

## **ICP Test Report Certification Packet**

Company name:	Littelfuse, Inc.
Product Series:	GDT
Product #:	SL1021A and SL1021B Series
Issue Date:	April 3, 2009
2002/95/EC)-restricted is packing/packaging mater In addition, it is hereby refor unit parts, the packing	by Littelfuse, Inc. that there is neither RoHS (EU Directive substance nor such use, for materials to be used for unit parts, for rials, and for additives and the like in the manufacturing processes. Exported to you that the parts and sub-materials, the materials to be used /packaging materials, and the additives and the like in the manufacturing used of the following components.
	Issued by: Domallatials
	<global &="" environmental,="" health="" manager="" safety=""></global>
(1) Parts, sub-materials  This document continued the Littelfuse, Inc.	and unit parts overs the GDT RoHS-Compliant series products manufactured by
< Raw Materials l	Jsed
Please see Tab	ple 1
. ,	measurable substances propriate pages as identifed in Table 1
Remarks :	



Table 1: List of Raw Materials covered by this report

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	N/A	Ceramic	3-6
2	N/A	Copper Electrode	7-10
3	N/A	Silver Brazing Ring	11-14
4	N/A	Silicon Oil	15-18
5	N/A	Blue Ink	19-22
6	N/A	Terminal Wire	23-26
7	N/A	Failsafe Clip	27-30
8	N/A	Solder Pill	31-34
9	N/A	Red Ink	35-38



**Test Report** No. LPCI/10214(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description Ceramic Sample Receiving Date 2008/05/16

**Testing Period** 2008/05/16 to 2008/05/26

Test Requested In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

(1) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Cadmium Test Method

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2nd (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) Section 9 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results Please refer to next page.

Analysts Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10214(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of RoHS
Cadmium(Cd)	(1)	N.D.	2	100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)	(4)	N.D.	2	1000
Sum of Polybrominated Biphenyl (PBBs)	(5)	N.D.	_	1000
(Mono to Deca)			_	1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl		N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl		N.D.	5	-
Pentabromobiphenyl		N.D.	5	-
Hexabromobiphenyl		N.D.	5	-
Heptabromobiphenyl		N.D.	5	-
Octabromobiphenyl		N.D.	5	-
Nonabromobiphenyl		N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether	]	N.D.	5	-
Tetrabromodiphenyl ether		N.D.	5	-
Pentabromodiphenyl ether		N.D.	5	-
Hexabromodiphenyl ether		N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether		N.D.	5	-
Nonabromodiphenyl ether		N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC

LAB MANAGER



No. LPCI/10214(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 3 of 4

**Test Part Description**:

Sample Description : Ceramic



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) This report supersedes report no. LPCI/10214(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10214(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

(B-AD)/08 Date : 2008/05/26 Page: 4 of 4 8/2410/Littelfuse

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

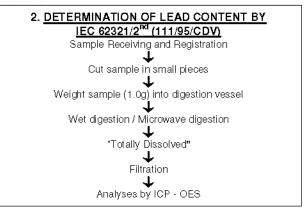
Sample Preparation

Add colour-developing reagent

Acidify with H<sub>2</sub>SO<sub>4</sub>

Let stand for 5-10 min

Analyses by UV- Spectrophotometer (540 nm)



## 3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP - OES

# 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) Acid digestion "Totally Dissolved" Filtration Analyses by ICP - OES

#### 5. <u>DETERMINATION OF PBB/PBDE WITH GC-MS</u> BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Cut sample in small pieces

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



Test Report No. LPCI/10215(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Copper Electrode

Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 8.5.1 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10215(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of
Cadmium(Cd)	(1)	N.D.	2	RoHS 100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)		Negative	*	1000
Sum of Polybrominated Biphenyl (PBBs)	(4) (5)	-		
(Mono to Deca)	(-)	N.D.	-	1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl	1	N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl	1	N.D.	5	-
Pentabromobiphenyl	]	N.D.	5	-
Hexabromobiphenyl	1	N.D.	5	-
Heptabromobiphenyl	1	N.D.	5	-
Octabromobiphenyl	]	N.D.	5	-
Nonabromobiphenyl	1	N.D.	5	-
Decabromobiphenyl	1	N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs)		N.D.	_	_
(Mono to Deca)  Sum of Polybrominated Diphenylethers (PBDEs)	-			
(Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether	]	N.D.	5	-
Pentabromodiphenyl ether	]	N.D.	5	-
Hexabromodiphenyl ether	]	N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether	]	N.D.	5	-
Nonabromodiphenyl ether	]	N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10215(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26

