



## ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: TR5

Product #: 382xxxxxxx, and 383xxxxxx Series

Issue Date: November 23, 2012

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

Issued by:

  
KRISTEEN BACILA

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<Global EHS Engineer>

(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	3-8
2	DRAGxxx	Element – Silver Plated Wires	9-14
3	LOZZ194(692213)	Solder Wire	15-20
4	910-016	Plastic Cap	21-29
5	867-00x	Socket with Pin	30-39
6	GLZZ013 (GLZZxxx)	Yarn-Glass Fibre	40-46
7	FUSA006 (090125)	Filler Sand	47-53



**TEST REPORT**

NUMBER: SHAH00320484

APPLICANT: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
ATTN: A. CESISTA/ K. BACILA

DATE: JUN 06, 2012

SAMPLE DESCRIPTION:

ONE(1) SUBMITTED SAMPLE SAID TO BE **WIRE WITH PLATING.**

PART DESCRIPTION : SN PLATED CU WIRE.

PART NUMBER : 082417-001.

DATE SAMPLE RECEIVED : MAY.30, 2012.

DATE TEST STARTED : MAY.30, 2012.

\*\*\*\*\*

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**

NUMBER: SHAH00320484

TESTS CONDUCTED

(I) TEST RESULT SUMMARY :

TESTING ITEM	RESULT (PPM)
<b>HEAVY METAL</b>	( 1 )
CADMIUM (Cd) CONTENT	ND
LEAD (Pb) CONTENT	53
MERCURY (Hg) CONTENT	ND
CHROMIUM VI (Cr <sup>6+</sup> ) CONTENT (mg/kg WITH 50cm <sup>2</sup> )	NEGATIVE (< 0.02) (#)

TESTING ITEM	RESULT (PPM)
<b>HEAVY METAL</b>	( 2 )
CADMIUM (Cd) CONTENT / PLATING	ND
LEAD (Pb) CONTENT / PLATING	ND
MERCURY (Hg) CONTENT / PLATING	ND
CHROMIUM VI (Cr <sup>6+</sup> ) CONTENT (mg/kg WITH 50cm <sup>2</sup> ) / 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 cm<sup>2</sup> WAS USED AND THE DILUTION FACTOR WAS ADJUSTED ACCORDINGLY.

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 TESTING.

TESTED COMPONENTS:

(1) SUBSTRATE.

(2) PLATING.

\*\*\*\*\*

TO BE CONTINUED

# **TEST REPORT**

NUMBER: SHAH00320484

## TESTS CONDUCTED

### (II) RoHS REQUIREMENT:

<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 ETHERS (PBDEs)	0.1% (1000ppm)

THE ABOVE LIMITS WERE QUOTED FROM 2002/95/EC AND AMENDMENT 2005/618/EC FOR HOMOGENEOUS MATERIAL.

### (III) 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 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 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

DATE SAMPLE RECEIVED : MAY 30, 2012

TESTING PERIOD : MAY 30, 2012 TO JUN.4, 2012

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TO BE CONTINUED

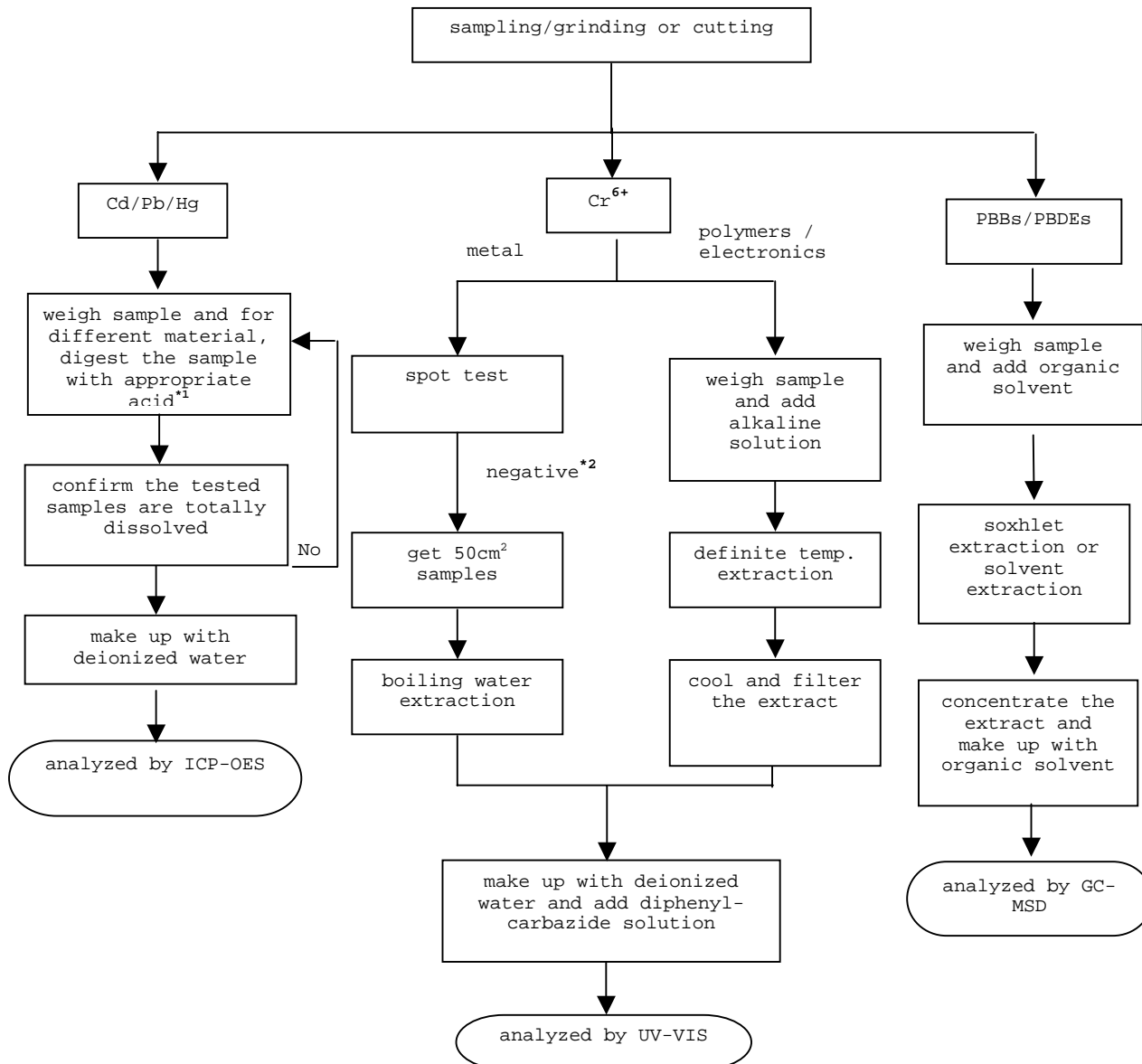
**TEST REPORT**

NUMBER: SHAH00320484

TESTS CONDUCTED

(IV) MEASUREMENT FLOWCHART:

TEST FOR Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs CONTENTS  
 REFERENCE STANDARD: IEC 62321 EDITION 1.0:2008



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 TO BE CONTINUED



**TEST REPORT**

NUMBER: SHAH00320484

TESTS 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.

