



## ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: TR5

Product #: 382xxxxxxx, and 383xxxxxxx Series

Issue Date: May 07, 2013

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (2011/65/EU – recast of EU Directive 2002/95/EC)-restricted substance nor such use, for materials to be used for unit parts, for packing/package materials, and for additives and the like in the manufacturing processes. In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/package materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by:

A handwritten signature in black ink, appearing to read 'Jenny'.

JENNY DINGLASAN

<Global EHS Specialist>

(1) Parts, sub-materials and unit parts

This document covers the TR5 RoHS-Compliant series products manufactured by Littelfuse, Inc.

< Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

Remarks :

**Table 1: List of Raw Materials covered by this report**

<b>Total Parts</b>	<b>Raw Material Part Number</b>	<b>Raw Material Description</b>	<b>Page(s)</b>
1	DRCUxxx	Element – Tinned Copper wires	3-10
2	DRAGxxx	Element – Silver Plated Wires	11-15
3	LOZZ194(692213)	Solder Wire	16-21
4	910-016	Plastic Cap	22-30
5	867-00x	Socket with Pin	31-42
6	GLZZ013 (GLZZxxx)	Yarn-Glass Fibre	43-49
7	FUSA006 (090125)	Filler Sand	50-56



**Test Report**

Number : TWNC00296620

Applicant: Elschukom Elektroschutzkomponentenbau  
GmbH  
Gewerbestrasse 87, D-98669 Veilsdorf,  
Germany

Date : Jan 30, 2013

**Sample Description:**

One (1) group of submitted samples said to be :  
Sample Description : Tin plated Wires  
Style / Item No. : Please see page two to three.  
Country of Origin : Germany  
Date Sample Received : Jan 23, 2013  
Date Test Started : Jan 23, 2013

**Test Conducted :**

As requested by the applicant, for details please refer to attached pages.

Authorized by:  
On Behalf of Intertek Testing Services  
Taiwan Limited



K. Y. Liang  
Director



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**Intertek Testing Services Taiwan Ltd.**

8F., No. 423, Ruiguang Rd., Neihu District, Taipei 11492, Taiwan, R.O.C.

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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

**Test Report**

Number : TWNC00296620

## Sample Description:

Style / Item No. : (A-1)101--271.0---  
- tin plated copper wire - Cu, Sn--%

(A-2)101--283.0---  
- tin plated, copper plated copper nickel alloy wire  
- Elcon30, Sn--%

(A-3)101--272.0---  
- tin plated, copper plated steel wire - ElconF, Sn--%

(A-4)101--281.0---  
- tin plated, copper plated iron nickel alloy wire  
- ElconD, Sn--%

(A-5)101--221.0---  
- tin plated copper nickel alloy wire - CuNi44, Sn--%

(A-6)101--24-.0---  
- tin plated, silver plated copper wire - Cu, Ag--%, Sn--%

(A-7)101--257.0---  
- tin plated brass wire - Cu80Zn20, Sn--%

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Taiwan Limited



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Director



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**Test Report**

Number : TWNC00296620

## Sample Description:

Style / Item No. : (A-9)101--234.0---  
- tin plated silver copper alloy wire  
- AgCu90, Sn--% (ElCu90, Sn--%)

(A-10)101--255.-----  
- tin plated copper zinc alloy wire - Cu70Zn30, Sn--%

(A-11)101--229.-----  
- tin plated copper nickel alloy wire - CuNi12, Sn--%

(A-12)101--235.-----  
- tin plated silver copper alloy wire - Ag72Cu28, Sn--%

(A-13)101--231.-----  
- tin plated silver wire - Ag1000, Sn--%

(A-14)101--236.-----  
- tin plated silver copper alloy wire  
- Ag45Cu55, Sn--%(AgCu55, Sn)

(A-15)101--266.-----  
- tin plated silver copper alloy wire  
- AgCu70, Sn--%(ElCu70, Sn)

(A-16)101--238.-----  
- tin plated silver copper alloy wire  
- AgCu80, Sn--%(Elcu80, Sn)

(A-17)101--228.0---  
- tin plated tungsten wire - W, Sn

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Taiwan Limited



---

K. Y. Liang  
Director



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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00296620

Test Conducted

( I ) Test Result Summary:

<u>Test Item</u>	<u>Unit</u>	<u>Test Method</u>	<u>Result</u>	<u>RL</u>
			<u>Mixed all kinds of metal wire</u>	
<b>Heavy Metal</b>				
Cadmium (Cd) content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	2
Lead (Pb) content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	37	2
Mercury (Hg) content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	2
Chromium VI (Cr <sup>6+</sup> ) content	mg/kg with 50 cm <sup>2</sup>	With reference to IEC 62321: 2008, by boiling water extraction and determined by UV-Vis Spectrophotometer.	Negative (#)	0.02

Remarks: ppm = parts per million based on weight of tested sample = mg/kg  
 ND = Not detected  
 RL = Reporting Limit, Quantitation limit of analyte in sample  
 mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimeter  
 Negative = A negative test result indicated positive observation was not found at the time of Test. When the spot test showed a negative result, the boiling water extraction procedure shall be used to verify the result.  
 # = Due to the insufficient sample area, reduced total sample surface of 10 cm<sup>2</sup> was used and the dilution factor was adjusted accordingly.

Responsibility of Chemist: Kevin Liu/ Irene Chiou

Date Sample Received : Jan 23, 2013

Test Period : Jan 23, 2013 To Jan 29, 2013



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Number : TWNC00296620

Test Conducted

(II) RoHS Limits:

<u>Restricted Substances</u>	<u>Limits</u>
Cadmium (Cd) content	0.01% (100ppm)
Lead (Pb) content	0.1% (1000ppm)
Mercury (Hg) content	0.1% (1000ppm)
Chromium VI (Cr <sup>6+</sup> ) content	0.1% (1000ppm)

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.

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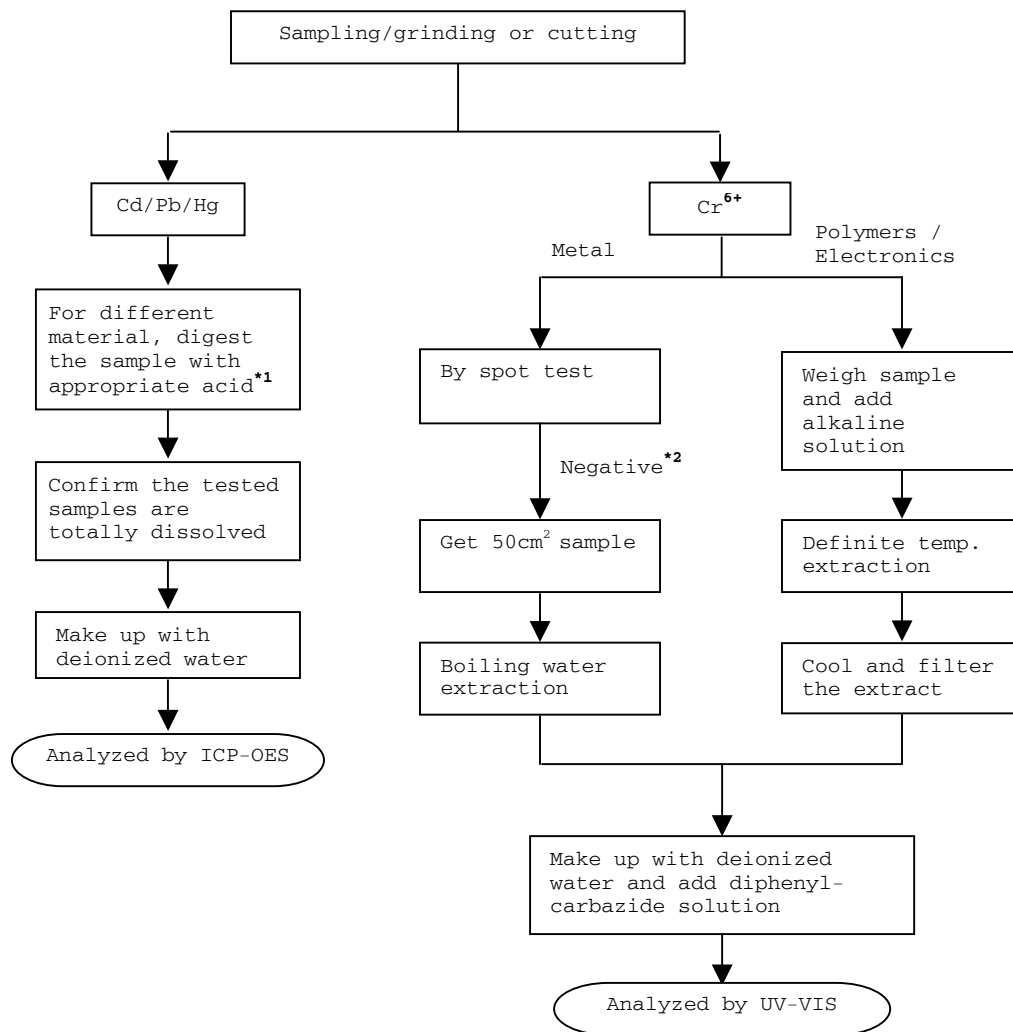
Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Test Conducted

