



**ICP Test Report Certification Packet**

Company name: Littelfuse, Inc.  
Product Series: Solar Panel Fuse  
Product #: SPF Series (1-12A)  
Issue Date: February 15, 2012

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (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:

\_\_\_\_\_  
<Global EHS Specialist>

(1) Parts, sub-materials and unit parts

This document covers the Solar Panel Fuse 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	082xxx	Element-5% by weight Ag Clad Cu	3-7
2	909-161 (039145)	Body-Melamine	8-14
3	901-182	Plug-Rubber	15-21
4	923-080	Cap	22-26
5	090169	Filler/Silica Sand	27-33
6	927-xxx	Solder (927-293/927-296)	34-38
7	882-808	Plated Lead	39-43
8	927-027	Solder Overlay	44-48



**Test Report**

Number : TWNC00194902

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

Date : Mar 17, 2011

**Sample Description:**

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

Part Description : Silver Clad Cu wire with 5 mass % Ag  
Part Number : 082375  
Date Sample Received : Mar 14, 2011  
Date Test Started : Mar 15, 2011

**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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approval of the laboratory.



Number : TWNC00194902

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Silvery Metal</u>
<b>Heavy Metal</b>	
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)

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 / Cathy Chen

Date Sample Received : Mar 14, 2011

Test Period : Mar 15, 2011 To Mar 17, 2011

( 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)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.



Number : TWNC00194902

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 (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>

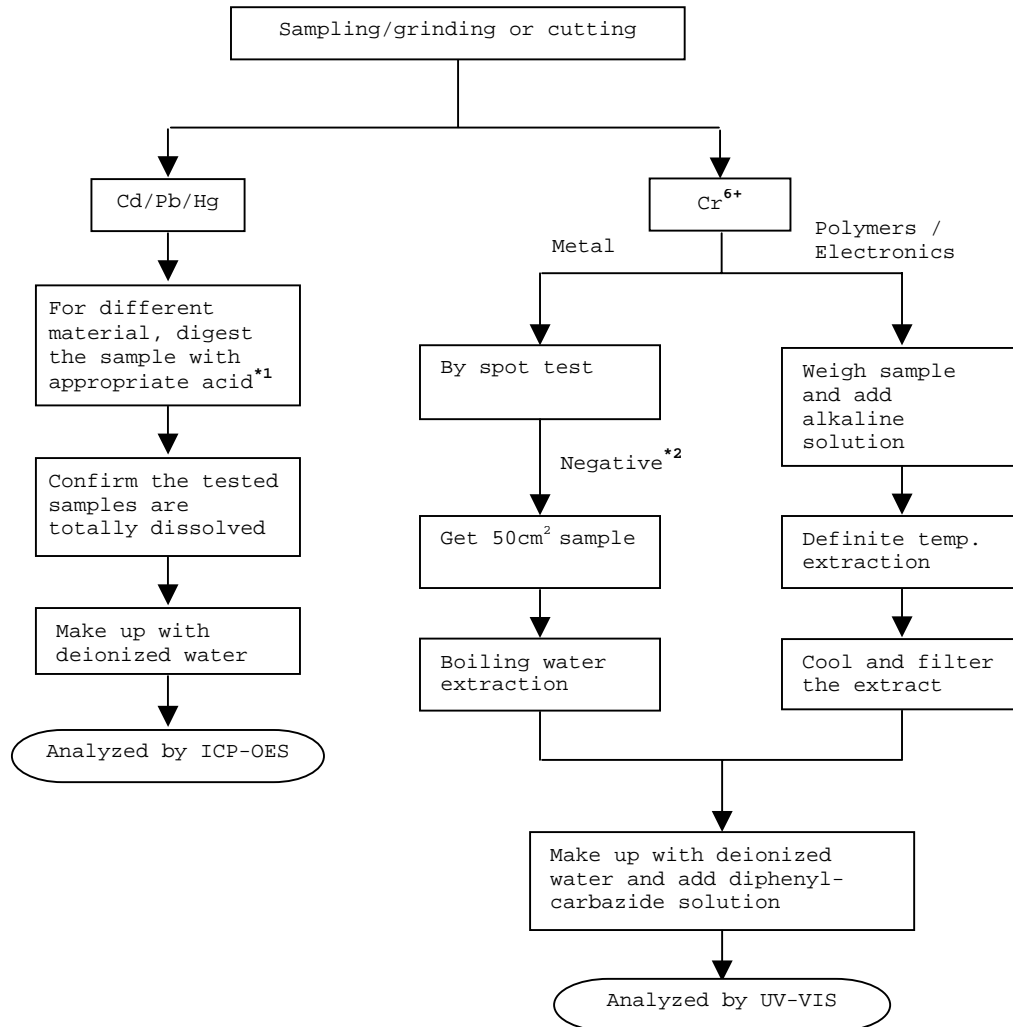
Remark: Reporting limit = Quantitation limit of analyte in sample

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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.

End Of Report

Test Conducted

Photo





**Test Report**

Number : TWNC00216194

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jul 19, 2011

**Sample Description:**

One (1) group of submitted samples said to be :  
Part Description : Body  
Part Number : 039145  
Date Sample Received : Jul 14, 2011  
Date Test Started : Jul 14, 2011

**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 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) 6602-2400 · 6602-2401





Number : TWNC00216194

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>White Material</u>
<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 : Jul 14, 2011

Test Period : Jul 14, 2011 To Jul 19, 2011



Number : TWNC00216194

Test 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 Ehters (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>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 : TWNC00216194

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-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 calorimetric bomb with oxygen and determined by ion chromatography	50 ppm