\*\*\*\*\*

TO BE CONTINUED

**TEST REPORT**

NUMBER: SHAH00320484

TESTS CONDUCTED



\*\*\*\*\*

END OF REPORT





**TEST REPORT**

NUMBER: SHAH00320463

APPLICANT: LITTELFUSE, INC.  
800 E. NORTHWEST HWY  
ATTN: A. CESISTA/ K. BACILA

DATE: JUN 06, 2012

SAMPLE DESCRIPTION:

ONE(1) SUBMITTED SAMPLE SAID TO BE **WIRE WITH PLATING.**

PART DESCRIPTION : AG PLATED CU WIRE.

PART NUMBER : 082555.

DATE SAMPLE RECEIVED : MAY.30, 2012.

DATE TEST STARTED : MAY.30, 2012.

\*\*\*\*\*

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**

NUMBER: SHAH00320463

TESTS CONDUCTED

(I) TEST RESULT SUMMARY:

<u>TESTING ITEM</u>	<u>RESULT (PPM)</u>
<b>HEAVY METAL</b>	( 1 )
CADMIUM (Cd) CONTENT	ND
LEAD (Pb) CONTENT	ND
MERCURY (Hg) CONTENT	ND
CHROMIUM VI (Cr <sup>6+</sup> ) CONTENT (mg/kg WITH 50cm <sup>2</sup> )	NEGATIVE (< 0.02)

<u>TESTING ITEM</u>	<u>RESULT (PPM)</u>
<b>HEAVY METAL</b>	( 2 )
CADMIUM (Cd) CONTENT / PLATING	ND
LEAD (Pb) CONTENT / PLATING	ND
MERCURY (Hg) CONTENT / PLATING	ND
CHROMIUM VI (Cr <sup>6+</sup> ) CONTENT (mg/kg WITH 50cm <sup>2</sup> ) / PLATING	NEGATIVE (< 0.02)

REMARKS: ppm = PARTS PER MILLION = mg/kg  
 ND = NOT DETECTED  
 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 TESTING.

TESTED COMPONENTS:

- (1) SUBSTRATE.  
 (2) PLATING.

\*\*\*\*\*  
 TO BE CONTINUED

**TEST REPORT**

NUMBER: SHAH00320463

## TESTS CONDUCTED

## (II) RoHS REQUIREMENT:

<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 ETHERS (PBDEs)	0.1% (1000ppm)

THE ABOVE LIMITS WERE QUOTED FROM 2002/95/EC AND AMENDMENT  
2005/618/EC FOR HOMOGENEOUS MATERIAL.

## (III) 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 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 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

DATE SAMPLE RECEIVED : JUN.1, 2012

TESTING PERIOD : JUN.1, 2012 TO JUN.4, 2012

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TO BE CONTINUED

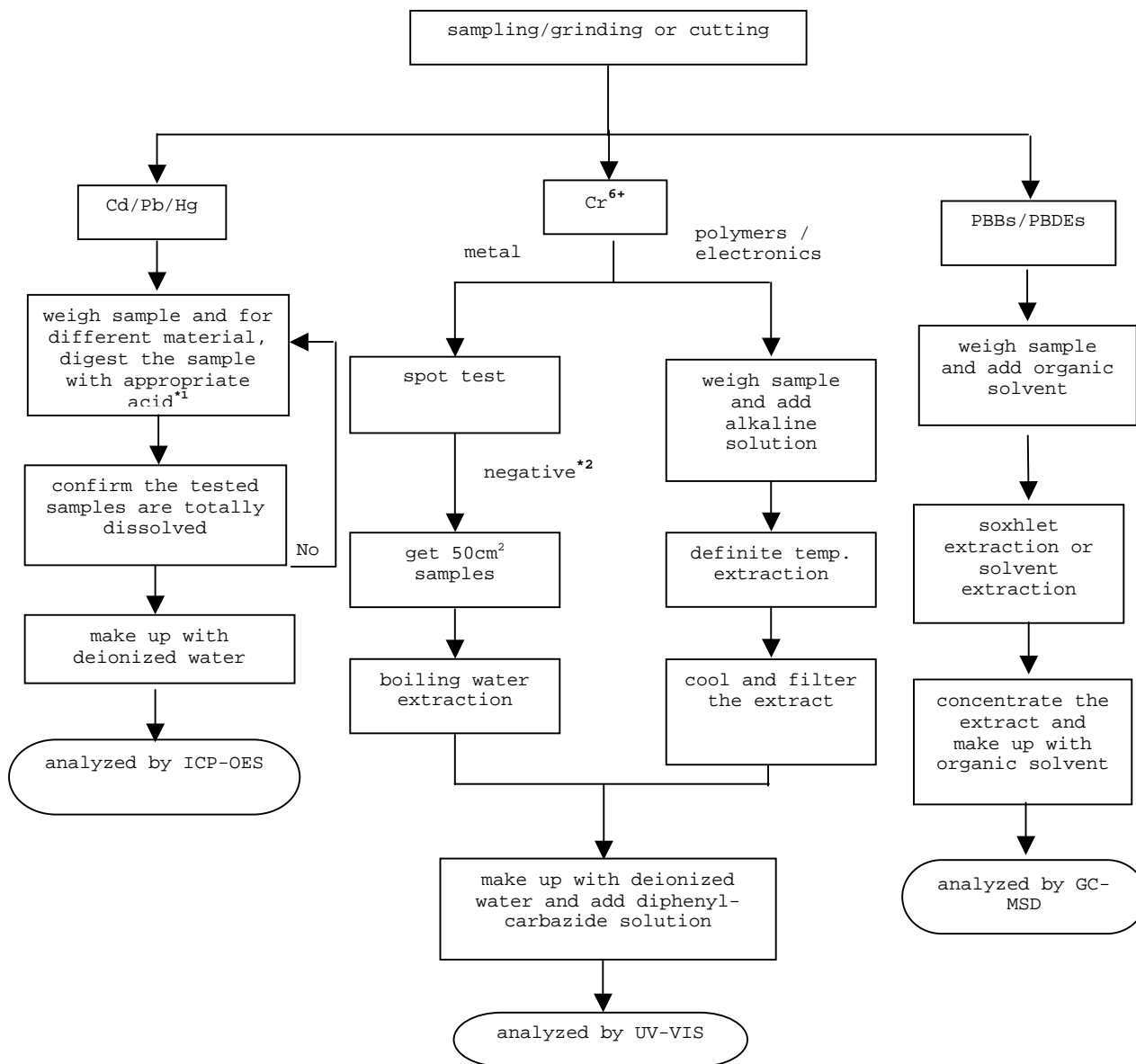
**TEST REPORT**

NUMBER: SHAH00320463

TESTS CONDUCTED

(IV) MEASUREMENT FLOWCHART:

TEST FOR Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs CONTENTS  
 REFERENCE STANDARD: IEC 62321 EDITION 1.0:2008



\*\*\*\*\*

TO BE CONTINUED



**TEST REPORT**

NUMBER: SHAH00320463

TESTS 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.