## (III) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (VI)

Reference Standard: IEC 62321 edition 1.0:2008







Number : TWNC00296620

Test Conducted

Remarks:

\*1: List of Appropriate Acid:

Material	Acid Added for Digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

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End of Report

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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00296620

Test Conducted

**Photo**



Applicant: ELSCHUKOM ELEKTROSCHUTZKOMPONENTENBAU  
GMBH  
GEWERBESTRASSE 87,D-98669 VEILSDORF,  
GERMANY

Date: JAN 18, 2013

**Sample Description:**

Two(2) pieces of submitted samples said to be :

**(1) Mixed all kinds of metal substrates.**

**(2) Mixed all kinds of plating layers.**

Item Name

: Silver Plated & Pure Silver Wires.

Item No.

: (B-1) 101.014 -. ----

– silver plated copper wire – Cu, Ag--%

(B-2) 101.0131.----

– pure silver wire – Ag 1000

(B-3) 101.0123.0---

– silver plated purest nickel wire – Ni99.98%, Ag1%

(B-4) 101.0182.0---

– silver-copper alloy plated copper plated iron nickel alloy wire

– ElconD, AgCu5%

(B-5) 101.0120.0---

– silver plated constantan wire – CuNi44, Ag5%

(B-6) 101.0151.0---

– silver plated copper - nickel 44 alloy wire

– CuNi44, Ag10%

(B-7) 1050--31.-----

– pure silver strips – Ag 1000 pure

Country Of Origin

: Germany.

**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



## Tests Conducted

## (A) Test result of RoHS Directive:

<u>Testing item</u>	<u>Result</u>
	(1)
Cadmium (Cd) content (mg/kg)	ND
Lead (Pb) content (mg/kg)	ND
Mercury (Hg) content (mg/kg)	ND
Chromium <sub>2</sub> (VI)(Cr <sup>6+</sup> ) result (by boiling water extraction on metal) (mg/kg with 50cm <sup>2</sup> )	ND

<u>Testing item</u>	<u>Result</u>
	(2)
Cadmium (Cd) content (mg/kg) /Plating	ND
Lead (Pb) content (mg/kg) /Plating	ND
Mercury (Hg) content (mg/kg) /Plating	ND
Chromium <sub>2</sub> (VI)(Cr <sup>6+</sup> ) result (by boiling water extraction on metal) (mg/kg with 50cm <sup>2</sup> ) /Plating	ND

Remark: mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimeter  
ND = not detected

## (B) RoHS Requirement:

<u>Restricted substances</u>	<u>Limits</u>
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>6+</sup> )	0.1% (1000 mg/kg)

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

## (C) Test method:

<u>Testing item</u>	<u>Testing method</u>	<u>Reporting limit</u>
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 <sup>6+</sup> ) content (for metal)	With reference to IEC 62321 Edition 1.0: 2008, by boiling water extraction and determined by UV-VIS Spectrophotometer.	0.02mg/kg with 50cm <sup>2</sup> (in testing solution)

Date sample received: Jan.14, 2013

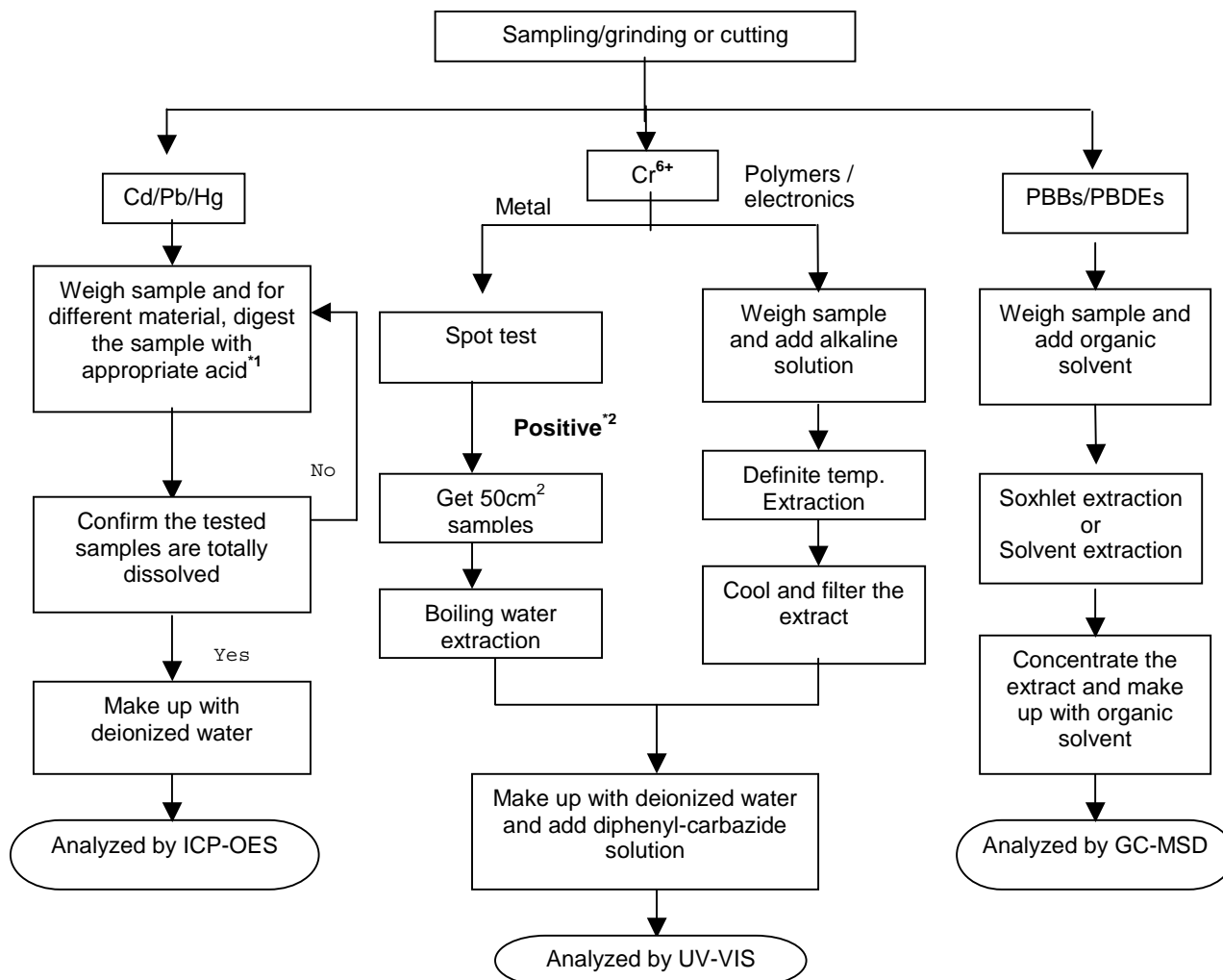
Testing period: Jan.14, 2013 To Jan.17, 2013

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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



Remarks:

\*1: list of appropriate acid:

Material	Acid added for digestion
Polymers	HNO <sub>3</sub> , HCL, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCL, HF
Electronics	HNO <sub>3</sub> , HCL, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

\*\*\*\*\*

To Be Continued

Tests Conducted



To Be Continued



Tests Conducted



End Of Report

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**Test Report**

Number : TWNC00282894

Applicant: Littelfuse Philippines Inc.  
LIMA Technology Center, Lipa City,  
Malvar, Batangas

Date : Nov 01, 2012

**Sample Description:**

One (1) group of submitted samples said to be :

Part Description : Solder wire

Part Number : 692213

Date Sample Received : Oct 24, 2012

Date Test Started : Oct 25, 2012

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**Test Conducted :**

As requested by the applicant, for details please refer to attached pages.

