



## ICP Test Report Certification Packet

Company Name: Littelfuse, Inc.

Product Type: Metal Oxide Varistors

Product Series: MOV Series RoHS Models

Issue Date: Nov. 17<sup>th</sup>, 2010

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/package materials, and for additives and the like in the manufacturing processes.

And it is certified by Littelfuse, Inc. that the series products listed above are compliant with LF Halogen Free Standard ( $Cl \leq 800\text{ppm}$ ,  $Br \leq 800\text{ppm}$ ,  $Cl + Br \leq 1000\text{ppm}$ ).

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: *David Huang*

< DGLF Environmental, Health & Safety Engineer >

(1) Parts, sub-materials and unit parts

This document covers Metal Oxide Varistors MOV series RoHS Compliant models manufactured by Littelfuse, Inc.

Please see Table 1 for raw materials used.

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

Remarks :

Table 1: List of Raw Materials covered by this report

Total Parts	P/N	Raw Material Description	Page
1	N/A	Black disc, type including DD, DM, DP, DV and DH.	3-27
2	N/A	A6PL Silver Paste	28-34
3	N/A	Pb-free Sold Bar	35-42
4	N/A	Tinned Copper Wire	43-46
5	N/A	Epoxy, type including red and blue	47-60



**TEST REPORT**

NUMBER: SZHH0049776103

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE 500  
CHICAGO IL 60631 USA

DATE: Jun 19, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **DD BLACK DISC.**

TESTED COMPONENT : GREY SOLID.

PART DESCRIPTION : DD BLACK DISC.

DATE SAMPLE RECEIVED : JUN 12, 2010.

DATE TEST STARTED : JUN 12, 2010.



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**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

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AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.



KARBON M.Y. WU  
GENERAL MANAGER

**TEST REPORT**

NUMBER: SZHH0049776103

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) CONTENT (mg/kg)	15
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

&lt; = LESS THAN

ND = NOT DETECTED

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**TEST REPORT**

NUMBER: SZHH0049776103

## TESTS CONDUCTED

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

## (C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : JUN 12, 2010

TESTING PERIOD : JUN 12, 2010 TO JUN 17, 2010

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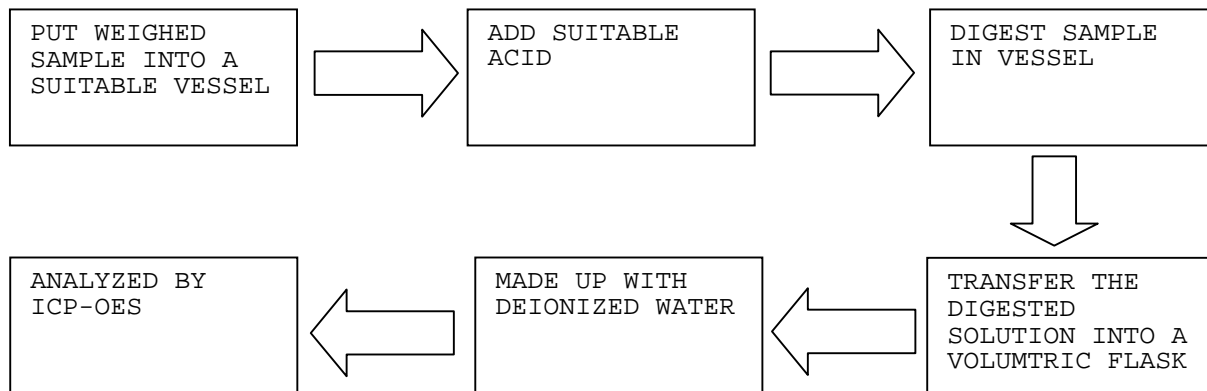
**TEST REPORT**

NUMBER: SZHH0049776103

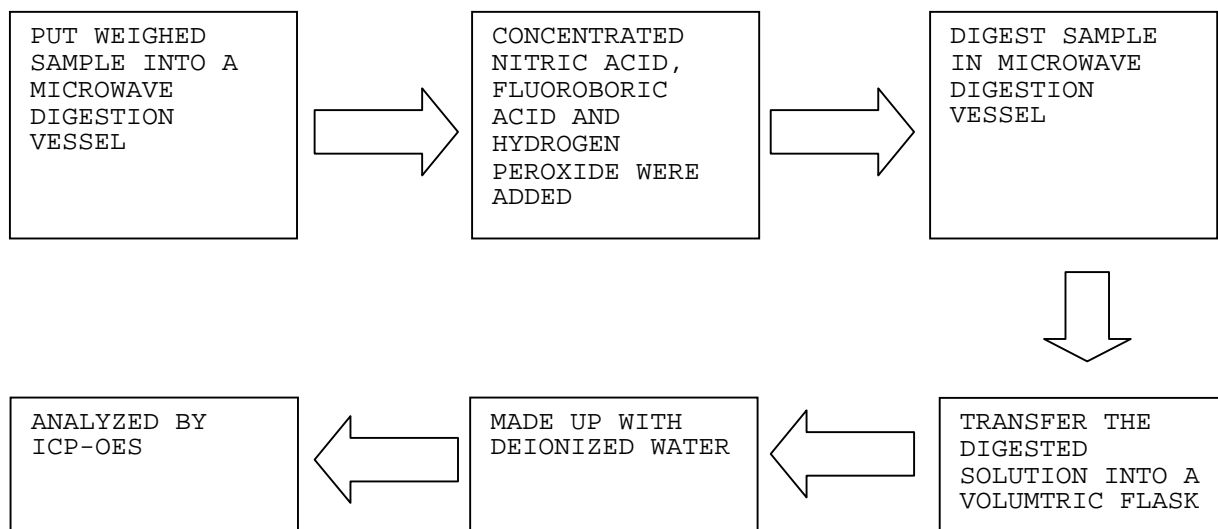
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



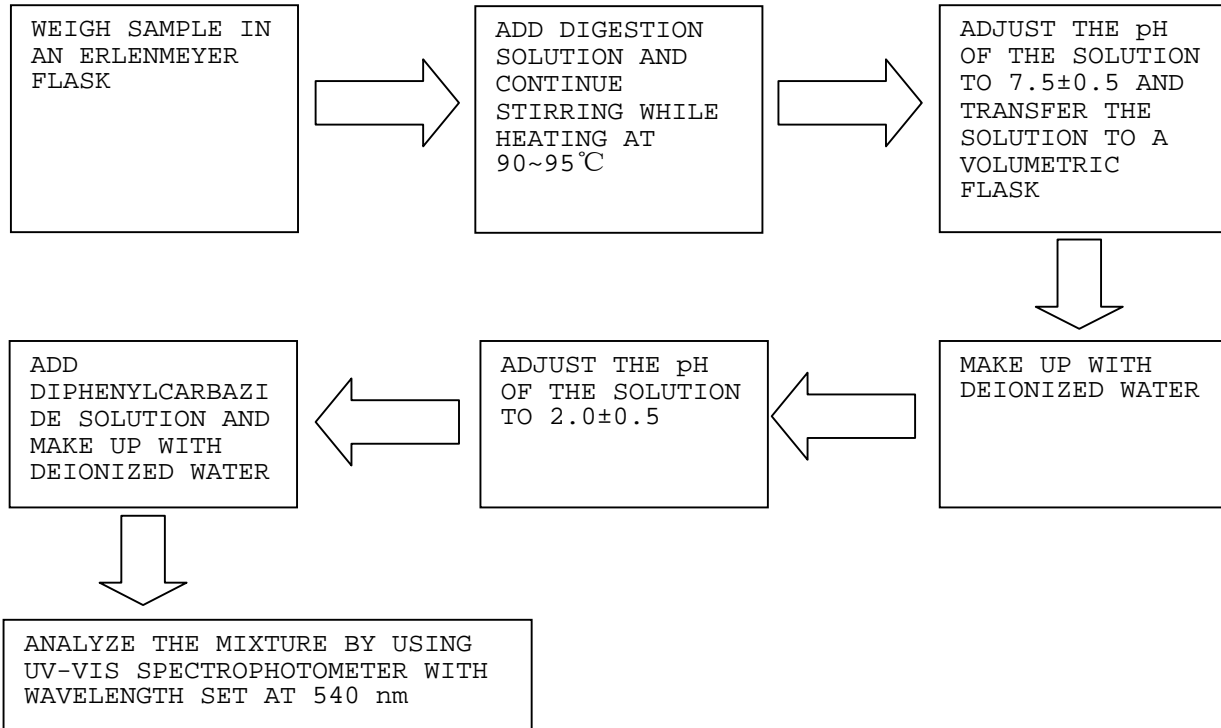
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**TEST REPORT**

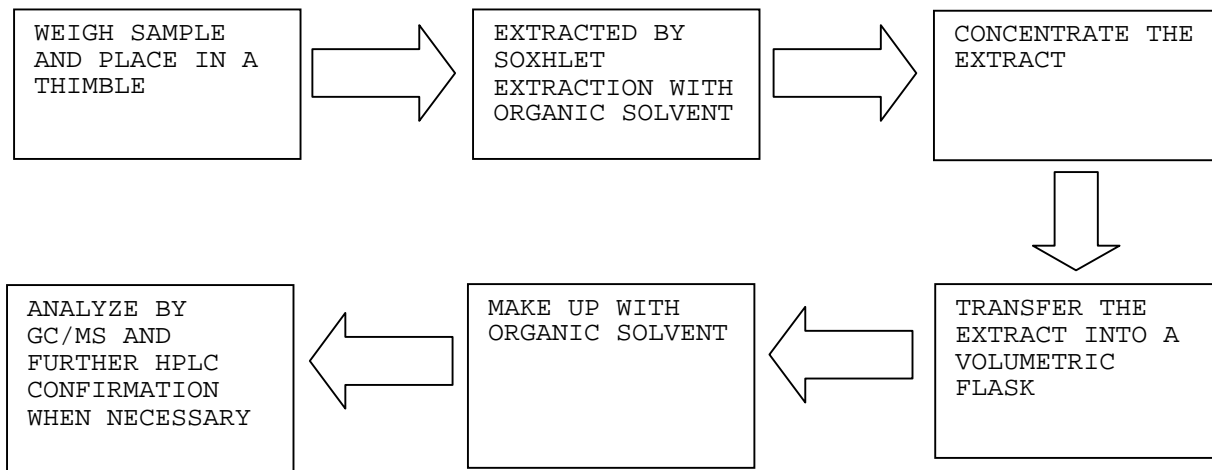
NUMBER: SZHH0049776103

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



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END OF REPORT



**TEST REPORT**

NUMBER: SZHH0049776104

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE 500  
CHICAGO IL 60631 USA

DATE: Jun 19, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

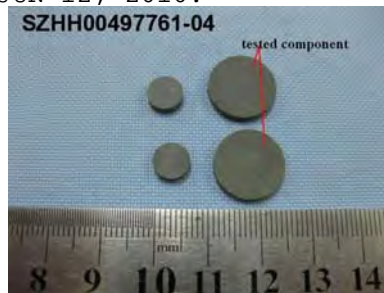
ONE (1) SUBMITTED SAMPLE SAID TO BE **DM BLACK DISC.**

TESTED COMPONENT : GREY SOLID.

PART DESCRIPTION : DM BLACK DISC.

DATE SAMPLE RECEIVED : JUN 12, 2010.

DATE TEST STARTED : JUN 12, 2010.



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**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

\*\*\*\*\*

AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

KARBON M.Y. WU  
GENERAL MANAGER



**TEST REPORT**

NUMBER: SZHH0049776104

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) CONTENT (mg/kg)	23
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

&lt; = LESS THAN

ND = NOT DETECTED

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**TEST REPORT**

NUMBER: SZHH0049776104

## TESTS CONDUCTED

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

## (C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : JUN 12, 2010

TESTING PERIOD : JUN 12, 2010 TO JUN 17, 2010

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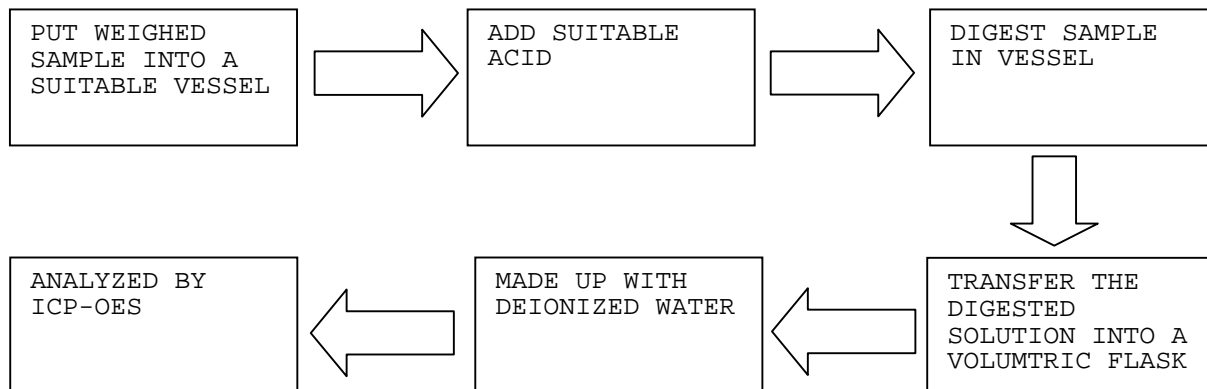
**TEST REPORT**

NUMBER: SZHH0049776104

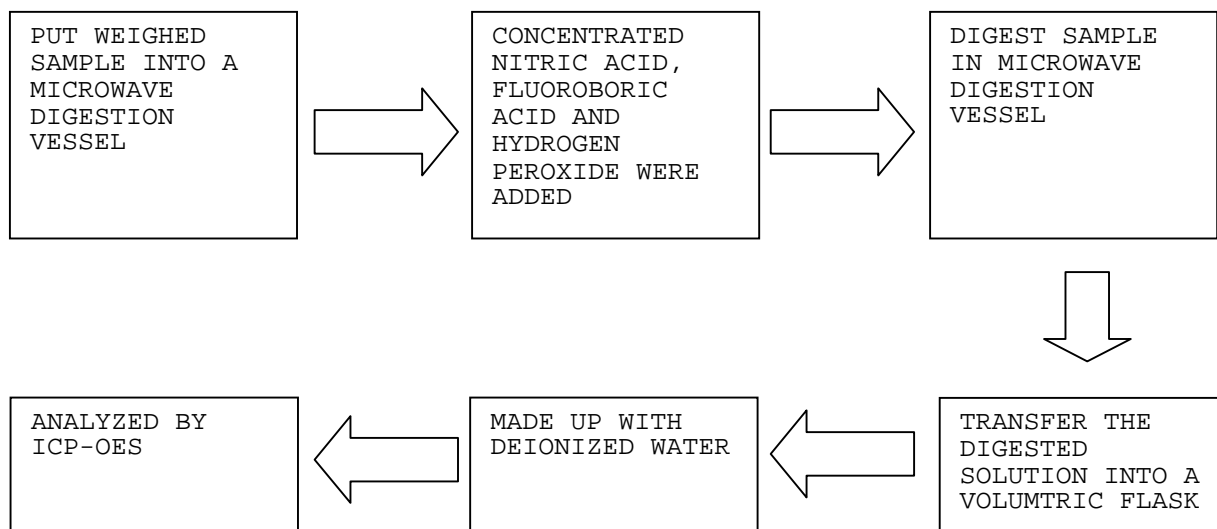
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