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TO BE CONTINUED

**TEST REPORT**

NUMBER: SHAH00320463

TESTS CONDUCTED



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END OF REPORT



**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

**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



Page 1 of 6

**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 : 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.



Page 2 of 6

**Intertek Testing Services Taiwan Ltd.**

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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

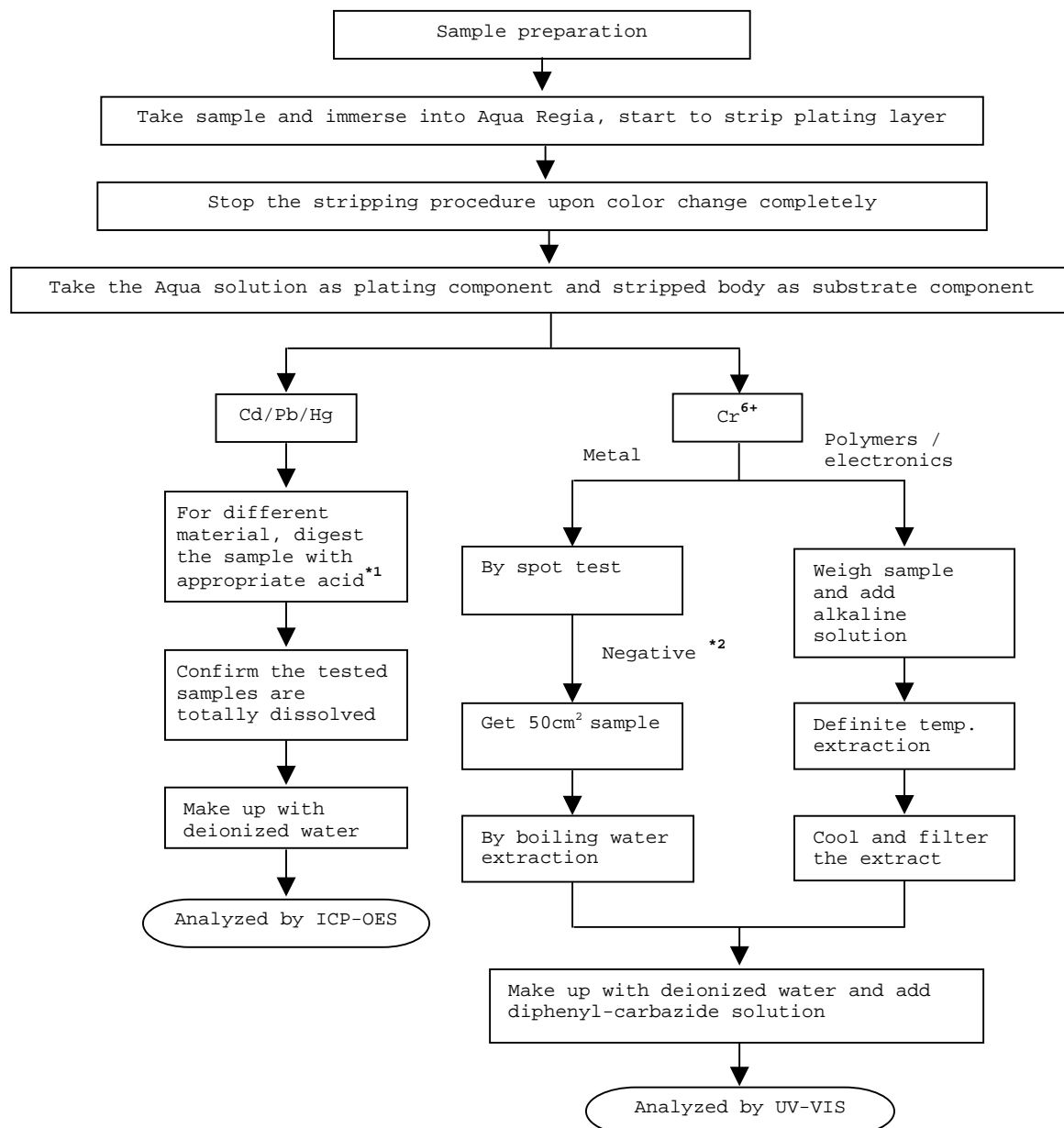


## Test Conducted

## (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

*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.*



Page 5 of 6

**Intertek Testing Services Taiwan Ltd.**

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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



---

K. Y. Liang  
Director



Page 1 of 9

**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

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

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



Page 2 of 9

Intertek Testing Services Taiwan Ltd.

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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 : 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



