

Company name:

Product Series:

Product #:

ICP Test Report Certification Packet

Littelfuse, Inc.

3AG Cartridge

313P Series

Issue Date:	November 12, 2013	
2011/65/EU)-restricted packing/packaging mate In addition, it is hereby for unit parts, the packing	substance nor such use terials, and for additives a reported to you that the p	re is neither RoHS (EU Directive 2002/95/EC, e, for materials to be used for unit parts, for and the like in the manufacturing processes. arts and sub-materials, the materials to be used and the additives and the like in the manufacturing apponents.
	Issued by: -	JORDANUFF H. CABILAN [Global EHS Engineer]
(1) Parts, sub-material This document of by Littelfuse, Inc	overs the 3AG Cartridge	RoHS-Compliant series products manufactured
< Raw Materials Please see T		
` '	all measurable substances appropriate pages as ident	
Remarks :		



Table 1: List of Raw Materials covered by this report

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	910-005	Cap	3-9
2	909-002-002	Body (Soda Lime Glass tube)	10-14
3	909-194-00x (909-194-001)	Body	15-21
4	082xxx-001	Wire-Cu99.9MSn	22-25
5	497xxx	Wire-Ni99.9MAg	26-31
6	YTW102 (692535-003)	Solder	32-37
7	AIM230 Fast Core H RSA605 (692539-003)	Solder	38-41
8	648102	Yarn	42-48
9	RD series (899-4xx-1)	Carbon Film Resistor- RoHS	49-54
10	RD series (899-4xx-1)	Carbon Film Resistor- Halogen	55-58
11	3M 3779-PG (087244)	HMA - RoHS	59-65
12	3M 3779-PG (087244)	HMA - Halogen	66-71
13	425900	Ink - Orange	72-82
14	425902	Ink-Black	83-93
15	425903	Ink-Yellow	94-104
16	425906	Ink - Brown	105-115
17	425907	Ink- Green	116-126
18	425911	Ink-Violet	127-137
19	912-228	Spring (Copper Berrylium Alloy Rod)	138-141



Report No. RLSZE001492100002

Page 1 of 4

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

Sample Name

BASE OF CAP

Material

BRASS H65

Sample Received Date

Nov. 16, 2012

Testing Period

Nov. 16, 2012 to Nov. 19, 2012

Test Requested

As specified by client, to test Lead(Pb), Cadmium(Cd), Mercury(Hg),

Hexavalent Chromium(Cr(VI)) in the submitted sample(s).

Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Lead(Pb)	IEC 62321:2008 Ed.1 Sec.9	ICP-OES	2 mg/kg
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.9	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 B	UV-Vis	1

Test Result(s)

Please refer to the following page(s).

Approved by Danny Liu

Reviewed by

Nov. 19, 2012

No. 11033098

Technical Manager

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

E-mail info@cti-cert.com

www.cti-cert.com



Report No. RLSZE001492100002

Page 2 of 4

Test Result(s)

est Result(s)		
Tested Item(s)	Result	
Lead(Pb)	13 mg/kg	
Cadmium (Cd)	N.D.	
Mercury(Hg)	N.D.	
Hexavalent Chromium(Cr(VI))	Negative	

Tested Sample/Part Description

Metal base

Note:

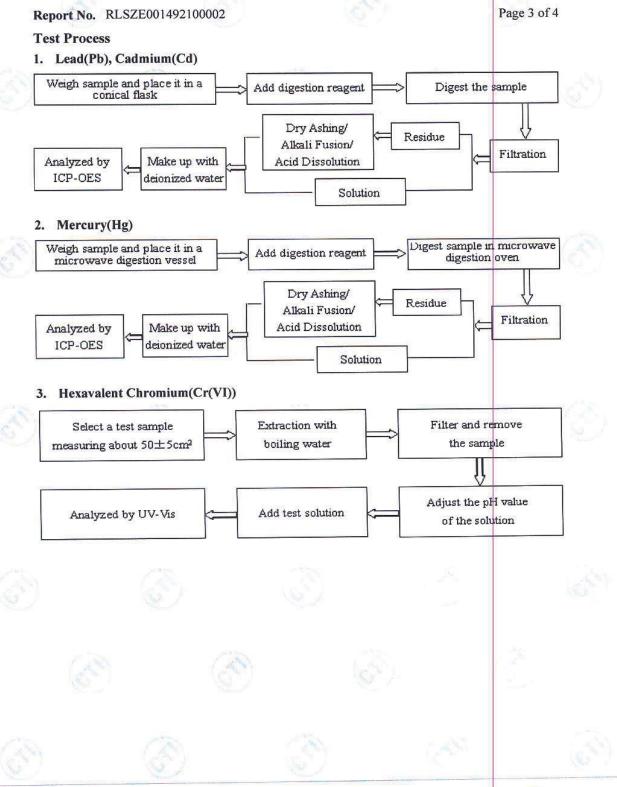
The sample had been dissolved totally tested for Lead, Cadmium, Mercury.

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

-Negative = Absence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02~mg/kg with $50cm^2$ sample surface area used.







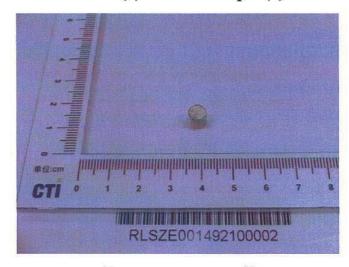




Report No. RLSZE001492100002

Photo(s) of the sample(s)





*** End of report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.







Report No. RLSZE001492100001

Page 1 of 3

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

behalf of the client

Sample Name

SILVER COLOR PLATING OF CAP

Material

Electrolytic Nickel

Sample Received Date

Nov. 16, 2012

Testing Period

Nov. 16, 2012 to Nov. 19, 2012

Test Requested

As specified by client, to test Lead(Pb), Cadmium(Cd), Mercury(Hg),

Hexavalent Chromium(Cr(VI)) in the submitted sample(s).

Test Method

Test Item(s)	Test Method	Measured Equipment(s)	MDL	
Lead(Pb)	Refer to IEC 62321:2008 Ed.1	ICP-OES	2 mg/kg	
Cadmium(Cd)	Refer to IEC 62321:2008 Ed.1	ICP-OES	2 mg/kg	
Mercury(Hg)	Refer to IEC 62321:2008 Ed.1	ICP-OES	2 mg/kg	
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis	1	

Test Result(s)

Please refer to the following page(s).

Reviewed by Approved by Danny Liu

Technical Manager

Nov. 19, 2012

No. 11033098

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



E-mail info@cti-cert.com





Report No. RLSZE001492100001

Page 2 of 3

Test Result(s)

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

Tested Sample/Part Description

Silvery plating

Note:

The washed plating had been dissolved totally tested for Lead, Cadmium,

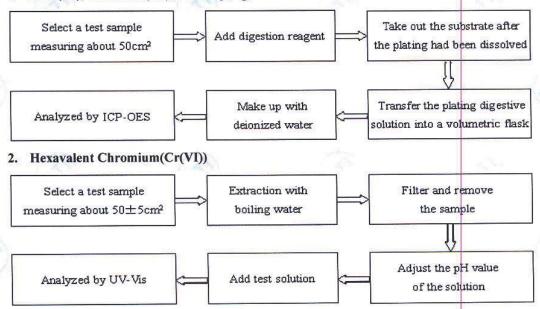
-MDL = Method Detection Limit -N.D. = Not Detected (<MDL)

-mg/kg = ppm = parts per million

-Negative = Absence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with 50cm² sample surface area used.

Test Process

1. Lead(Pb), Cadmium(Cd), Mercury(Hg)





Report No. RLSZE001492100001

Photo(s) of the sample(s)

Page 3 of 3



*** End of report ***

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400-6788-333



Test Report No. CANEC1309150301 Date: 24 Jun 2013 Page 1 of 5

XIAMEN LICHUN ELECTRONIC ELEMENT CO.,LTD
42-2 XINGLIN WEST RD,361022,JIMEI DISTRICT,XIAMEN,FUJIAN,P.R.C

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

SGS Job No. : XM14644726EC - XM

Date of Sample Received: 18 Jun 2013

Testing Period: 18 Jun 2013 - 24 Jun 2013

Test Requested : Selected test(s) as requested by client.

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

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

Conclusion: Based on the performed tests on submitted samples, the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

Almay Gao

Approved Signatory

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No. CANEC1309150301

Date: 24 Jun 2013

Page 2 of 5

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

1 CAN13-091503.001 Transparent glass tube

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

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.

Limit	Unit	MDL	001
			ND
			142
	77.00		ND
			ND
1100		4	ND
		5	ND
11.0	mg/kg	5	ND
4	mg/kg	5	ND
-	mg/kg	5	ND
	mg/kg	5	ND
100	mg/kg	5	ND
62	mg/kg	5	ND
-	mg/kg	5	ND
1.2	mg/kg	5	ND
-	mg/kg	5	ND
1,000	mg/kg	1.5	ND
-	mg/kg	5	ND
		100 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg 1,000 mg/kg - mg/kg	100 mg/kg 2 1,000 mg/kg mg/kg 5 - mg/kg 5

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Test Report	No. CANEC13091503	01	Date: 24	Jun 2013	Page 3 of 5
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>001</u>	
Dibromodiphenyl ether	2	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	1.2	mg/kg	5	ND	
Nonabromodiphenyl ether	-	mg/kg	5	ND	
Decabromodiphenyl ether	-	mg/kg	5	ND	

Notes:

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

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No. CANEC1309150301

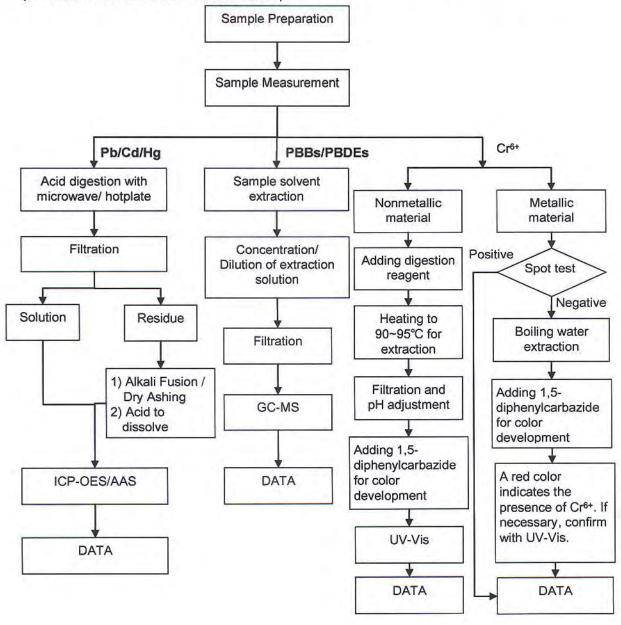
Date: 24 Jun 2013

Page 4 of 5

ATTACHMENTS

RoHS Testing Flow Chart

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



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No. CANEC1309150301

Date: 24 Jun 2013

Page 5 of 5

Sample photo:



SGS authenticate the photo on original report only

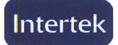
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Number: 130702078SHA-001

Applicant:

LITTELFUSE, INC.