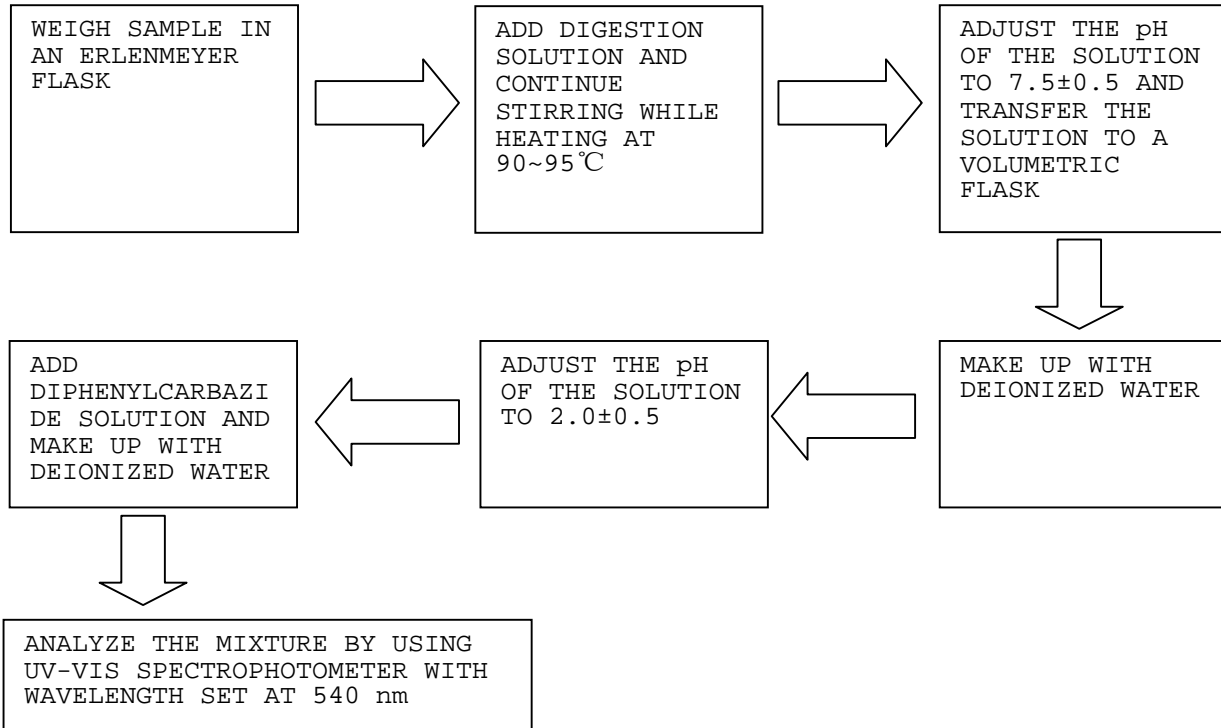
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**TEST REPORT**

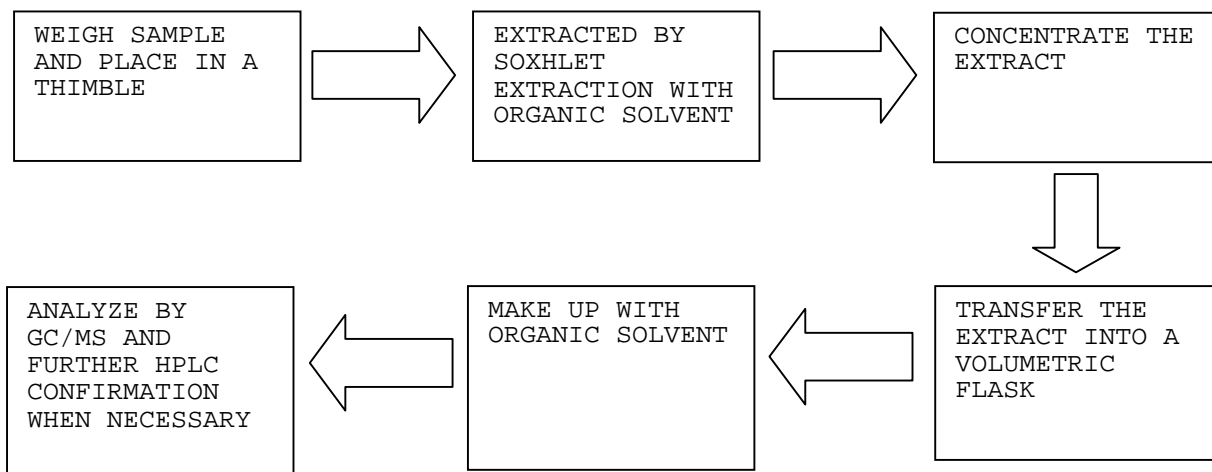
NUMBER: SZHH0049776104

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



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END OF REPORT



**TEST REPORT**

NUMBER: SZHH0049776102

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE 500  
CHICAGO IL 60631 USA

DATE: Jun 19, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **GREY SOLID**.  
PART DESCRIPTION : DP BLACK DISC.  
DATE SAMPLE RECEIVED : JUN 12, 2010.  
DATE TEST STARTED : JUN 12, 2010.



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**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

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AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

KARBON M.Y. WU  
GENERAL MANAGER

**TEST REPORT**

NUMBER: SZHH0049776102

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) CONTENT (mg/kg)	31
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

&lt; = LESS THAN

ND = NOT DETECTED

\*\*\*\*\*

**TEST REPORT**

NUMBER: SZHH0049776102

## TESTS CONDUCTED

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

## (C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : JUN 12, 2010

TESTING PERIOD : JUN 12, 2010 TO JUN 17, 2010

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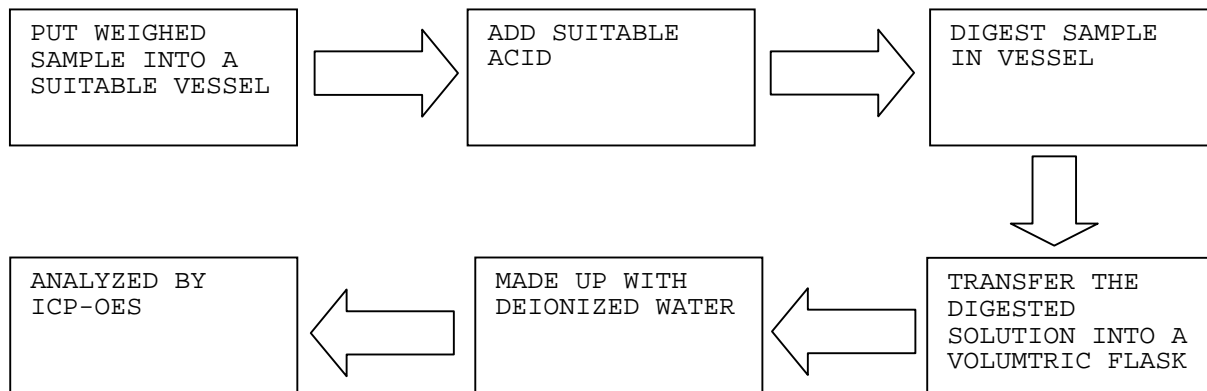
**TEST REPORT**

NUMBER: SZHH0049776102

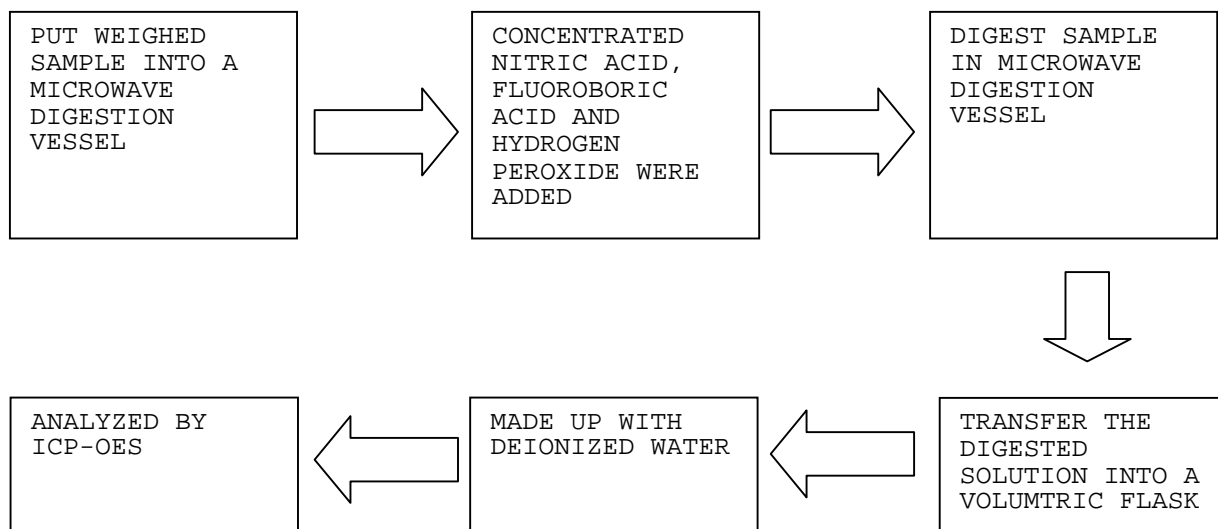
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



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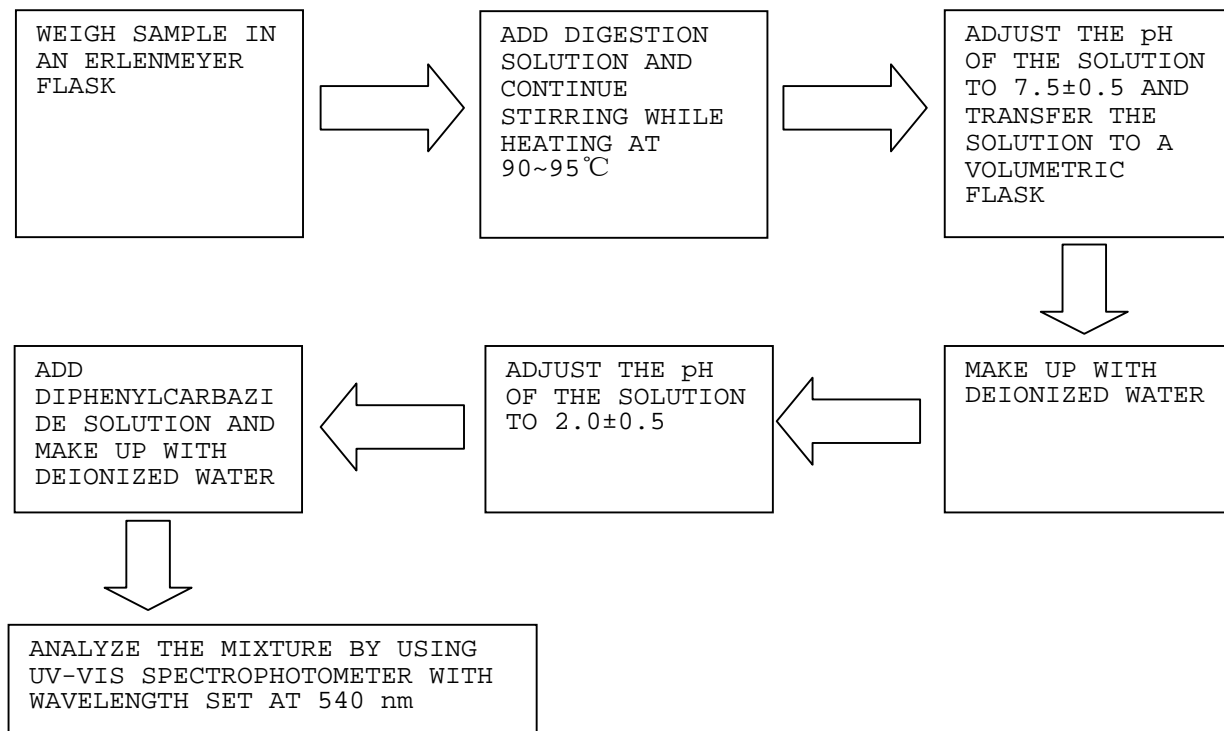


**TEST REPORT**

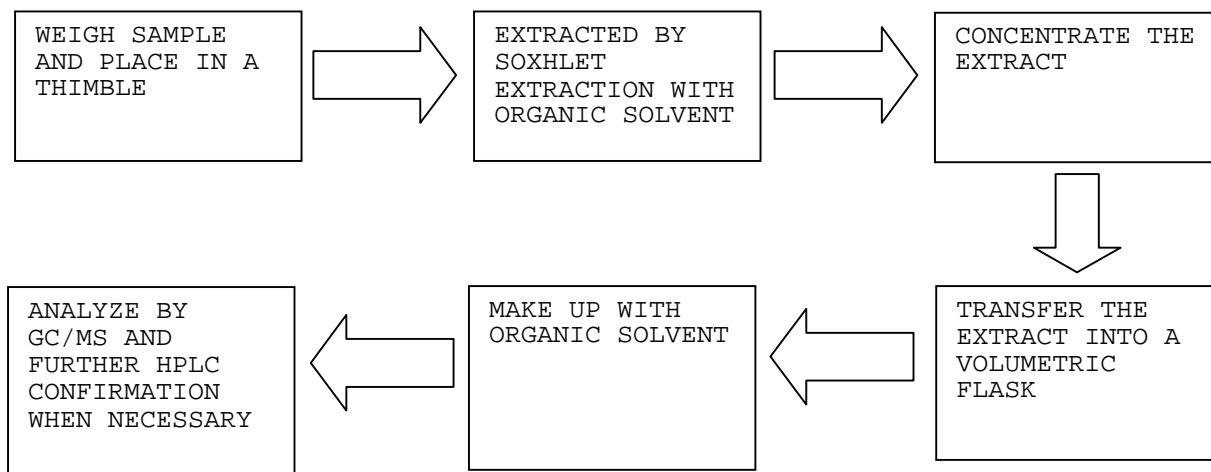
NUMBER: SZHH0049776102

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



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END OF REPORT



**TEST REPORT**

NUMBER: SZHH0049776101

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE 500  
CHICAGO IL 60631 USA

DATE: Jun 19, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **DV BLACK DISC.**  
TESTED COMPONENT : GREY SOLID.  
PART DESCRIPTION : DV BLACK DISC.  
DATE SAMPLE RECEIVED : JUN 12, 2010.  
DATE TEST STARTED : JUN 12, 2010.