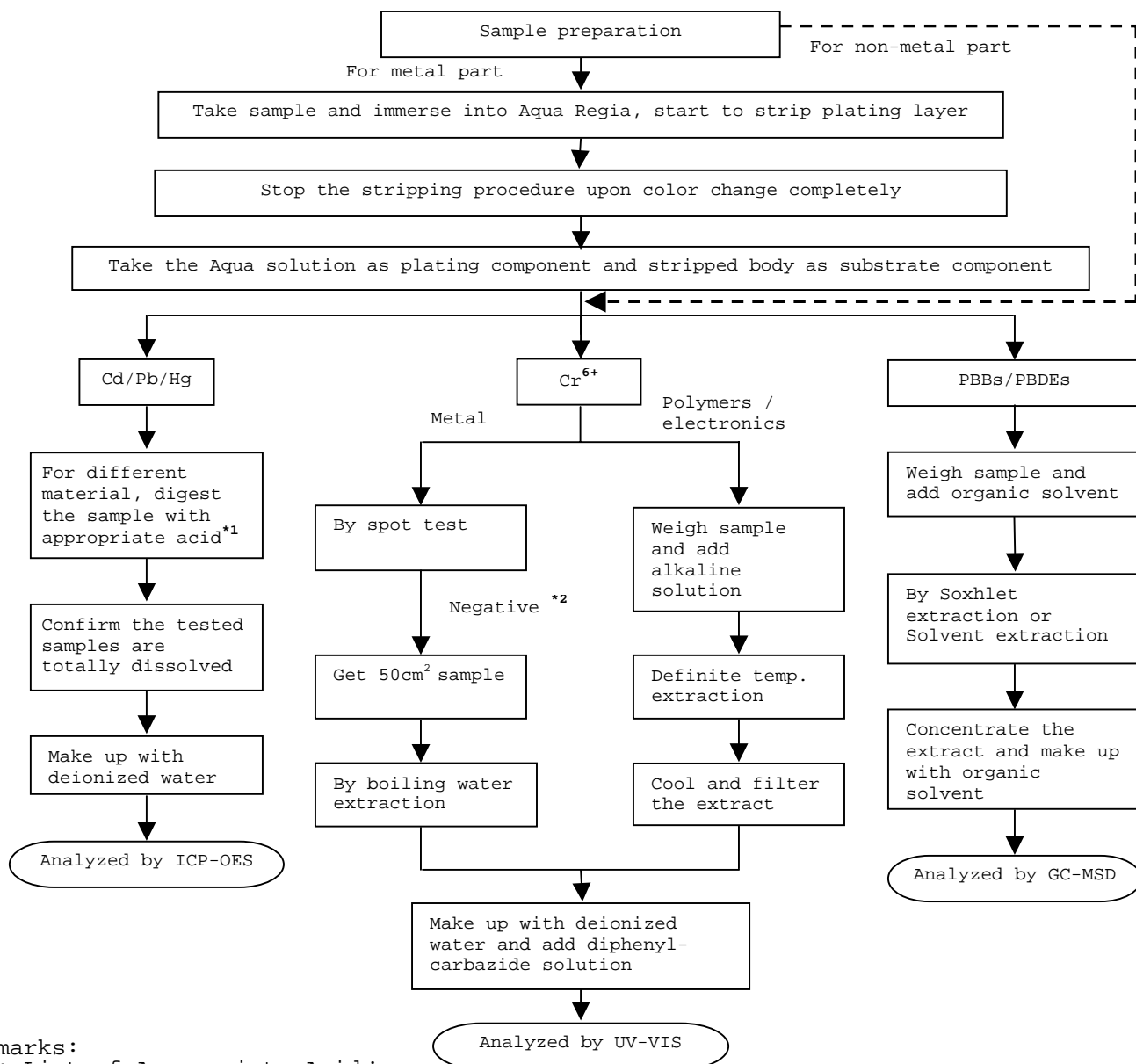


Test Conducted

(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.

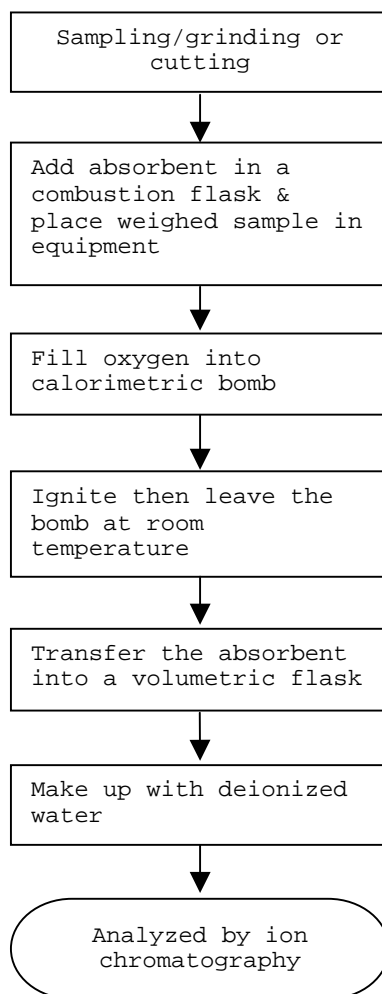


Test Conducted

(IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard: EN 14582

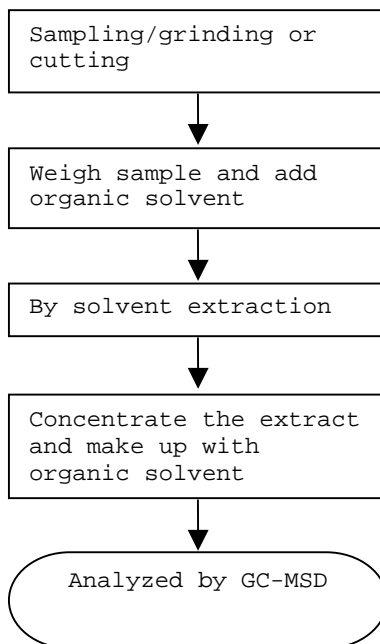


Test Conducted

(IV) Measurement Flowchart:

Test For Phthalates Contents

Reference Method: EN 14372: 2004

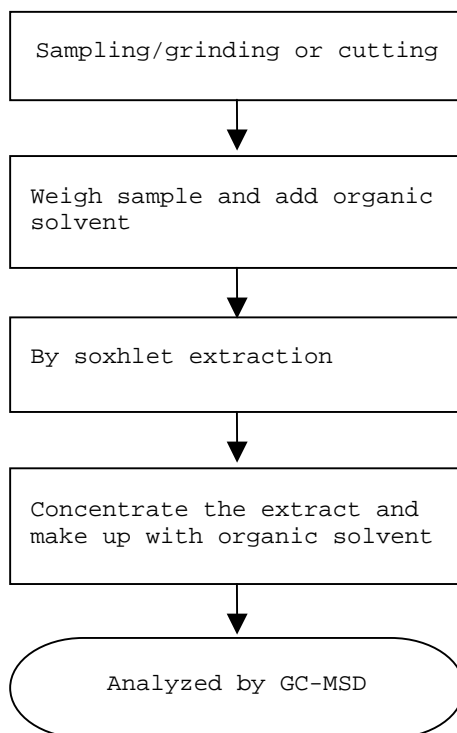


Test Conducted

(IV) Measurement Flowchart:

Test For Hexabromocyclododecane (HBCDD)

Reference Standard : USEPA 3540C



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End of Report

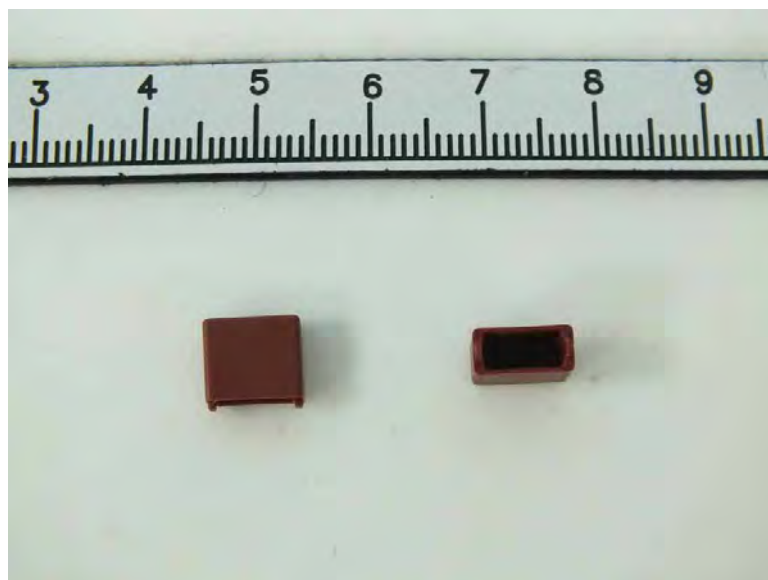
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Test Conducted