800 E. NORTHWEST HWY

Attn: J.DINGLASAN / A.CESISTA JR

Date: Aug. 01, 2013

Sample Description:

One (1) pieces of submitted samples said to be: **Transparent glass**Part Description : Body

Part Number

909-194-002

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

Conclusion:

Standard

Result Pass

Tested sample Submitted sample

With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive

2011/65/EU

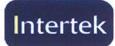
To be continued

Authorized by:

For Intertek testing services Ltd., Shanghai

Joy Zhou





Tests Conducted

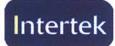
1. Test result of RoHS Directive:

esting item	Result
Cadmium (Cd) content (mg/kg)	ND
Lead (Pb) content (mg/kg)	ND
Mercury (Hg) content (mg/kg)	ND
Chromium (VI) (Cr ⁶⁺) content (mg/kg)(for non-metal)	ND
Polybrominated biphenyls (PBBs) (mg/kg)	
monobromo biphenyls (MonoBB)	ND
Dibromo biphenyls (DiBB)	ND
Tribromo biphenyls (TriBB)	ND
Tetrabromo biphenyls (TetraBB)	ND
Pentabromo biphenyls (PentaBB)	ND
Hexabromo biphenyls (HexaBB)	ND
Heptabromo biphenyls (HeptaBB)	ND
Octabromo biphenyls (OctaBB)	ND
Nonabromo biphenyls (NonaBB)	ND
Decabromo biphenyl (DecaBB)	ND
Polybrominated diphenyl ethers (PBDEs) (mg/kg)	
Monobromo diphenyl ethers (MonoBDE)	ND
Dibromo diphenyl ethers (DiBDE)	ND
Tribromo diphenyl ethers (TriBDE)	ND
Tetrabromo diphenyl ethers (TetraBDE)	ND
Pentabromo diphenyl ethers (PentaBDE)	ND
Hexabromo diphenyl ethers (HexaBDE)	ND
Heptabromo diphenyl ethers (HeptaBDE)	ND
Octabromo diphenyl ethers (OctaBDE)	ND
Nonabromo diphenyl ethers (NonaBDE)	ND
Decabromo diphenyl ether (DecaBDE)	ND

Remark: ND = not detected

To be continued

Number: 130702078SHA-001



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)

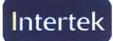
The above limits were quoted from RoHS Directive 2011/65/EU for homogeneous material.

(C) Test method:

Testing item	Testing method	Reporting limit
Cadmium (Cd) content	With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Lead (Pb) content	With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Mercury (Hg) content	With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Chromium (VI) (Cr ⁶⁺) content (for non-metal)	With reference to IEC 62321 Edition 1.0: 2008, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1mg/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

To be continued

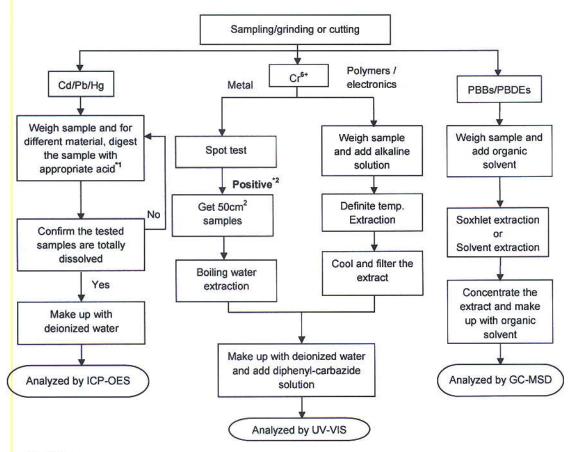
Number: 130702078SHA-001



Tests Conducted

(D) Measurement flowchart:

Test for Cd/Pb/Hg/Cr (VI)/PBBs/PBDEs contents Reference standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: list of appropriate acid:

Material	Acid added for digestion
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO ₃ ,HCI,HF
Electronics	HNO ₃ ,HCl,H ₂ O ₂ ,HBF ₄

*2: If the result of spot test is positive, Chromium VI would be determined as detected.

To be continued

Number: 130702078SHA-001



Number: 130702078SHA-001

Tests Conducted

Test result summary

Halogen content:

Testing item	Result (ppm)	
Fluorine (F) content	ND	
Chlorine (CI) content	ND	
Bromine (Br) content	ND	
lodine (I) content	ND	

Remark: ppm = Parts per million = mg/kg

ND = Not detected

II. Test method

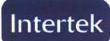
Testing item	Testing method	Reporting limit
Halogen (F, Cl, Br, I) content	With reference to EN 14582:2007 by combustion in a calorimetric bomb and determined by ion chromatography	50 ppm

Remarks: Reporting limit = Quantitation limit of analyte in sample

Date sample received: Jul. 26, 2013

Testing period: Jul. 26, 2013 To Aug. 01, 2013

To be continued



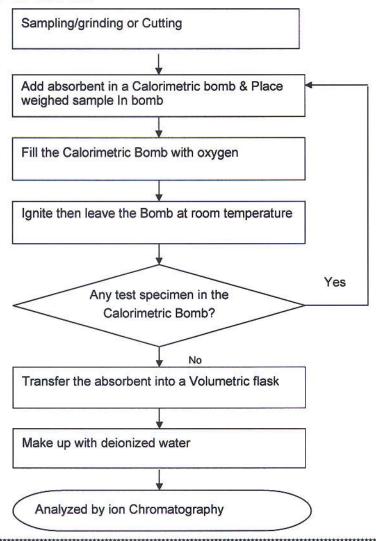
Number: 130702078SHA-001

Test Conducted

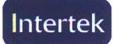
Measurement flowchart:

Test for Halogen content

Reference method: EN 14582: 2007



To be continued



Tests Conducted

Number: 130702078SHA-001



End of report

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Test Report SHAH00361401 Number:

Date:

JAN 16, 2013

Applicant: LITTELFUSE,INC.

800 E. NORTHWEST HWY

A.DIVIETRO/D.UNTIEDT

Sample Description:

One (1) submitted sample said to be Grey Wire.

: Wire Tin Plated Cu. Item Name

Part No. Element.

Tests Conducted:

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

To be continued

Authorized by:

For intertek testing services Ltd., Shanghai

Jacob Lin

General Manager





Test Report SHAH00361401 Number:

Tests Conducted

(I) Test Result Summary:

<u>Testing Item</u>	Result (ppm)
	(1)
Heavy Metal	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr ⁸⁺) content (mg/kg With 50cm ²)	Negative (< 0.02)

<u>Testing Item</u>	Result (ppm)
	(2)
Heavy Metal	
Cadmium (Cd) content / Plating	ND
Lead (Pb) content / Plating	60
Mercury (Hg) content / Plating	ND
Chromium VI (Cr ⁶⁺) content (mg/kg With 50cm ²) / Plating	Negative (< 0.02)

Remarks:

ppm = parts per million = mg/kg

ND = not detected

@ = Due to the insufficient sample area, reduced total sample surface of 10 cm² was used and the dilution factor was adjusted accordingly.

mg/kg with 50cm² = milligram per kilogram with 50 square centimetre

Tested components:

(1)Substrate. (2)Plating.

Responsibility of Chemist: Dent Fang / Ken He

(II) RoHS Requirement:

Restricted substances	<u>Limits</u>
Cadmium (Cd) Content	0.01% (100ppm)
Lead (Pb) Content	0.1% (1000ppm)
Mercury (Hg) Content	0.1% (1000ppm)
Chromium VI (Cr ^{o+}) Content	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)

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

(III) Test Method:

Testing item		Reporting limit
Cadmium (Cd) content	determined by ICP-OES.	2 ppm
Lead (Pb) content	determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content		0.02 mg/kg with 50cm ²

Remark: Reporting limit = Quantitation limit of analyze in sample

Date Sample Received: Jan.9, 2013
Testing Period: Jan.9, 2013 to Jan.14, 2013

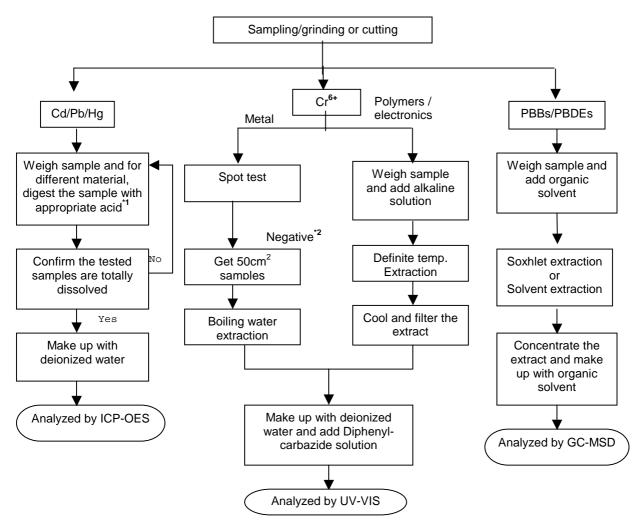
To be continued



Test Report Number: SHAH00361401

Tests Conducted (IV) MEASUREMENT FLOWCHART:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs contents Reference standard: IEC 62321 edition 1.0:2008



REMARKS:

*1: LIST OF APPROPRIATE ACID:

7 ALLIKOT KIALL AGID.	
MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO ₃ ,HCL,H ₂ O ₂ ,HBF ₄

*2: IF THE RESULT OF SPOT TEST IS POSITIVE, CHROMIUM (VI) WOULD BE DETERMINED AS DETECTED.

To be continued



Test Report SHAH00361401 Number:

Tests Conducted



End of report

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Intertek Consumer Goods GmbH · Würzburger Straße 152 · 90766 Fürth

Polyfil AG

Gina Gregorio Oberallmendstrasse 20A

6300 Zug / Switzerland

Fürth, 2012-12-19

Test report No. FUHL1236941

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

Sample description: Ni99.9MAg wire

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

Copying this test report is permitted only in agreement with the contracted lab. The test results refer only to the tested item. This report consists of 6 page(s).

The test methods signed with * are not listed in the attachment of the accreditation certificate.

