liquids (i.e., non-gaseous mixtures); or
- (c) a substance on the SVHC candidate list (for reasons other than those listed above), in an individual concentration of ≥ 0.1 % by weight for non-gaseous mixtures; or
- (d) a substance for which there are Europe-wide workplace exposure limits.
- (5) If a SVHC is found over the reporting limit, client is suggested to identify the component which contains the SVHC and the exact concentration of the SVHC by requesting further quantitative analysis from the laboratory.

Test Method:

SGS In-House method- GZTC CHEM-TOP-092-01, Analyzed by ICP-OES, UV-VIS.

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Test Result: (Substances in the Candidate List of SVHC)

Substance Name	CAS No.	EC No.	001 Concentration (%)	RL(%)
Aluminosilicate Refractory Ceramic Fibres **	650-017-00-8 (Index no.)	3.	ND	0.005
Ammonium dichromate*	7789-09-5	232-143-1	ND	0.005
Arsenic acid*	7778-39-4	231-901-9	ND	0.005
Boric acid*	10043-35-3 11113-50-1	233-139-2 234-343-4	ND	0.005
Calcium arsenate*	7778-44-1	231-904-5	ND	0.005
Chromic acid, Oligomers of chromic acid and dichromic acid, Dichromic acid*	7738-94-5 - 13530-68-2	231-801-5 - 236-881-5	ND	0.005
Chromium trioxide*	1333-82-0	215-607-8	ND	0.005
Cobalt dichloride*	7646-79-9	231-589-4	ND	0.005
Cobalt(II) carbonate*	513-79-1	208-169-4	ND	0.005
Cobalt(II) diacetate*	71-48-7	200-755-8	ND	0.005
Cobalt(II) dinitrate*	10141-05-6	233-402-1	ND	0.005
Cobalt(II) sulphate*	10124-43-3	233-334-2	ND	0.005
Diarsenic pentaoxide*	1303-28-2	215-116-9	ND	0.005
Diarsenic trioxide*	1327-53-3	215-481-4	ND	0.005
Diboron trioxide*	1303-86-2	215-125-8	ND	0.005
Dichromium tris(chromate)*	24613-89-6	246-356-2	ND	0.005
Disodium tetraborate, anhydrous*	1303-96-4 1330-43-4 12179-04-3	215-540-4	ND	0.005
Lead(II) bis(methanesulfonate)*	17570-76-2	401-750-5	ND	0.005
Lead chromate*	7758-97-6	231-846-0	ND	0.00

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Substance Name	CAS No.	EC No.	001 Concentration (%)	RL(%)	
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)*	12656-85-8	235-759-9	ND	0.005	
Lead diazide, Lead azide*	13424-46-9	236-542-1	ND	0.005	
Lead dipicrate*	6477-64-1	229-335-2	ND	0.005	
Lead hydrogen arsenate*	7784-40-9	232-064-2	ND	0.005	
Lead styphnate*	15245-44-0	239-290-0	ND	0.005	
Lead sulfochromate yellow (C.I. Pigment Yellow 34)*	1344-37-2	215-693-7	ND	0.005	
Pentazinc chromate octahydroxide*	49663-84-5	256-418-0	ND	0.005	
Potassium chromate*	7789-00-6	232-140-5	ND	0.005	
Potassium dichromate*	7778-50-9	231-906-6	ND	0.005	
Potassium hydroxyoctaoxodizincatedichromate*	11103-86-9	234-329-8	ND	0.005	
Sodium chromate*	7775-11-3	231-889-5	ND	0.005	
Sodium dichromate*	7789-12-0 10588-01-9	234-190-3	ND	0.005	
Strontium chromate*	7789-06-2	232-142-6	ND	0.005	
Tetraboron disodium heptaoxide, hydrate*	12267-73-1	235-541-3	ND	0.005	
Trilead diarsenate*	3687-31-8	222-979-5	ND	0.005	
Zirconia Aluminosilicate Refractory Ceramic Fibres**	650-017-00-8 (Index no.)		ND	0.005	