Number : TWNC00282891

Photo





**Test Report**

Number : TWNC00256914

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

Date : May 15, 2012

**Sample Description:**

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

Part Description : Socket with Pin

Part Number : 867-003

Date Sample Received : May 10, 2012

Date Test Started : May 10, 2012

---

**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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Number: TWNC00256914

Test Conducted

(I) Test Result Summary :

Test Item	Result (ppm)		
	(1)	(2)	(3)
<b>Heavy Metal</b>			
Cadmium (Cd) content	ND	ND	ND
Lead (Pb) content	ND	ND	ND
Mercury (Hg) content	ND	ND	ND
Chromium VI (Cr <sup>6+</sup> ) content (For Non-Metal Material)	ND	--	--
Chromium VI (Cr <sup>6+</sup> ) content (By Boiling Water Extraction On Metal) (mg/kg with 50cm <sup>2</sup> )	ND	Negative (< 0.02)(#)	Negative (< 0.02)(#)
<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	--	--

Number: TWNC00256914

Test Conducted

( I ) Test Result Summary :

Test Item	Result (ppm)		
	(1)	(2)	(3)
<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  
 < = 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.  
 # = Due to the insufficient sample area, reduced total sample surface of 25 cm<sup>2</sup> was used and the dilution factor was adjusted accordingly.

Tested Components:

- (1) Black Body Part
- (2) Coppery Metal Substrate
- (3) Silvery Plating On Metal Pin

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

Date Sample Received : May 10, 2012

Test Period : May 10, 2012 To May 14, 2012

( II ) RoHS Requirement:

Restricted Substances	Limits
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 2002/95/EC and amendment 2005/618/EC for homogeneous material.



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 (For Non-Metal Extraction On Metal)	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer.	1 ppm
Chromium VI ( $\text{Cr}^{6+}$ ) content (By Boiling Water Extraction On Metal)	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>
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

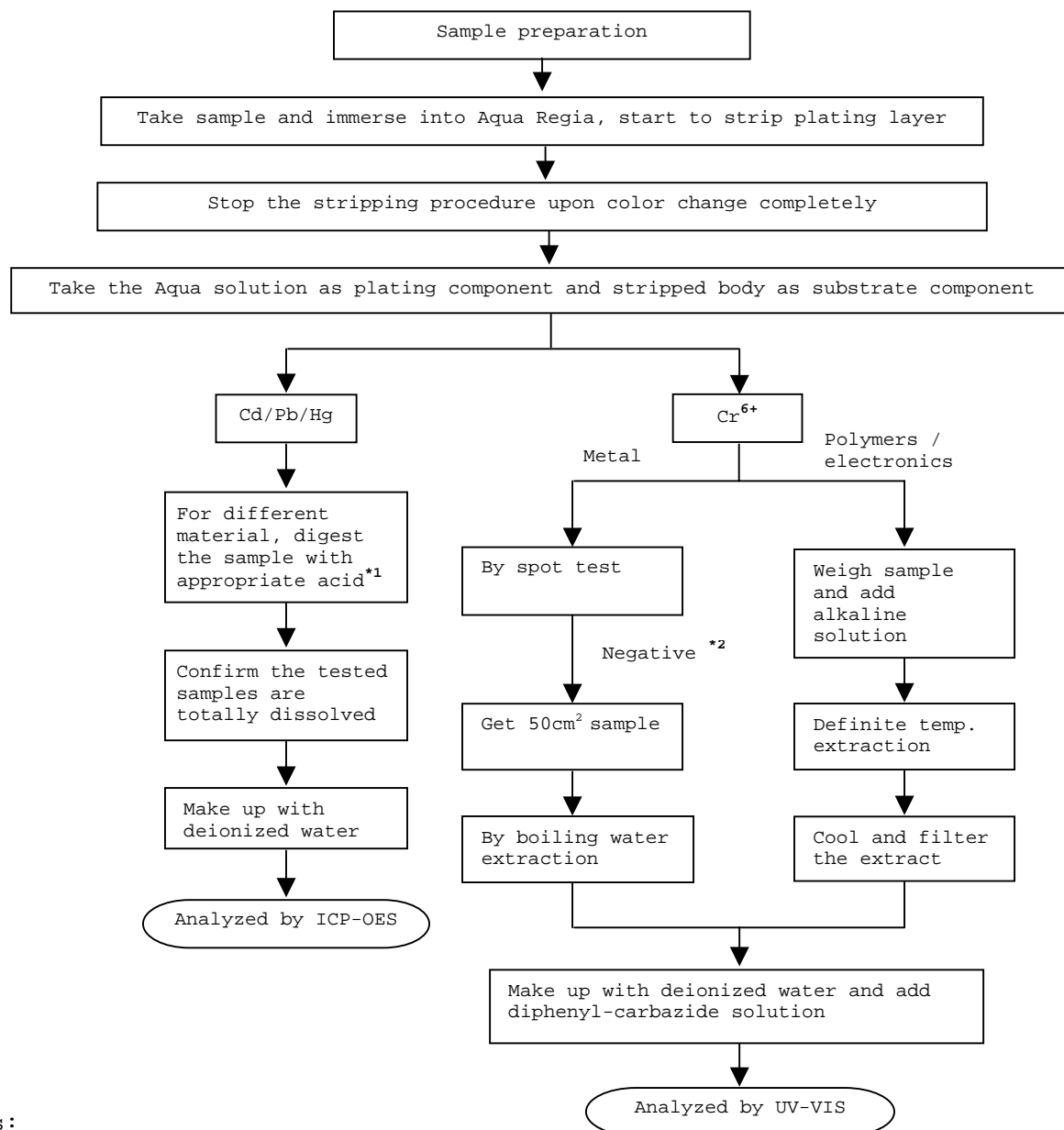
Remark: Reporting limit = Quantitation limit of analyte in sample