Page: 3 of 4

**Test Part Description:** 

Sample Description : Copper Electrode



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) \*Detection limit = 1 mg/kg of Hexavalent Chromium on the tested areas Negative = less than detection limit

(e) This report supersedes report no. LPCI/10215(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10215(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Pag

Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Sample Receiving and Registration
Sample Preparation
Spot-test (Qualitative)
Boiling-water-extraction
Analyses by UV- Spectrophotometer
Test Report



## 3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321/2<sup>nd</sup> (111/95/CDV)
Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP - OES

# 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) Acid digestion "Totally Dissolved" Filtration Analyses by ICP - OES

#### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Cut sample in small pieces

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



Test Report No. LPCI/10217(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Silver Ring Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 8.5.1 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10217(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of
Cadmium(Cd)	(1)	N.D.	2	RoHS 100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)		Negative	*	1000
Sum of Polybrominated Biphenyl (PBBs)	(4) (5)	-		
(Mono to Deca)	(-)	N.D.	-	1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl	1	N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl	1	N.D.	5	-
Pentabromobiphenyl	]	N.D.	5	-
Hexabromobiphenyl	1	N.D.	5	-
Heptabromobiphenyl	1	N.D.	5	-
Octabromobiphenyl	]	N.D.	5	-
Nonabromobiphenyl	1	N.D.	5	-
Decabromobiphenyl	1	N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs)		N.D.	_	_
(Mono to Deca)  Sum of Polybrominated Diphenylethers (PBDEs)	-			
(Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether	]	N.D.	5	-
Pentabromodiphenyl ether	]	N.D.	5	-
Hexabromodiphenyl ether	]	N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether	]	N.D.	5	-
Nonabromodiphenyl ether	]	N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN

B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10217(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26

Page: 3 of 4

Test Part Description:

Sample Description : Silver Ring



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) \*Detection limit = 1 mg/kg of Hexavalent Chromium on the tested areas Negative = less than detection limit

(e) This report supersedes report no. LPCI/10217(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10217(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26

Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Sample Receiving and Registration
Sample Preparation
Spot-test (Qualitative)
Boiling-water-extraction
Analyses by UV- Spectrophotometer
Test Report

# 2. DETERMINATION OF LEAD CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) into digestion vessel Wet digestion / Microwave digestion "Totally Dissolved" Filtration Analyses by ICP - OES

# 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP - OES

# 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) Acid digestion "Totally Dissolved" Filtration Analyses by ICP - OES

#### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Cut sample in small pieces

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

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CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



**Test Report** No. LPCI/10223(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description Silicon Oil Sample Receiving Date 2008/05/16

Testing Period 2008/05/16 to 2008/05/26

Test Requested In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

(1) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Cadmium Test Method

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 9 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2nd (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results Please refer to next page.

Analysts Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10223(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	<u>MDL</u>	Limit of
Cadmium(Cd)	(1)	N.D.	2	RoHS 100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)	(4)	N.D.	2	1000
Sum of Polybrominated Biphenyl (PBBs)	(5)	N.D.	_	1000
(Mono to Deca)				1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl		N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl		N.D.	15	-
Pentabromobiphenyl		N.D.	5	-
Hexabromobiphenyl		N.D.	5	-
Heptabromobiphenyl		N.D.	5	-
Octabromobiphenyl		N.D.	5	-
Nonabromobiphenyl		N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether		N.D.	5	-
Pentabromodiphenyl ether		N.D.	5	-
Hexabromodiphenyl ether		N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether		N.D.	5	-
Nonabromodiphenyl ether		N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10223(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 3 of 4

Test Part Description :

Sample Description : Silicon Oil

#### LITTELFUSE INC. LPCI/10223(B-AD)/08



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) Testing based on original basis

(e) This report supersedes report no. LPCI/10223(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10223(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date: 2008/05/26 Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

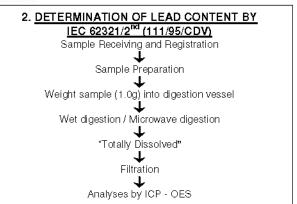
Sample Preparation

Add colour-developing reagent

Acidify with H<sub>2</sub>SO<sub>4</sub>

Let stand for 5-10 min

Analyses by UV- Spectrophotometer (540 nm)



## 3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321/2<sup>nd</sup> (111/95/CDV)
Sample Receiving and Registration