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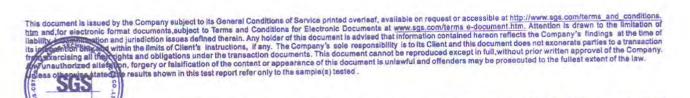
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Notes:

- (1) RL = Reporting Limit. All RL are based on homogenous material ND = Not detected (lower than RL), ND is denoted on the SVHC substance.
- (2) * The test result is based on the calculation of selected element(s) / marker(s) and to the worst-case scenario. For detail information, please refer to the SGS REACH website: www.reach.sgs.com/substance-of-very-high-concern-analysis-information-page.htm

Calculated concentration of diboron trioxide, boric acid, disodium tetraborate, anhydrous and tetraboron disodium heptaoxide, hydrate are based on the water extractive boron and sodium by ICP-OES.

- RL = 0.005% is evaluated for element (i.e. cobalt, arsenic, lead, sodium, chromium (VI), silicon, aluminum, zirconium, boron, potassium, strontium, zinc and calcium respectively), except molybdenum RL=0.0005%
- (3) On Jun 18, 2012, ECHA consolidated two entries of aluminosilicate refractory ceramic fibres and two of zirconia aluminosilicate refractory ceramic fibres in the Candidate List of SVHC for authorization published in Jan 2010 and Dec 2011 into one entry for aluminosilicate refractory ceramic fibres and one for zirconia aluminosilicate refractory ceramic fibres.





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B: 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 and PBDEs by GC-MS.

Test Item(s):	Limit	Unit	MDL	001
Cadmium(Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	53
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))			\Diamond	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	1.0	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
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	12	mg/kg	5	ND
Heptabromodiphenyl ether		mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	4.1	mg/kg	5	ND
Decabromodiphenyl ether	1	mg/kg	5	ND

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Notes:

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

(2) Spot-test:

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

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

Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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



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Sample photo:



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No. TSNEC1200948802

Date: 24 Oct 2012

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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:

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

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No. TSNEC1200948802

Date: 24 Oct 2012

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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

V (5-110

RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

(1) Determination of Cadmium by ICP-OES.

(2) Determination of Lead by ICP-OES.

(3) Determination of Mercury by ICP-OES.

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

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

Test Item(s)	<u>Limit</u>	Unit	MDL	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))	-		\rightarrow	Negative
Sum of PBBs	1000	mg/kg	4	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	(+)	mg/kg	5	ND
Pentabromobiphenyl	O é o.	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	4	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Report	No. TSNEC120094880	02	Date: 24	Oct 2012	Page 3 of 5
Test Item(s)	Limit	<u>Unit</u>	MDL	001	
Dibromodiphenyl ether	-	mg/kg	5	ND	
Tribromodiphenyl ether	+	mg/kg	5	ND	
Tetrabromodiphenyl ether	1.0	mg/kg	5	ND	
Pentabromodiphenyl ether	(6)	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 cm² sample surface area.

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

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No. TSNEC1200948802

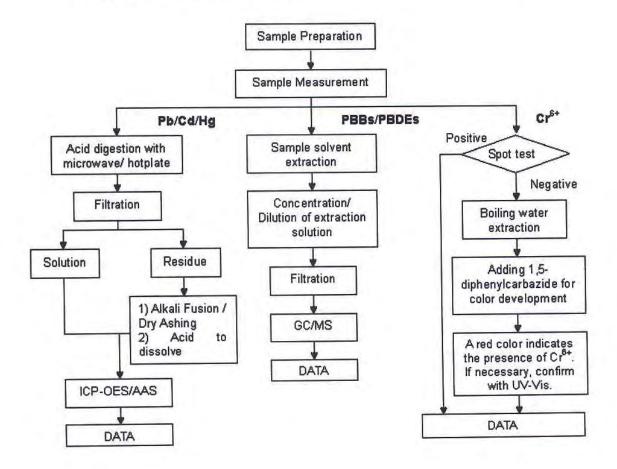
Date: 24 Oct 2012

Page 4 of 5

ATTACHMENTS

Cd/Pb/Hg/Cr⁸⁺/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
- These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