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Authorized By:

On Behalf Of Intertek Testing Services  
Taiwan Limited



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K. Y. Liang  
Director



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**Intertek Testing Services Taiwan Ltd.**

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Number : TWNC00282894

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Silvery Metal Wire</u>
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	84
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content (mg/kg with 50cm <sup>2</sup> )	Negative (< 0.02)

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg  
 ND = Not detected  
 < = Less than  
 mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimetre  
 Negative = A negative test result indicated positive observation was not found at the time of Test.

Responsibility of Chemist : Irene Chiou / Kevin Liu

Date Sample Received : Oct 24, 2012

Test Period : Oct 25, 2012 To Nov 01, 2012

( II ) RoHS Limits:

<u>Restricted Substances</u>	<u>Limits</u>
Cadmium (Cd) Content	0.01% (100ppm)
Lead (Pb) Content	0.1% (1000ppm)
Mercury (Hg) Content	0.1% (1000ppm)
Chromium VI (Cr <sup>6+</sup> ) Content	0.1% (1000ppm)

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.



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## Test Conducted

## (III) Test Method:

Test Item	Test 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 ( $\text{Cr}^{6+}$ ) content	With reference to IEC 62321 edition 1.0:2008 in annex B, by boiling water extraction and determined by UV-Vis Spectrophotometer.	0.02 mg/kg with 50cm <sup>2</sup>

Remark: Reporting limit = Quantitation limit of analyte in sample

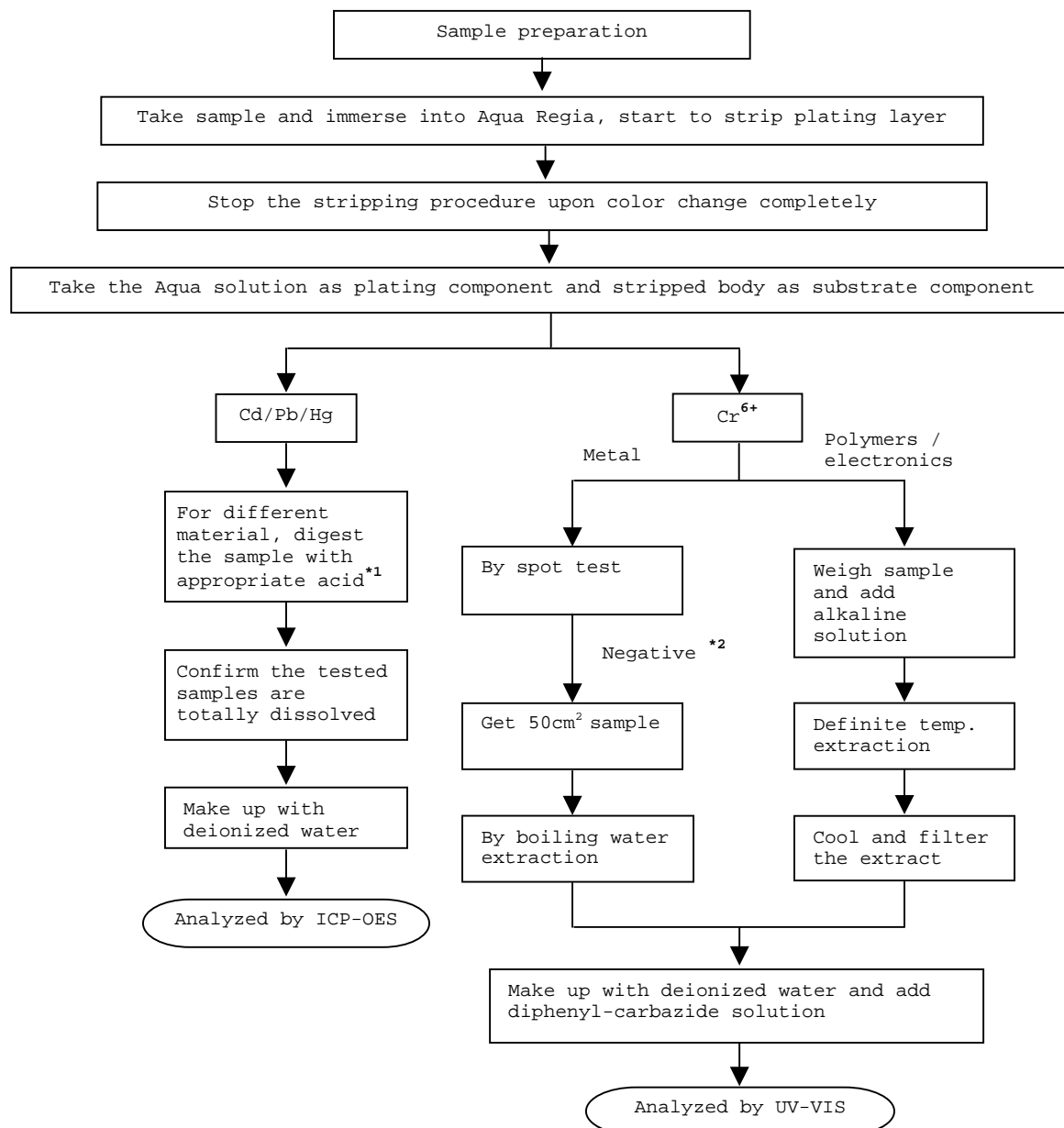


## Test Conducted

## (IV) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (VI)

Reference Standard : IEC 62321 edition 1.0:2008





Number : TWNC00282894

Test Conducted

Remarks:

\*1: List of Appropriate Acid:

<u>Material</u>	<u>Acid Added for Digestion</u>
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

End of Report

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Number : TWNC00282894

Test Conducted

Photo





**Test Report**

Number : TWNC00282891

Applicant: Littelfuse Philippines Inc.  
LIMA Technology Center, Lipa City,  
Malvar, Batangas

Date : Oct 31, 2012

**Sample Description:**

One (1) group of submitted samples said to be :

Part Description : TRTE cap

Part Number : 910-017

Date Sample Received : Oct 24, 2012

Date Test Started : Oct 25, 2012

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**Test Conducted :**

As requested by the applicant, for details please refer to attached pages.

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Authorized By:

On Behalf Of Intertek Testing Services  
Taiwan Limited



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K. Y. Liang  
Director



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Number : TWNC00282891

Test Conducted

(I) Test Result Summary :

Test Item	Result (ppm)
	Brown Plastic
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	ND
Bromine (Br)	ND
Iodine (I)	ND



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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00282891

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Brown Plastic</u>
<b>Phthalates</b>	
Di(2-ethylhexyl) Phthalate (DEHP)	ND
Dibutyl Phthalate (DBP)	ND
Benzyl Butyl Phthalate (BBP)	ND
<b>Others</b>	
Hexabromocyclododecane (HBCDD)	ND

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg  
 ND = Not detected

Responsibility of Chemist : Irene Chiou / Kevin Liu / Cathy Chen

Date Sample Received : Oct 24, 2012

Test Period : Oct 25, 2012 To Oct 30, 2012

( II ) RoHS Limits:

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

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.