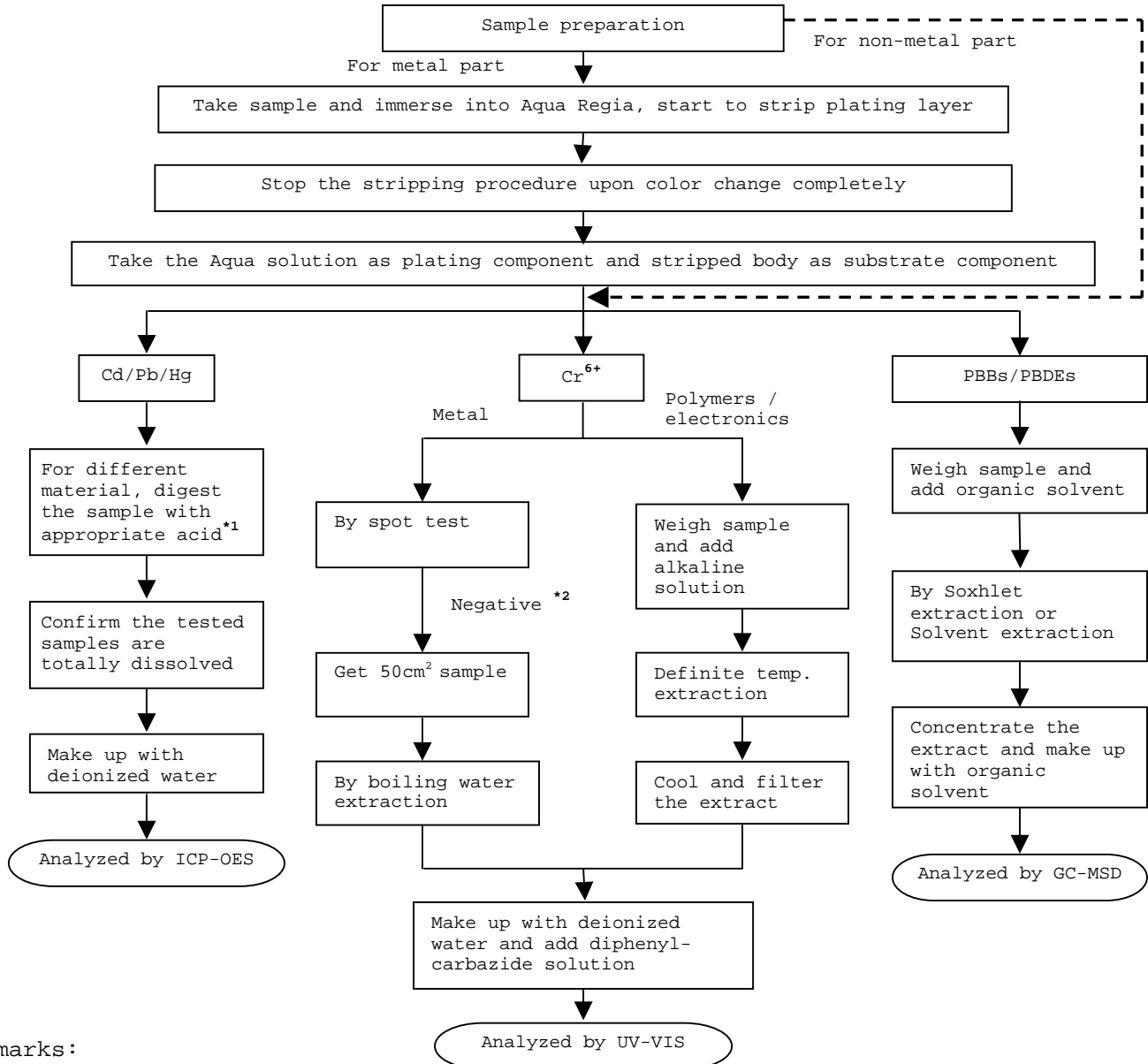
Remark: Reporting limit = Quantitation limit of analyte in sample

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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>

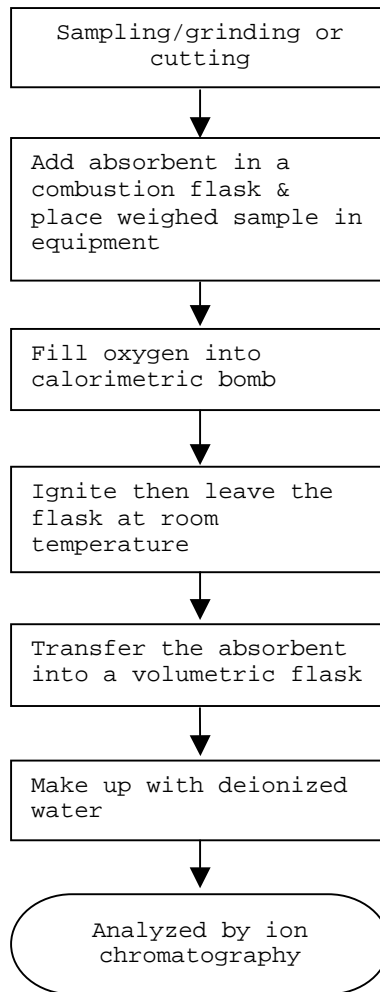
\*2: If the result of spot test is positive, Chromium VI would be determined as detected.

Test Conducted

(IV) Measurement Flowchart:

Test for Halogen Content

Reference Standard : EN 14582

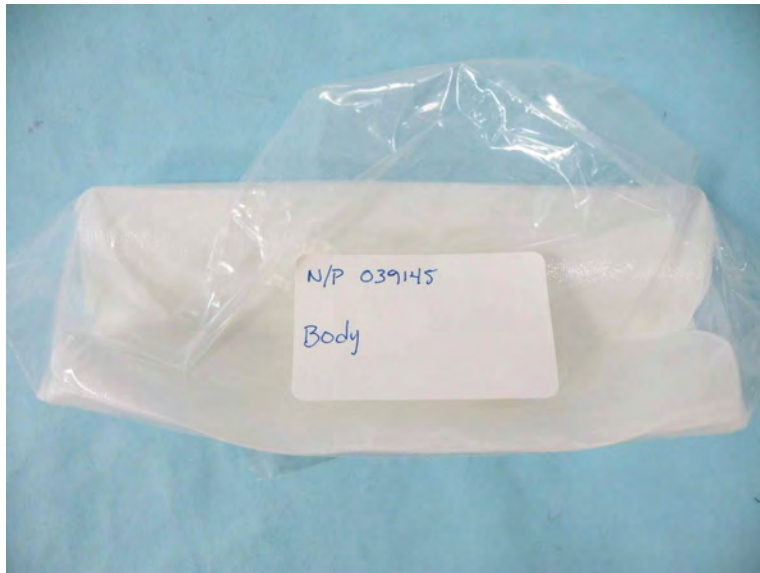
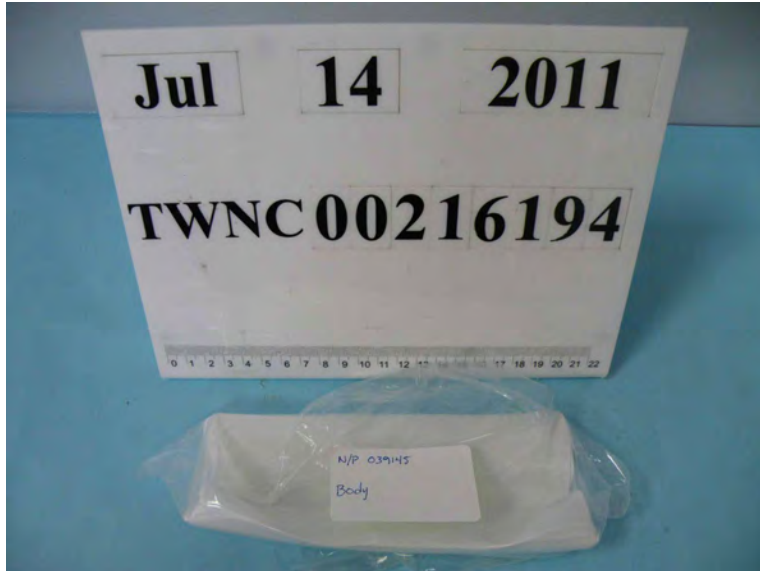


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End of Report

Test Conducted

Photo





**Test Report**

Number : TWNC00216212

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jul 18, 2011

**Sample Description:**

One (1) group of submitted samples said to be :  
Part Description : Rubber  
Part Number : 901-182  
Date Sample Received : Jul 14, 2011  
Date Test Started : Jul 14, 2011

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**Test Conducted :**

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

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On Behalf Of Intertek Testing Services  
Taiwan Limited



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K. Y. Liang  
Director

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Number : TWNC00216212

Test Conducted

( I ) Test Result Summary :

Test Item	Result (ppm)
	Red/Semitransparent Rubber
<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)	335
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 : Jul 14, 2011

Test Period : Jul 14, 2011 To Jul 19, 2011





Number : TWNC00216212

Test 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 Ehters (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>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 : TWNC00216212

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-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 calorimetric bomb with oxygen and determined by ion chromatography	50 ppm

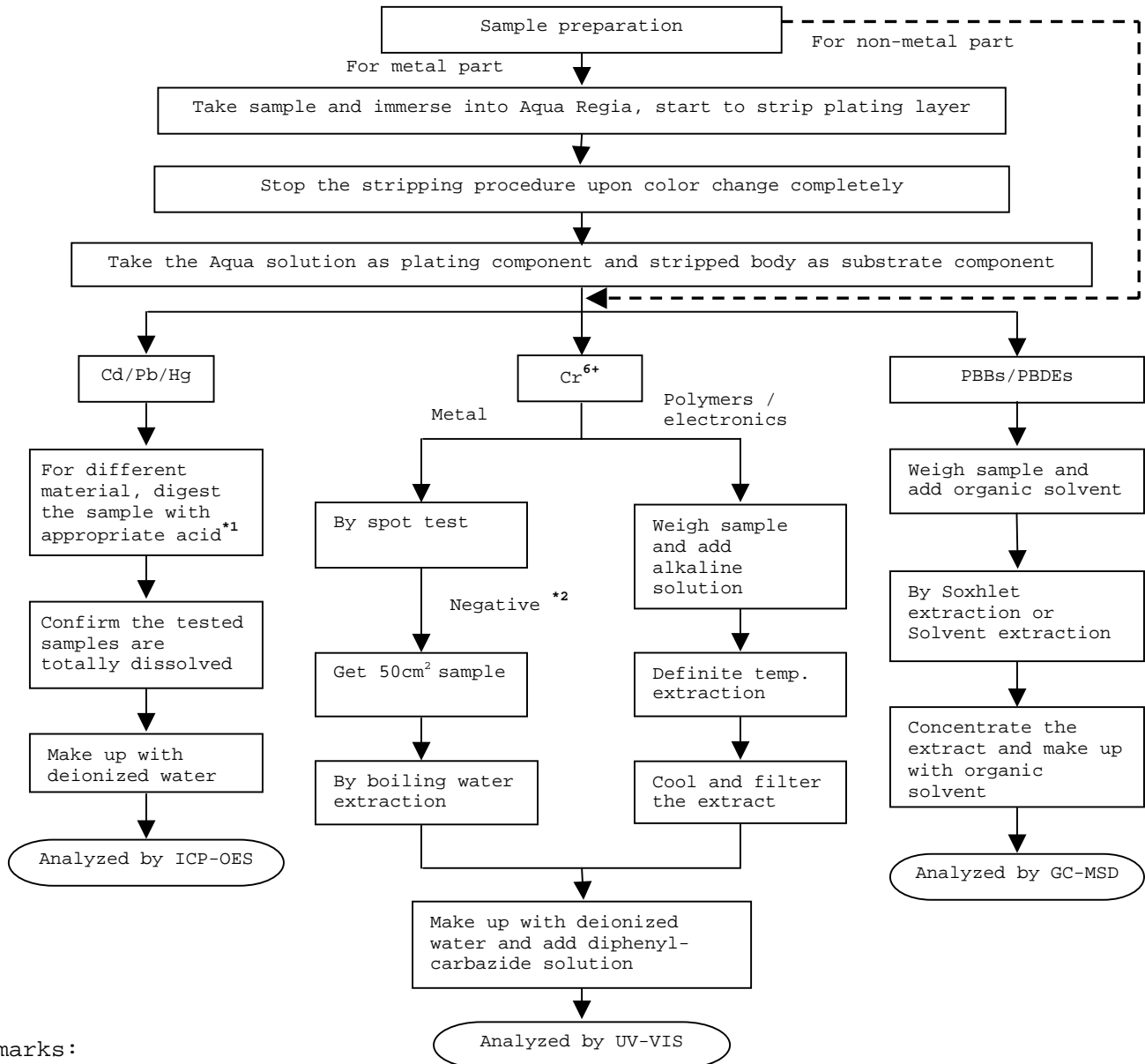
Remark: Reporting limit = Quantitation limit of analyte in sample