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No. TSNEC1200948802

Date: 24 Oct 2012

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Sample photo:



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Applicant: LITTELFUSE, INC

8755 WEST HIGGINS ROAD SUITE

500CHICAGO IL 60631 USA

Attn: KRISTEEN BACILA/ARSENIO CESISTA JR.

Sample Description:

One (1) submitted sample said to be black powder (black epoxy resin PCE283).



Tests conducted:

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

To be continued

Jun 20, 2012

Date:

Authorized by: For Intertek Testing Services

Shenzhen Ltd.

Ben N.L. Lin General Manager



Conclusion:

Tested Samples <u>Standard</u> Restriction of the use of certain hazardous substance in Submitted sample

electrical electronic and equipment (RoHS Direction

2002/95/EC and supersedure 2011/65/EU)

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)

Hexabromocyclododecane Content

See test conducted

Result

Pass

Pass

Halogen (F, Cl, Br, I) Content

See test conducted

Authorized by: For Intertek Testing Services Shenzhen Ltd.

Ben N.L. Lin General Manager



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



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

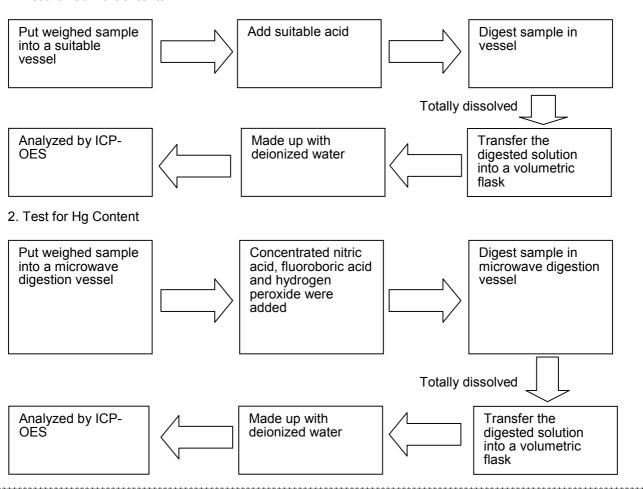
Date sample received: Jun 09, 2012 Testing period: Jun 09, 2012 to Jun 12, 2012



Tests Conducted

(D) Measurement Flowchart:

1. Test for Cd/Pb Contents

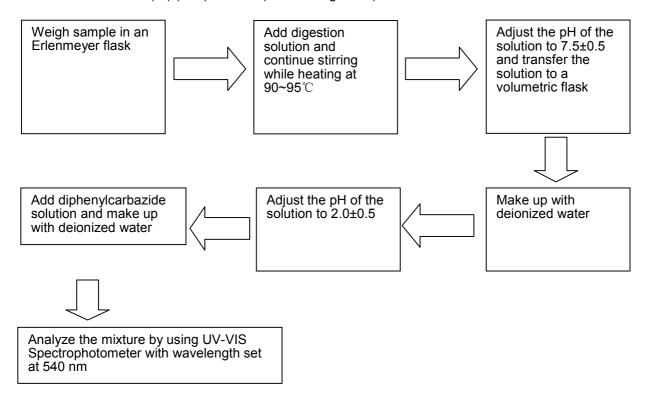




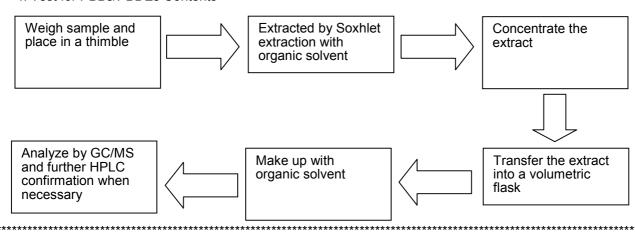
SZHH00699675 **Test Report** Number:

Tests Conducted

3. Test for Chromium (VI) (Cr⁶⁺) Content (Alkaline Digestion)



4. Test for PBBs/PBDEs Contents





Tests Conducted

2 Phthalate Content

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

Dibutyl phthalate (DBP) Di-(2-ethyl hexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP)	Result (%) <0.01 <0.01 <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.

Date sample received : Jun 09, 2012

Testing period : Jun 09, 2012 to Jun 14, 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: Jun 09, 2012

Testing period : Jun 09, 2012 to Jun 12, 2012



Tests Conducted

4 Halogen Content

(I) Test Result Summary:

Testing Item	Result (mg/kg)
Fluorine (F) Content	16600
Chlorine (CI) Content	250
Bromine (Br) Content	38900
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

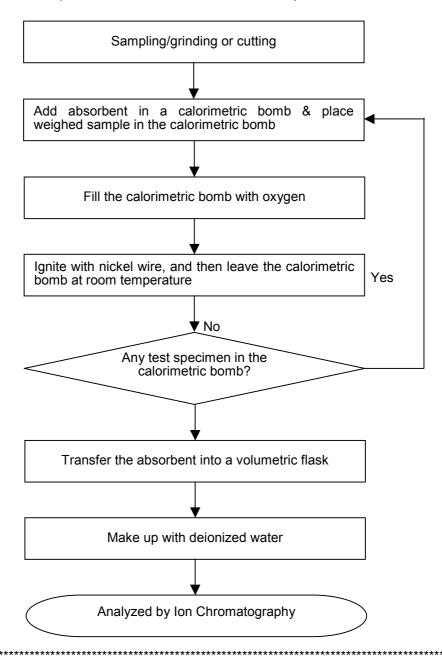
Date sample received : Jun 09, 2012 Testing period : Jun 09, 2012 to Jun 18, 2012



Tests Conducted

(III) Measurement Flowchart:

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



End of report



Report No. RLSZF001581760007

Page 1 of 6

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

CP-930-1HF

Sample Received Date

Feb. 20, 2013

Testing Period

Feb. 20, 2013 to Feb. 23, 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),

Hexabromocyclododecane(HBCDD), Phthalates, 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).

Reviewed by

Feb. 23, 2013

Danny Liu Technical Manager

No. 14983392

Centre Testing International (Shenzhen) Co., Ltd. Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China





Report No. RLSZF001581760007

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Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Lead(Pb)	IEC 62321:2008 Ed.1 Sec.8	ICP-OES	2 mg/kg
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.8	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
Hexabromocyclododecane(HBCDD)	Refer to US EPA 3540C:1996	GC-MS	5 mg/kg
Phthalates	Refer to EN 14372:2004	GC-MS	50 mg/kg

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.	



Report No. RLSZF001581760007

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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 Item(s)	Result

Tested Item(s)	Result	
Halogen(s)		
Fluorine (F)	N.D.	
Chlorine (Cl)	233 mg/kg	
Bromine (Br)	N.D.	
Iodine (I)	N.D.	

Tested Item(s)	Result	
Hexabromocyclododecane (HBCDD)	N.D.	

Tested Item(s)	CAS No.	EC No.	Result
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.