Conclusion based on tested item

Test order	Status	
testing according to the RoHS directive 2011/65/EC	conform [°]	

Please see overview of test results

- Test results see next pages -





Page 2 of 6 page(s) of our test report No. FUHL1236941 dated 2012-12-19

Sample description: Ni99.9MAg wire

nM = non Metal M = Metal cM = composite Material

List of component parts:

Sample No.	Part No.	Material	Description
236941	1	М	Ni99.9MAg wire

Sitz Fürth Amtsgericht Fürth, HRB 5756 Ust-IdNr. DE169317871



Page 3 of 6 page(s) of our test report No. FUHL1236941 dated 2012-12-19

Sample description: Ni99.9MAg wire

Comment

LOD = Limit of Detection

BL = Below Limit
OL = Over Limit

X = Inconclusive, further test necessary

 σ = Standard deviation

CS = Composite sample

Remark:

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

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

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



Page 4 of 6 page(s) of our test report No. FUHL1236941 dated 2012-12-19

Sample description: Ni99.9MAg wire

1. XRF screening

Method: XRF according to IEC 62321:2008*

Sample No.	Part No.	Pb	Hg	Cd	Cr _{total}	Br	
236941	1	BL	BL	BL	BL		

Comment:

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

Intertek Consumer Goods GmbH

Prüfleitung / Lab Manager

□ A. Breunig, □ K. Grönhardt, □ Dr. K. Laue-Schuler,
□ R. Micolay, □ M. Neumeister, □ Dr. R. Rätze, □ K. Scharrer, □ M. Tutsch

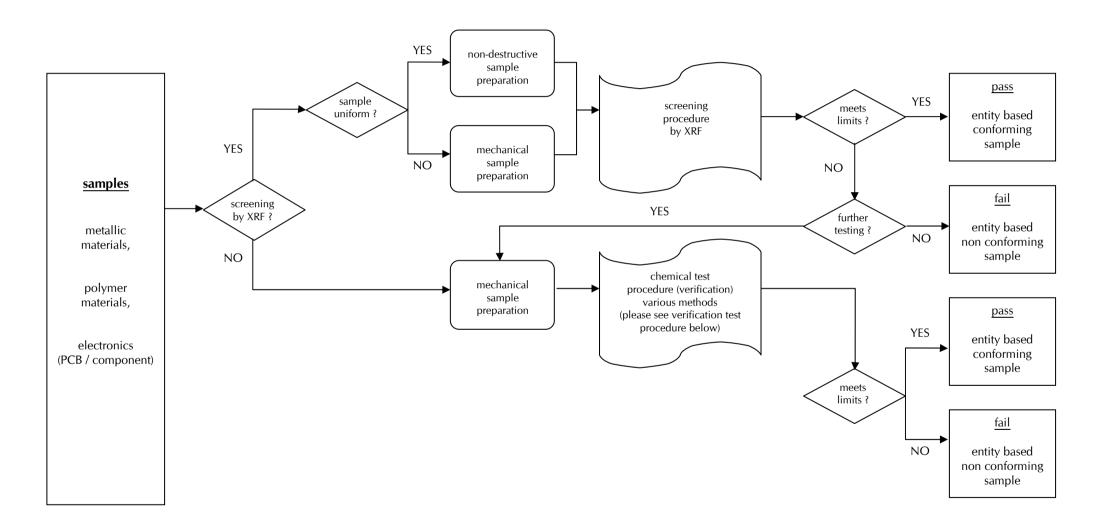
- Flow charts see next page(s) -

Status conform



Page 5 of 6 page(s)

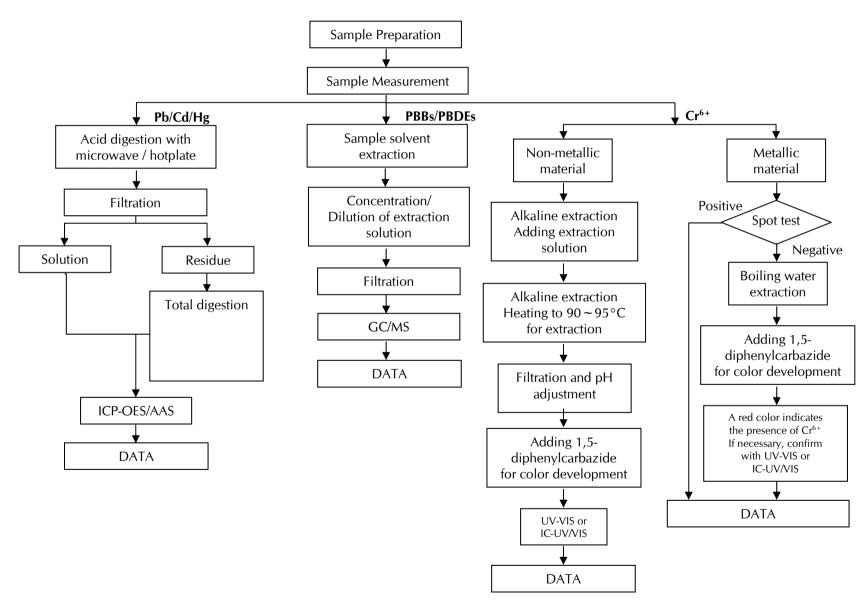
Test procedure





Page 6 of 6 page(s)

Verification test procedure



Sitz Fürth Amtsgericht Fürth, HRB 5756 Ust-IdNr. DE169317871 Geschäftsführer Kay Grönhardt Rainer Mast



Test Report No. SHAEC1317518845 Date: 06 Sep 2013 Page 1 of 6

ZHEJIANG ASIA GENERAL SOLDERING&BRAZING MATERIAL CO., LTD XIHU INDUSTRIAL PARK, SANDUN, HANGZHOU CITY, ZHEJIANG, PROVINCE, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: LEAD-FREE SOLDER

WIRE

SGS Job No.: SP13-026309 - SH

Model No.: YTW108 (692535-001 \, 692535-003 \, 693535-004)

Composition : Sn3.0CuRE

Date of Sample Received : 03 Sep 2013

Testing Period: 03 Sep 2013 - 06 Sep 2013

Test Requested : Selected test(s) as requested by client.

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

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

Conclusion: Based on the performed tests on submitted samples, the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

JJ Fan

Approved Signatory

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Test Report No. SHAEC1317518845 Date: 06 Sep 2013 Page 2 of 6

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

1 SHA13-175188.038 Silvery metal wire

Remarks:

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

RoHS Directive 2011/65/EU

Test Method: (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.

(2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.

(3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.

(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by spot test / Colorimetric Method using UV-Vis.

(5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>038</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	129
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	\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	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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t E&E (86-21) 61402553 f E&E (86-21) 64953679 HL: (86-21) 61402594 HL: (86-21) 54500353



Test Report	No. SHAEC131751884	No. SHAEC1317518845		Sep 2013	Page 3 of 6	
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>038</u>		
Dibromodiphenyl ether	-	mg/kg	5	ND		
Tribromodiphenyl ether	-	mg/kg	5	ND		
Tetrabromodiphenyl ether	-	mg/kg	5	ND		
Pentabromodiphenyl ether	-	mg/kg	5	ND		
Hexabromodiphenyl ether	-	mg/kg	5	ND		
Heptabromodiphenyl ether	-	mg/kg	5	ND		
Octabromodiphenyl ether	-	mg/kg	5	ND		
Nonabromodiphenyl ether	-	mg/kg	5	ND		
Decabromodiphenyl ether	-	mg/kg	5	ND		

Notes:

- (1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II
- (2) \$Spot-test:

Negative = Absence of Cr(VI) coating, Positive = Presence of Cr(VI) coating;

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

◇Boiling-water-extraction:

Negative = Absence of Cr(VI) coating

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

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

Halogen

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

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

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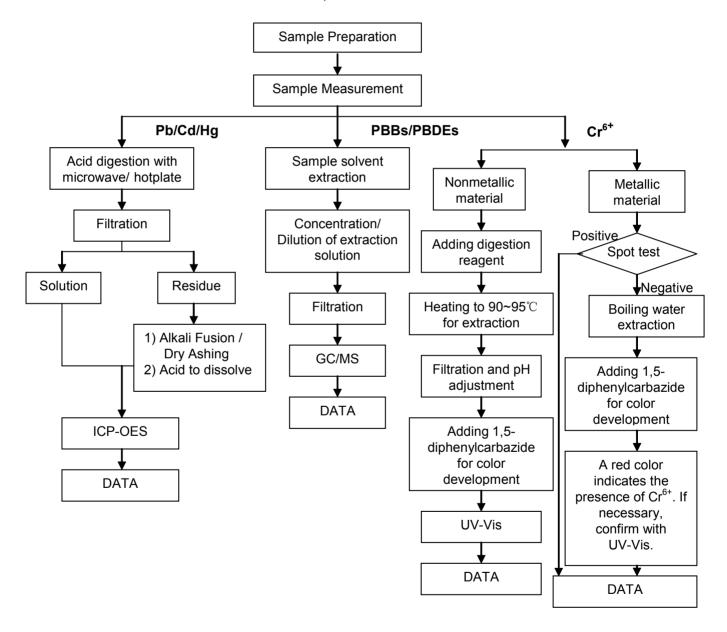
Date: 06 Sep 2013

Page 4 of 6

ATTACHMENTS

RoHS Testing Flow Chart

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



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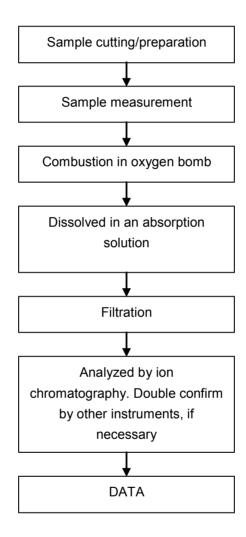
No. SHAEC1317518845

Page 5 of 6

Date: 06 Sep 2013

Halogen Testing (oxygen bomb) Flow Chart

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



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No. SHAEC1317518845

Date: 06 Sep 2013

Page 6 of 6

Sample photo:



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Test Report No. CANEC1309341001 Date: 25 Jun 2013 Page 1 of 4

AIM SOLDER (SHEN ZHEN) CO.,LTD.

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

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

SGS Job No.: CP13-031878 - SZ

Date of Sample Received: 20 Jun 2013

Testing Period: 20 Jun 2013 - 25 Jun 2013

Test Requested : Selected test(s) as requested by client.

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

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

Conclusion: Based on the performed tests on submitted samples, the results of Lead,

Mercury, Cadmium, Hexavalent chromium comply with the limits as set by RoHS

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

Signed for and on behalf of SGS-CSTC Ltd.

Trophy Zhang
Approved Signatory

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No. CANEC1309341001

Date: 25 Jun 2013

Page 2 of 4

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

1 CAN13-093410.001 Silvery metal wire

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

(1) Determination of Cadmium by ICP-OES.

(2) Determination of Lead by ICP-OES.

(3) Determination of Mercury by ICP-OES.

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

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	127
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	-	-	\Diamond	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 cm2 sample surface area.

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

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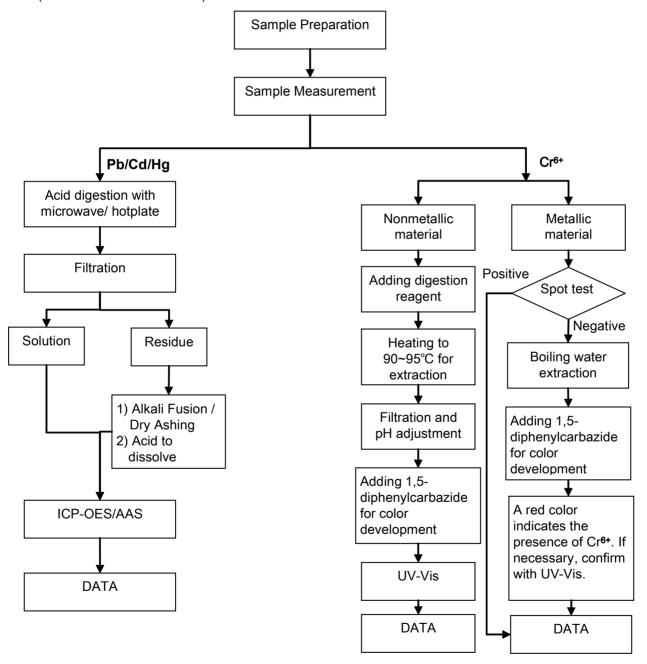
Date: 25 Jun 2013

Page 3 of 4

ATTACHMENTS

RoHS Testing Flow Chart

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



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No. CANEC1309341001

Date: 25 Jun 2013

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Sample photo:



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Julius of the content of the content of the sample(s) tested.