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**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

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AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

KARBON M.Y. WU  
GENERAL MANAGER

**TEST REPORT**

NUMBER: SZHH0049776101

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	4
LEAD (Pb) CONTENT (mg/kg)	17
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) CONTENT (mg/kg)	ND (<1)
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

&lt; = LESS THAN

ND = NOT DETECTED

\*\*\*\*\*

**TEST REPORT**

NUMBER: SZHH0049776101

## TESTS CONDUCTED

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

## (C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : JUN 12, 2010

TESTING PERIOD : JUN 12, 2010 TO JUN 17, 2010

\*\*\*\*\*

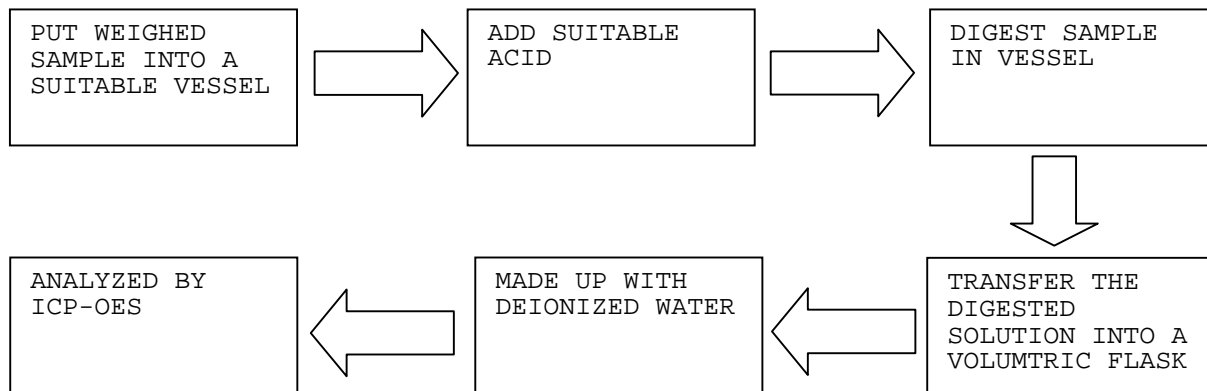
**TEST REPORT**

NUMBER: SZHH0049776101

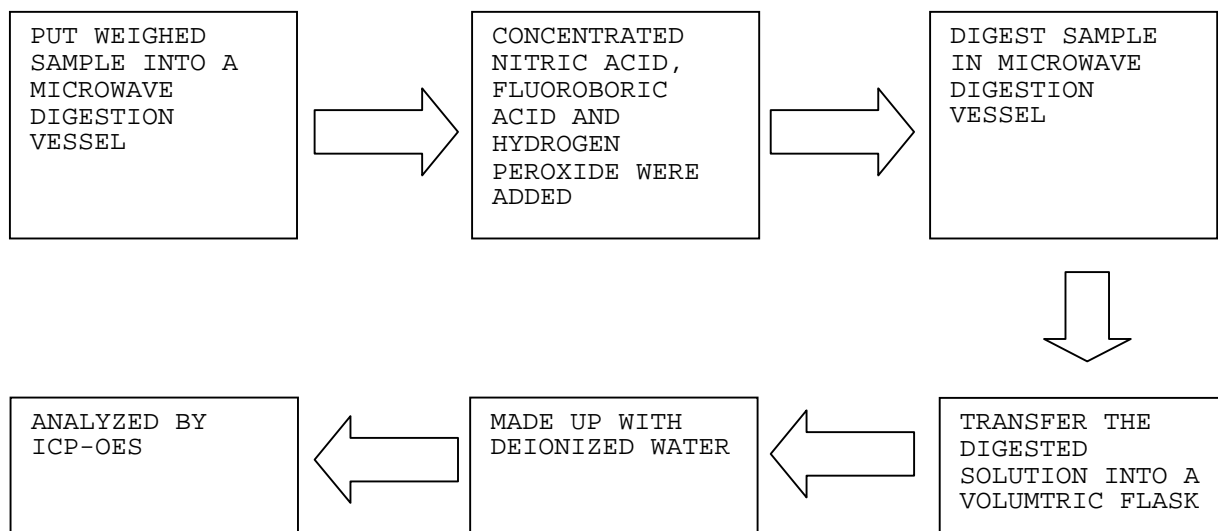
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



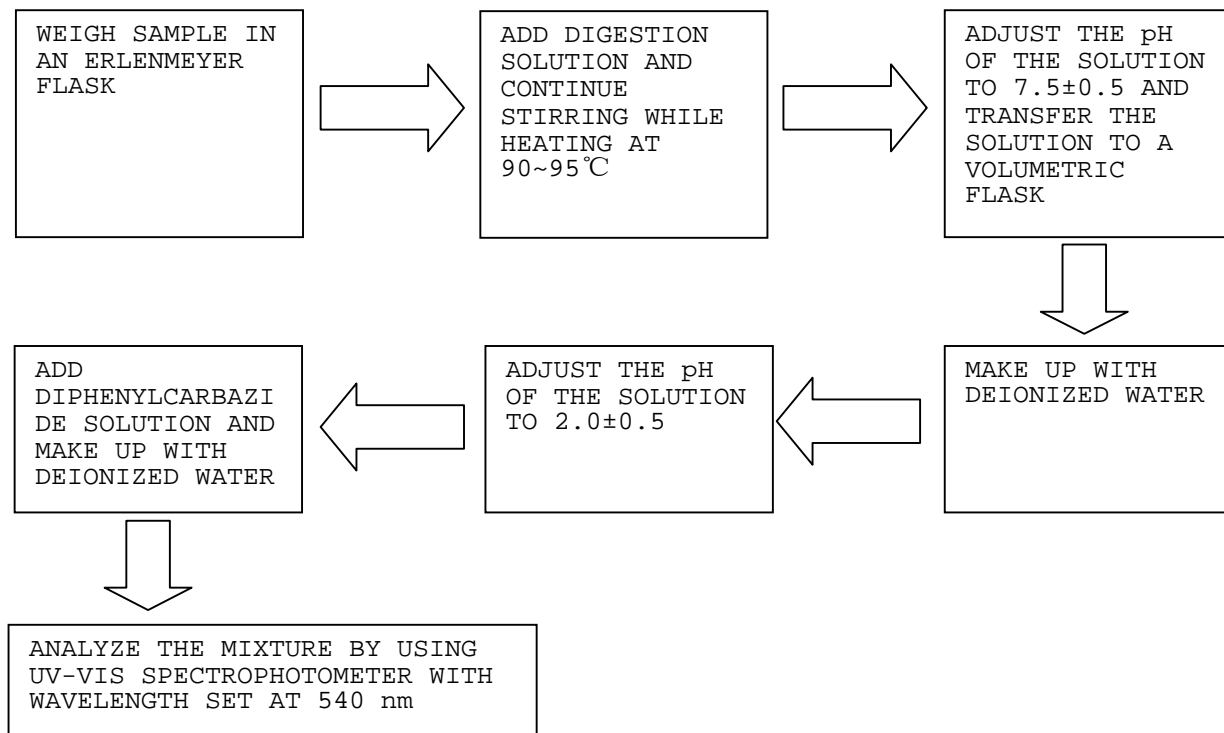
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**TEST REPORT**

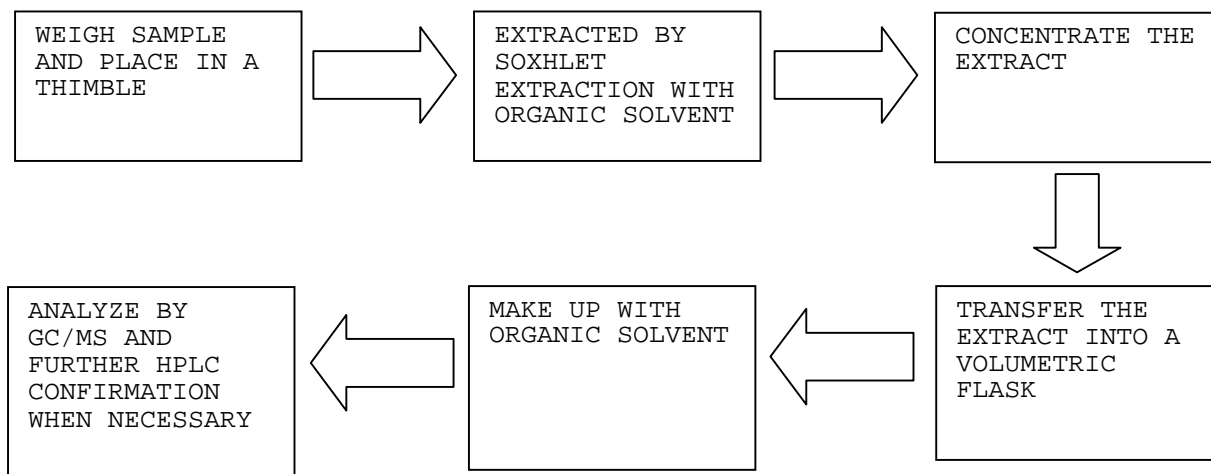
NUMBER: SZHH0049776101

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



\*\*\*\*\*  
END OF REPORT

**TEST REPORT**

NUMBER: SZHH0052365301

APPLICANT: LITTELFUSE, INC  
8755 WEST HIGGINS ROAD SUITE  
500CHICAGO IL 60631 USA

DATE: Sep 07, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **DULL GREY MATERIAL (DH BLACK DISC)**.



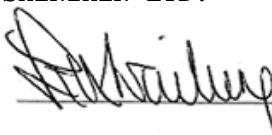

\*\*\*\*\*

**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

\*\*\*\*\*

AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

BEN N.L. LIN  
GENERAL MANAGER

**TEST REPORT**

NUMBER: SZHH0052365301

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) CONTENT (mg/kg)	3
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