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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>

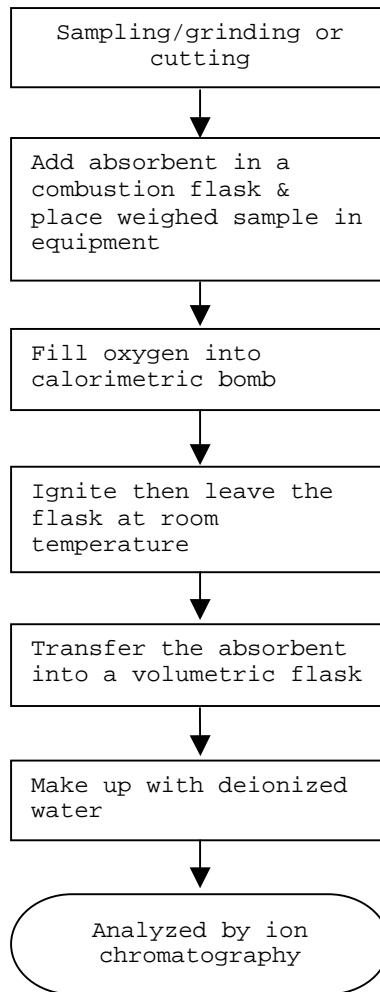
\*2: If the result of spot test is positive, Chromium VI would be determined as detected.

Test Conducted

(IV) Measurement Flowchart:

Test For Halogen Content

Reference Standard : EN 14582



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End of Report

Test Conducted

Photo





Test Report

Number : TWNC00216193

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jul 19, 2011

Sample Description:

One (1) group of submitted samples said to be :  
Part Description : Cap  
Part Number : 923-080  
Date Sample Received : Jul 14, 2011  
Date Test Started : Jul 14, 2011

Test Conducted :

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

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On Behalf Of Intertek Testing Services  
Taiwan Limited



K. Y. Liang  
Director

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Number : TWNC00216193

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>	
	<u>(1)</u>	<u>(2)</u>
<b>Heavy Metal</b>		
Cadmium (Cd) content	ND	ND
Lead (Pb) content	ND	ND
Mercury (Hg) content	ND	ND
Chromium VI (Cr <sup>6+</sup> ) content (mg/kg with 50cm <sup>2</sup> )	Negative ( < 0.02 ) ( # )	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.  
 # = 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.

Tested Components

- (1) Silvery Metal Base Material
- (2) Silvery Plating Layer

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

Date Sample Received : Jul 14, 2011  
 Test Period : Jul 14, 2011 To Jul 19, 2011

( 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)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.



Number : TWNC00216193

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 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

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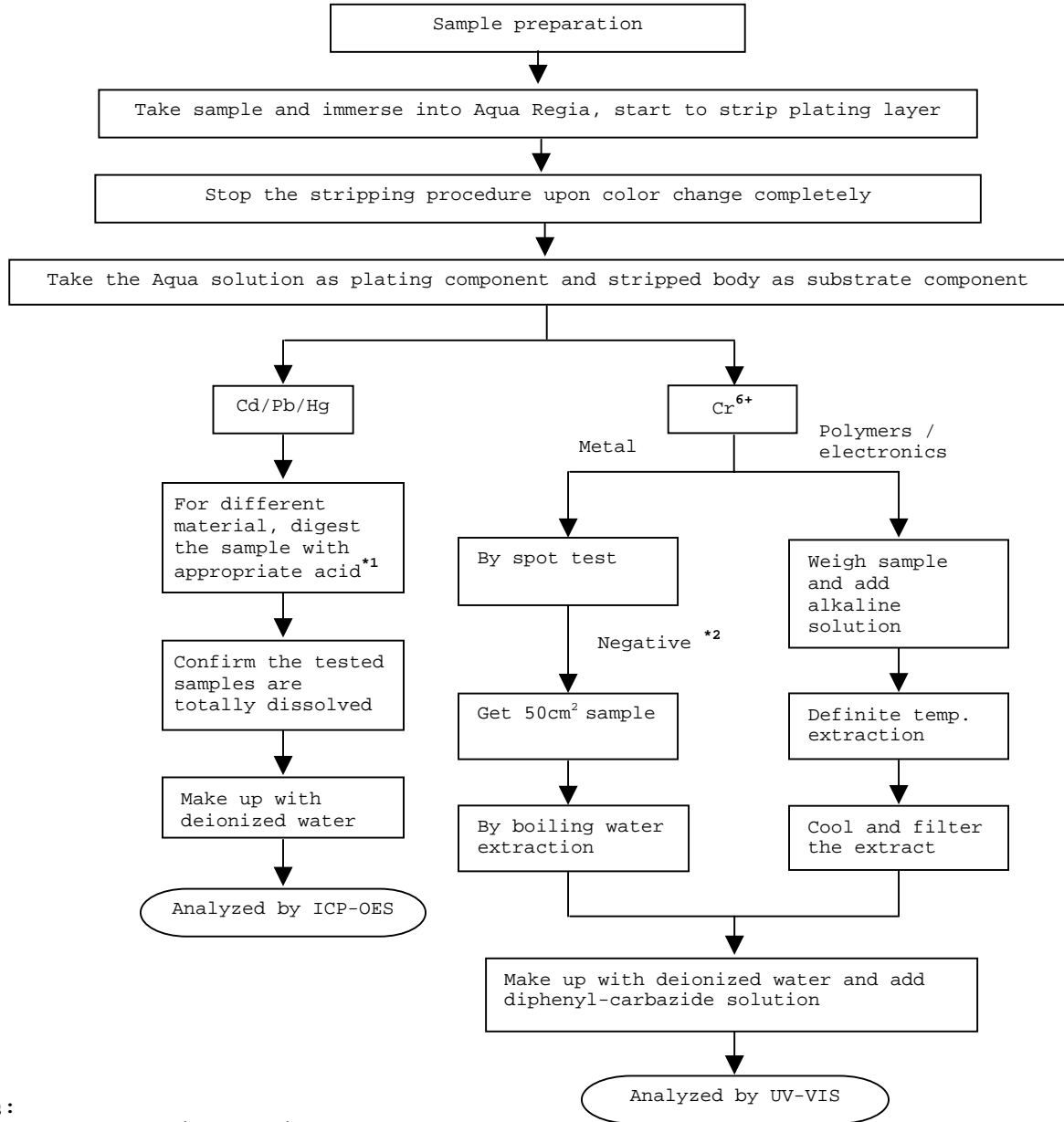


Test Conducted

(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.