Test Conducted

(III) Test Method:

<u>Test Item</u>	<u>Test Method</u>	<u>Reporting Limit</u>
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 <sup>6+</sup> ) 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-MS and further HPLC-DAD 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-MS and further HPLC-DAD confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by calorimetric bomb with oxygen and determined by Ion Chromatograph.	50 ppm
Phthalates	With reference to EN 14372: 2004, by solvent extraction and determined by GC-MS.	50 ppm
Hexabromocyclododecane (HBCDD)	With reference to USEPA 3540C, by solvent extraction and determined by GC-MSD.	10 ppm

Remark: Reporting limit = Quantitation limit of analyte in sample

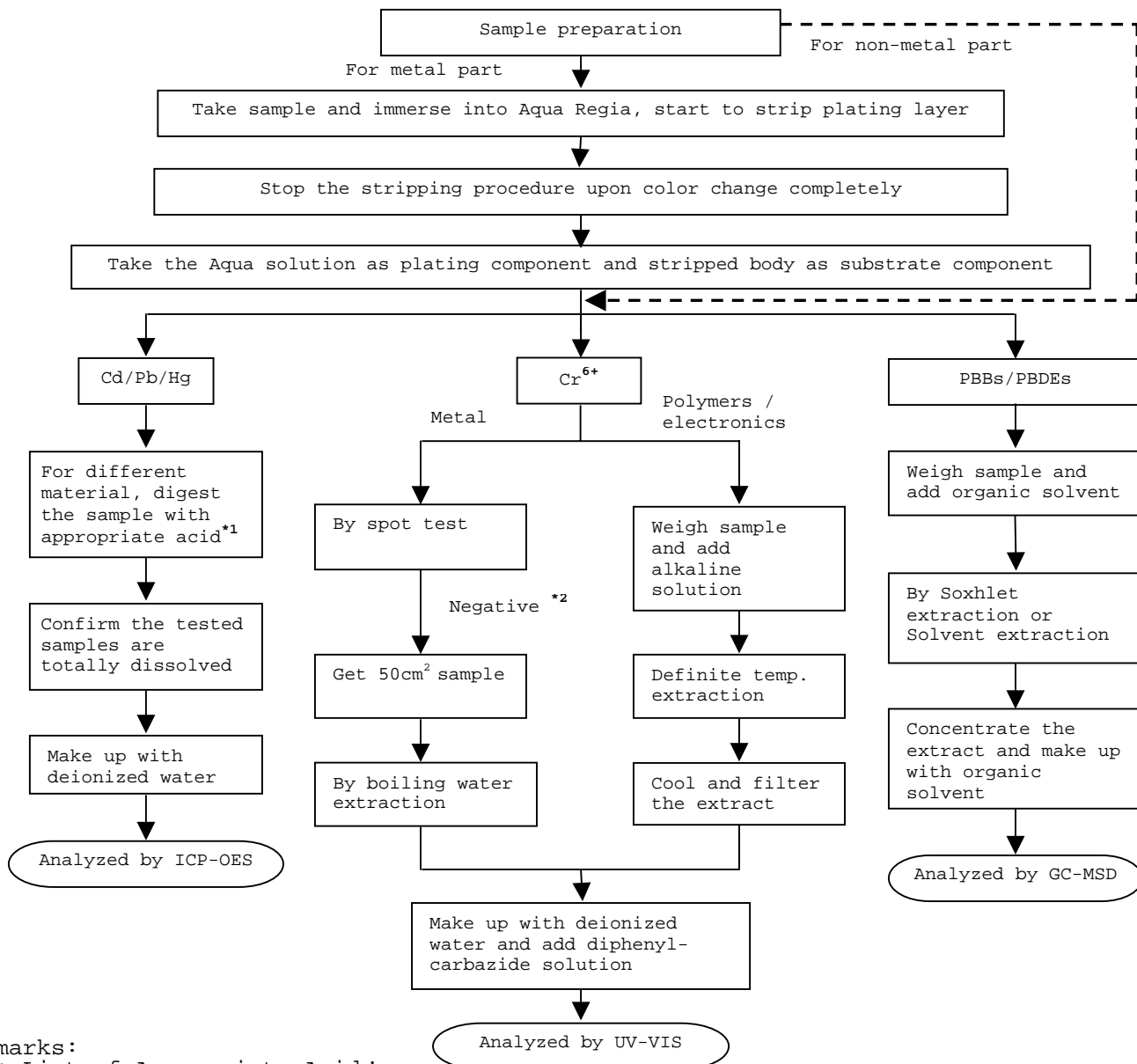


Test Conducted

(IV) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (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 <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

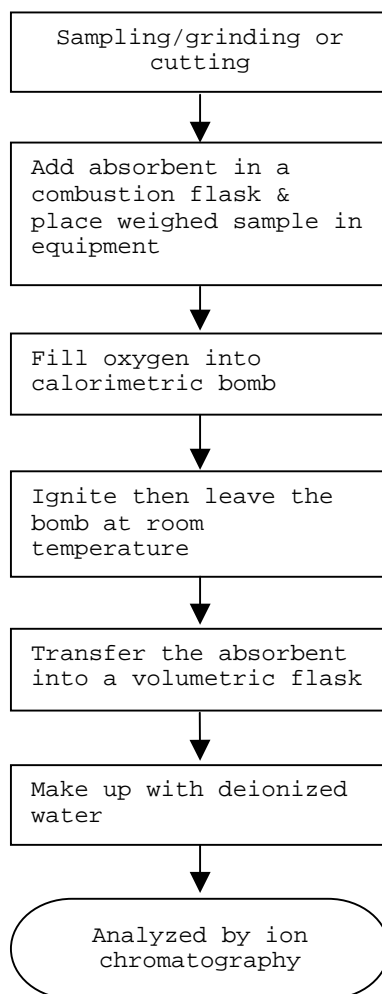


Test Conducted

(IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard: EN 14582

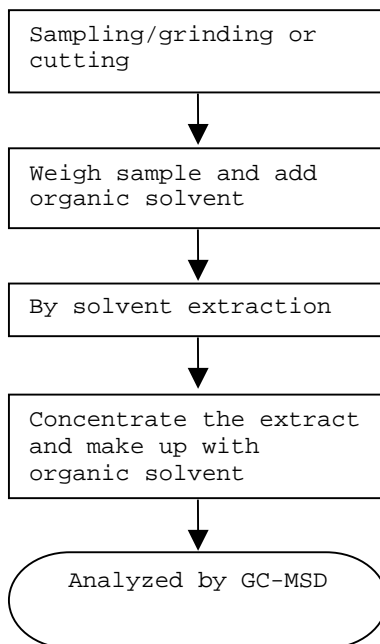


Test Conducted

(IV) Measurement Flowchart:

Test For Phthalates Contents

Reference Method: EN 14372: 2004

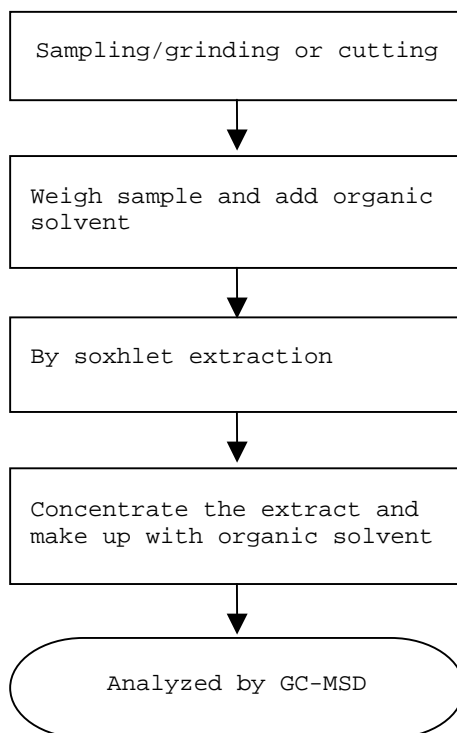


Test Conducted

(IV) Measurement Flowchart:

Test For Hexabromocyclododecane (HBCDD)