Sample Preparation

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP - OES

# 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Sample Preparation Weight sample (1.0g) Acid digestion "Totally Dissolved" Filtration Analyses by ICP - OES

# 5. <u>DETERMINATION OF PBB/PBDE WITH GC-MS</u> BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Preparation

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

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CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10227(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date: 2008/05/26

Page: 1 of 4

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Blue Ink Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2nd (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2nd (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 9 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2nd (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10227(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of RoHS
Cadmium(Cd)	(1)	N.D.	2	100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)	(4)	N.D.	2	1000
Sum of Polybrominated Biphenyl (PBBs)	(5)	N.D.	-	1000
(Mono to Deca) Monobromobiphenyl	- I	N.D.	5	
Dibromobiphenyl	1 1	N.D.	5	-
Tribromobiphenyl	1	N.D.	5	
Tetrabromobiphenyl	1	N.D.	5	-
Pentabromobiphenyl	1 i	N.D.	5	
Hexabromobiphenyl	1 1	N.D.	5	-
Heptabromobiphenyl	1 1	N.D.	5	-
Octabromobiphenyl	1 1	N.D.	5	-
Nonabromobiphenyl	1 1	N.D.	5	-
Decabromobiphenyl	1 1	N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)	]	N.D.	-	1000
Monobromodiphenyl ether	]	N.D.	5	-
Dibromodiphenyl ether	] [	N.D.	5	-
Tribromodiphenyl ether	] [	N.D.	5	
Tetrabromodiphenyl ether	] [	N.D.	5	-
Pentabromodiphenyl ether	] [	N.D.	5	-
Hexabromodiphenyl ether		N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether	] [	N.D.	5	
Nonabromodiphenyl ether		N.D.	5	-
Decabromodiphenyl ether		N.D.	5	

#### Test Part Description:

As per page 3

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**Test Report** No. LPCI/10227(B-AD)/08 Page: 3 of 4 Date: 2008/05/26

CTS Ref. CTS/08/2410/Littelfuse

Test Part Description :

Sample Description Blue Ink



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) Testing based on original basis

(e) This report supersedes report no. LPCI/10227(B)/08

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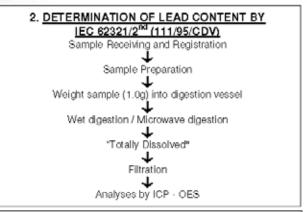


No. LPCI/10227(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date: 2008/05/26 Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> BY IEC 62321/2<sup>MJ</sup> (111/95/CDV)

Sample Preparation Add colour-developing reagent Acidity with H2SO4 Let stand for 5-10 min Analyses by UV- Spectrophotometer (540 nm)



## 3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321/2nd (111/95/CDV) Sample Receiving and Registration Sample Preparation Weight sample (0.5 - 1.0g) into digestion vessel Acid digestion (Microwave) "Totally Dissolved" Filtration Analyses by ICP - OES

## 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2nd (111/95/CDV) Sample Receiving and Registration Sample Preparation Weight sample (1.0g) Acid digestion "Totally Dissolved" Filtration

Analyses by ICP - OES

# 5. DETERMINATION OF PBB/PBDE WITH GC-MS

BY IEC 62321/2<sup>rd</sup> (111/95/CDV) Sample Preparation Weight sample (2g) into extraction thimble Soxhlet Extraction with Toluene Filter through 0.45 um membrane filter Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

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>
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Test Report No. LPCI/10220(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Terminal Wire (Tin Plated)

Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 8.5.1 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

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No. LPCI/10220(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of RoHS
Cadmium(Cd)	(1)	N.D.	2	100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)	(4)	Negative	*	1000
Sum of Polybrominated Biphenyl (PBBs) (Mono to Deca)	(5)	N.D.	-	1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl		N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl		N.D.	5	-
Pentabromobiphenyl		N.D.	5	-
Hexabromobiphenyl		N.D.	5	-
Heptabromobiphenyl		N.D.	5	-
Octabromobiphenyl	7	N.D.	5	-
Nonabromobiphenyl	7	N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether		N.D.	5	-
Pentabromodiphenyl ether		N.D.	5	-
Hexabromodiphenyl ether		N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether		N.D.	5	-
Nonabromodiphenyl ether		N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

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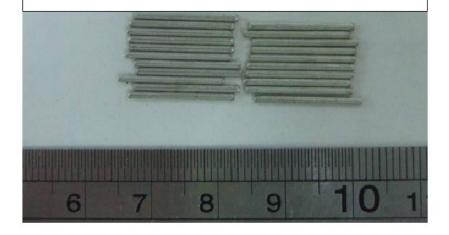
Test Report No. LPCI/10220(B-AD)/08 Date: 2008/05/26 Page: 3 of 4