End of Report

Test Conducted

Photo





**Test Report**

Number : TWNC00213352

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jun 30, 2011

**Sample Description:**

One (1) group of submitted samples said to be :  
Part Description : SILICA SAND #2  
Part Number : 090169  
Date Sample Received : Jun 28, 2011  
Date Test Started : Jun 28, 2011

**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 : TWNC00213352

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Beige Powder</u>
<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 : Jun 28, 2011

Test Period : Jun 28, 2011 to Jun 30, 2011



Number : TWNC00213352

Test 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 Ehters (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>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 : TWNC00213352

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-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 calorimetric bomb with oxygen and determined by ion chromatography	50 ppm

Remark: Reporting limit = Quantitation limit of analyte in sample

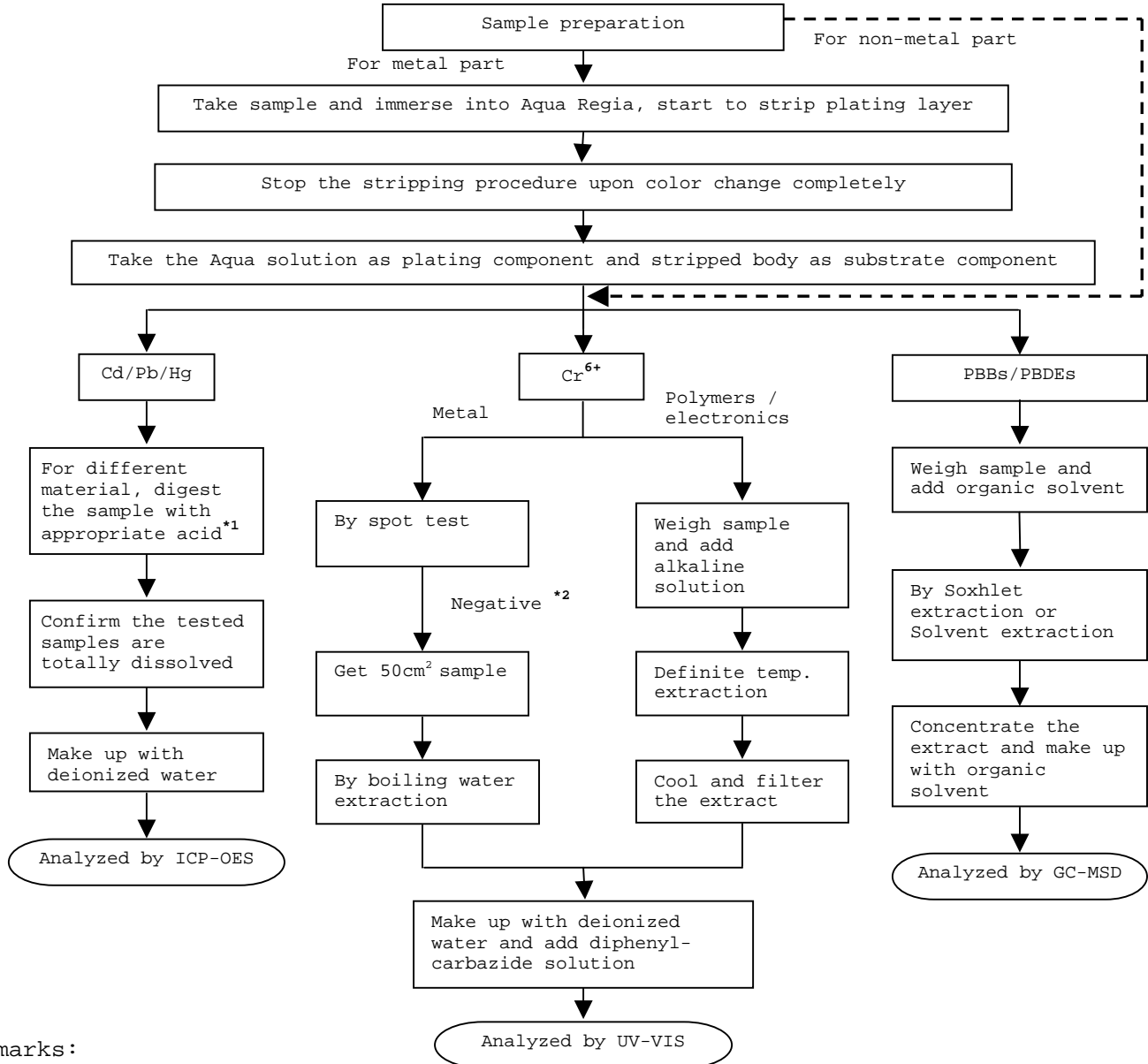
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Test Conducted

(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>

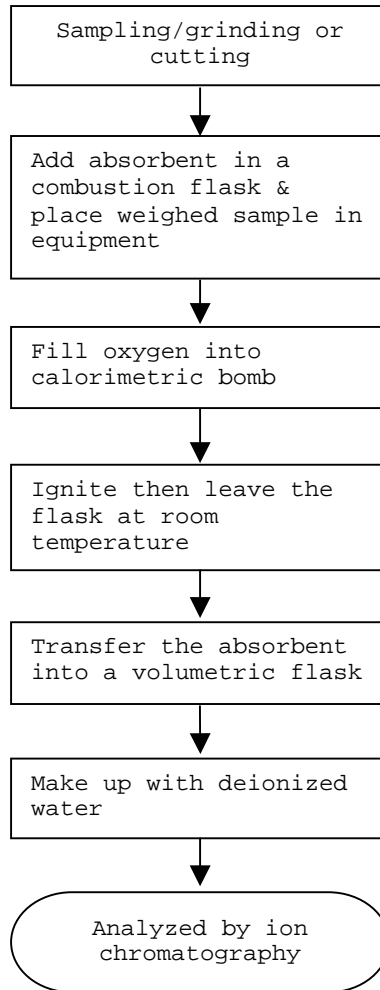
\*2: If the result of spot test is positive, Chromium VI would be determined as detected.