Reference Standard : USEPA 3540C



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End of Report

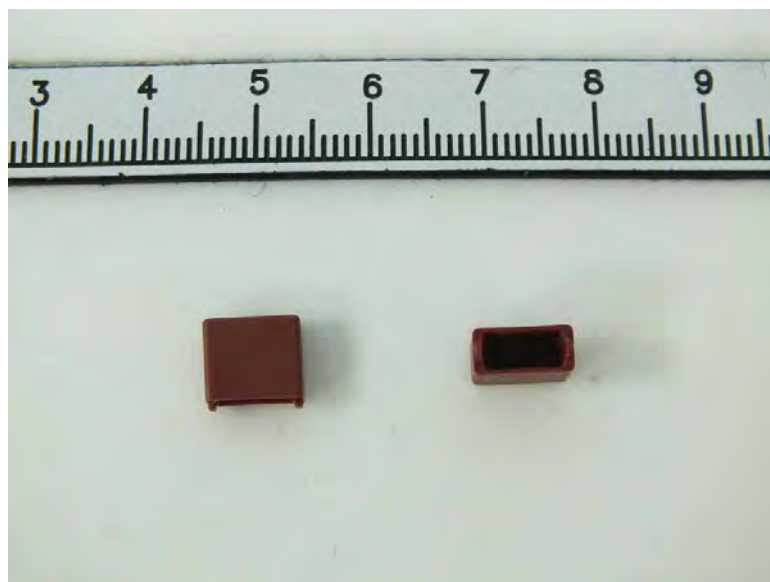
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Test Conducted

Number : TWNC00282891

Photo





**Test Report**

Applicant: Littelfuse, Inc.  
800 E. NORTHWEST HWY  
DESPLAINES IL 60016

Number : TWNC00304278

Date : Apr 03, 2013

Sample Description:

One (1) group of submitted samples said to be :  
Part Description : Socket with Pin  
Part Number : 867-003  
Date Sample Received : Mar 21, 2013  
Date Test Started : Mar 21, 2013

---

Test Conducted :

As requested by the applicant, for details please refer to attached pages.

---

Authorized by:  
On Behalf of Intertek Testing Services  
Taiwan Limited



---

K. Y. Liang  
Director



**Intertek Testing Services Taiwan Ltd.**

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全國公證檢驗股份有限公司

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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

## Test Conducted

## (I) Test Result Summary:

Test Item	Unit	Test Method	Result		RL
			(1)	(2)	
Heavy Metal					
Cadmium (Cd) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	ND	2
Lead (Pb) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	ND	2
Mercury (Hg) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	ND	2
Chromium VI (Cr <sup>6+</sup> ) Content	ppm	With reference to IEC 62321: 2008, by spot test.	Negative	Negative	1
Chromium VI (Cr <sup>6+</sup> ) Content	µg/cm <sup>2</sup>	With reference to IEC 62321: 2008, by boiling water extraction and determined by UV-Vis Spectrophotometer.	Negative	Negative	0.02





## Test Conducted

## (I) Test Result Summary:

<u>Test Item</u>	<u>Unit</u>	<u>Test Method</u>	<u>Result</u>	<u>RL</u>
			<u>(3)</u>	
<b>Heavy Metal</b>				
Cadmium (Cd) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	2
Lead (Pb) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	2
Mercury (Hg) Content	ppm	With reference to IEC 62321: 2008, by microwave digestion and determined by ICP-OES.	ND	2
Chromium VI (Cr <sup>6+</sup> ) Content	ppm	With reference to IEC 62321: 2008, by spot test.	Negative	1



## Test Conducted

## (I) Test Result Summary:

Test Item	Unit	Test Method	Result	RL
			(3)	
Polybrominated Biphenyls (PBBs)				
Monobrominated Biphenyls (MonoBB)	ppm	With reference to IEC 62321: 2008, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Biphenyls (DiBB)	ppm		ND	5
Tribrominated Biphenyls (TriBB)	ppm		ND	5
Tetrabrominated Biphenyls (TetraBB)	ppm		ND	5
Pentabrominated Biphenyls (PentaBB)	ppm		ND	5
Hexabrominated Biphenyls (HexaBB)	ppm		ND	5
Heptabrominated Biphenyls (HeptaBB)	ppm		ND	5
Octabrominated Biphenyls (OctaBB)	ppm		ND	5
Nonabrominated Biphenyls (NonaBB)	ppm		ND	5
Decabrominated Biphenyl (DecaBB)	ppm		ND	5
Polybrominated Diphenyl Ethers (PBDEs)				
Monobrominated Diphenyl Ethers (MonoBDE)	ppm	With reference to IEC 62321: 2008, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Diphenyl Ethers (DiBDE)	ppm		ND	5
Tribrominated Diphenyl Ethers (TriBDE)	ppm		ND	5
Tetrabrominated Diphenyl Ethers (TetraBDE)	ppm		ND	5
Pentabrominated Diphenyl Ethers (PentaBDE)	ppm		ND	5
Hexabrominated Diphenyl Ethers (HexaBDE)	ppm		ND	5
Heptabrominated Diphenyl Ethers (HeptaBDE)	ppm		ND	5
Octabrominated Diphenyl Ethers (OctaBDE)	ppm		ND	5
Nonabrominated Diphenyl Ethers (NonaBDE)	ppm		ND	5
Decabrominated Diphenyl Ether (DecaBDE)	ppm		ND	5



Number : TWNC00304278

Test Conducted

( I ) Test Result Summary:

Test Item	Unit	Test Method	Result	RL
			(3)	
Phthalates				
Di (2-ethylhexyl) Phthalate (DEHP)	ppm	With reference to EN 14372: 2004, by solvent extraction and determined by GC-MS.	ND	50
Dibutyl Phthalate (DBP)	ppm		ND	50
Benzyl Butyl Phthalate (BBP)	ppm		ND	50
Halogen Content				
Fluorine (F)	ppm	With reference to EN 14582:2007 by calorimetric bomb with oxygen and determined by Ion Chromatograph.	ND	50
Chlorine (Cl)	ppm		ND	50
Bromine (Br)	ppm		ND	50
Iodine (I)	ppm		ND	50
Others				
Hexabromo cyclododecane (HBCDD)	ppm	With reference to USEPA 3540C, by solvent extraction and determined by GC-MS.	ND	10

Remarks: ppm = parts per million based on weight of tested sample = mg/kg  
 ND = Not detected  
 RL = Reporting Limit, Quantitation limit of analyte in sample  
 mg/kg with 50cm<sup>2</sup> = milligram per kilogram with 50 square centimeter  
 Negative = A negative test result indicated positive observation was not found at the time of Test. When the spot test showed a negative result, the boiling water extraction procedure shall be used to verify the result.  
 # = Due to the insufficient sample area, reduced total sample surface of 10 cm<sup>2</sup> was used and the dilution factor was adjusted accordingly.  
 Samples were ground and randomly selected for test.

Tested Components

- (1) Coppey metal base material
- (2) Silvery plating layer
- (3) Black plastic body

Responsibility of Chemist: Kevin Liu/ Irene Chiou/ Vico Lin

Date Sample Received : Mar 21, 2013

Test Period : Mar 22, 2013 to Apr 03, 2013



Page 5 of 12

**Intertek Testing Services Taiwan Ltd.**

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全國公證檢驗股份有限公司

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Number : TWNC00304278

Test Conducted

(II) RoHS Limits:

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

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.