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Number: 130702078SHA-002

Applicant:

LITTELFUSE, INC.

800 E. NORTHWEST HWY

Attn: J.DINGLASAN / A.CESISTA JR

Date: Aug. 01, 2013

Sample Description:

One (1) pieces of submitted samples said to be: White yarn

Part Description

INK-DEEP YELLOW

Part Number

648102

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

Conclusion:

Tested sample Submitted sample

Result Pass

With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive

2011/65/EU

To be continued

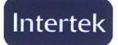
Authorized by:

For Intertek testing services Ltd., Shanghai

Thou

Joy Zhou





Test Report Number: 130702078SHA-002

Tests Conducted

1. Test result of RoHS Directive:

esting item	Result
Cadmium (Cd) content (mg/kg)	ND
Lead (Pb) content (mg/kg)	ND
Mercury (Hg) content (mg/kg)	ND
Chromium (VI) (Cr ⁶⁺) content (mg/kg)(for non-metal)	ND
Polybrominated biphenyls (PBBs) (mg/kg)	
monobromo biphenyls (MonoBB)	ND
Dibromo biphenyls (DiBB)	ND
Tribromo biphenyls (TriBB)	ND
Tetrabromo biphenyls (TetraBB)	ND
Pentabromo biphenyls (PentaBB)	ND
Hexabromo biphenyls (HexaBB)	ND
Heptabromo biphenyls (HeptaBB)	ND
Octabromo biphenyls (OctaBB)	ND
Nonabromo biphenyls (NonaBB)	ND
Decabromo biphenyl (DecaBB)	ND
Polybrominated diphenyl ethers (PBDEs) (mg/kg)	
Monobromo diphenyl ethers (MonoBDE)	ND
Dibromo diphenyl ethers (DiBDE)	ND
Tribromo diphenyl ethers (TriBDE)	ND
Tetrabromo diphenyl ethers (TetraBDE)	ND
Pentabromo diphenyl ethers (PentaBDE)	ND
Hexabromo diphenyl ethers (HexaBDE)	ND
Heptabromo diphenyl ethers (HeptaBDE)	ND
Octabromo diphenyl ethers (OctaBDE)	ND
Nonabromo diphenyl ethers (NonaBDE)	ND
Decabromo diphenyl ether (DecaBDE)	ND

Remark: ND = not detected

To be continued



Test Report Number: 130702078SHA-002

Tests Conducted

(B) RoHS Requirement:

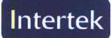
Restricted substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr ⁶⁺)	0.1% (1000 mg/kg)
Polybrominated biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated diphenyl ethers (PBDEs)	0.1% (1000 mg/kg)

The above limits were quoted from RoHS Directive 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 until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Lead (Pb) content	With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Mercury (Hg) content	With reference to IEC 62321 Edition 1.0: 2008, by acid digestion until the tested sample was totally dissolved, and determined by ICP-OES.	2 mg/kg
Chromium (VI) (Cr ⁶⁺) content (for non-metal)	With reference to IEC 62321 Edition 1.0: 2008, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1mg/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

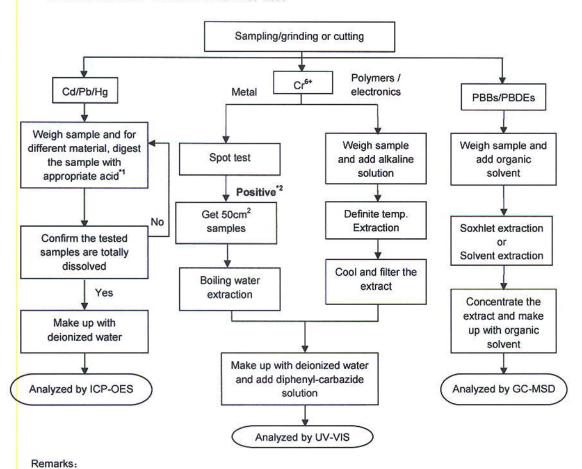
To be continued



Tests Conducted

(D) Measurement flowchart:

Test for Cd/Pb/Hg/Cr (VI)/PBBs/PBDEs contents Reference standard: IEC 62321 Edition 1.0: 2008



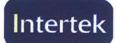
*1: list of appropriate acid:

Material	Acid added for digestion
Polymers	HNO ₃ ,HCl,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO ₃ ,HCI,HF
Electronics	HNO ₃ HCI, H ₂ O ₂ HBF ₄

*2: If the result of spot test is positive, Chromium VI would be determined as detected.

To be continued

Number: 130702078SHA-002



Number: 130702078SHA-002

Tests Conducted

I. Test result summary

Halogen content:

Testing item	Result (ppm)	
Fluorine (F) content	ND	
Chlorine (CI) content	150	
Bromine (Br) content	ND	
Iodine (I) content	ND	

Remark: ppm = Parts per million = mg/kg

ND = Not detected

II. Test method

<u>Testing item</u>	Testing method	Reporting limit
Halogen (F, Cl, Br, I) content	With reference to EN 14582:2007 by combustion in a calorimetric bomb and determined by ion chromatography	50 ppm

Remarks: Reporting limit = Quantitation limit of analyte in sample

Date sample received: Jul. 26, 2013

Testing period: Jul. 26, 2013 To Aug. 01, 2013

To be continued



Test Conducted

Measurement flowchart:

Test for Halogen content

Reference method: EN 14582: 2007

Sampling/grinding or Cutting Add absorbent in a Calorimetric bomb & Place weighed sample In bomb Fill the Calorimetric Bomb with oxygen Ignite then leave the Bomb at room temperature Yes Any test specimen in the Calorimetric Bomb? No Transfer the absorbent into a Volumetric flask Make up with deionized water Analyzed by ion Chromatography

To be continued

Number: 130702078SHA-002

Intertek





Test Report

號碼(No.): CE/2013/40568 日期(Date): 2013/04/11 頁數(Page): 1 of 6

幸亞電子工業股份有限公司

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NO. 49, DINGFU 1st STREET, GUEISHAN TOWNSHIP, TAOYUAN COUNTY 333, TAIWAN

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

樣品名稱(Sample Description) : CARBON FILM RESISTORS

樣品型號(Style/Item No.) : RD SERIES 收件日期(Sample Receiving Date) : 2013/04/02

測試期間(Testing Period) : 2013/04/02 TO 2013/04/11

測試需求(Test Requested): 依據客户指定,進行鎘,鉛,汞,六價鉻,多溴聯苯,多溴聯苯醚測試. (As

specified by client, to test Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs

contents in the submitted sample.)

測試方法(Test Method) : 參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008.

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).



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號碼(No.): CE/2013/40568 日期(Date): 2013/04/11 頁數(Page): 2 of 6

Test Report

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測試部位(PART NAME)No.1 : 整體混測 (MIXED ALL PARTS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result)
鎬 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電	2 2	No.1
鉛 / Lead (Pb)	mg/kg	漿原子發射光譜儀檢測. / With reference	2	n.d.
汞 / Mercury (Hg)	mg/kg	to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	参考IEC 62321: 2008方法,以UV-VIS檢測. / With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
多溴聯苯總和 / Sum of PBBs	mg/kg		-	n.d.
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.
四溴聯苯 / Tetrabromobiphenyl	mg/kg	参考IEC 62321: 2008方法,以氣相層析/質	5	n.d.
五溴聯苯 / Pentabromobiphenyl		譜儀檢測. / With reference to IEC	5	n.d.
六溴聯苯 / Hexabromobiphenyl	mg/kg	62321: 2008 and performed by GC/MS.	5	n.d.
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.
八溴聯苯 / Octabromobiphenyl	mg/kg	†	5	n.d.
九溴聯苯 / Nonabromobiphenyl	mg/kg	İ	5	n.d.
十溴聯苯 / Decabromobiphenyl	mg/kg	İ	5	n.d.

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Test Report

號碼(No.): CE/2013/40568 日期(Date): 2013/04/11 頁數(Page): 3 of 6

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) No.1
多溴聯苯醚總和 / Sum of PBDEs	mg/kg		-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg	参考IEC 62321: 2008方法,以氣相層析/質	5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg	譜儀檢測. / With reference to IEC	5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg	$62321\colon\ 2008$ and performed by GC/MS.	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.

備註(Note):

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)
- 5. 樣品的測試是基於申請人要求混合測試,報告中的混合測試結果不代表其中個别單一材質的含量. (The samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)

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號碼(No.): CE/2013/40568

日期(Date): 2013/04/11

頁數(Page): 4 of 6

Test Report

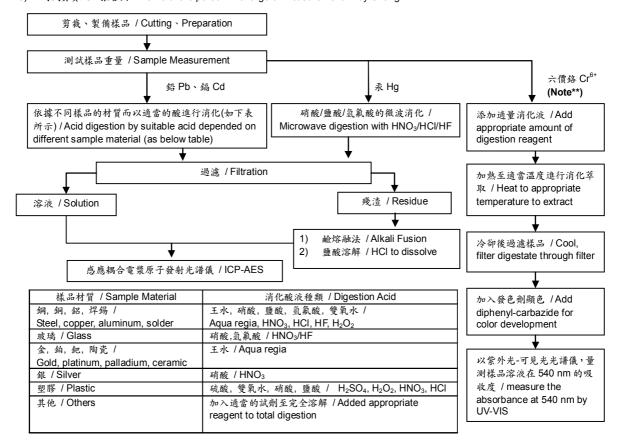
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)
- 2) 測試人員:楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang



Note**:(1) 針對非金屬材料加入鹼性消化液 · 加熱至 90~95℃ 萃取. / For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.

(2) 針對金屬材料加入純水,加熱至沸騰萃取. / For metallic material, add pure water and heat to boiling.

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號碼(No.): CE/2013/40568

日期(Date): 2013/04/11

頁數(Page): 5 of 6

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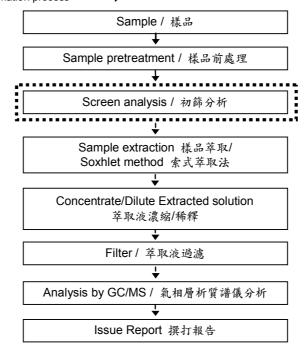
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多溴聯苯/多溴聯苯醚分析流程圖 / PBB/PBDE analytical FLOW CHART

- 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong

確認程序 / Confirmation process - - - - →



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號碼(No.): CE/2013/40568 日期

日期(Date): 2013/04/11

頁數(Page): 6 of 6

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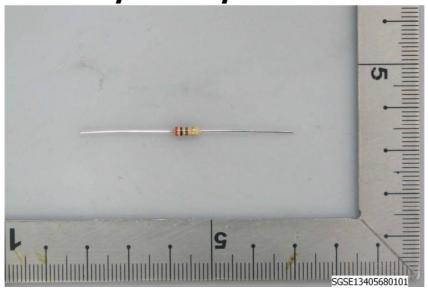
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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位。*
(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2013/40568



** 報告結尾 (End of Report) **

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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

樣品名稱(Sample Description) : CARBON FILM RESISTORS

樣品型號(Style/Item No.) : RD SERIES 收件日期(Sample Receiving Date) : 2013/04/02

測試期間(Testing Period) : 2013/04/02 TO 2013/04/11

測試需求(Test Requested) : 依據客户指定,於送測樣品中檢測鹵素-氟、氟、溴、碘含量.(As specified by

client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine in the

submitted sample.)