## Test Conducted

## (IV) Measurement Flowchart:

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

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>

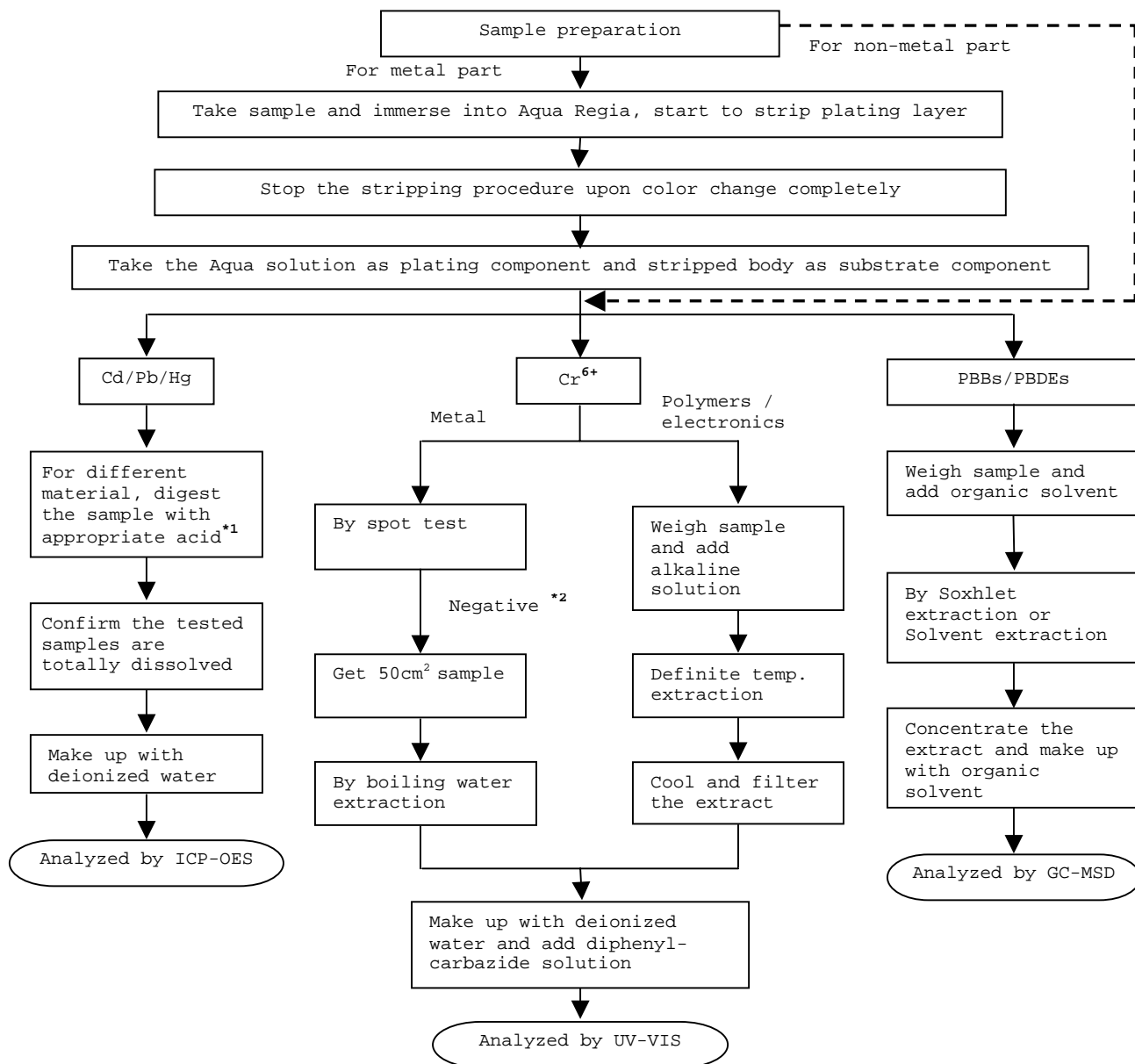
\*2: If the result of spot test is positive, Chromium VI would be determined as detected.

## Test Conducted

## (IV) Measurement Flowchart:

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

Reference Standard: IEC 62321 edition 1.0:2008



## Remarks:

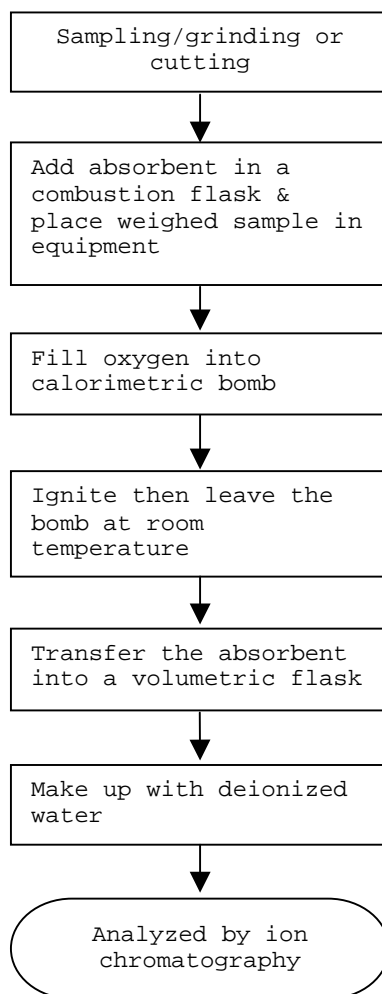
\*1: List of Appropriate Acid:

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.

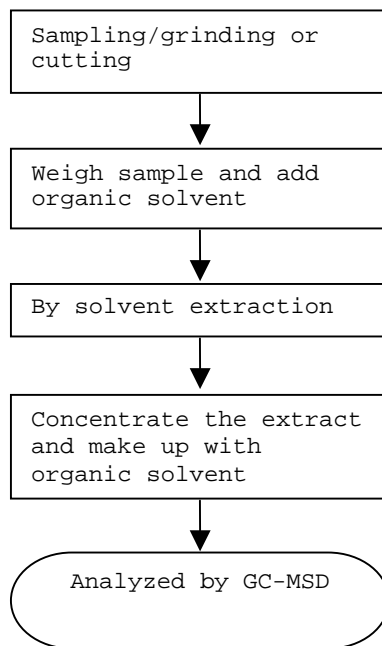
Test Conducted  
(IV) Measurement Flowchart:

Test for Halogen Content  
Reference Standard: EN 14582



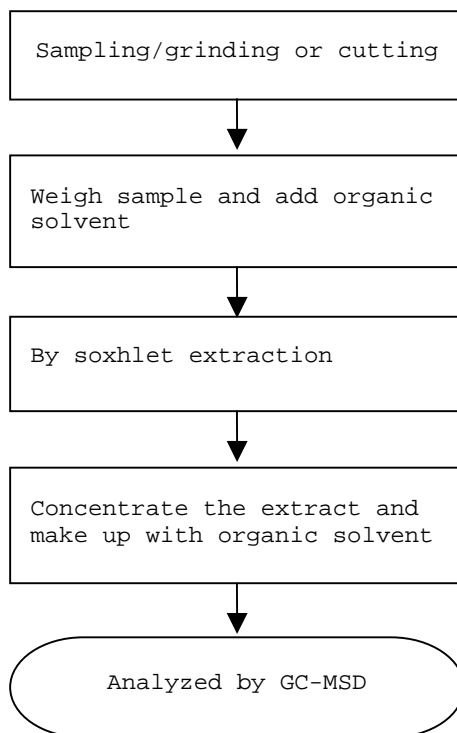
Test Conducted  
(IV) Measurement Flowchart:

Test For Phthalates Contents  
Reference Method: EN 14372: 2004



Test Conducted  
(IV) Measurement Flowchart:

Test For Hexabromocyclododecane (HBCDD)  
Reference Standard: USEPA 3540C



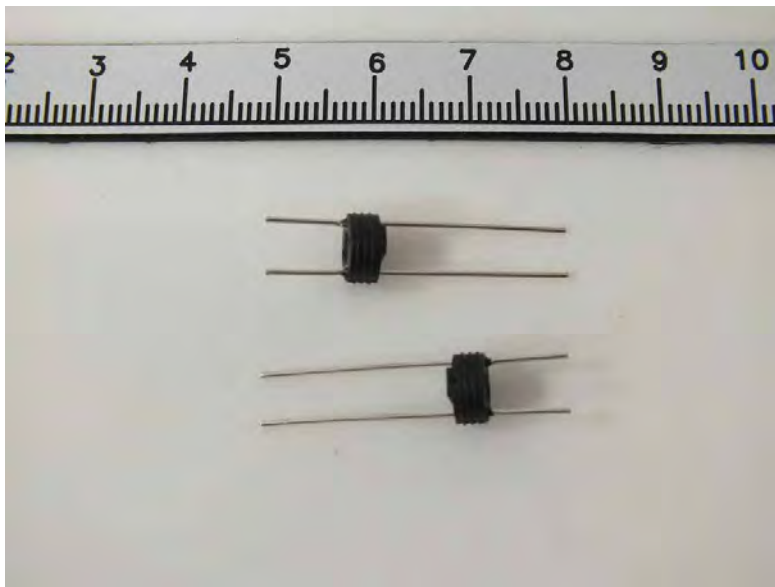
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End of Report

Test Conducted

Number: TWNC00256914

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.

Authorized By:

On Behalf Of Intertek Testing Services  
Taiwan Limited



K. Y. Liang  
Director



Page 1 of 7

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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



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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

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Remark: Reporting limit = Quantitation limit of analyte in sample

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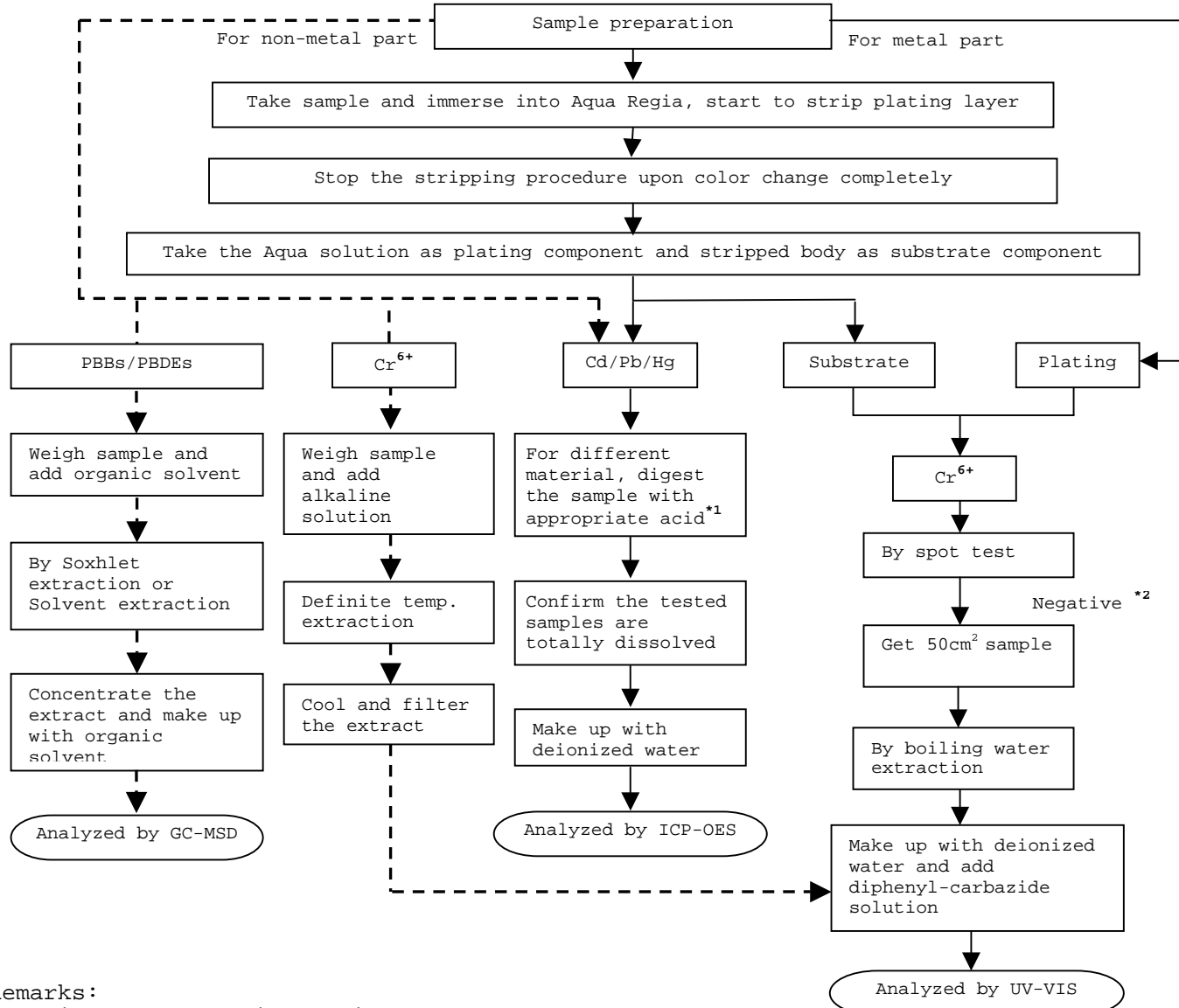
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## Test Conducted

## (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.

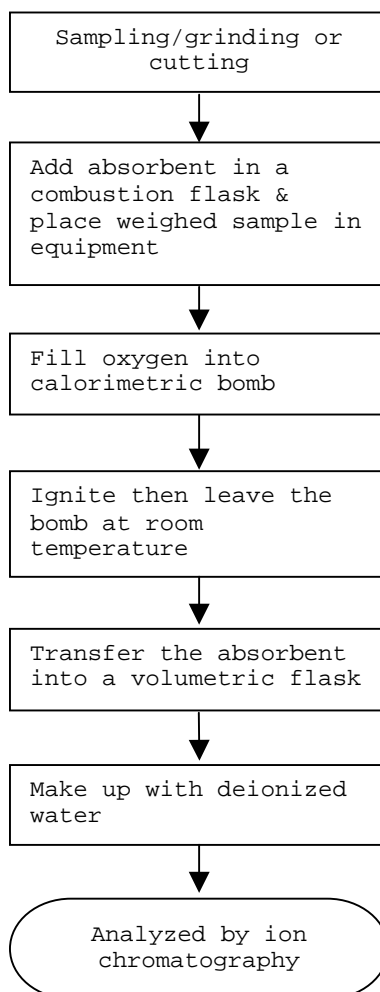


Test Conducted

## (IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard: EN 14582



End of Report

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Test Conducted

Number : TWNC00286464

Photo



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**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

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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



---

K. Y. Liang  
Director



Page 1 of 7

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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



Page 2 of 7

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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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Number : TWNC00282885

Test Conducted

(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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全國公證檢驗股份有限公司