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Page 6 of 12

**Intertek Testing Services Taiwan Ltd.**

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全國公證檢驗股份有限公司

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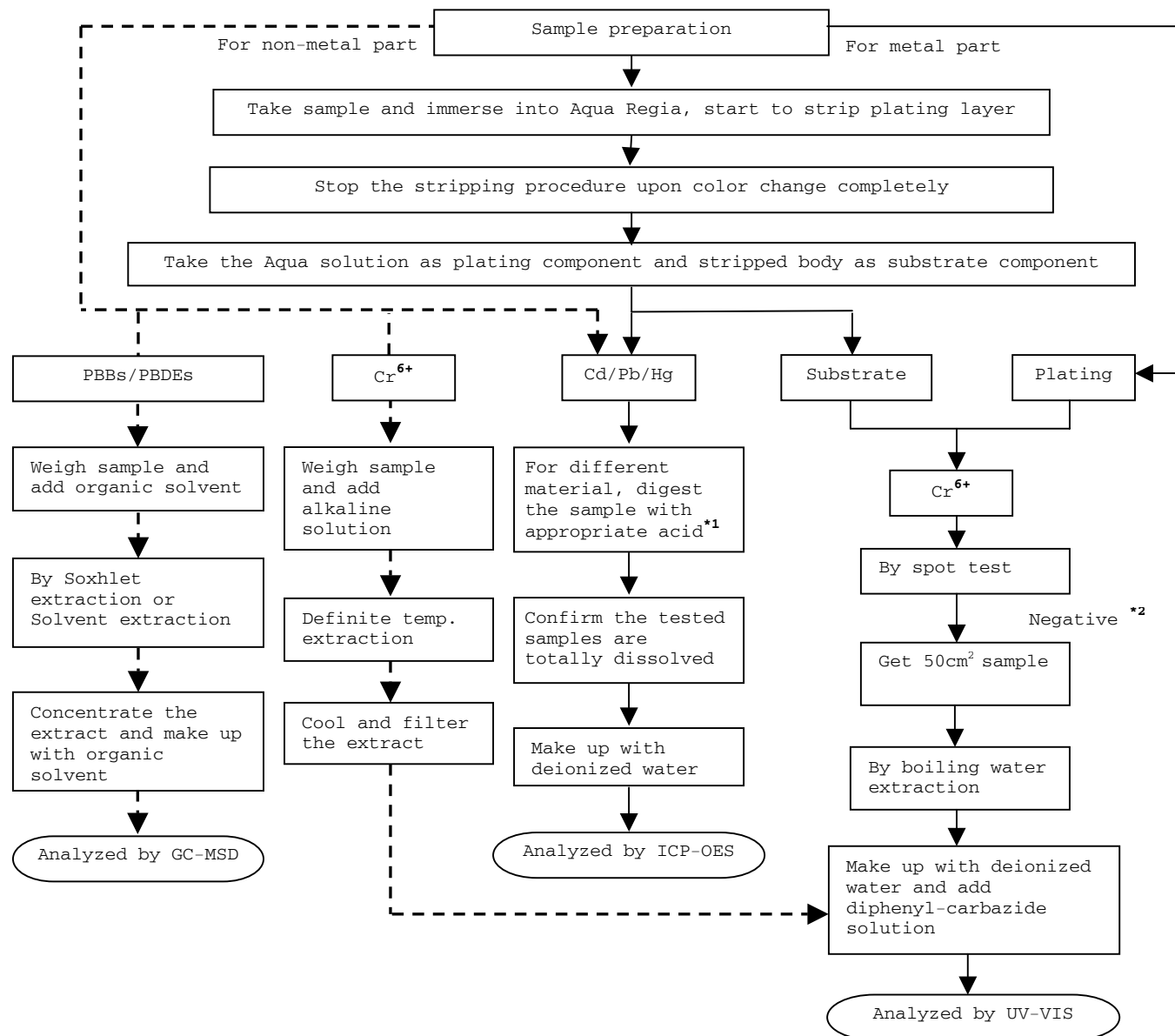
Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Test Conducted

## (IV) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (VI)/PBBS/PBDES Contents

Reference Standard: IEC 62321 edition 1.0:2008



Number : TWNC00304278

Test Conducted

Remarks:

\*1: List of Appropriate Acid:

Material	Acid Added for Digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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



Page 8 of 12

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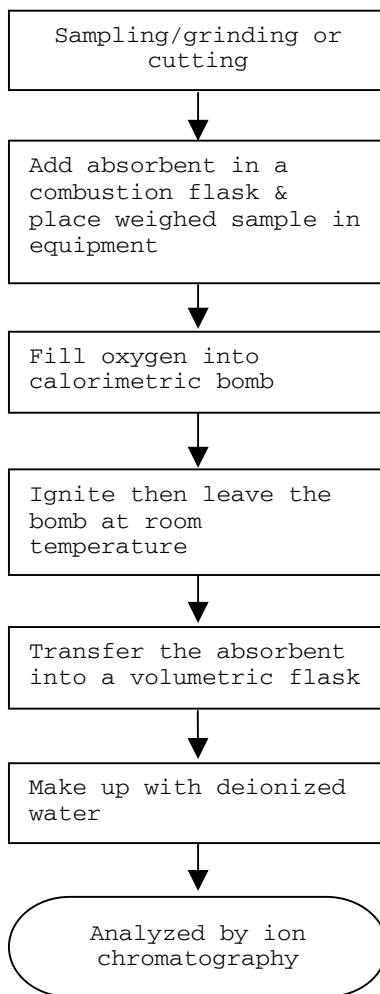
全國公證檢驗股份有限公司

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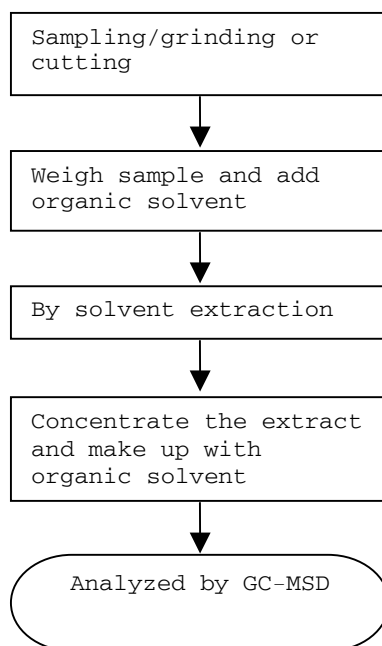
## Test Conducted

Test for Halogen Content  
Reference Standard: EN 14582



Test Conducted

Test For Phthalates Contents  
Reference Method: EN 14372: 2004

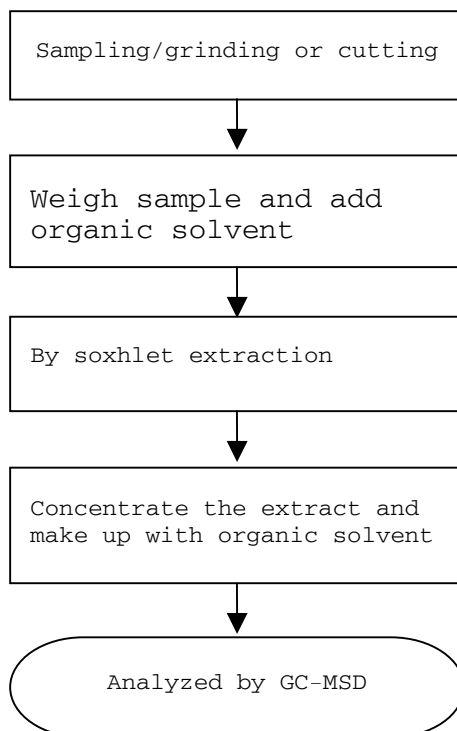




## Test Conducted

Test For Hexabromocyclododecane (HBCDD)

Reference Standard : USEPA 3540C



End of Report

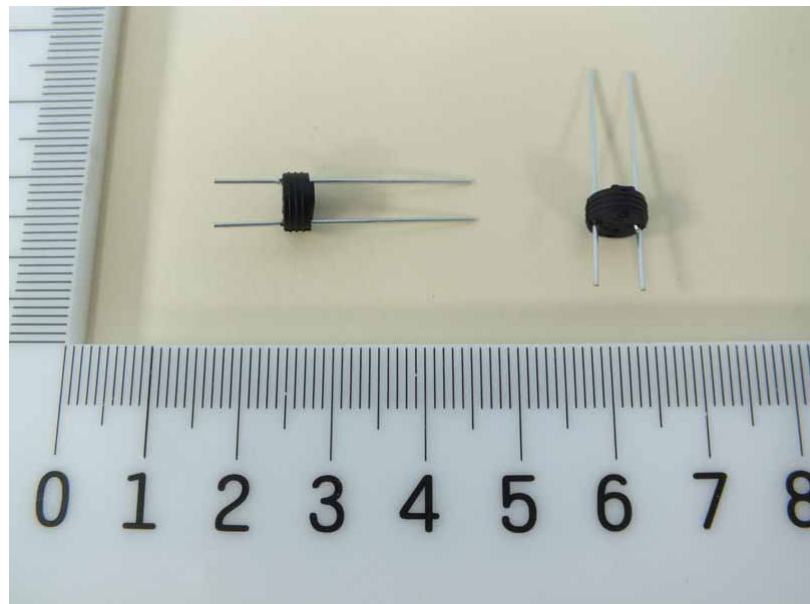
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Number : TWNC00304278

Test Conducted

**Photo**





**Test Report**

Number : TWNC00286464

Applicant: Littelfuse Philippines Inc.  
LIMA Technology Center, Lipa City,  
Malvar, Batangas

Date : Nov 22, 2012

**Sample Description:**

One (1) group of submitted samples said to be :

Part Description : Yarn

Part Number : 648118\_648119\_648120 (6481xxx\_GLZZxxx)

Date Sample Received : Nov 15, 2012

Date Test Started : Nov 16, 2012

---

**Test Conducted :**

As requested by the applicant, for details please refer to attached pages.