测試方法(Test Method) : 参考BS EN 14582:2007. / With reference to BS EN 14582:2007.

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).



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測試結果(Test Results)

測試部位(PART NAME) No.1 : 整體混測 (MIXED ALL PARTS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) No.1
鹵素 / Halogen				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)			50	n.d.
鹵素 (氣) / Halogen-Chlorine (C1) (CAS No.: 22537-15-1)		参考BS EN 14582:2007, 以離子層 析儀分析. / With reference to	50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)			50	n.d.

備註(Note):

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. 樣品的測試是基於申請人要求混合測試,報告中的混合測試結果不代表其中個别單一材質的含量. (The samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)

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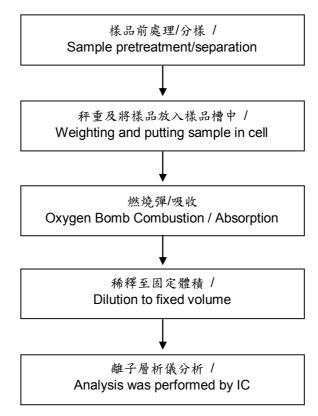
號碼(No.): CE/2013/40569 日期(Date): 2013/04/11 頁數(Page): 3 of 4

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NO. 49, DINGFU 1st STREET, GUEISHAN TOWNSHIP, TAOYUAN COUNTY 333, TAIWAN

鹵素分析流程圖 / Analytical flow chart of halogen content

- 測試人員:陳恩臻 / Name of the person who made measurement: Rita Chen
- 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang



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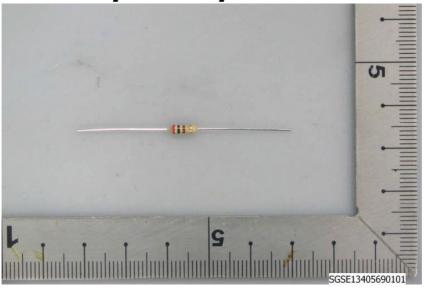
號碼(No.): CE/2013/40569 日期(Date): 2013/04/11 頁數(Page): 4 of 4

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NO. 49, DINGFU 1st STREET, GUEISHAN TOWNSHIP, TAOYUAN COUNTY 333, TAIWAN

* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2013/40569



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No. SHAEC1219975401

Date: 19 Nov 2012

Page 1 of 7

3M CHINA LIMITED 222# TIAN LIN ROAD, SHANGHAI (200233)

The following sample(s) was/were submitted and identified on behalf of the clients as: 3M 3779-PG

SGS Job No. :

SP12-033081 - SH

Date of Sample Received:

14 Nov 2012

Testing Period:

14 Nov 2012 - 19 Nov 2012

Test Requested:

Selected test(s) as requested by client.

Test Method:

Please refer to next page(s).

Test Results:

Please refer to next page(s).

Conclusion:

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

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

Signed for and on behalf of SGS-CSTC Ltd.

JJ Fan

Approved Signatory

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No. SHAEC1219975401

Date: 19 Nov 2012

Page 2 of 7

Test Results:

Test Part Description:

Specimen No.

SGS Sample ID

Description

1

SHA12-199754.001

Brown solid

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: With reference to IEC 62321:2008

- (1) Determination of Cadmium by ICP-OES.
- (2) Determination of Lead by ICP-OES.
- (3) Determination of Mercury by ICP-OES.
- (4) Determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
- (5) Determination of PBBs / PBDEs content by GC-MS.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>001</u>
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	2	mg/kg	5	ND
Dibromobiphenyl	70	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	120	mg/kg	5	ND
Octabromobiphenyl	(, 1)	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	100	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	2	ND
Monobromodiphenyl ether	28	mg/kg	5	ND

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Test Report	No. SHAEC1219975401		Date: 19 Nov 2012		Page 3 of 7
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>001</u>	
Dibromodiphenyl ether	-	mg/kg	5	ND	
Tribromodiphenyl ether	-	mg/kg	5	ND	
Tetrabromodiphenyl ether	12	mg/kg	5	ND	
Pentabromodiphenyl ether	-	mg/kg	5	ND	
Hexabromodiphenyl ether		mg/kg	5	ND	
Heptabromodiphenyl ether	0 <u>#</u> 0	mg/kg	5	ND	
Octabromodiphenyl ether		mg/kg	5	ND	
Nonabromodiphenyl ether	8 <u>55</u>	mg/kg	5	ND	
Decabromodiphenyl ether	166	mg/kg	5	ND	

Notes:

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

Hexabromocyclododecane (HBCDD)

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

Test Item(s)	<u>Unit</u>	MDL	<u>001</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

Test Method: Determination of phthalates by GC-MS based on EN 14372:2004.

Test Item(s)	<u>Unit</u>	MDL	<u>001</u>
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.

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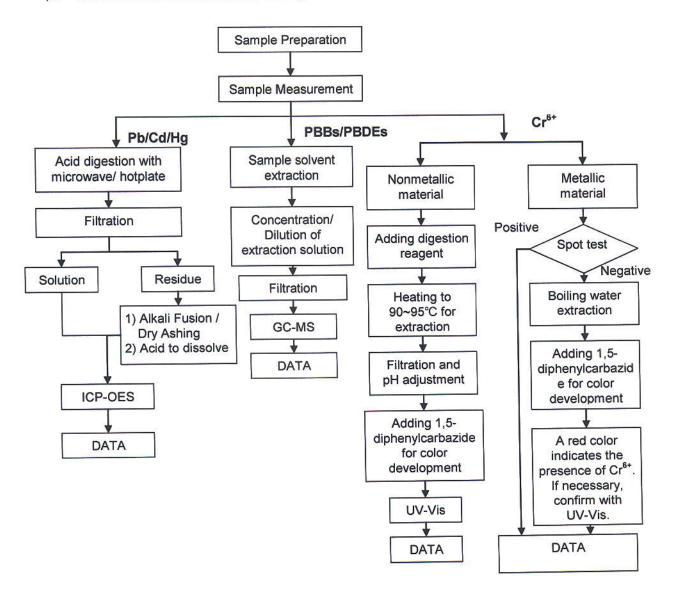
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Page 4 of 7

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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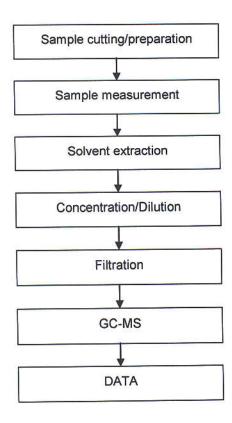
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Date: 19 Nov 2012

Page 5 of 7

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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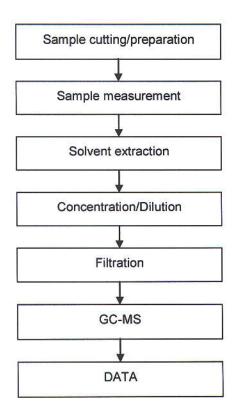
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Date: 19 Nov 2012

Page 6 of 7

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



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No. SHAEC1219975401

Date: 19 Nov 2012

Page 1 of 6

3M CHINA LIMITED 222# TIAN LIN ROAD, SHANGHAI (200233)

The following sample(s) was/were submitted and identified on behalf of the clients as: 3M 3779-PG

SGS Job No.:

SP12-033081 - SH

Date of Sample Received:

14 Nov 2012

Testing Period:

14 Nov 2012 - 19 Nov 2012

Test Requested :

Selected test(s) as requested by client.

Test Method : Test Results : Please refer to next page(s). Please refer to next page(s).

Signed for and on behalf of SGS-CSTC Ltd.

JJ Fan

Approved Signatory

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No. SHAEC1219975401

Date: 19 Nov 2012

Page 2 of 6

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

SHA12-199754.001 Brown solid

Remarks:

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

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

Halogen

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

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

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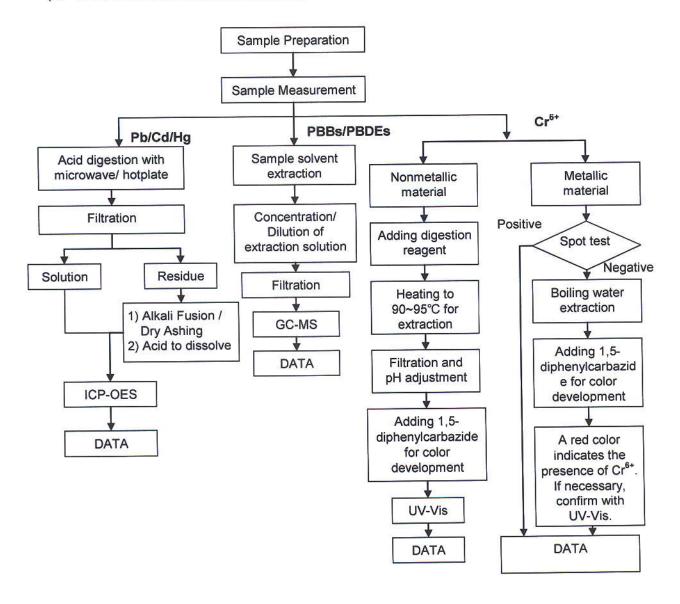
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Page 3 of 6

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. (Cr⁶⁺ and PBBs/PBDEs test method excluded)



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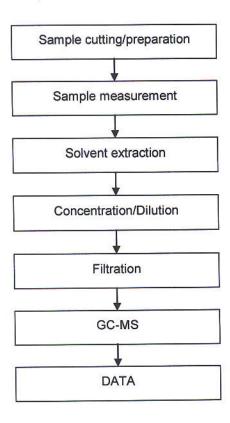
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Phthalates Testing Flow Chart

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



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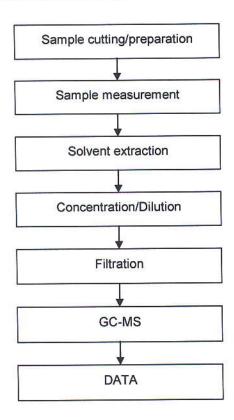
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HBCDD Testing Flow Chart

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



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Sample photo:



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Joy Zhou

Test Report Number: 131000457SHA-006

Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST I DES PLAINES, IL 600 ATTN: J. CABILAN / A	16		Da	ate: Oct. 29, 2013
Sample Descriptio One (1) s Part Desc Part Num	ubmitted sample said to be cription	: INK	(- ORANGE 900	**********	********
Tests conducted: As reques	sted by the applicant, for	details refer to	attached page(s).	**********	********
Conclusion: Tested sample Submitted sample	e **********			EC 62321 Edition 1.0: 2008 quoted from RoHS Directiv	
					To be continued
Prepared and che For Intertek Testi	eck by: ng Services Ltd., Shangh	ai	Authorized by: For Intertek testing	services Ltd., Shanghai	