Test Conducted

(IV) Measurement Flowchart:

Test For Halogen Content

Reference Standard : EN 14582



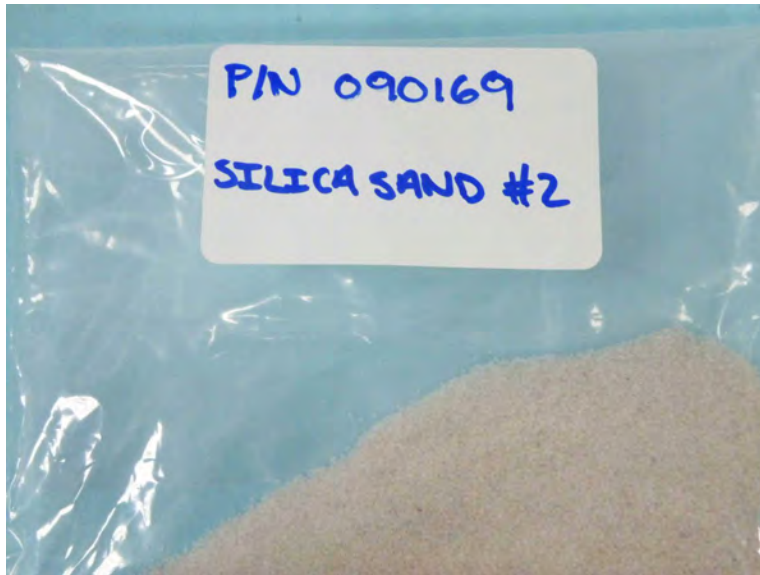
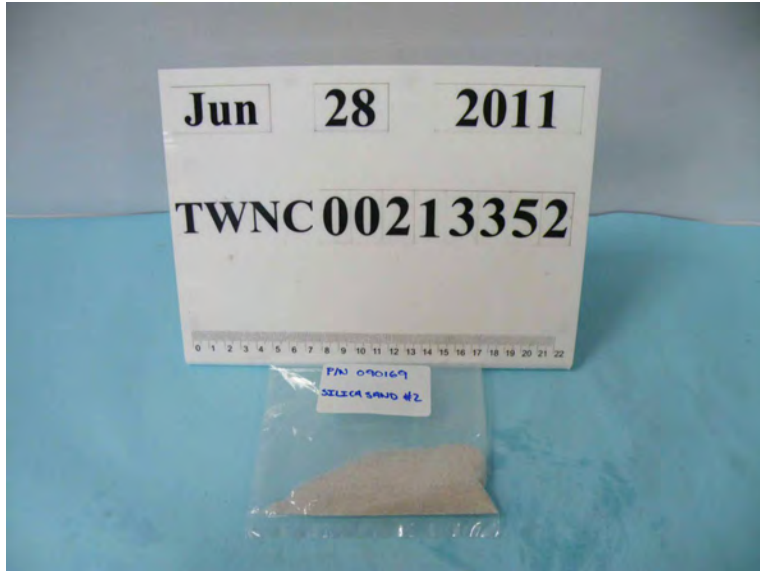
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End Of Report



Test Conducted

Photo





**Test Report**

Number : TWNC00216205

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jul 20, 2011

**Sample Description:**

One (1) group of submitted samples said to be :  
Part Description : Cap Solder  
Part Number : 927-293  
Date Sample Received : Jul 14, 2011  
Date Test Started : Jul 14, 2011

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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 : TWNC00216205

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Grey Metal</u>
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	353
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 / Cathy Chen

Date Sample Received : Jul 14, 2011

Test Period : Jul 14, 2011 To Jul 20, 2011

( 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)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.



Number : TWNC00216205

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 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