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Authorized By:

On Behalf Of Intertek Testing Services  
Taiwan Limited



---

K. Y. Liang  
Director



Page 1 of 7

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114 台北市內湖區瑞光路 423 號 8 樓

Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00286464

Test Conducted

( I ) Test Result Summary :

Test Item	Result (ppm)
	White Yarn
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	14
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	ND
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg  
ND = Not detected

Responsibility of Chemist : Irene Chiou / Kevin Liu / Cathy Chen

Date Sample Received : Nov 15, 2012  
Test Period : Nov 16, 2012 To Nov 21, 2012



Page 2 of 7

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Test Conducted

## ( II ) RoHS Limits:

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

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.

## ( III ) Test Method:

<u>Test Item</u>	<u>Test Method</u>	<u>Reporting Limit</u>
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 <sup>6+</sup> ) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer.	1 ppm



Number : TWNC00286464

Test Conducted

( III ) Test Method:

Test Item	Test Method	Reporting Limit
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent extraction and determined by GC-MS and further HPLC-DAD 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-MS and further HPLC-DAD confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by calorimetric bomb with oxygen and determined by Ion Chromatograph.	50 ppm

Remark: Reporting limit = Quantitation limit of analyte in sample



Page 4 of 7

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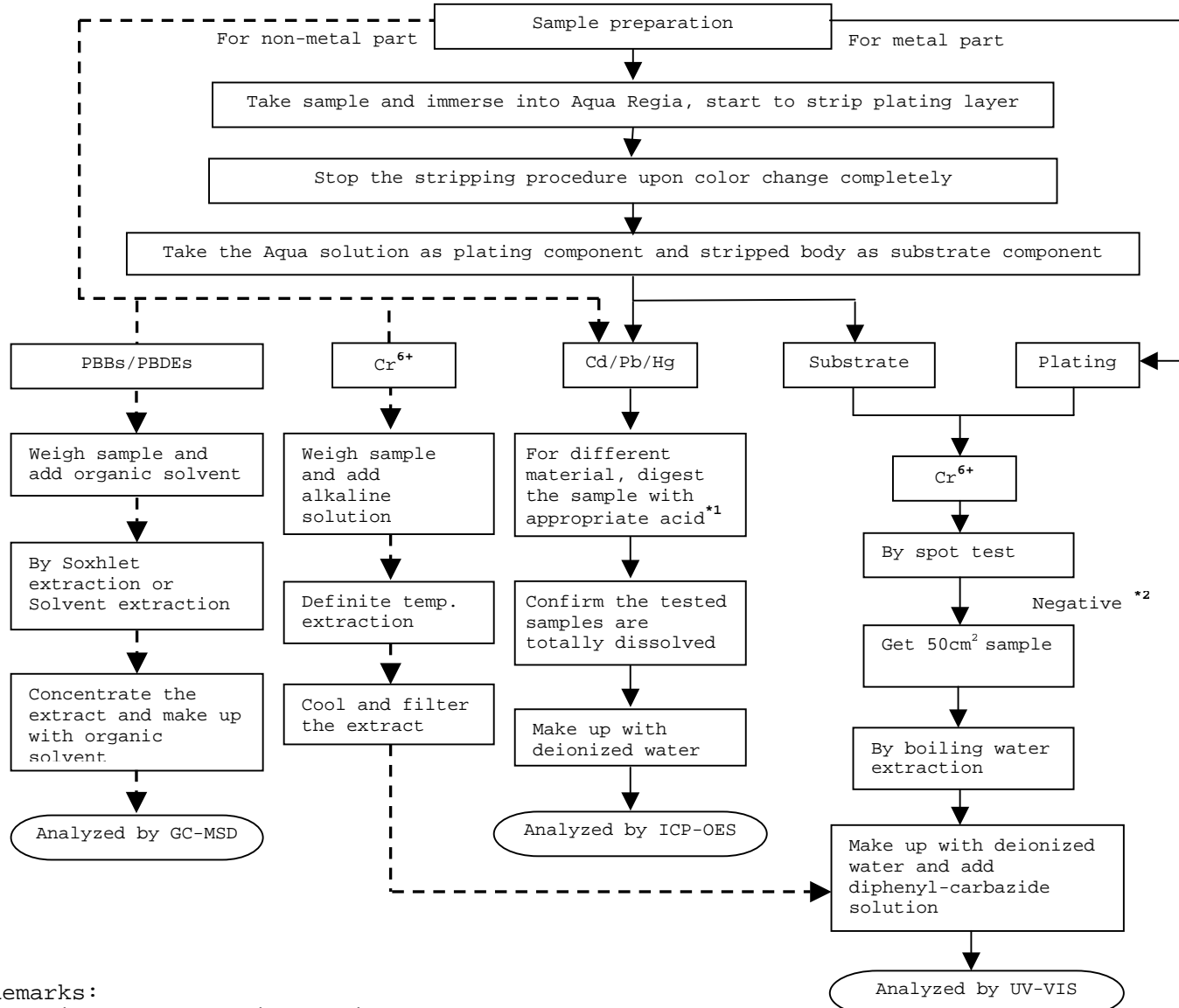
Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

## Test Conducted

## (IV) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (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 <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

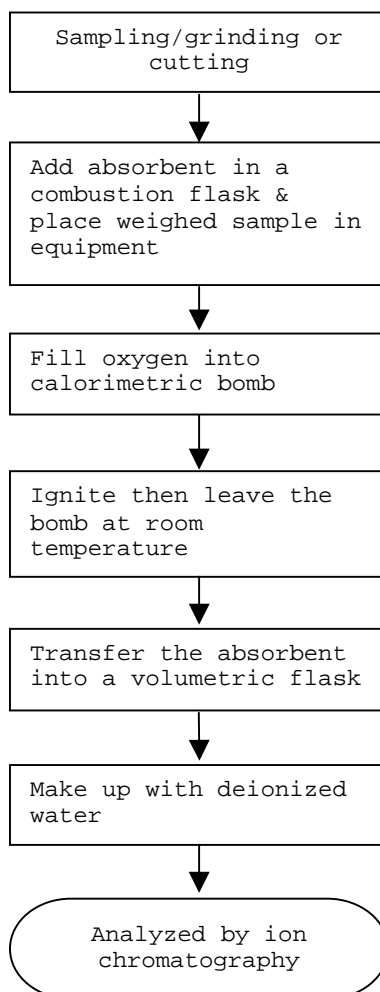


Test Conducted

## (IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard: EN 14582



End of Report

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Test Conducted

Number : TWNC00286464

Photo





**Test Report**

Number : TWNC00282885

Applicant: Littelfuse Philippines Inc.  
LIMA Technology Center, Lipa City,  
Malvar, Batangas

Date : Oct 31, 2012

**Sample Description:**

One (1) group of submitted samples said to be :

Part Description : Filler

Part Number : 090125

Date Sample Received : Oct 24, 2012

Date Test Started : Oct 25, 2012

---

**Test Conducted :**

As requested by the applicant, for details please refer to attached pages.