Jonny Jing Manager



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

<u>Testing Item</u>	Result (ppm)	
Heavy Metal		
Cadmium (Cd) content	ND	
Lead (Pb) content	ND	
Mercury (Hg) content	ND	
Chromium VI (Cr ⁶⁺) content	ND	
Polybrominated Biphenyls (PBBs)		
Monobrominated Biphenyls (MonoBB)	ND	
Dibrominated Biphenyls (DiBB)	ND	
Tribrominated Biphenyls (TriBB)	ND	
Tetrabrominated Biphenyls (TetraBB)	ND	
Pentabrominated Biphenyls (PentaBB)	ND	
Hexabrominated Biphenyls (HexaBB)	ND	
Heptabrominated Biphenyls (HeptaBB)	ND	
Octabrominated Biphenyls (OctaBB)	ND	
Nonabrominated Biphenyls (NonaBB)	ND	
Decabrominated Biphenyl (DecaBB)	ND	
Polybrominated Diphenyl Ethers (PBDEs)		
Monobrominated Diphenyl Ethers (MonoBDE)	ND	
Dibrominated Diphenyl Ethers (DiBDE)	ND	
Tribrominated Diphenyl Ethers (TriBDE)	ND	
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND	
Pentabrominated Diphenyl Ethers (PentaBDE)	ND	
Hexabrominated Diphenyl Ethers (HexaBDE)	ND	
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND	
Octabrominated Diphenyl Ethers (OctaBDE)	ND	
Nonabrominated Diphenyl Ethers (NonaBDE)	ND	
Decabrominated Diphenyl Ether (DecaBDE)	ND	
Halogen Content		
Fluorine (F)	ND	
Chlorine (CI)	63900	
Bromine (Br)	ND	
lodine (I)	ND	

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

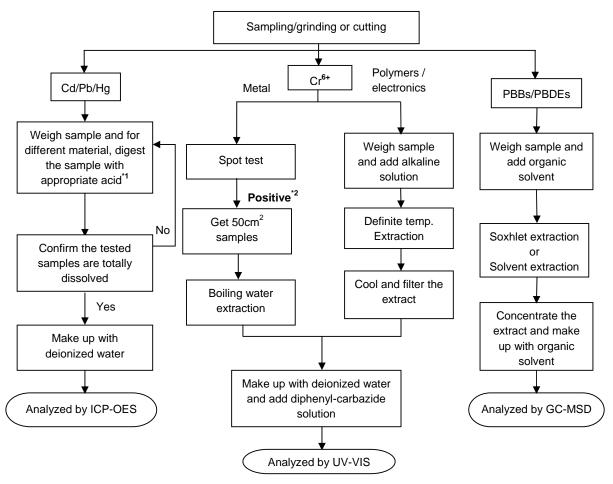
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO _{3,} HCL,H ₂ O _{2,} HBF ₄

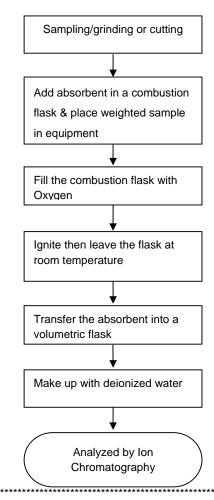
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

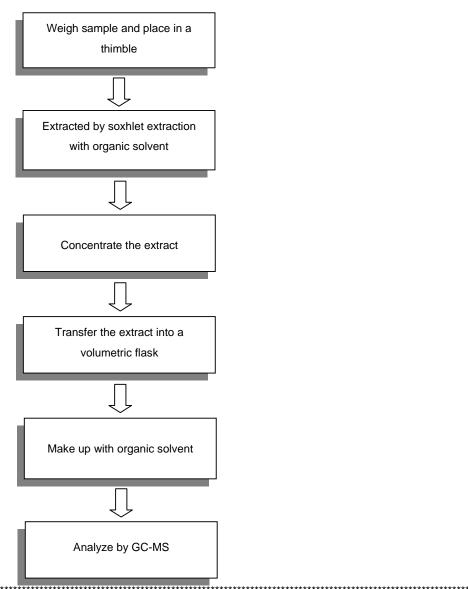
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(II) Test method:

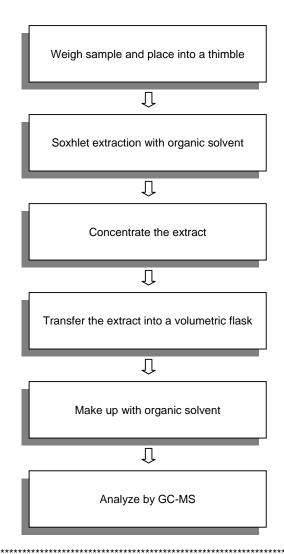
Testing item		Testing method	Reporting limit
HBCDD (hexabrom	locyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm
**********	********	*****************	*******



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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



Tests Conducted



Picture was provided by applicant

End of report

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Joy Zhou

Test Report Number: 131000457SHA-001

Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST I DES PLAINES, IL 600 ATTN: J. CABILAN / A	16		Date:	Oct. 29, 2013
Sample Description One (1) s Part Desc Part Num	ubmitted sample said to be cription	: INK	- BLACK 902	*******	*******
Tests conducted: As reques	sted by the applicant, for	details refer to	attached page(s).	******	*******
Conclusion: Tested sample Submitted sample	Э	and maximum 2011/65/EU	e to test method of IEC 62321 n concentration limits quoted fro	om RoHS Directive	Result Pass
*******	**********	******	*************************	**********	To be continued
Prepared and che For Intertek Testi	eck by: ng Services Ltd., Shangh	ai	Authorized by: For Intertek testing services l	_td., Shanghai	

Jonny Jing Manager



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

Testing Item	Result (ppm)	
Heavy Metal		
Cadmium (Cd) content	ND	
Lead (Pb) content	ND	
Mercury (Hg) content	ND	
Chromium VI (Cr ⁶⁺) content	ND	
Polybrominated Biphenyls (PBBs)		
Monobrominated Biphenyls (MonoBB)	ND	
Dibrominated Biphenyls (DiBB)	ND	
Tribrominated Biphenyls (TriBB)	ND	
Tetrabrominated Biphenyls (TetraBB)	ND	
Pentabrominated Biphenyls (PentaBB)	ND	
Hexabrominated Biphenyls (HexaBB)	ND	
Heptabrominated Biphenyls (HeptaBB)	ND	
Octabrominated Biphenyls (OctaBB)	ND	
Nonabrominated Biphenyls (NonaBB)	ND	
Decabrominated Biphenyl (DecaBB)	ND	
Polybrominated Diphenyl Ethers (PBDEs)		
Monobrominated Diphenyl Ethers (MonoBDE)	ND	
Dibrominated Diphenyl Ethers (DiBDE)	ND	
Tribrominated Diphenyl Ethers (TriBDE)	ND	
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND	
Pentabrominated Diphenyl Ethers (PentaBDE)	ND	
Hexabrominated Diphenyl Ethers (HexaBDE)	ND	
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND	
Octabrominated Diphenyl Ethers (OctaBDE)	ND	
Nonabrominated Diphenyl Ethers (NonaBDE)	ND	
Decabrominated Diphenyl Ether (DecaBDE)	ND	
Halogen Content		
Fluorine (F)	ND	
Chlorine (CI)	100	
Bromine (Br)	ND	
lodine (I)	ND	

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

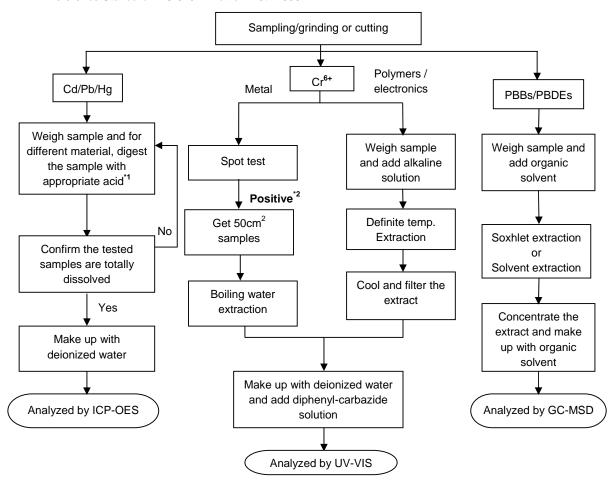
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO _{3,} HCL,H ₂ O _{2,} HBF ₄

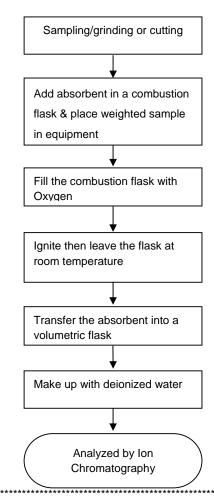
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

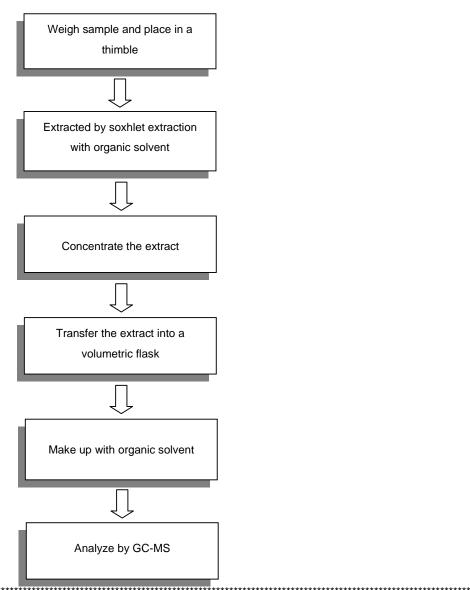
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(II) Test method:

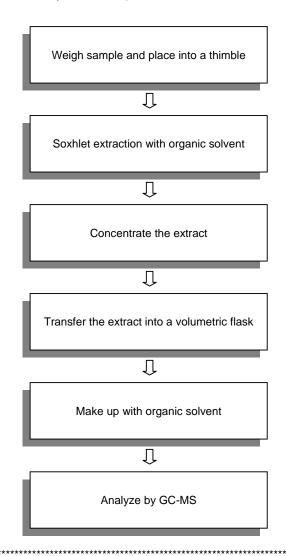
Testing item		Testing method	Reporting limit
HBCDD (hexabrom	locyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm
······································			



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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

resting period. Oct. 10, 2010 10 Oct. 23, 2010



Tests Conducted



Picture was provided by applicant

End of report

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Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST H DES PLAINES, IL 600 ATTN: J. CABILAN / A	16	ΓA JR	Date:	Oct. 29, 2013
Sample Description One (1) so Part Description Part Num	ubmitted sample said to b cription ber	:	w ink INK - YELLOW 425903	******	*******
Tests conducted:		-1-4-11	for to all other description		
As reques	sted by the applicant, for o	details re	erer to attached page(s).	******	******
Conclusion: Tested sample Submitted sample)		 ference to test method of IEC 62321 Edition ximum concentration limits quoted from Rol		Result Pass
**********	******************	******	*****************	*******	To be continued