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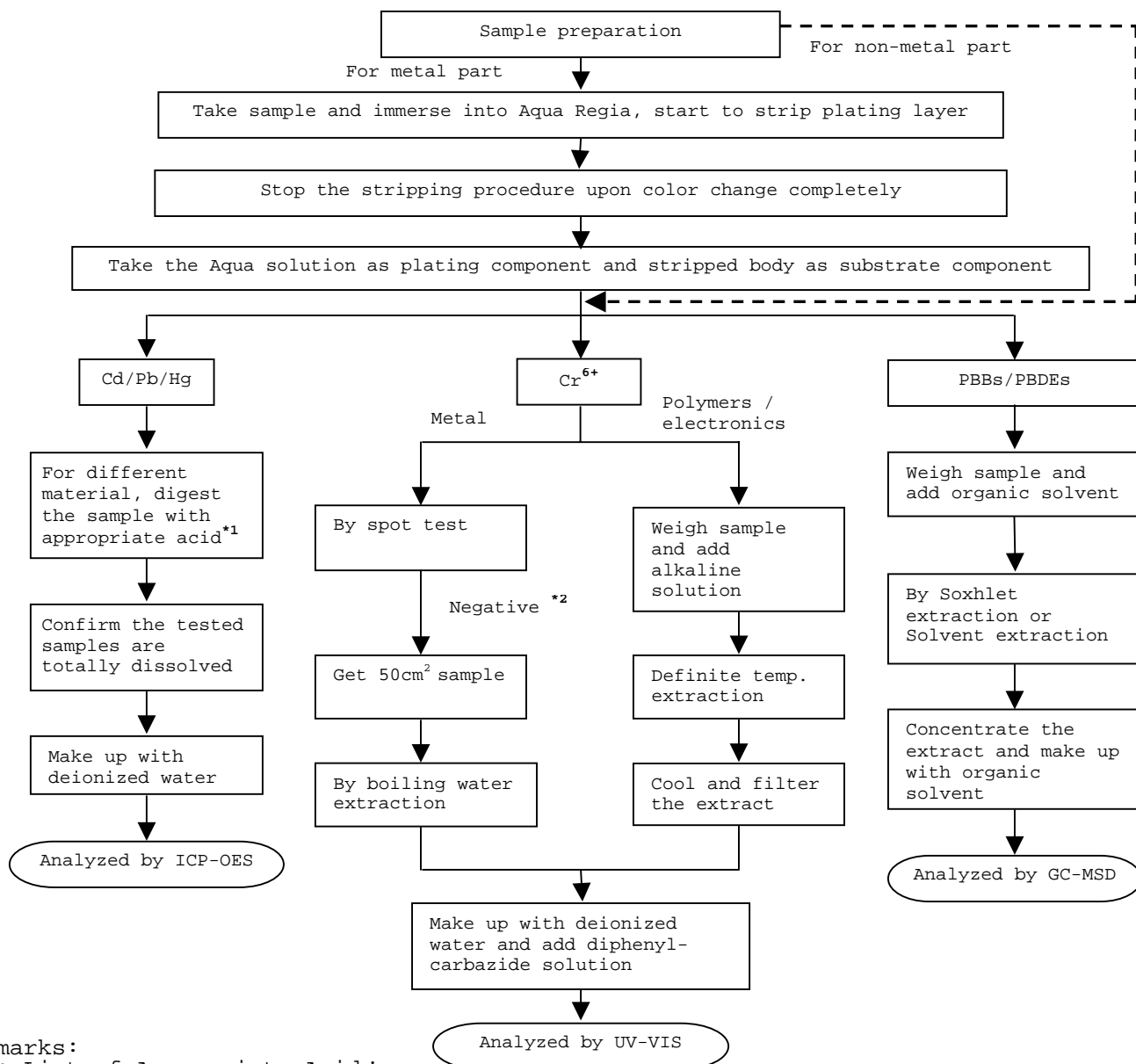
Tel: (+886-2) 6602-2888 · 2797-8885 Fax: (+886-2) 6602-2410

Test Conducted

(IV) Measurement Flowchart:

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

Reference Standard: IEC 62321 edition 1.0:2008



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.

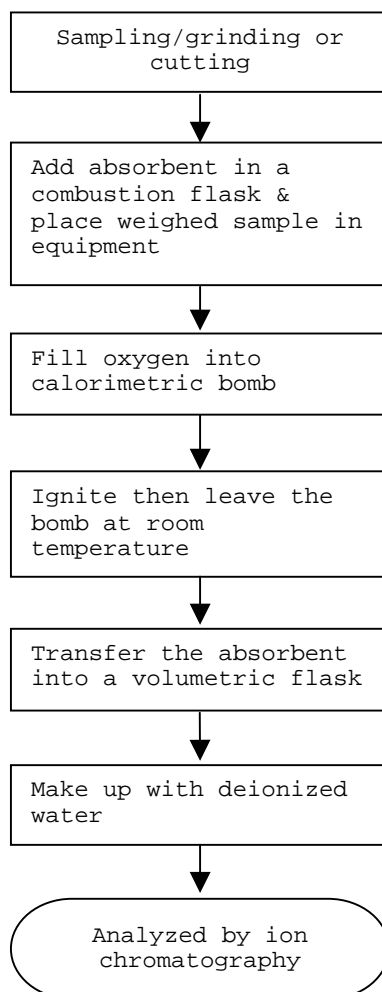


Test Conducted

(IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard: EN 14582



End of Report

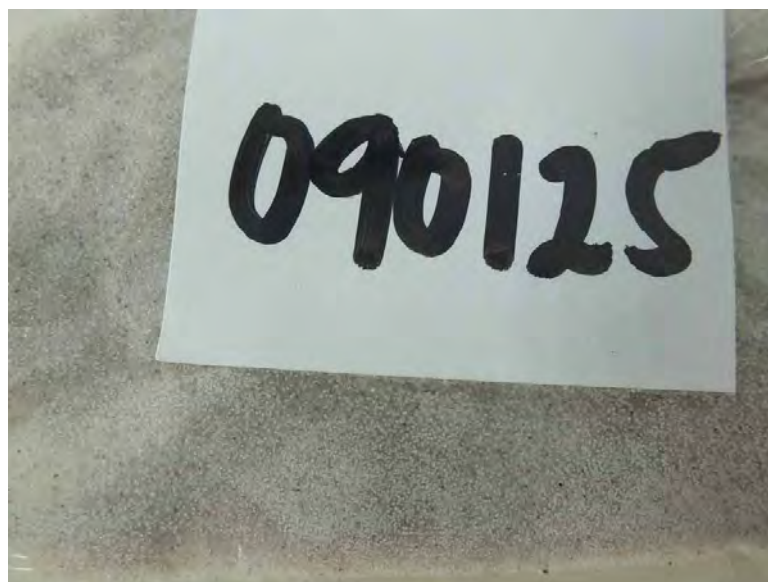
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Test Conducted

Number : TWNC00282885

Photo



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**Intertek Testing Services Taiwan Ltd.**

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