&lt; = LESS THAN

ND = NOT DETECTED

\*\*\*\*\*



**TEST REPORT**

NUMBER: SZHH0052365301

## TESTS CONDUCTED

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

## (C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : SEP 01, 2010

TESTING PERIOD : SEP 01, 2010 TO SEP 06, 2010

\*\*\*\*\*

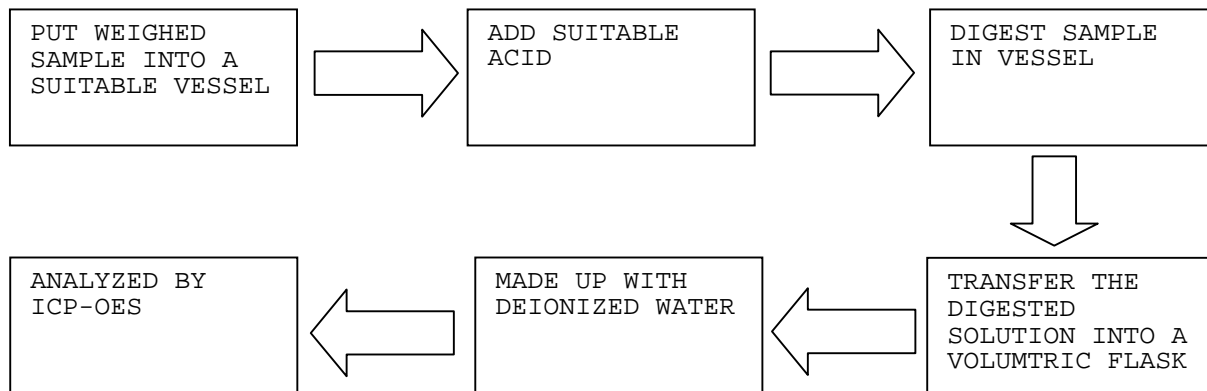
**TEST REPORT**

NUMBER: SZHH0052365301

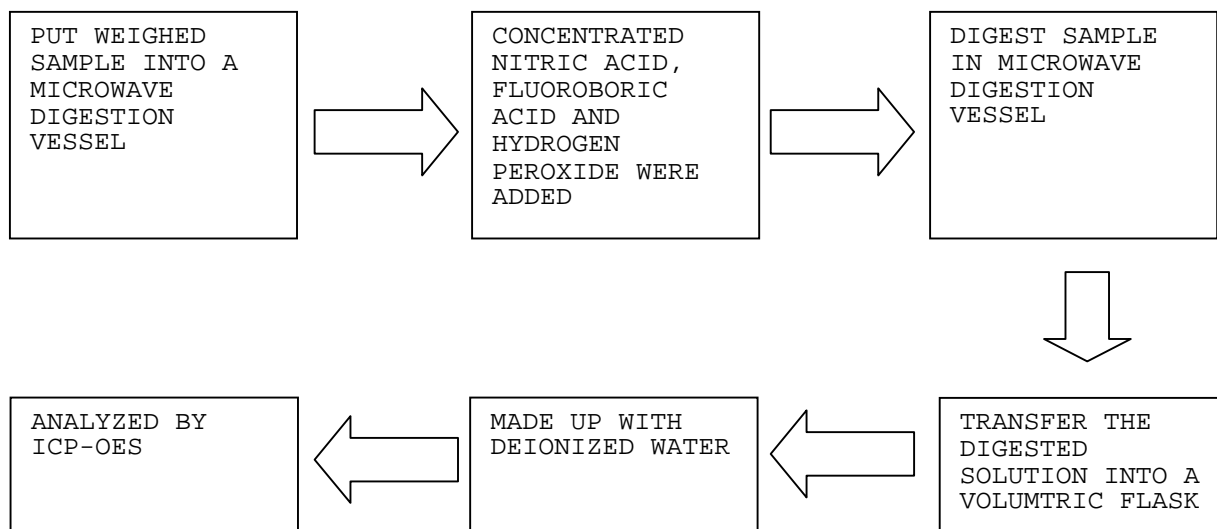
TESTS CONDUCTED

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



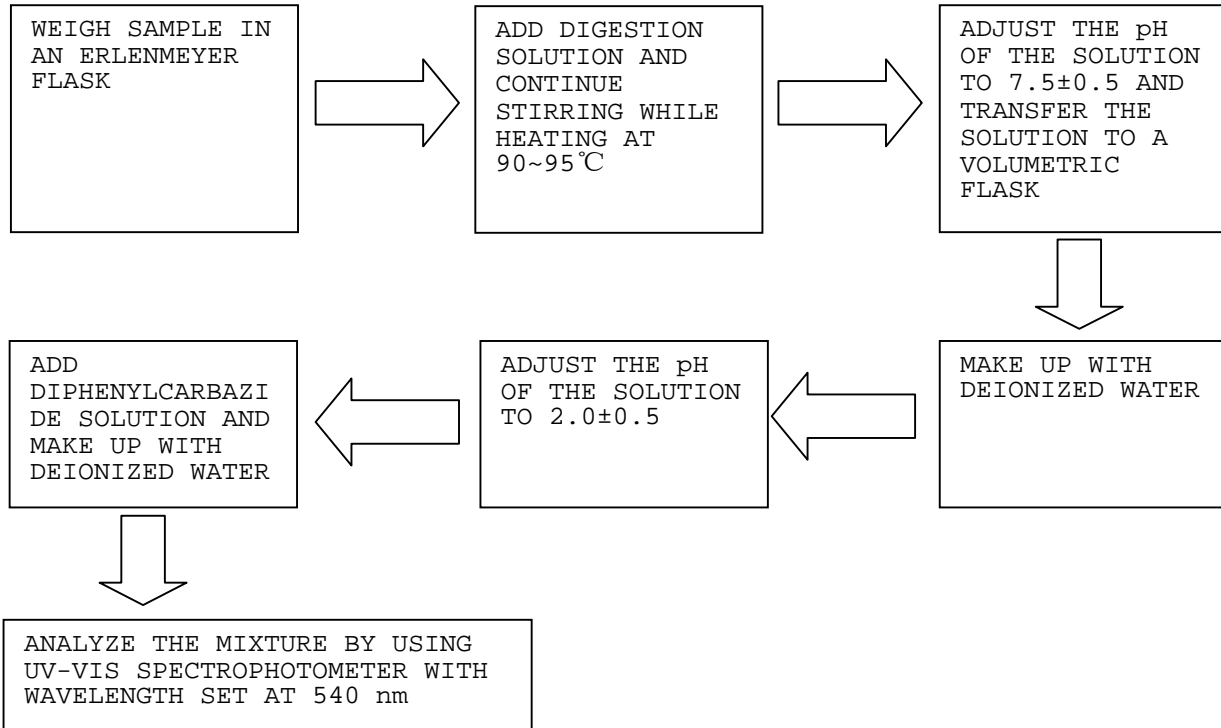
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**TEST REPORT**

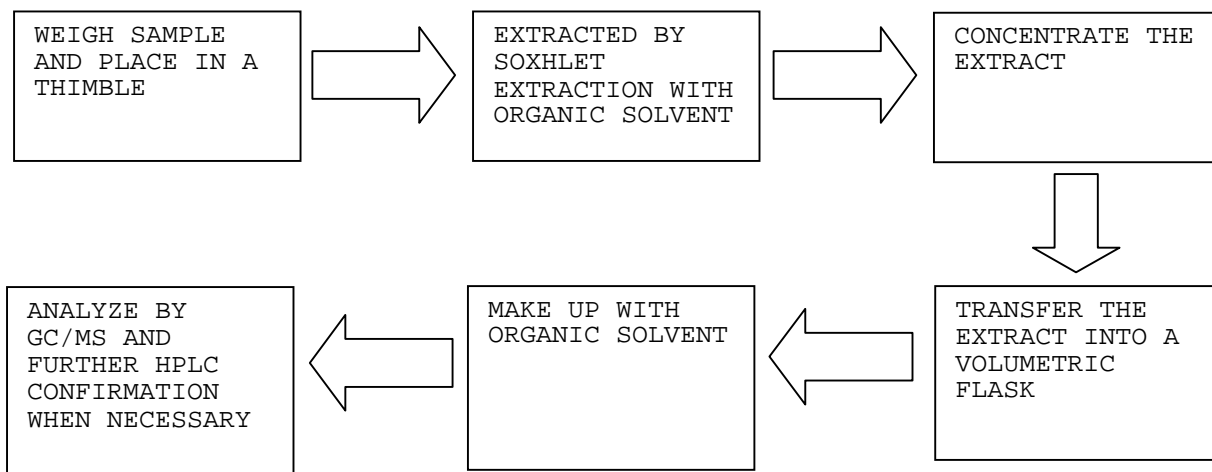
NUMBER: SZHH0052365301

TESTS CONDUCTED

3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



4. TEST FOR PBBs/PBDEs CONTENTS



\*\*\*\*\*  
END OF REPORT

# 測試報告 Test Report

號碼(No.) : CE/2010/62645 日期(Date) : 2010/06/21 頁數(Page) : 1 of 7

新日本化金株式會社  
SHIN-NIHON KAKIN CO., LTD.

東京都板橋區宮本町33番7號

33-7, MIYAMOTO-CHO, ITABASHI-KU, TOKYO, JAPAN



以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as):

樣品名稱(Sample Description) : 銀膏 (SILVER PASTE)  
樣品型號(Style/Item No.) : SP-A6PL  
材料批號(Lot No.) : 00603  
收件日期(Sample Receiving Date) : 2010/06/11  
測試期間(Testing Period) : 2010/06/11 TO 2010/06/21

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

  
Chenyu Kung / Operation Manager  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory – Taipei

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東京都板橋區宮本町33番7號

33-7, MIYAMOTO-CHO, ITABASHI-KU, TOKYO, JAPAN



### 測試結果(Test Results)

測試部位(PART NAME) NO.1 : 灰綠色膏狀 (GRAY-GREEN PASTE)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測。 / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
鉛 / Lead (Pb)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測。 / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
汞 / Mercury (Hg)	mg/kg	參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測。 / With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
六價鉻 / Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	參考IEC 62321: 2008方法, 以UV-VIS檢測。 / With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
鹵素 / Halogen				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析。 / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)			50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 010097-32-2)			50	n.d.
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 014362-44-8)			50	n.d.

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# 測試報告

## Test Report

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33-7, MIYAMOTO-CHO, ITABASHI-KU, TOKYO, JAPAN



測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result) NO.1
多溴聯苯總和 / Sum of PBBs	mg/kg	參考 IEC 62321: 2008 方法, 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.
一溴聯苯 / Monobromobiphenyl			5	n.d.
二溴聯苯 / Dibromobiphenyl			5	n.d.
三溴聯苯 / Tribromobiphenyl			5	n.d.
四溴聯苯 / Tetrabromobiphenyl			5	n.d.
五溴聯苯 / Pentabromobiphenyl			5	n.d.
六溴聯苯 / Hexabromobiphenyl			5	n.d.
七溴聯苯 / Heptabromobiphenyl			5	n.d.
八溴聯苯 / Octabromobiphenyl			5	n.d.
九溴聯苯 / Nonabromobiphenyl			5	n.d.
十溴聯苯 / Decabromobiphenyl			5	n.d.
多溴聯苯醚總和 / Sum of PBDEs			-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether			5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether			5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether			5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether			5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether			5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether			5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether			5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether			5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether			5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether			5	n.d.

## 備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)

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# 測試報告

## Test Report

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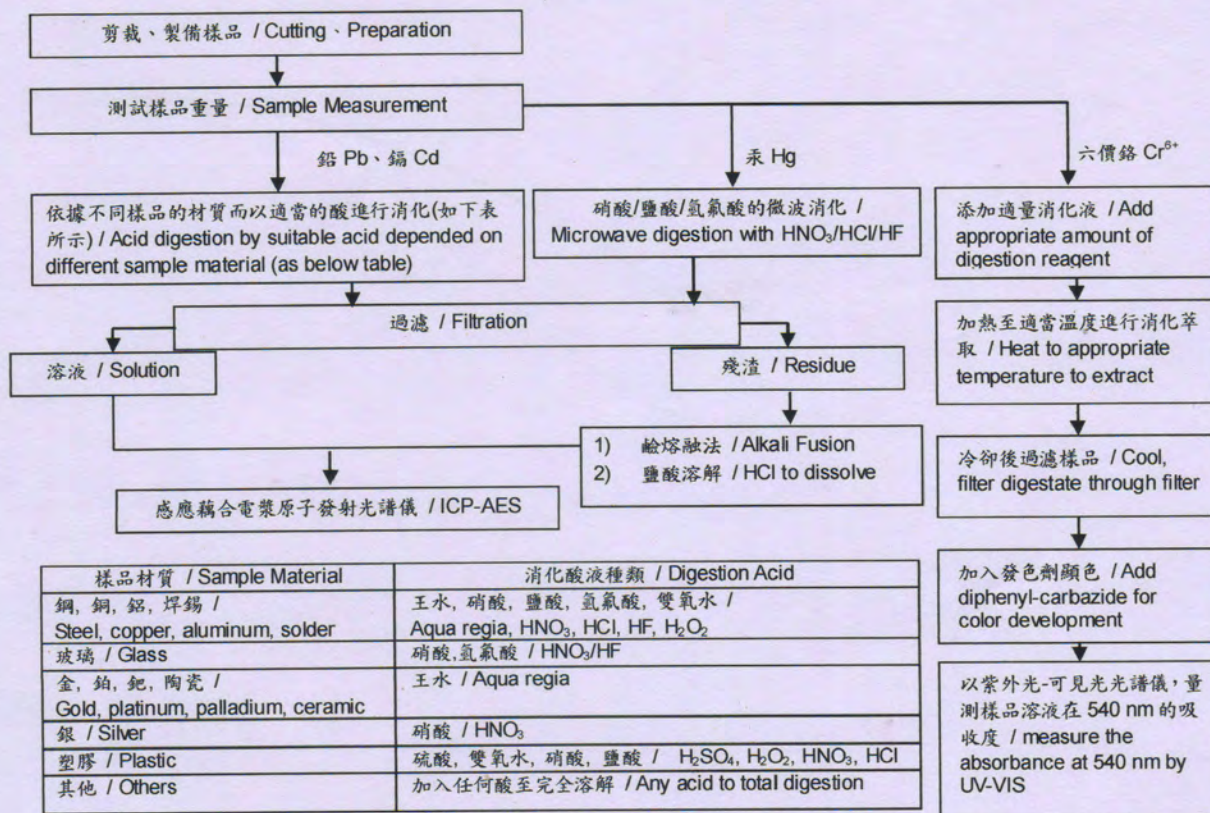
東京都板橋區宮本町33番7號

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號碼(No.) : CE/2010/62645 日期(Date) : 2010/06/21 頁數(Page) : 4 of 7



- 1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)
- 2) 測試人員：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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## 測試報告 Test Report

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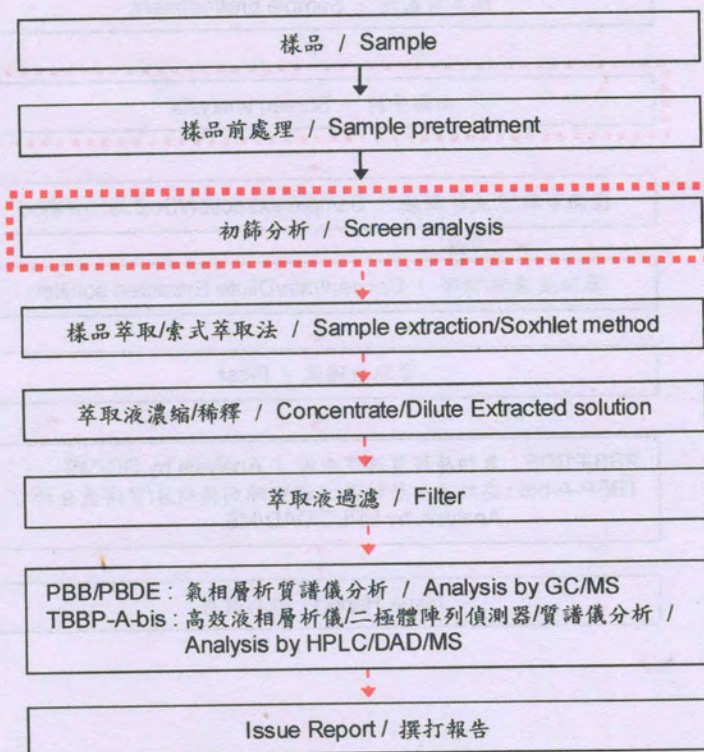
號碼(No.) : CE/2010/62645 日期(Date) : 2010/06/21 頁數(Page) : 5 of 7



### 分析流程圖 / Analytical flow chart

- 1) 測試人員: 翁賜彬 / Name of the person who made measurement: Roman Wong  
 2) 測試負責人: 張啓興 / Name of the person in charge of measurement: Troy Chang  
 ■ 測試項目(Test Items): 多溴聯苯/多溴聯苯醚, 四溴雙酚-A-雙 / PBB/PBDE, TBBP-A-bis

初次測試程序 / First testing process → 選擇性篩檢程序 / Optional screen process ..... 確認程序 / Confirmation process →



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## 測試報告 Test Report

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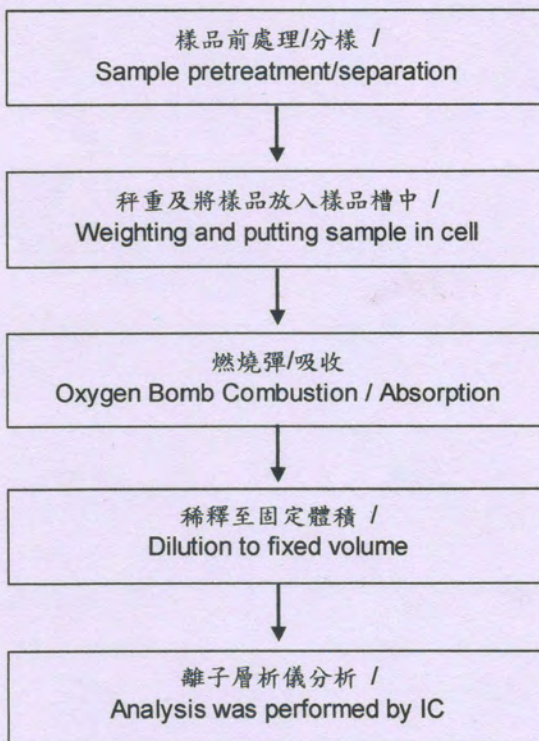
東京都板橋區宮本町33番7號