Prepared and check by: For Intertek Testing Services Ltd., Shanghai Authorized by: For Intertek testing services Ltd., Shanghai Joy Zhou Jonny Jing Manager



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

Testing Item	Result (ppm)
Heavy Metal	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr ⁶⁺) content	ND
Polybrominated Biphenyls (PBBs)	
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Nonabrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)	
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Nonabrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND
Halogen Content	
Fluorine (F)	ND
Chlorine (CI)	7050
Bromine (Br)	ND
lodine (I)	ND

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

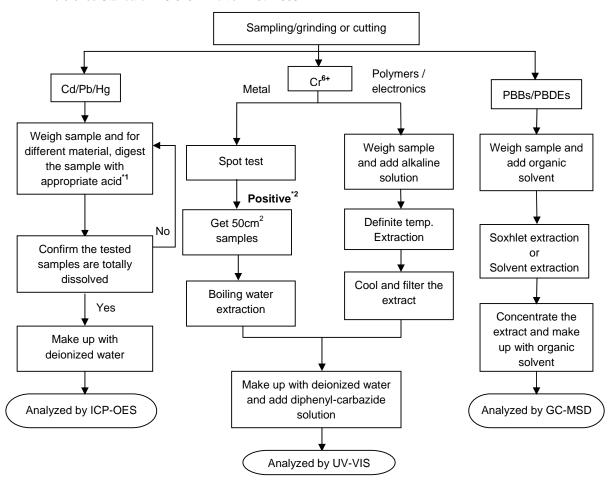
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCl,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO ₃ ,HCL,HF
Electronics	HNO ₃ ,HCL,H ₂ O ₂ ,HBF ₄

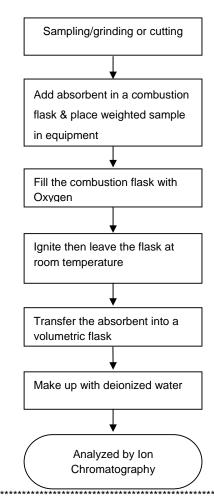
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

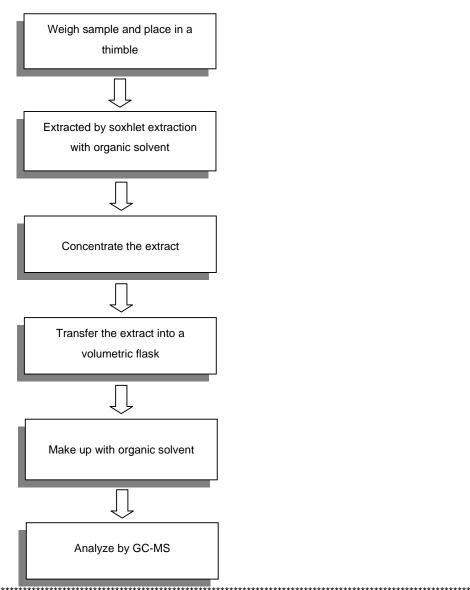
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(II) Test method:

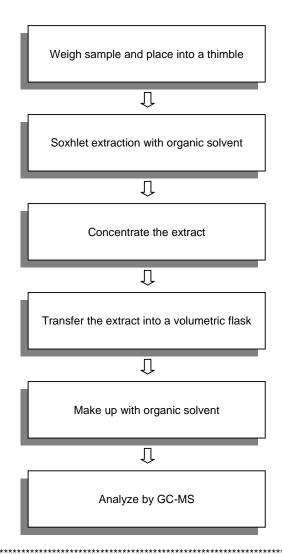
Testing item		Testing method	Reporting limit
HBCDD (hexabrom	locyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm
······································			



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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



Tests Conducted



Picture was provided by applicant

End of report

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

Joy Zhou

Test Report Number: 131000457SHA-003

Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST I DES PLAINES, IL 600 ATTN: J. CABILAN / A	HWY 16	: Oct. 29, 2013
Part Desc Part Num ************************************	ubmitted sample said to loription uber uber	be: Brown ink : INK - BROWN : 425906 details refer to attached page(s).	******
Conclusion: Tested sample Submitted sample	***********	Standard With reference to test method of IEC 62321 Edition 1.0: 2008 and maximum concentration limits quoted from RoHS Directive 2011/65/EU	**************************************
*******	***************************************	***************************************	To be continued

Authorized by:

Jonny Jing Manager

For Intertek testing services Ltd., Shanghai



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

Testing Item	Result (ppm)
Heavy Metal	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr ⁶⁺) content	ND
Polybrominated Biphenyls (PBBs)	
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Nonabrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)	
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Nonabrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND
Halogen Content	
Fluorine (F)	ND
Chlorine (CI)	9800
Bromine (Br)	ND
lodine (I)	ND

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

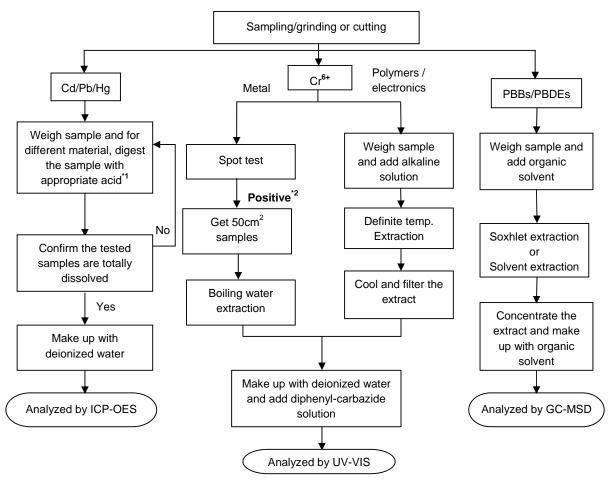
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO _{3,} HCL,H ₂ O _{2,} HBF ₄

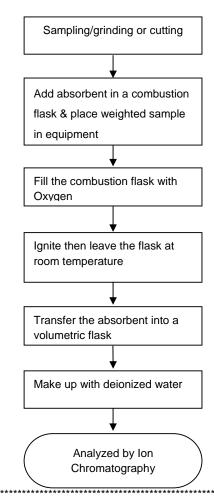
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

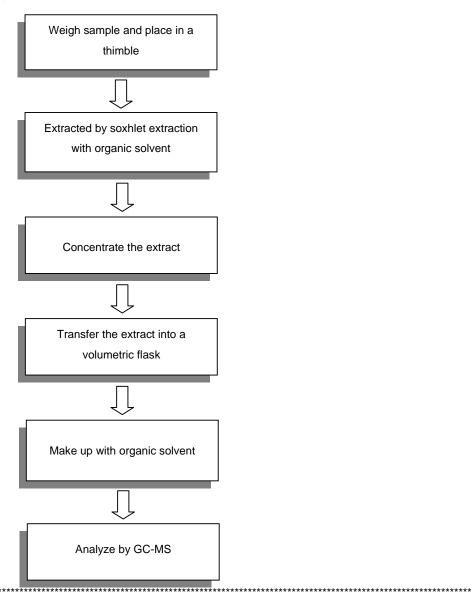
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(${\rm II}$) Test method:

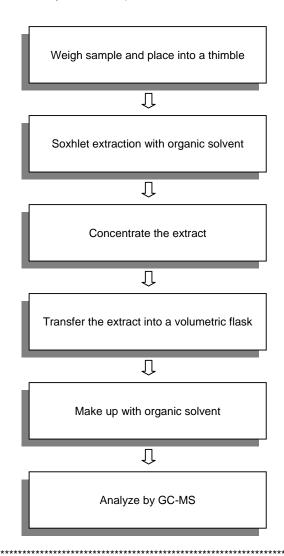
Testing item		Testing method	Reporting limit
HBCDD (hexabrom	locyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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



Tests Conducted



Picture was provided by applicant

End of report

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Joy Zhou

Test Report Number: 131000457SHA-004

Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST I DES PLAINES, IL 600 ATTN: J. CABILAN / A	16		Date	Oct. 29, 2013
Sample Descriptio One (1) s Part Desc Part Num	submitted sample said to be cription	: INK	(- GREEN 1907	***********	*****
Tests conducted: As reque	sted by the applicant, for	details refer to	attached page(s).	*******	*******
Conclusion: <u>Tested sample</u> Submitted sampl		and maximur 2011/65/EU	ee to test method of IEC 62 n concentration limits quote	ed from RoHS Directive	Result Pass
***********	*********	******	***********	**********	To be continued
Prepared and che For Intertek Testi	eck by: ing Services Ltd., Shangh	ai	Authorized by: For Intertek testing service	ces Ltd., Shanghai	

Jonny Jing Manager



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

Testing Item	Result (ppm)			
Heavy Metal				
Cadmium (Cd) content	ND			
Lead (Pb) content	ND			
Mercury (Hg) content	ND			
Chromium VI (Cr ⁶⁺) content	ND			
Polybrominated Biphenyls (PBBs)				
Monobrominated Biphenyls (MonoBB)	ND			
Dibrominated Biphenyls (DiBB)	ND			
Tribrominated Biphenyls (TriBB)	ND			
Tetrabrominated Biphenyls (TetraBB)	ND			
Pentabrominated Biphenyls (PentaBB)	ND			
Hexabrominated Biphenyls (HexaBB)	ND			
Heptabrominated Biphenyls (HeptaBB)	ND			
Octabrominated Biphenyls (OctaBB)	ND			
Nonabrominated Biphenyls (NonaBB)	ND			
Decabrominated Biphenyl (DecaBB)	ND			
Polybrominated Diphenyl Ethers (PBDEs)	·			
Monobrominated Diphenyl Ethers (MonoBDE)	ND			
Dibrominated Diphenyl Ethers (DiBDE)	ND			
Tribrominated Diphenyl Ethers (TriBDE)	ND			
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND			
Pentabrominated Diphenyl Ethers (PentaBDE)	ND			
Hexabrominated Diphenyl Ethers (HexaBDE)	ND			
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND			
Octabrominated Diphenyl Ethers (OctaBDE)	ND			
Nonabrominated Diphenyl Ethers (NonaBDE)	ND			
Decabrominated Diphenyl Ether (DecaBDE)	ND			
Halogen Content				
Fluorine (F)	ND			
Chlorine (CI)	700			
Bromine (Br)	ND			
lodine (I)	ND			

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

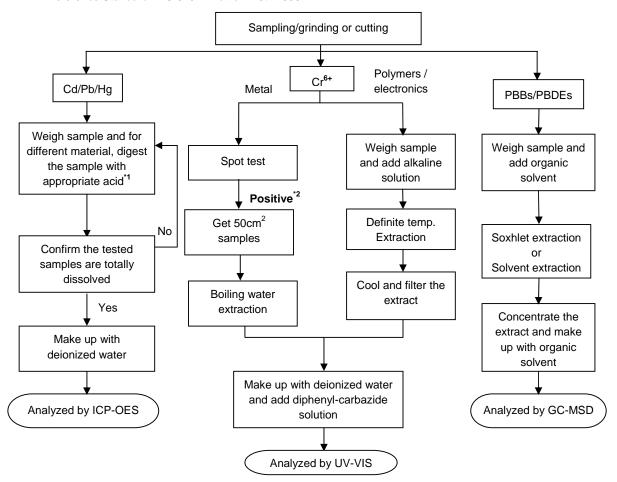
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO _{3,} HCL,H ₂ O _{2,} HBF ₄