Tested Sample/Part Description Re

Red resin

Note:

The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL)

-mg/kg = ppm = parts per million



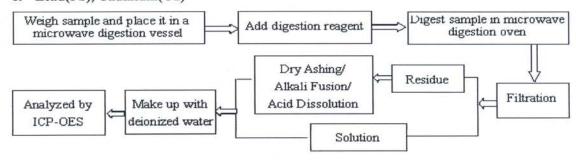


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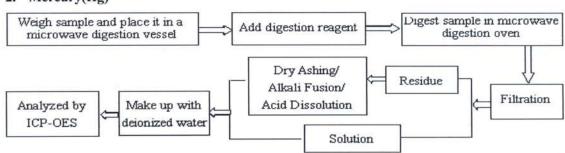
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Test Process

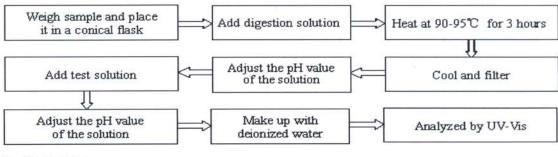
1. Lead(Pb), Cadmium(Cd)



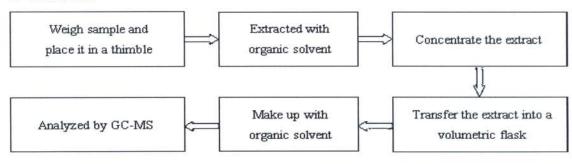
2. Mercury(Hg)



3. Hexavalent Chromium(Cr(VI))



4. Phthalates

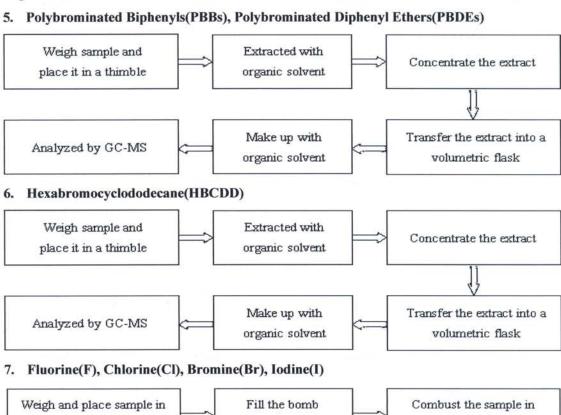


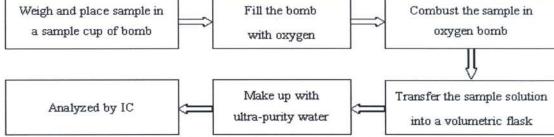




Report No. RLSZF001581760007

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Report No. RLSZF001581760007

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Photo(s) of the sample(s)



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No. TSNEC1300137705

Date: 27 Feb 2013

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TIANJIN CITY KAIHUA INSULATION MATERIAL CO.,LTD. NO.27 YIJING ROAD, DONGLI DEVELOPMENT AREA TIANJIN 300300, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: HALOGEN-FREE **EPOXY SEALING POWDER**

SGS Job No.:

TP13-000644 - TJ

Main Substance:

EPOXY RESIN

Model No.:

EF-150

Date of Sample Received:

21 Feb 2013

Testing Period:

21 Feb 2013 - 27 Feb 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.

Summer Bai

Approved Signatory

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No. TSNEC1300137705

Date: 27 Feb 2013

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Test Results:

Test Part Description:

Specimen No.

SGS Sample ID

Description

1

TSN13-001377.005

blue powder

Remarks:

(1) 1 mg/kg = 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)	<u>Limit</u>	<u>Unit</u>	MDL	005
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	1 -0	mg/kg	5	ND
Octabromobiphenyl	190	mg/kg	5	ND
Nonabromobiphenyl		mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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Test Report	No. TSNEC130013770	05	Date: 27	Feb 2013	Page 3 of 9
Test Item(s)	<u>Limit</u>	Unit	MDL	<u>005</u>	
Dibromodiphenyl ether	-	mg/kg	5	ND	
Tribromodiphenyl ether	G•11	mg/kg	5	ND	
Tetrabromodiphenyl ether	-	mg/kg	5	ND	
Pentabromodiphenyl ether	040	mg/kg	5	ND	
Hexabromodiphenyl ether	4	mg/kg	5	ND	
Heptabromodiphenyl ether	140	mg/kg	5	ND	
Octabromodiphenyl ether		mg/kg	5	ND	
Nonabromodiphenyl ether	19	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.