33-7, MIYAMOTO-CHO, ITABASHI-KU, TOKYO, JAPAN



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

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



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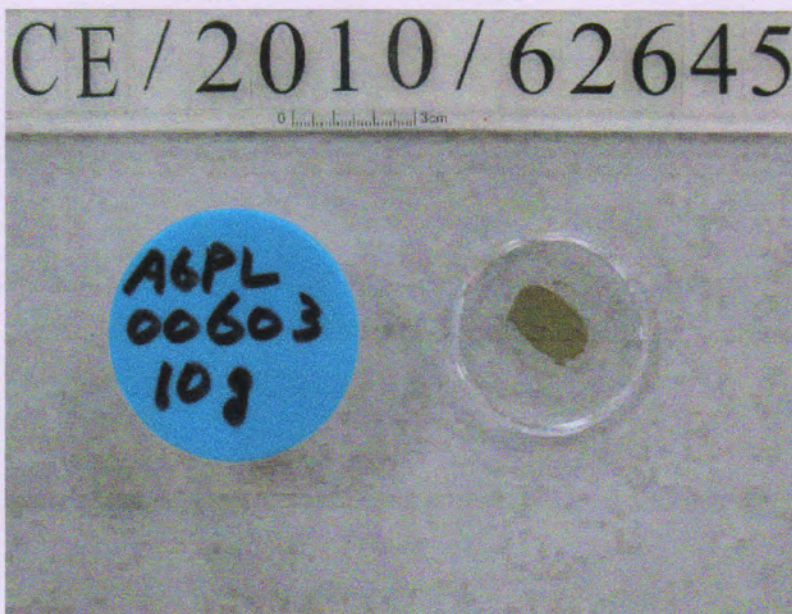
號碼(No.) : CE/2010/62645 日期(Date) : 2010/06/21 頁數(Page) : 7 of 7

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\*\* 報告結尾(End of Report) \*\*

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## Test Report

No. GZ1011128213/CHEM Date: NOV 16, 2010

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

The following sample(s) was/were submitted and identified by/on behalf of the client as:  
无铅焊锡 SnAgCu

SGS Job No. : SCATR1011006894

Date of Sample Received : NOV 10, 2010

Testing Period : NOV 10, 2010 TO NOV 16, 2010

Test Requested : A: As requested by client, SVHC screening is performed according to:  
Fifteen (15) substances in the Candidate List of Substances of Very High Concern (SVHC) for authorization published by European Chemicals Agency (ECHA) on October 28, 2008 regarding Regulation (EC) No 1907/2006 concerning the REACH.

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

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

Summary :

A: According to the specified scope and analytical techniques, concentrations of tested SVHC are  $\leq 0.1\%$  (w/w) in the submitted sample.

PASS

Conclusion

B: Based on the performed tests on submitted sample(s), the results **comply with** the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of  
SGS-CSTC Ltd.

Manson Yang  
Approved Signatory

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SGS Standards Technical Services Co. Ltd.  
Zhangjiang

133 Kiedu Road, Sientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663  
中国·广州·经济技术开发区科学城科珠路133号

I (86-20) 82155555 F (86-20) 82075125  
邮编: 510663 I (86-20) 82155555 F (86-20) 82075125

www.cn.sgs.com  
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## Test Report

No. GZ1011128213/CHEM Date: NOV 16, 2010

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### Test Sample :

#### Sample Description :

#### Specimen No. Description

001 Silvery metal bar

### A: SVHC

#### Remark :

- (1) The chemical analysis of specified SVHC is performed by means of currently available analytical techniques against the following SVHC related documents published by ECHA:  
(A) [http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp)  
(B) [http://echa.europa.eu/consultations/authorisation/svhc/svhc\\_cons\\_en.asp](http://echa.europa.eu/consultations/authorisation/svhc/svhc_cons_en.asp)  
(C) [http://echa.europa.eu/chem\\_data/reg\\_int\\_tables/reg\\_int\\_en.asp?substance\\_type=SVHC&substance\\_state=current](http://echa.europa.eu/chem_data/reg_int_tables/reg_int_en.asp?substance_type=SVHC&substance_state=current)  
These lists are under evaluation by ECHA and may subject to change in the future.
- (2) In accordance with Regulation (EC) No 1907/2006, any EU producer or importer of articles shall notify ECHA, in accordance with paragraph 4 of Article 7, if a substance meets the criteria in Article 57 and is identified in accordance with Article 59(1) of the Regulation, if (a) the substance in the Candidate List is present in those articles in quantities totaling over one tonne per producer or importer per year; and (b) the substance in the Candidate List is present in those articles above a concentration of 0.1% weight by weight (w/w).
- (3) Article 33 of Regulation (EC) No 1907/2006 requires supplier of an article containing a substance meeting the criteria in Article 57 and identified in accordance with Article 59(1) in a concentration above 0.1% weight by weight (w/w) shall provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance in the Candidate List.
- (4) If a SVHC is found over the reporting limit, client is suggested to identify the component which contains the SVHC and the exact concentration of the SVHC by requesting further quantitative analysis from the laboratory.

### Test Method :

SGS In-House method-RSTS-EE-SVHC-003, RSTS-EE-SVHC-004, Analyzed by ICP-OES, GC-MS and UV-VIS.

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SGS Standard Technic Services Co., Ltd.  
SGS TESTING SERVICE  
Europe

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中国·广州·经济技术开发区科学城科珠路199号 邮编: 510663 | (86-20) 82155555 | (86-20) 82075125 | [sgs.china@sgs.com](mailto:sgs.china@sgs.com)

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## Test Report

No. GZ1011128213/CHEM Date: NOV 16, 2010

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

Substance Name	CAS No.	EC No.	Concentration(%)	RL(%)
			001	
4,4'-Diaminodiphenylmethane(MDA)	101-77-9	202-974-4	ND	0.050
5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	81-15-2	201-329-4	ND	0.050
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	85535-84-8	287-476-5	ND	0.050
Anthracene	120-12-7	204-371-1	ND	0.050
Benzyl butyl phthalate (BBP)	85-68-7	201-622-7	ND	0.050
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	204-211-0	ND	0.050
Bis(tributyltin)oxide (TBTO)	56-35-9	200-268-0	ND	0.050
Cobalt dichloride*	7646-79-9	231-589-4	ND	0.005
Diarsenic pentaoxide*	1303-28-2	215-116-9	ND	0.005
Diarsenic trioxide*	1327-53-3	215-481-4	ND	0.005
Dibutyl phthalate (DBP)	84-74-2	201-557-4	ND	0.050
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ -HBCDD, $\beta$ -HBCDD, $\gamma$ -HBCDD) $\Delta$	25637-99-4 and 3194-55-6	247-148-4 and 221-695-9	ND	0.050
Lead hydrogen arsenate*	7784-40-9	232-064-2	ND	0.005
Sodium dichromate*	7789-12-0 and 10588-01-9	234-190-3	ND	0.005
Triethyl arsenate*	15606-95-8	427-700-2	ND	0.005

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Europe

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中国·广州·经济技术开发区科学城科珠路130号 邮编: 510663 | (86-20) 82155555 | (86-20) 82075125 | e: sgs.china@sgs.com

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## Test Report

No. GZ1011128213/CHEM Date: NOV 16, 2010

Page 4 of 8

### Notes:

- (1). RL = Reporting Limit. All RL are based on homogenous material.  
ND = Not detected (lower than RL), ND is denoted on the target compound.
- (2).  $\Delta$  CAS No. of diastereoisomers identified ( $\alpha$ -HBCDD,  $\beta$ -HBCDD,  $\gamma$ -HBCDD): 134237-50-6, 134237-51-7, 134237-52-8
- (3). \* The test result is based on the calculation of selected element(s) / marker(s) and to the worst-case scenario. For detail information, please refer to the SGS REACH website:  
[www.reach.sgs.com/substance-of-very-high-concern-analysis-information-page.htm](http://www.reach.sgs.com/substance-of-very-high-concern-analysis-information-page.htm)

The client is advised to review the chemical formulation to ascertain above substances present in the sample.

RL = 0.005% is evaluated for element (i.e. cobalt, arsenic, lead, sodium, chromium, chromium (VI) respectively)

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### B: RoHS Directive 2002/95/EC

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium (Cd)	mg/kg	IEC 62321: 2008, ICP-OES	N.D.	2	100
Lead (Pb)	mg/kg	IEC 62321: 2008, ICP-OES	49	2	1000
Mercury (Hg)	mg/kg	IEC 62321: 2008, ICP-OES	N.D.	2	1000
Hexavalent Chromium (CrVI) by boiling water extraction	-	IEC 62321: 2008, UV-Vis	Negative	◇	#
Sum of PBBs	mg/kg	-	N.D.	-	1000
Monobromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Dibromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Tribromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Tetrabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Pentabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Hexabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Heptabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Octabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Nonabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Decabromobiphenyl	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Sum of PBDEs	mg/kg	-	N.D.	-	1000
Monobromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Dibromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Tribromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Tetrabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Pentabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Hexabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Heptabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Octabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Nonabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	
Decabromodiphenyl ether	mg/kg	IEC 62321: 2008, GC-MS	N.D.	5	

#### Note:

1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit
4. ◇ = Spot test:  
Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;  
(The tested sample should be further verified by boiling water extraction method if the spot test result is negative or cannot be confirmed.)  
Boiling water extraction:  
Negative = Absence of CrVI coating  
Positive = Presence of CrVI coating; the detected concentration in boiling water extraction solution is equal or greater than 0.02 mg/kg with 50cm<sup>2</sup> sample surface area.  
Storage conditions and production date of the tested sample are unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.
5. # = Positive indicates the presence of CrVI on the tested area.  
Negative indicates the absence of CrVI on the tested area.
6. "-" = Not regulated

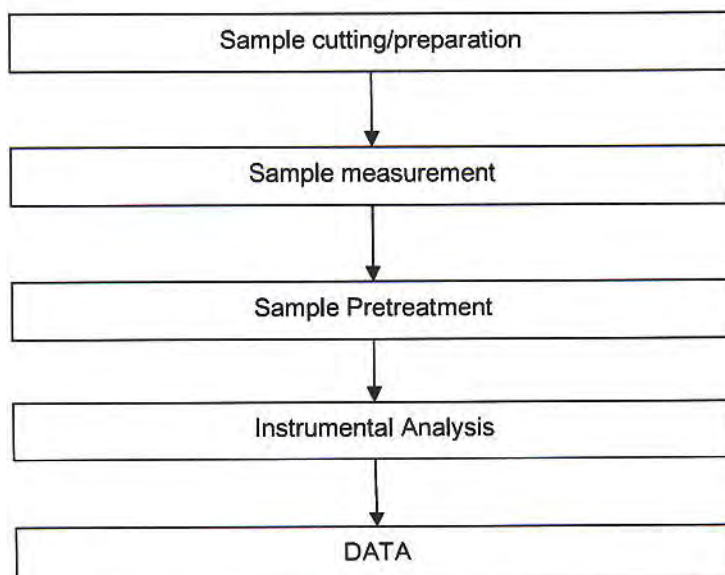
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### ATTACHMENTS

#### SVHC Testing Flow Chart

- 1) Name of the person who made testing: Bella Wang / Tina Zhao
- 2) Name of the person in charge of testing: Adams Yu / Ryan Yang



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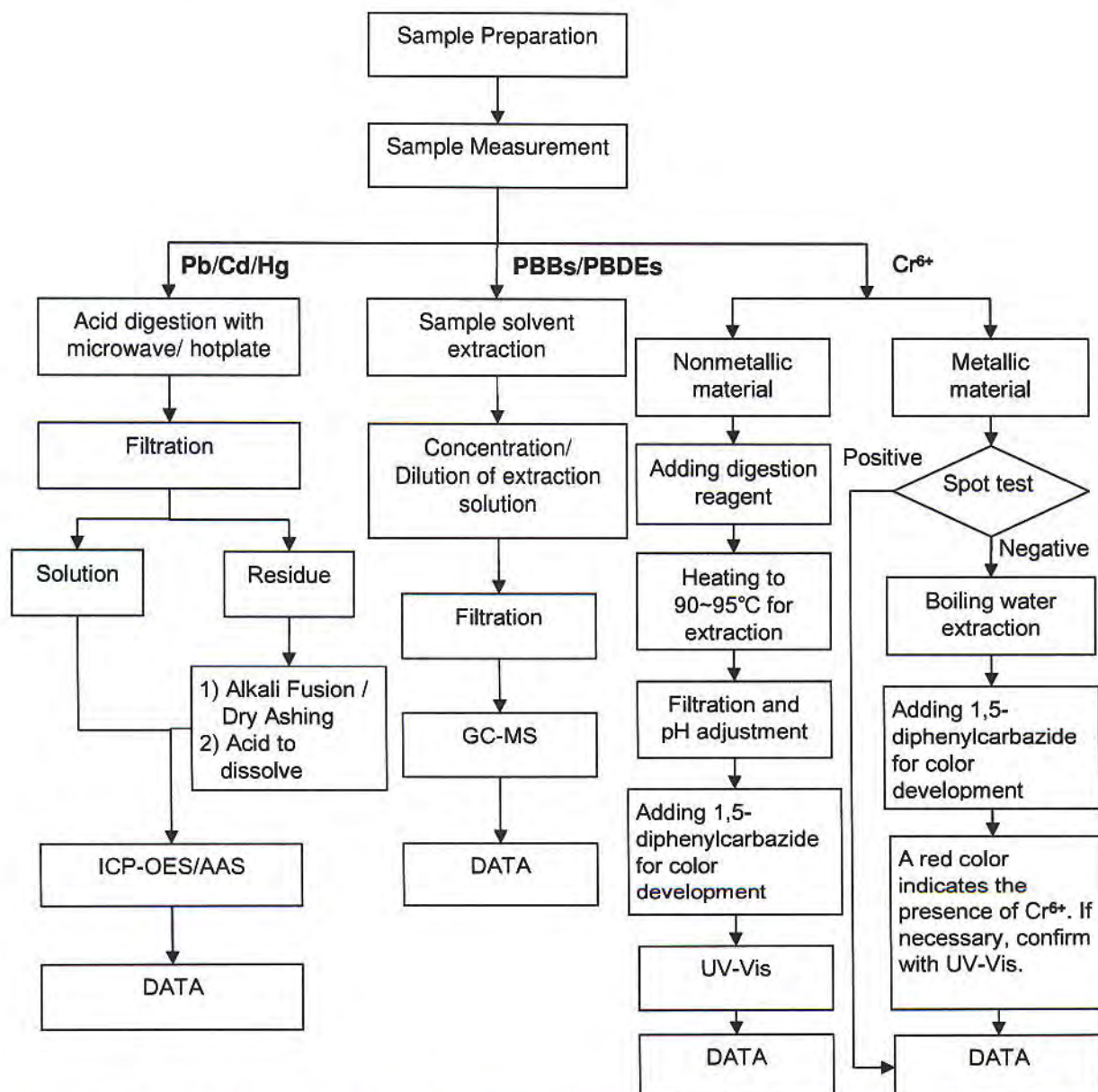