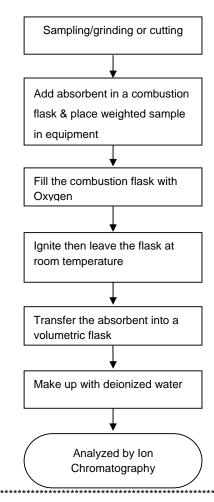
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

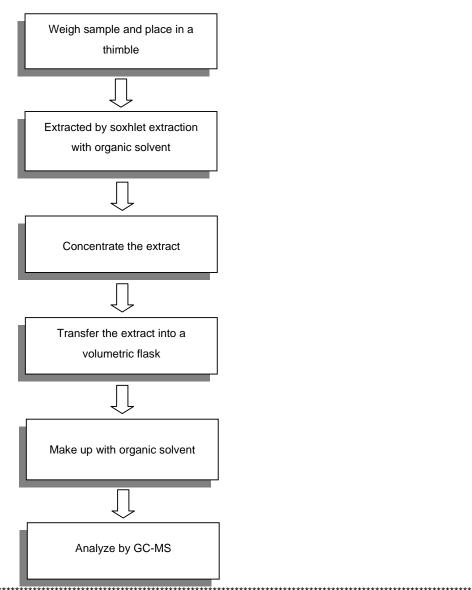
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)
HBCDD (hexabromocyclododecane)	ND

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(${\rm II}$) Test method:

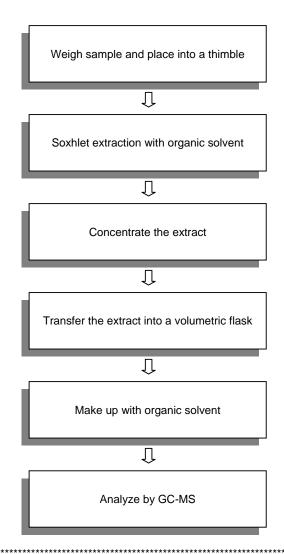
Testing item		Testing method	Reporting limit
	HBCDD (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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



Tests Conducted



Picture was provided by applicant

End of report

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Joy Zhou

Test Report Number: 131000457SHA-008

Applicant:	LITTELFUSE, INC. 800 E. NORTHWEST I DES PLAINES, IL 600 ATTN: J. CABILAN / A	16		Date	e: Oct. 29, 2013
Sample Descriptio One (1) s Part Desc Part Num	ubmitted sample said to be cription	: INK	(- VIOLET 1911 *********************************	********	*******
Tests conducted: As reques	sted by the applicant, for	details refer to	attached page(s).	**********	*******
Conclusion: Tested sample Submitted sample	e **********			C 62321 Edition 1.0: 2008 quoted from RoHS Directive	Result Pass
					To be continued
Prepared and che For Intertek Testi	eck by: ng Services Ltd., Shangh	ai	Authorized by: For Intertek testing s	services Ltd., Shanghai	

Jonny Jing Manager



Tests Conducted

RoHS testing and Halogen content

(I) Test Result Summary:

Testing Item	Result (ppm)
Heavy Metal	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr ⁶⁺) content	ND
Polybrominated Biphenyls (PBBs)	
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Nonabrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)	
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Nonabrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND
Halogen Content	
Fluorine (F)	ND
Chlorine (CI)	7600
Bromine (Br)	ND
lodine (I)	ND

Remarks: ppm = parts per million = mg/kg

ND = not detected

Responsibility of Chemist: Dent Fang / Leaf Liu



Tests Conducted

(II) RoHS Requirement:

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

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

(III) Test Method:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Mercury (Hg) content	With reference to IEC 62321 edition 1.0:2008 in clause 7, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-VIS Spectrophotometer.	1 ppm
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 edition 1.0:2008 in Annex A, by solvent extraction and determined by GC-MSD and further HPLC confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by combustion flask with oxygen and determined by Ion Chromatography	50 ppm

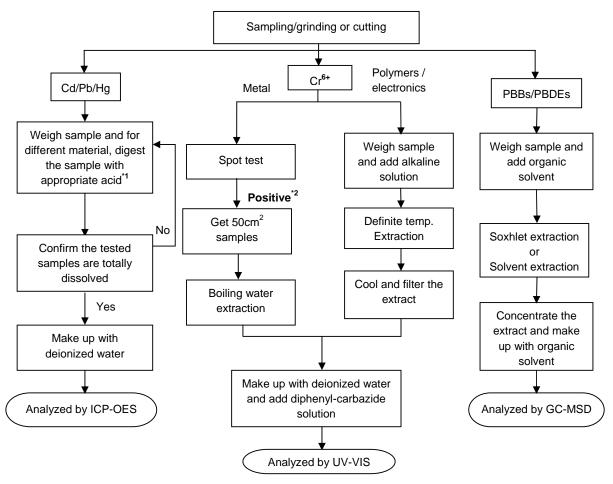
Remark: Reporting limit = Quantitation Limit of Analyze in Sample



Tests Conducted

(IV) Measurement Flowchart:

Test for Cd/ Pb/ Hg/Cr (VI)/ PBBs/PBDEs Contents Reference Standard: IEC 62321 Edition 1.0: 2008



Remarks:

*1: List of appropriate acid:

erle le control account	
MATERIAL	ACID ADDED FOR DIGESTION
Polymers	HNO ₃ ,HCI,HF,H ₂ O ₂ ,H ₃ BO ₃
Metals	HNO _{3,} HCL,HF
Electronics	HNO _{3,} HCL,H ₂ O _{2,} HBF ₄

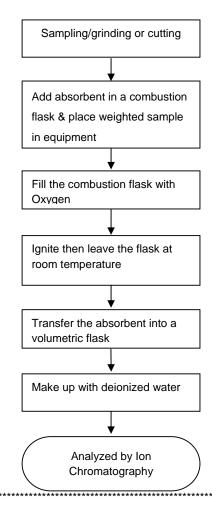
*2: If the result of spot test is positive, Chromium (VI) would be determined as detected.



Tests Conducted

(V) Measurement flowchart:

Test or Halogen content Reference standard: EN 14582





Tests Conducted

2. Phthalate content test

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

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

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

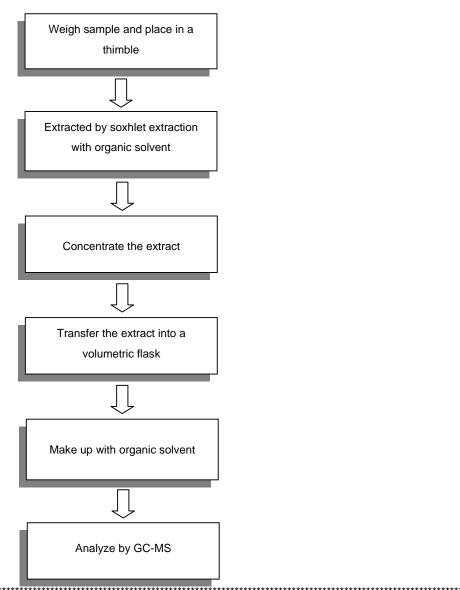
ND = Not Detected



Tests Conducted

Measurement flowchart:

Test for **phthalate** content





Tests Conducted

3. HBCDD content

(I)Test result summary:

Testing item	Result (ppm)	
HBCDD (hexabromocyclododecane)	ND	

Remarks: ppm = parts per million = mg/kg

ND = Not detected

(${\rm II}$) Test method:

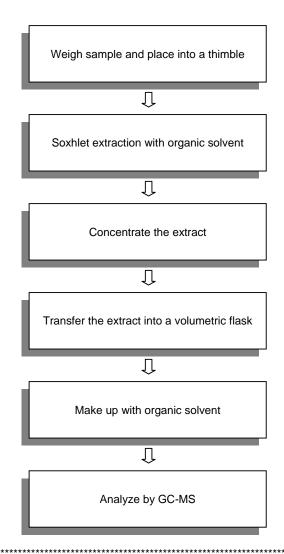
	Testing item	Testing method	Reporting limit	
	IHB(:I)I) (hexabromocyclododecane)	With reference to US EPA 3540C, by solvent extraction and determined by GC-MS	10 ppm	
********	***************************************			



Tests Conducted

Measurement flowchart:

Test for HBCDD (hexabromocyclododecane) content





Tests Conducted

4. Total Antimony (Sb) Content

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

Result: <10ppm

Remark: ppm = parts per million = mg/kg

Date sample received: Oct. 16, 2013

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



Tests Conducted



Picture was provided by applicant

End of report

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Test Report

RHS01F007483001 Report No.

Page 1 of 4

Applicant

TAILY HONG TRADING CO.,LTD

Address

FLAT 6, G/F., BLOCK A, VIGOR IND, BLDG, 14-20 CHEUNG TAT RD., TSING

YI , N. T. , HONG KONG .

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

Sample Name

Beryllium bronze

Part No.

C17200

Sample Received Date

Jul. 11, 2013

Testing Period

Jul. 11, 2013 to Jul. 15, 2013

Test Requested

As specified by client, to test Lead(Pb), Cadmium(Cd), Mercury(Hg),

Hexavalent Chromium(Cr(VI)) in the submitted sample(s).

Test Method

Test Item(s)	Test Method	Measured Equipment(s)
Lead(Pb)	IEC 62321:2008 Ed.1 Sec.9	ICP-OES
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.9	ICP-OES
Mercury(Hg)	IEC 62321:2008 Ed.1 Sec.7	ICP-OES
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis

Test Result(s)

Please refer to the following page(s).

Reviewed by Jul. 15, 2013 Danny Liu Technical Manager

No. 1012255348

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



Test Report

Report No. RHS01F007483001

Page 2 of 4

Test Result(s)

Tested Item(s)	Result	MDL
Lead(Pb)	N.D.	2 mg/kg
Cadmium (Cd)	N.D.	2 mg/kg
Mercury(Hg)	N.D.	2 mg/kg
Hexavalent Chromium(Cr(VI))	Negative	1

Tested Sample/Part Description

Cupreous metal wire

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

-Negative = Absence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with $50 cm^2$ sample surface area used.





Test Report

Page 3 of 4 RHS01F007483001 Report No. **Test Process** 1. Lead(Pb), Cadmium(Cd) Weigh sample and place it in a conical flask Digest the sample Add digestion reagent Dry Ashing/ Residue Alkali Fusion/ Filtration Acid Dissolution Make up with Analyzed by ICP-OES deionized water Solution 2. Mercury(Hg) Digest sample in microwave Weigh sample and place it in a microwave digestion vessel Add digestion reagent digestion oven Dry Ashing/ Residue Alkali Fusion/ Filtration Make up with Acid Dissolution Analyzed by deionized water ICP-OES Solution 3. Hexavalent Chromium(Cr(VI)) Filter and remove Extraction with Select a test sample the sample measuring about 50±5cm2 boiling water Adjust the pH value Analyzed by UV-Vis Add test solution of the solution

CTi 华测检测