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Authorized By:

On Behalf Of Intertek Testing Services  
Taiwan Limited



---

K. Y. Liang  
Director



Page 1 of 7

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Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00282885

Test Conducted

( I ) Test Result Summary :

Test Item	Result (ppm)
	Submitted Samples
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	ND
Mercury (Hg) content	ND
Chromium VI (Cr <sup>6+</sup> ) content	ND
<b>Polybrominated Biphenyls (PBBs)</b>	
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
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>	
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
<b>Halogen Content</b>	
Fluorine (F)	ND
Chlorine (Cl)	ND
Bromine (Br)	ND
Iodine (I)	ND

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg  
ND = Not detected

Responsibility of Chemist : Irene Chiou / Kevin Liu / Cathy Chen

Date Sample Received : Oct 24, 2012

Test Period : Oct 25, 2012 To Oct 30, 2012



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**Intertek Testing Services Taiwan Ltd.**

8F., No. 423, Ruiguang Rd., Neihu District, Taipei 114, Taiwan, R.O.C.

全國公證檢驗股份有限公司

114 台北市內湖區瑞光路 423 號 8 樓

Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Number : TWNC00282885

Test Conducted

( II ) RoHS Limits:

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

The above limits were quoted from Annex II of 2011/65/EU for homogeneous material.

( III ) Test Method:

<u>Test Item</u>	<u>Test Method</u>	<u>Reporting Limit</u>
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 <sup>6+</sup> ) content	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer.	1 ppm



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(III) Test Method:

<u>Test Item</u>	<u>Test Method</u>	<u>Reporting Limit</u>
Polybrominated Biphenyls (PBBs)	With reference to IEC 62321 edition 1.0:2008 in annex A, by solvent extraction and determined by GC-MS and further HPLC-DAD 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-MS and further HPLC-DAD confirmation when necessary.	5 ppm
Halogen Content	With reference to EN 14582:2007 by calorimetric bomb with oxygen and determined by Ion Chromatograph.	50 ppm

Remark: Reporting limit = Quantitation limit of analyte in sample



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114 台北市內湖區瑞光路 423 號 8 樓

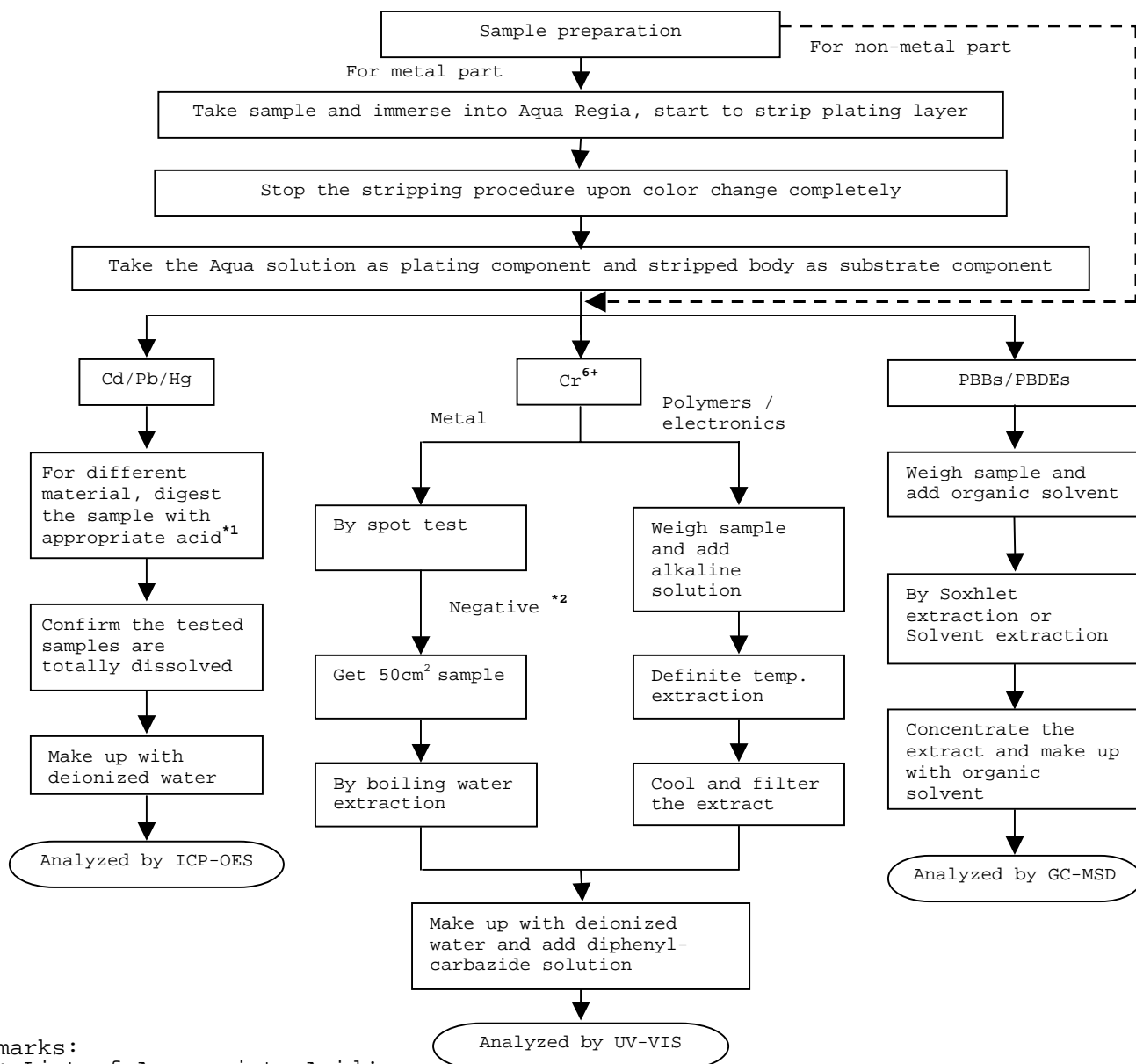
Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Test Conducted

(IV) Measurement Flowchart:

Test for Cd/Pb/Hg/Chromium (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 <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

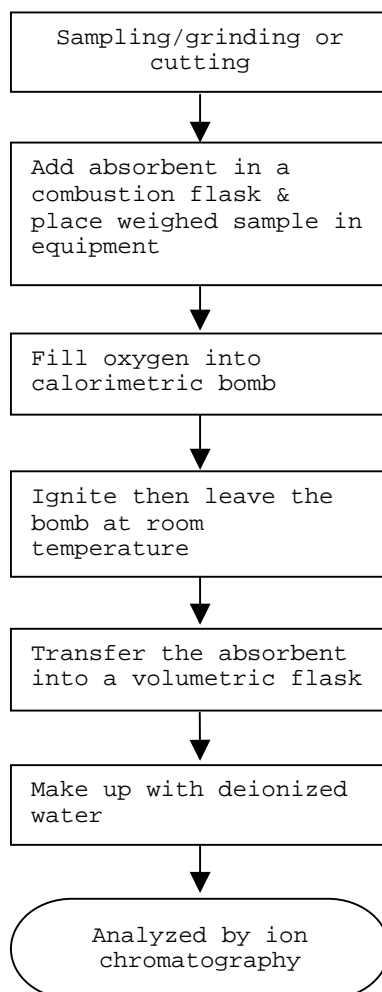


## Test Conducted

## (IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard : EN 14582



End of Report

*This report is made solely on the basis of your instructions and/or information and materials supplied by you. It is not intended to be a recommendation for any particular course of action. Intertek does not accept a duty of care or any other responsibility to any person other than the Client in respect of this report and only accepts liability to the Client insofar as is expressly contained in the terms and conditions governing Intertek's provision of services to you. Intertek makes no warranties or representations either express or implied with respect to this report save as provided for in those terms and conditions. We have aimed to conduct the Review on a diligent and careful basis and we do not accept any liability to you for any loss arising out of or in connection with this report, in contract, tort, by statute or otherwise, except in the event of our gross negligence or wilful misconduct.*



Test Conducted

Number : TWNC00282885

Photo