### ATTACHMENTS

#### RoHS Testing Flow Chart

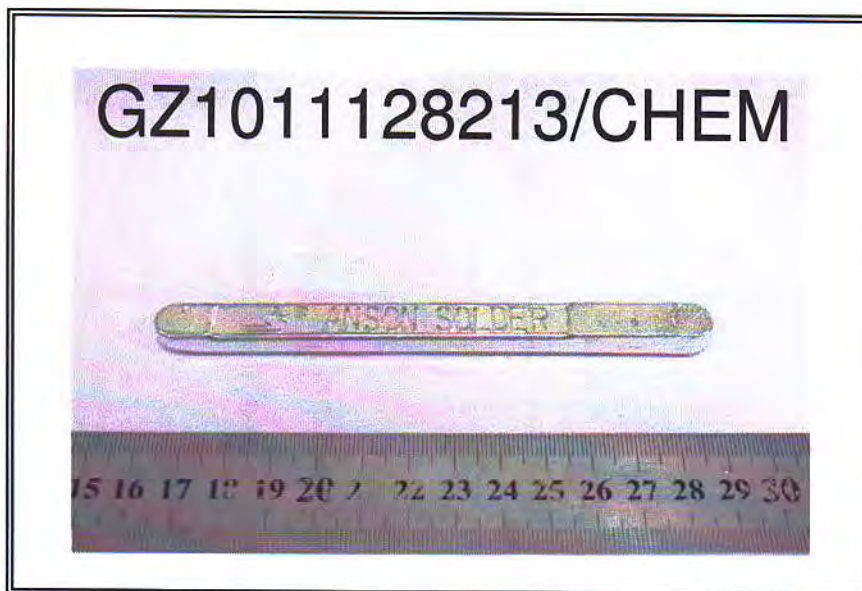
- 1) Name of the person who made testing: Bella Wang / Cutey Yu / Ross Zhan
- 2) Name of the person in charge of testing: Adams Yu / Ryan Yang



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Sample photo:



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**TEST REPORT**

NUMBER: SZHH0052168603

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE  
500 CHICAGO IL 60631 USA

DATE: Sep 01, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **SILVER COLOR PLATED METAL WIRE.**  
PART DESCRIPTION : TINNED COPPER WIRE.  
DATE SAMPLE RECEIVED : AUG 26, 2010.  
DATE TEST STARTED : AUG 26, 2010.



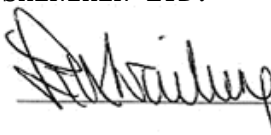

\*\*\*\*\*

**TESTS CONDUCTED:**

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

\*\*\*\*\*

AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

BEN N.L. LIN  
GENERAL MANAGER

**TEST REPORT**

NUMBER: SZHH0052168603

## TESTS CONDUCTED

## RoHS CHEMICAL TEST

## (A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND(<2)
LEAD (Pb) CONTENT (mg/kg)	ND(<2)
MERCURY (Hg) CONTENT (mg/kg)	ND(<2)
CHROMIUM (VI)(Cr <sup>6+</sup> ) RESULT (BY BOILING WATER EXTRACTION ON METAL)(mg/kg WITH 50cm <sup>2</sup> )	NEGATIVE (<0.02)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

mg/kg WITH 50cm<sup>2</sup> = MILLIGRAM PER KILOGRAM WITH 50 SQUARE CENTIMETRE

&lt; = LESS THAN

ND = NOT DETECTED

POSITIVE = A POSITIVE TEST RESULT INDICATED THE PRESENCE OF Cr(VI) AT THE TIME OF TESTING, EQUAL TO OR GREATER THAN THRESHOLD OF 1 mg/kg FOR SPOT TEST PROCEDURE OR 0.02 mg/kg FOR BOILING-WATER-EXTRACTION PROCEDURES WITH A SAMPLE SURFACE AREA OF 50cm<sup>2</sup> USED. HOWEVER, IT SHALL NOT BE INTERPRETED AS THE Cr(VI) CONCENTRATION IN THE COATING LAYER OF THE SAMPLE AND SHOULD NOT BE USED AS A METHOD DETECTION LIMIT FOR THIS QUALITATIVE TEST.

NEGATIVE = A NEGATIVE TEST RESULT INDICATED ABOVE POSITIVE OBSERVATION WAS NOT FOUND AT THE TIME OF TESTING. WHEN THE SPOT-TEST SHOWED A NEGATIVE RESULT, THE BOILING-WATER-EXTRACTION PROCEDURE SHALL BE USED TO VERIFY THE RESULT.

## (B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)

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

\*\*\*\*\*

**TEST REPORT**

NUMBER: SZHH0052168603

TESTS CONDUCTED

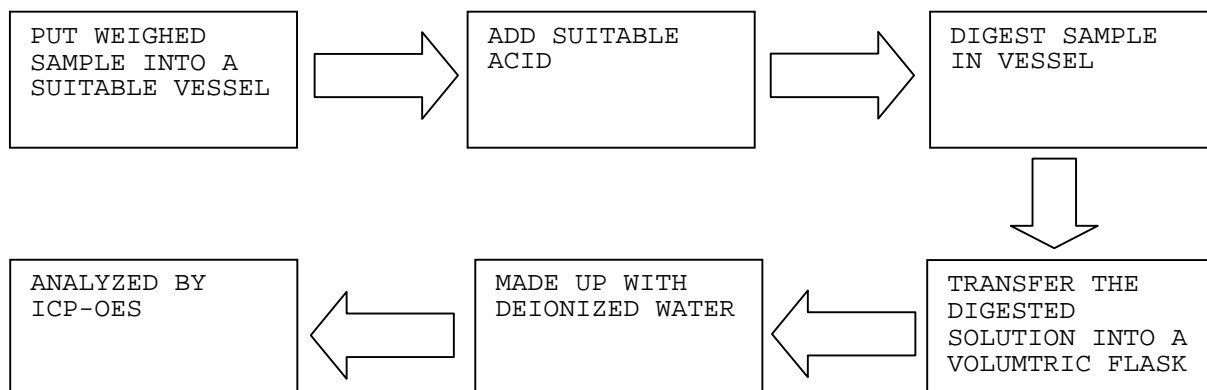
(C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY BOILING WATER EXTRACTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	POSITIVE/ NEGATIVE (THRESHOLD OF 0.02mg/kg with 50cm <sup>2</sup> )

DATE SAMPLE RECEIVED: AUG 26, 2010  
TESTING PERIOD: AUG 26, 2010 TO AUG 30, 2010

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



\*\*\*\*\*

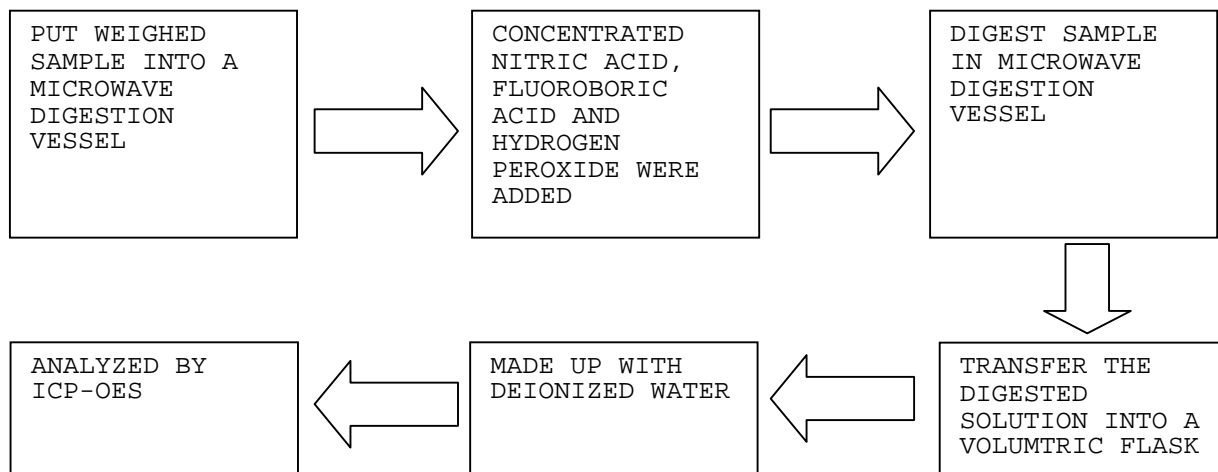


**TEST REPORT**

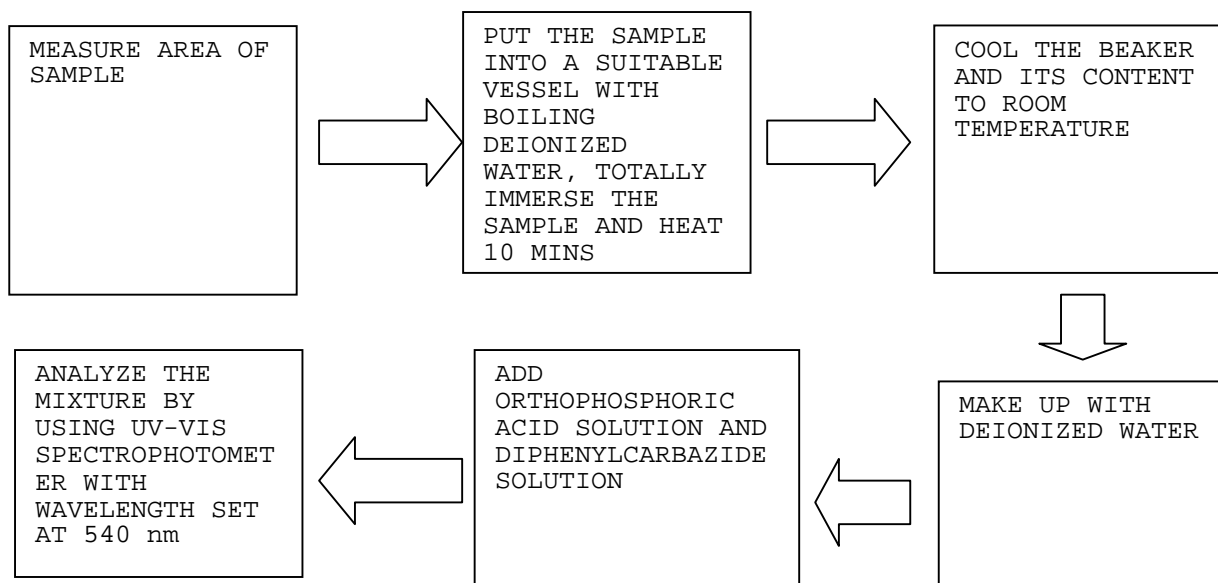
NUMBER: SZHH0052168603

TESTS CONDUCTED

2. TEST FOR Hg CONTENT



3. TEST FOR CHROMIUM(VI) ( $\text{Cr}^{6+}$ ) CONTENT (BOILING WATER EXTRACTION)



\*\*\*\*\*  
END OF REPORT



**TEST REPORT**

NUMBER: SZHH0052168602

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE  
500 CHICAGO IL 60631 USA

DATE: Sep 01, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

**SAMPLE DESCRIPTION:**

ONE (1) SUBMITTED SAMPLE SAID TO BE **RED POWDER**.  
PART DESCRIPTION : EPOXY POWDER, RED.  
PART NUMBER : CP-930-1, HF.  
DATE SAMPLE RECEIVED : AUG 26, 2010.  
DATE TEST STARTED : AUG 26, 2010.



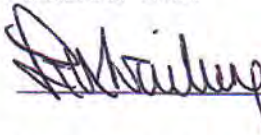

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**TESTS CONDUCTED:**

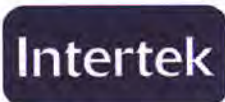
AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

\*\*\*\*\*

AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.