Halogen

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

Test Item(s)	<u>Unit</u>	MDL	005
Fluorine (F)	mg/kg	50	ND
Chlorine (CI)	mg/kg	50	319
Bromine (Br)	mg/kg	50	68
lodine (I)	mg/kg	50	ND

Hexabromocyclododecane (HBCDD)

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

Test Item(s)	<u>Unit</u>	MDL	<u>005</u>
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

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

Test Item(s)	<u>Unit</u>	MDL	005
Dibutyl Phthalate (DBP)	% (w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	% (w/w)	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	% (w/w)	0.003	ND

Notes:

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

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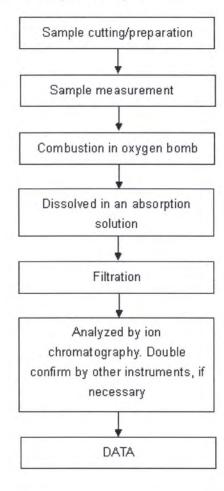
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ATTACHMENTS

Halogen Testing Flow Chart

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



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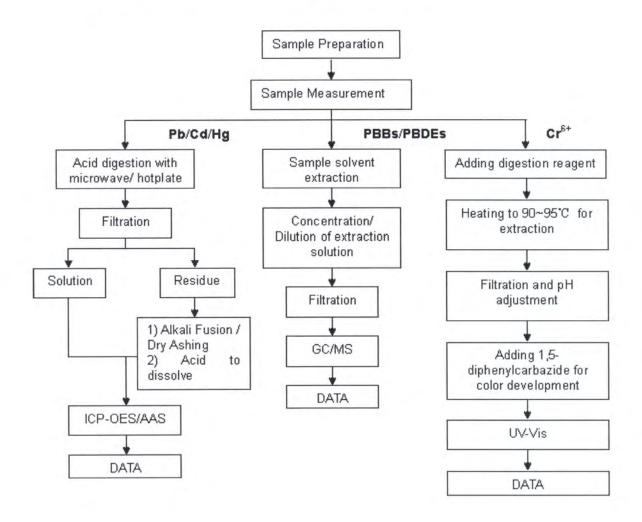
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ATTACHMENTS

Cd/Pb/Hg/Cr⁶⁺/PBBs&PBDEs Flow Chart

- 1) Name of the person who made testing: Aaron Wang/Jason Li /Angell Yao
- 2) Name of the person in charge of testing: Cindy Yin/Rex Zhu
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



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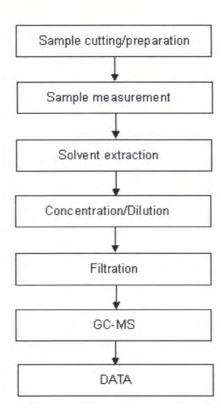
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HBCDD Testing Flow Chart

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



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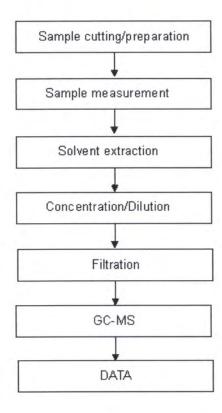
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Phthalate Testing Flow Chart

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



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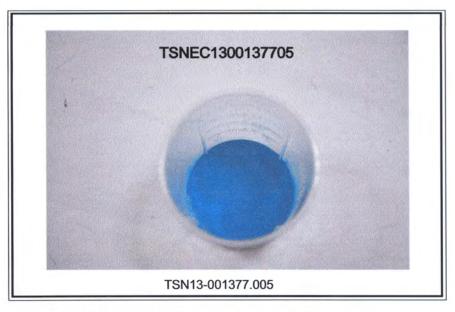


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Sample photo:



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