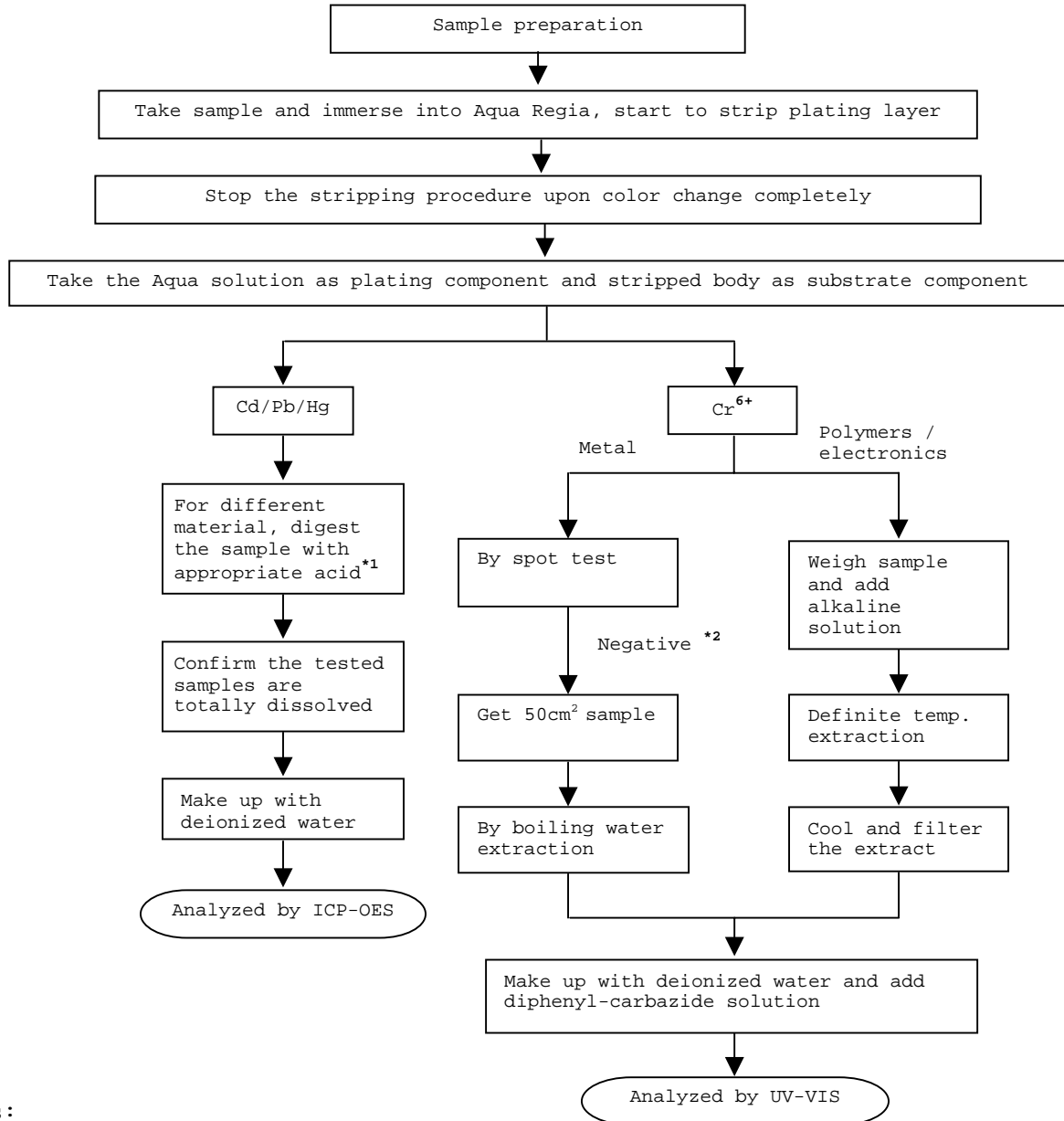
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Test Conducted

(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.

End of Report

Test Conducted

Photo





**Test Report**

Number : TWNC00240305

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila, Mexico

Date : Jan 17, 2012

Sample Description:

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

Sample Description : PLATED TVSS LEAD

Unit Weight : 882-808

Date Sample Received : Jan 11, 2012

Date Test Started : Jan 11, 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 : TWNC00240305

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>	
	<u>(1)</u>	<u>(2)</u>
<b>Heavy Metal</b>		
Cadmium (Cd) content	ND	ND
Lead (Pb) content	ND	74
Mercury (Hg) content	ND	ND
Chromium VI (Cr <sup>6+</sup> ) content (mg/kg with 50cm <sup>2</sup> )	Negative (<0.02)	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.

Tested Components

- (1) Coppery Metal Base Material
- (2) Silvery Plating Layer

Responsibility of Chemist : Irene Chiou / Kevin Liu

Date Sample Received : Jan 11, 2012

Test Period : Jan 11, 2012 To Jan 17, 2012

( 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)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.





Number : TWNC00240305

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 (mg/kg with 50cm <sup>2</sup> )	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

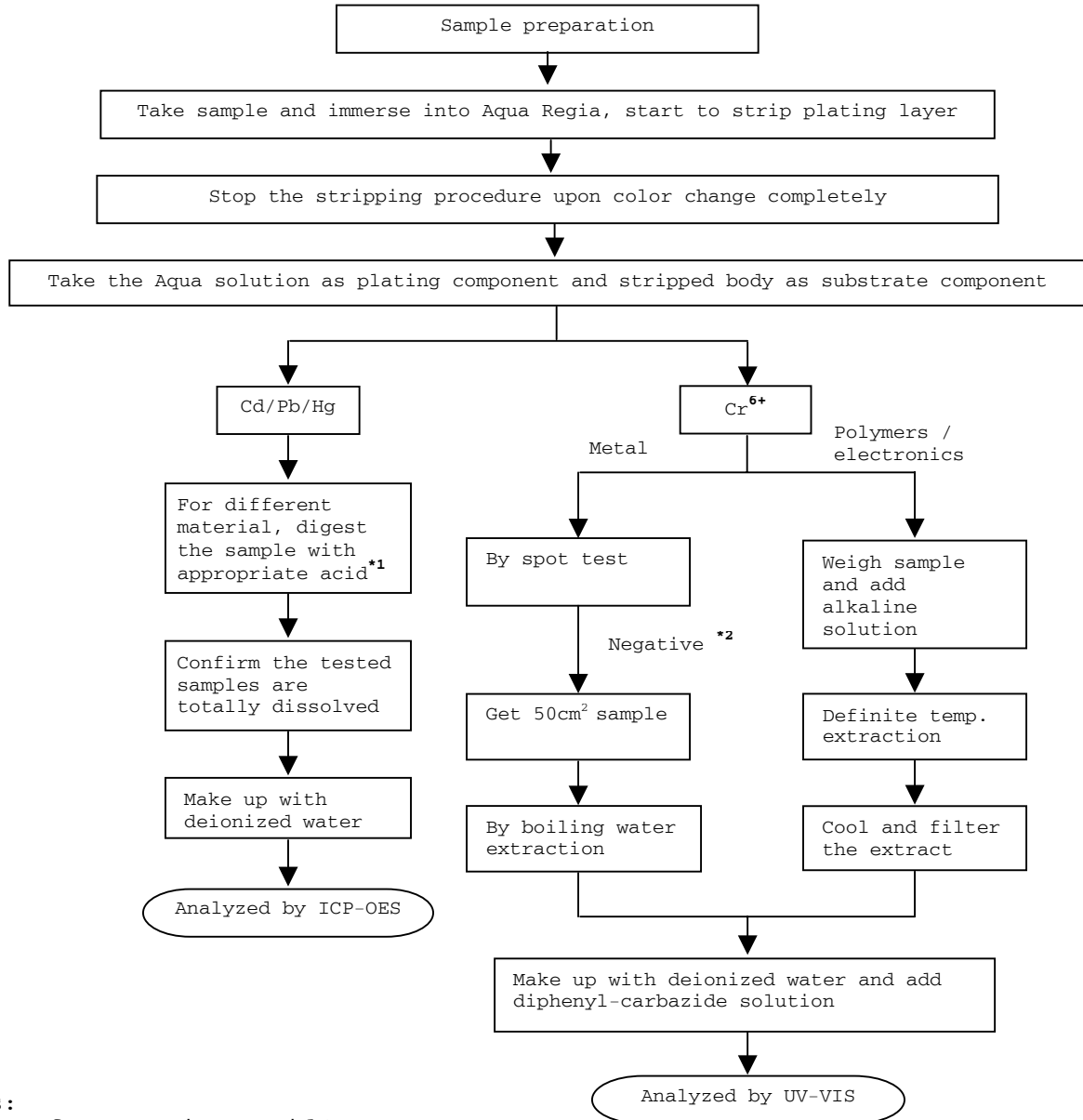
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Test Conducted