BEN N.L. LIN  
GENERAL MANAGER



**TEST REPORT**

NUMBER: SZHH0052168602

TESTS CONDUCTED

1 RoHS CHEMICAL TEST

(A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT (mg/kg)	ND (<1)
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

< = LESS THAN

ND = NOT DETECTED

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**TEST REPORT**

NUMBER: SZHH0052168602

TESTS CONDUCTED

(B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

(C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : AUG 26, 2010

TESTING PERIOD : AUG 26, 2010 TO AUG 30, 2010

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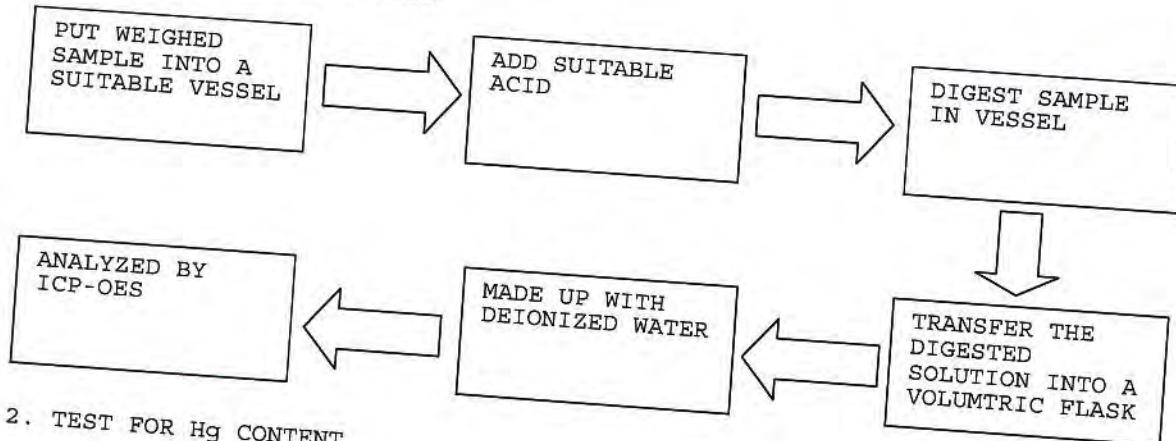
## TEST REPORT

TESTS CONDUCTED

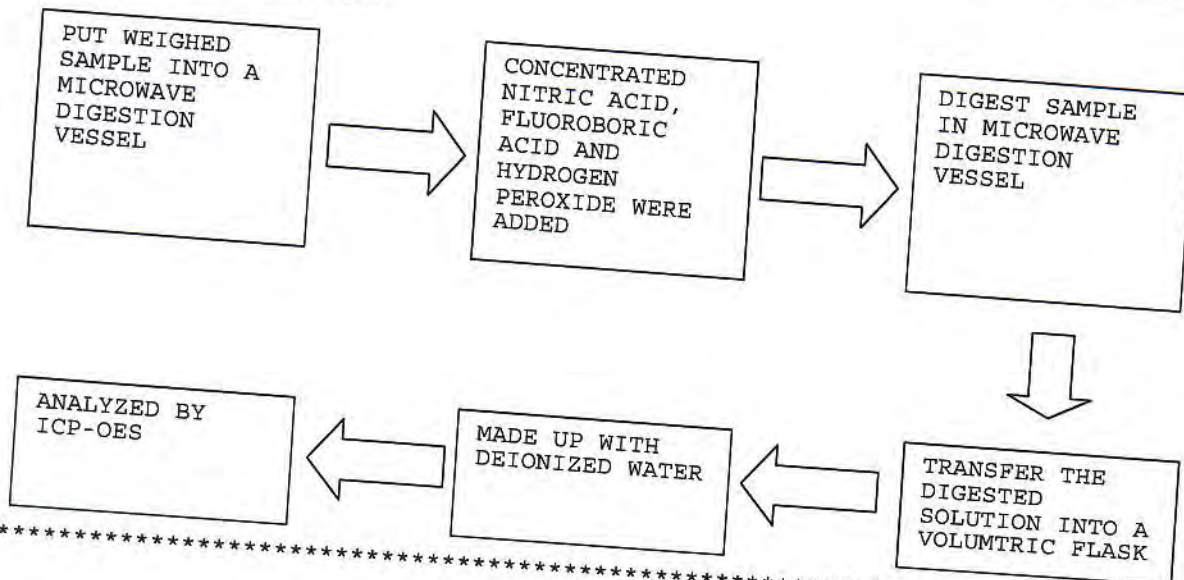
NUMBER: SZHH0052168602

(D) MEASUREMENT FLOWCHART:

1. TEST FOR Cd/Pb CONTENTS



2. TEST FOR Hg CONTENT



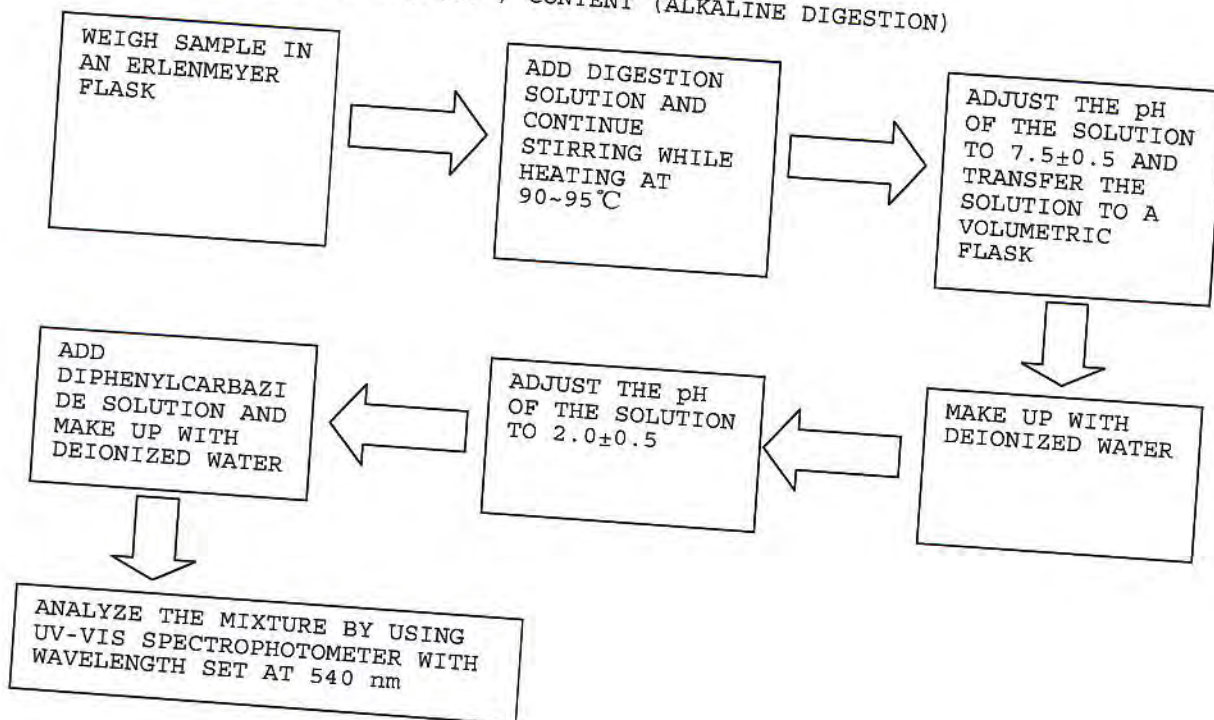
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## TEST REPORT

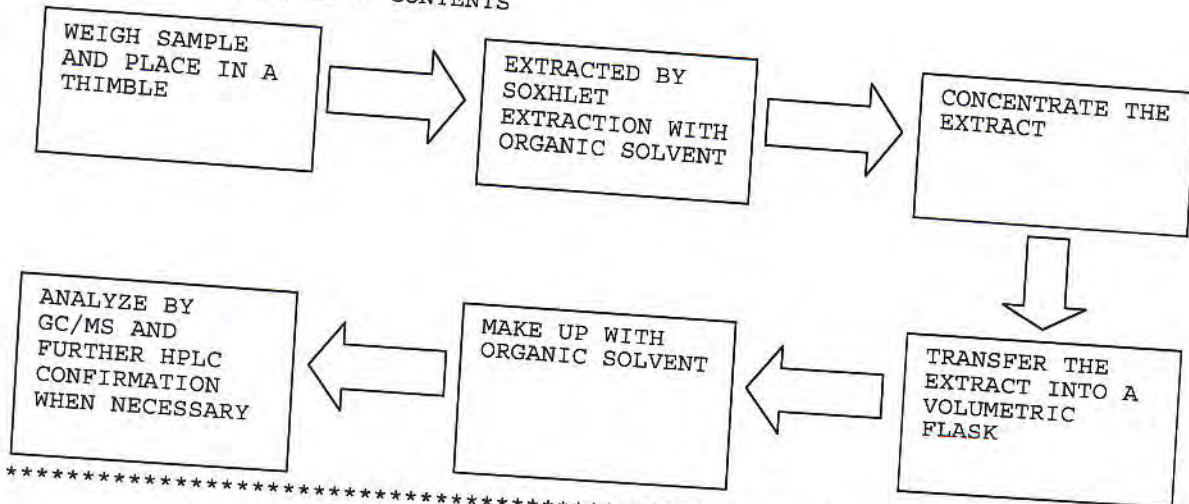
TESTS CONDUCTED

NUMBER: SZHH0052168602

### 3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



### 4. TEST FOR PBBs/PBDEs CONTENTS



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**TEST REPORT**

NUMBER: SZHH0052168602

TESTS CONDUCTED

2 (I) TEST RESULT SUMMARY :

HALOGEN CONTENT :

TESTING ITEM	RESULT (ppm)
FLUORINE (F) CONTENT	ND
CHLORINE (Cl) CONTENT	204
BROMINE (Br) CONTENT	87
IODINE (I) CONTENT	ND

REMARKS : ppm = PARTS PER MILLION  
ND = NOT DETECTED

(II) TEST METHOD :

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
HALOGEN (F, Cl, Br, I) CONTENT	WITH REFERENCE TO BS EN 14582:2007 BY CALORIMETRIC BOMB AND DETERMINED BY ION CHROMATOGRAPHY	50 ppm

REMARK : REPORTING LIMIT = QUANTITATION LIMIT OF ANALYTE IN SAMPLE

DATE SAMPLE RECEIVED : AUG 26, 2010

TESTING PERIOD : AUG 26, 2010 TO AUG 30, 2010

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## TEST REPORT

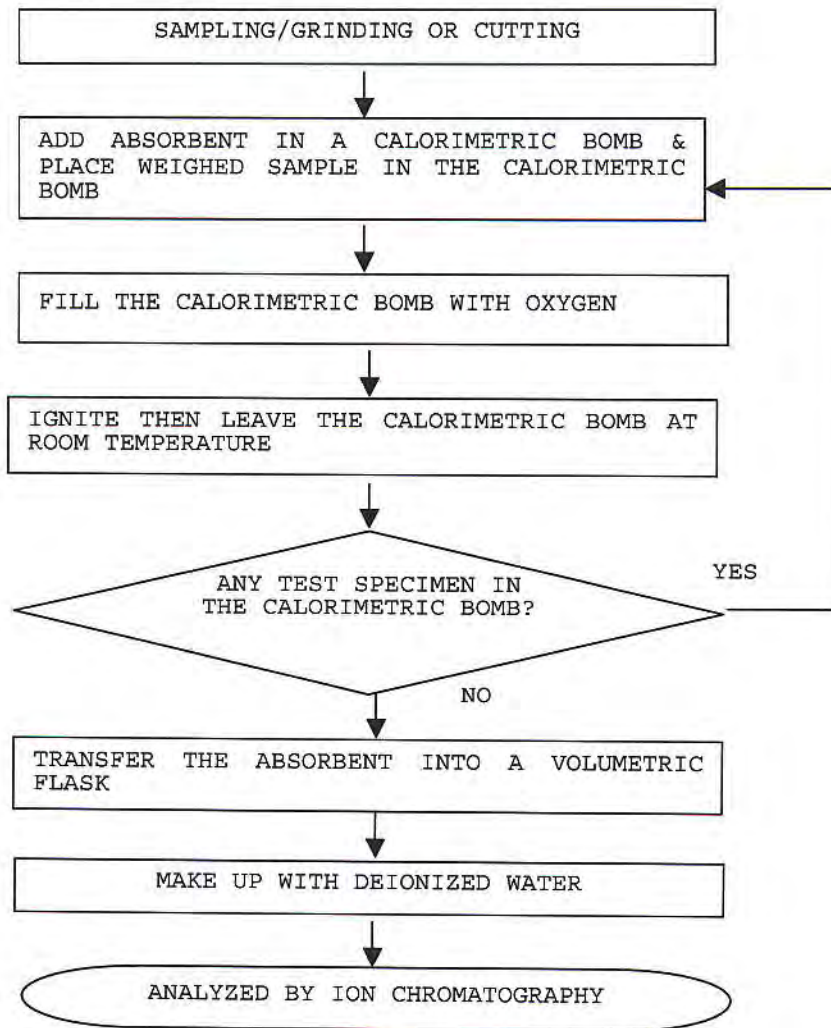
NUMBER: SZHH0052168602

### TESTS CONDUCTED

#### (III) MEASUREMENT FLOWCHART:

##### TEST FOR HALOGEN CONTENT

REFERENCE METHOD: BS EN 14582:2007



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END OF REPORT

## TEST REPORT

NUMBER: SZHH0052168601

APPLICANT: LITTELFUSE, INC.  
8755 WEST HIGGINS ROAD SUITE  
500 CHICAGO IL 60631 USA

DATE: Sep 01, 2010

ATTN: KRISTEEN BACILA/ARSENIO CESISTA JR.

### SAMPLE DESCRIPTION:

ONE (1) SUBMITTED SAMPLE SAID TO BE **BLUE POWDER**.  
PART DESCRIPTION : EPOXY POWDER, BLUE.  
PART NUMBER : EF-150, HF.  
DATE SAMPLE RECEIVED : AUG 26, 2010.  
DATE TEST STARTED : AUG 26, 2010.



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### TESTS CONDUCTED:

AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

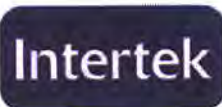
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AUTHORIZED BY:  
FOR INTERTEK TESTING SERVICES  
SHENZHEN LTD.


BEN N.L. LIN  
GENERAL MANAGER





**TEST REPORT**

NUMBER: SZHH0052168601

TESTS CONDUCTED

1 RoHS CHEMICAL TEST

(A) TEST RESULT SUMMARY:

TESTING ITEM	RESULT
CADMIUM (Cd) CONTENT (mg/kg)	ND (<2)
LEAD (Pb) CONTENT (mg/kg)	ND (<2)
MERCURY (Hg) CONTENT (mg/kg)	ND (<2)
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT (mg/kg)	ND (<1)
POLYBROMINATED BIPHENYLS (PBBs) (mg/kg)	
MONOBROMOBIPHENYL (MonoBB)	ND (<5)
DIBROMOBIPHENYL (DiBB)	ND (<5)
TRIBROMOBIPHENYL (TriBB)	ND (<5)
TETRABROMOBIPHENYL (TetraBB)	ND (<5)
PENTABROMOBIPHENYL (PentaBB)	ND (<5)
HEXABROMOBIPHENYL (HexaBB)	ND (<5)
HEPTABROMOBIPHENYL (HeptaBB)	ND (<5)
OCTABROMOBIPHENYL (OctaBB)	ND (<5)
NONABROMOBIPHENYL (NonaBB)	ND (<5)
DECABROMOBIPHENYL (DecaBB)	ND (<5)
POLYBROMINATED DIPHENYL ETHERS (PBDEs) (mg/kg)	
MONOBROMODIPHENYL ETHER (MonoBDE)	ND (<5)
DIBROMODIPHENYL ETHER (DiBDE)	ND (<5)
TRIBROMODIPHENYL ETHER (TriBDE)	ND (<5)
TETRABROMODIPHENYL ETHER (TetraBDE)	ND (<5)
PENTABROMODIPHENYL ETHER (PentaBDE)	ND (<5)
HEXABROMODIPHENYL ETHER (HexaBDE)	ND (<5)
HEPTABROMODIPHENYL ETHER (HeptaBDE)	ND (<5)
OCTABROMODIPHENYL ETHER (OctaBDE)	ND (<5)
NONABROMODIPHENYL ETHER (NonaBDE)	ND (<5)
DECABROMODIPHENYL ETHER (DecaBDE)	ND (<5)

CHEMIST: LV LINNA

mg/kg = MILLIGRAM PER KILOGRAM = ppm

< = LESS THAN

ND = NOT DETECTED

\*\*\*\*\*

**TEST REPORT**

NUMBER: SZHH0052168601

TESTS CONDUCTED

(B) RoHS REQUIREMENT:

RESTRICTED SUBSTANCES	LIMITS
CADMIUM (Cd)	0.01% (100 ppm)
LEAD (Pb)	0.1% (1000 ppm)
MERCURY (Hg)	0.1% (1000 ppm)
CHROMIUM (VI) (Cr <sup>6+</sup> )	0.1% (1000 ppm)
POLYBROMINATED BIPHENYLS (PBBs)	0.1% (1000 ppm)
POLYBROMINATED DIPHENYL ETHERS (PBDEs)	0.1% (1000 ppm)

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

(C) TEST METHOD:

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
CADMIUM (Cd) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
LEAD (Pb) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
MERCURY (Hg) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ACID DIGESTION AND DETERMINED BY ICP - OES	2 mg/kg
CHROMIUM (VI) (Cr <sup>6+</sup> ) CONTENT	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY ALKALINE DIGESTION AND DETERMINED BY UV-VIS SPECTROPHOTOMETER	1 mg/kg
POLYBROMINATED BIPHENYLS (PBBs) & POLYBROMINATED DIPHENYL ETHERS (PBDEs)	WITH REFERENCE TO IEC 62321 EDITION 1.0:2008, BY SOLVENT EXTRACTION AND DETERMINED BY GC/MS AND FURTHER HPLC CONFIRMATION WHEN NECESSARY	5 mg/kg

DATE SAMPLE RECEIVED : AUG 26, 2010

TESTING PERIOD : AUG 26, 2010 TO AUG 30, 2010

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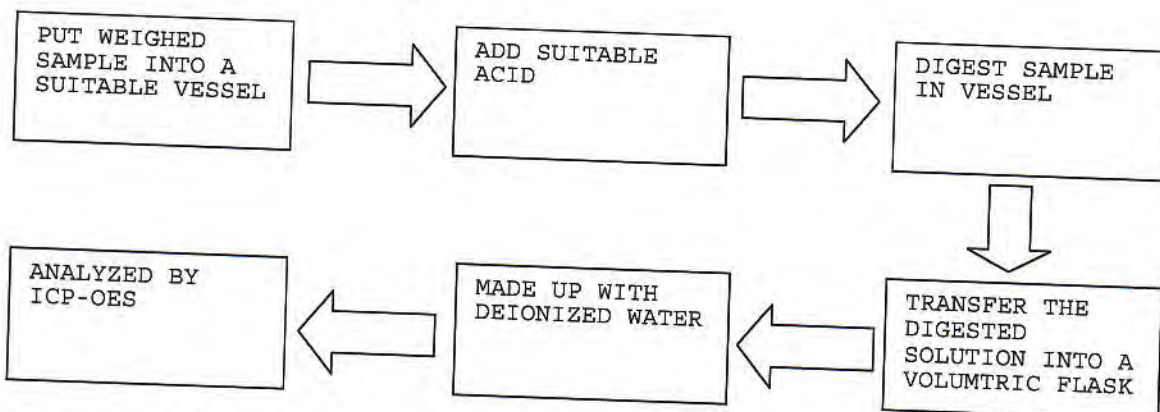
## TEST REPORT

TESTS CONDUCTED

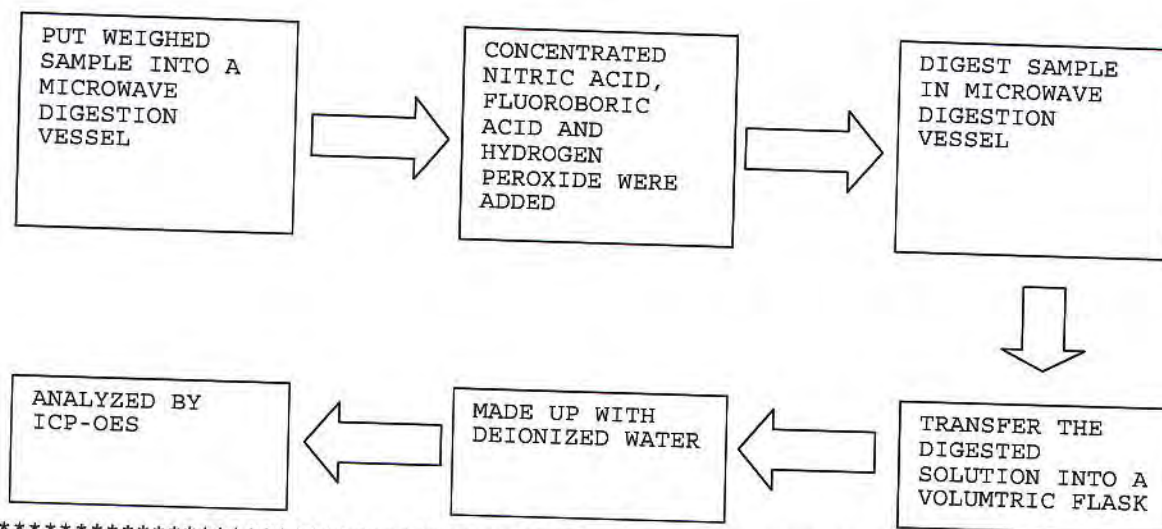
NUMBER: SZHH0052168601

### (D) MEASUREMENT FLOWCHART:

#### 1. TEST FOR Cd/Pb CONTENTS



#### 2. TEST FOR Hg CONTENT



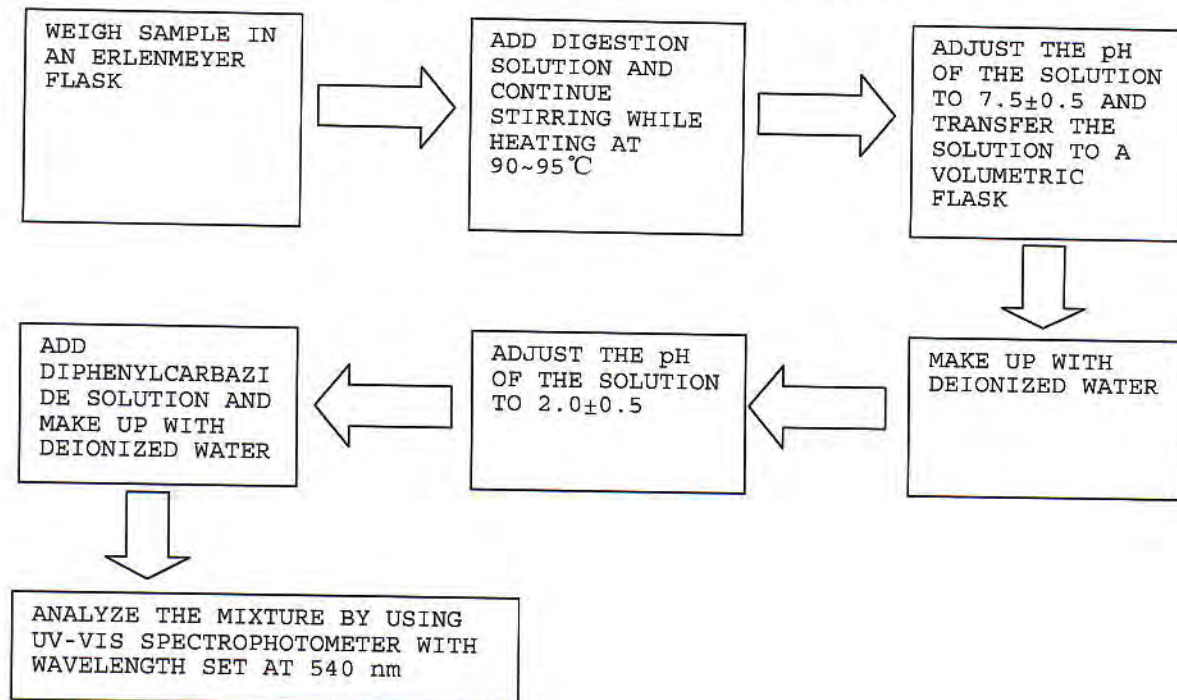
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## TEST REPORT

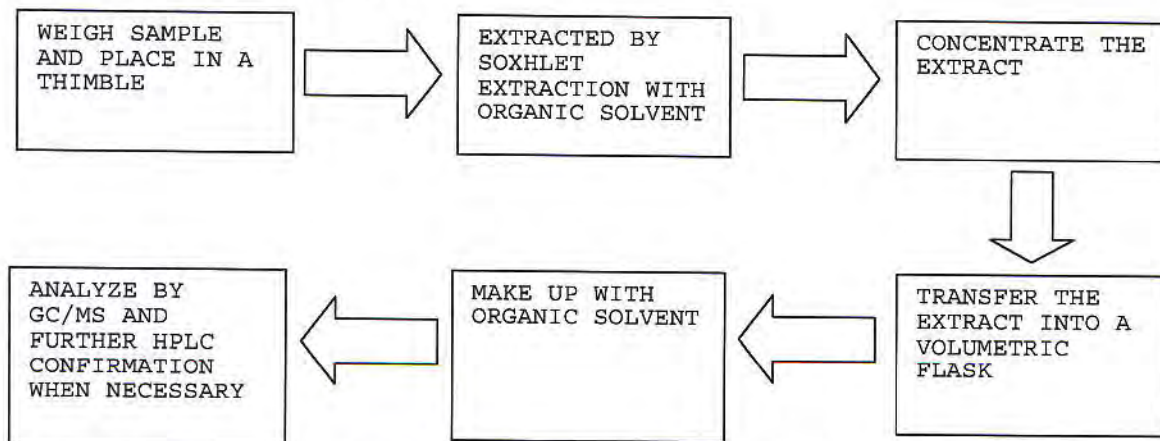
NUMBER: SZHH0052168601

### TESTS CONDUCTED

#### 3. TEST FOR CHROMIUM (VI) ( $\text{Cr}^{6+}$ ) CONTENT (ALKALINE DIGESTION)



#### 4. TEST FOR PBBs/PBDEs CONTENTS



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**TEST REPORT**

NUMBER: SZHH0052168601

TESTS CONDUCTED

2 (I) TEST RESULT SUMMARY :

HALOGEN CONTENT :

TESTING ITEM	RESULT (ppm)
FLUORINE (F) CONTENT	ND
CHLORINE (Cl) CONTENT	213
BROMINE (Br) CONTENT	ND
IODINE (I) CONTENT	ND

REMARKS : ppm = PARTS PER MILLION  
ND = NOT DETECTED

(II) TEST METHOD :

TESTING ITEM	TESTING METHOD	REPORTING LIMIT
HALOGEN (F, Cl, Br, I) CONTENT	WITH REFERENCE TO BS EN 14582:2007 BY CALORIMETRIC BOMB AND DETERMINED BY ION CHROMATOGRAPHY	50 ppm

REMARK : REPORTING LIMIT = QUANTITATION LIMIT OF ANALYTE IN SAMPLE

DATE SAMPLE RECEIVED : AUG 26, 2010

TESTING PERIOD : AUG 26, 2010 TO AUG 30, 2010

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## TEST REPORT

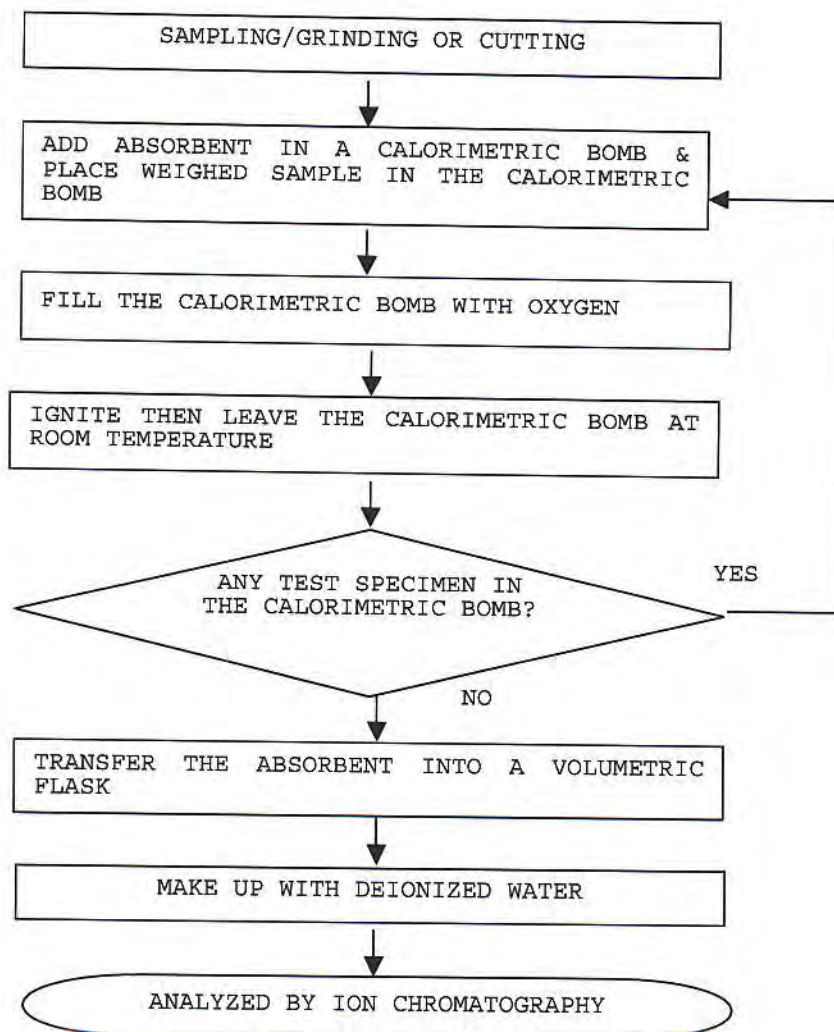
NUMBER: SZHH0052168601

### TESTS CONDUCTED

#### (III) MEASUREMENT FLOWCHART:

##### TEST FOR HALOGEN CONTENT

REFERENCE METHOD: BS EN 14582:2007



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END OF REPORT