(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.

End of Report

Test Conducted

Photo





**Test Report**

Number : TWNC00213353

Applicant: Littelfuse, S.A. de C.V.  
Blvd. Fausto Z. Martinez #1800  
Col. Magisterio Seccion 38 C.P.  
26070 Piedra Negras, Coahuila,  
Mexico

Date : Jul 01, 2011

Sample Description:

One (1) group of submitted samples said to be :  
Part Description : SOLDER PELLETT  
Part Number : 927-027  
Date Sample Received : Jun 28, 2011  
Date Test Started : Jun 28, 2011

Test Conducted :

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

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Taiwan Limited



K. Y. Liang  
Director

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Number : TWNC00213353

Test Conducted

( I ) Test Result Summary :

<u>Test Item</u>	<u>Result (ppm)</u>
	<u>Silvery Metal</u>
<b>Heavy Metal</b>	
Cadmium (Cd) content	ND
Lead (Pb) content	335
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 / Cathy Chen

Date Sample Received : Jun 28, 2011

Test Period : Jun 28, 2011 To Jul 01, 2011

( 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)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.

## Test Conducted

## (III) Test Method:

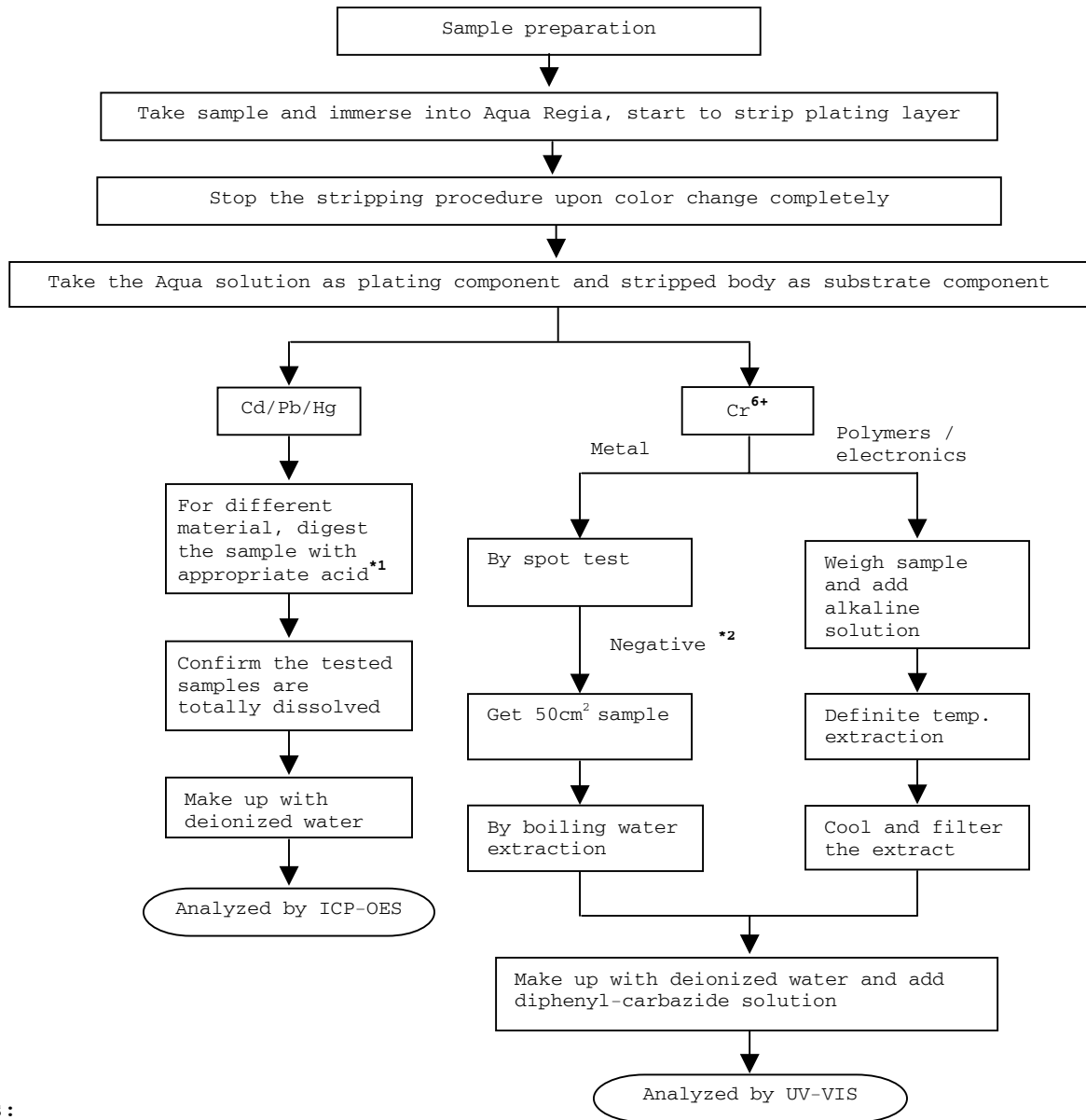
Test Item	Test Method	Reporting Limit
Cadmium (Cd) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, 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 (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

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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

End Of Report

Test Conducted

Photo