CTS Ref. CTS/08/2410/Littelfuse

Test Part Description:

Sample Description : Terminal Wire (Tin Plated)

#### LITTELFUSE INC. LPCI/10220(B-AD)/08



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) \*Detection limit = 1 mg/kg of Hexavalent Chromium on the tested areas Negative = less than detection limit

(e) This report supersedes report no. LPCI/10220(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10220(B-AD)/08

CTS Ref. CTS/08/2410/Littelfuse

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>rd</sup> (111/95/CDV)</u>

Sample Receiving and Registration Sample Preparation Spot-test (Qualitative) Boiling-water-extraction Analyses by UV- Spectrophotometer

# 2. <u>DETERMINATION OF LEAD CONTENT BY</u> <u>IEC 62321/2<sup>nd</sup> (111/95/CDV)</u> Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) into digestion vessel Wet digestion / Microwave digestion "Totally Dissolved" Filtration Analyses by ICP - OES

Date: 2008/05/26

Page: 4 of 4

#### 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321/2nd (111/95/CDV)

Test Report

Sample Receiving and Registration Cut sample in small pieces

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave) "Totally Dissolved"

Filtration

Analyses by ICP - OES

#### 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2nd (111/95/CDV)

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (1.0g)

Acid digestion

"Totally Dissolved"

Filtration

Analyses by ICP - OES

#### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321/2nd (111/95/CDV)

Cut sample in small pieces

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



Test Report No. LPCI/10218(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Fail safe Clip Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) Section 8.5.1 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

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No. LPCI/10218(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of
Cadmium(Cd)	(1)	N.D.		RoHS 100
Lead (Pb)	(2)	25	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)		Negative	*	1000
Sum of Polybrominated Biphenyl (PBBs)	(4) (5)	-		
(Mono to Deca)		N.D.	-	1000
Monobromobiphenyl		N.D.	5	-
Dibromobiphenyl	1	N.D.	5	-
Tribromobiphenyl	1	N.D.	5	-
Tetrabromobiphenyl	1	N.D.	5	-
Pentabromobiphenyl		N.D.	5	-
Hexabromobiphenyl	1	N.D.	5	-
Heptabromobiphenyl	1	N.D.	5	-
Octabromobiphenyl	1	N.D.	5	-
Nonabromobiphenyl	1	N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs)		N.D.	_	_
(Mono to Deca)		11.5.		
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether		N.D.	5	-
Pentabromodiphenyl ether		N.D.	5	-
Hexabromodiphenyl ether	]	N.D.	5	-
Heptabromodiphenyl ether	]	N.D.	5	-
Octabromodiphenyl ether		N.D.	5	-
Nonabromodiphenyl ether	]	N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN

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No. LPCI/10218(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date : 2008/05/26

Page: 3 of 4

Test Part Description:

Sample Description : Fail safe Clip



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) \*Detection limit = 1 mg/kg of Hexavalent Chromium on the tested areas Negative = less than detection limit

(e) This report supersedes report no. LPCI/10218(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10218(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date: 2008/05/26

Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>rd</sup> (111/95/CDV)</u>

Sample Receiving and Registration Sample Preparation Spot-test (Qualitative) Boiling-water-extraction Analyses by UV- Spectrophotometer Test Report

# 2. <u>DETERMINATION OF LEAD CONTENT BY</u> <u>IEC 62321/2<sup>nd</sup> (111/95/CDV)</u> Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) into digestion vessel Wet digestion / Microwave digestion "Totally Dissolved" Filtration Analyses by ICP - OES

#### 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321/2nd (111/95/CDV)

Sample Receiving and Registration Cut sample in small pieces Weight sample (0.5 - 1.0g) into digestion vessel Acid digestion (Microwave)

"Totally Dissolved" Filtration

Analyses by ICP - OES

#### 4. DETERMINATION OF CADMIUM CONTENT BY IEC 62321/2nd (111/95/CDV) Sample Receiving and Registration

Cut sample in small pieces

Weight sample (1.0g) Acid digestion

"Totally Dissolved"

Filtration

Analyses by ICP - OES

#### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321/2nd (111/95/CDV)

Cut sample in small pieces Weight sample (2g) into extraction thimble Soxhlet Extraction with Toluene Filter through 0.45 um membrane filter Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



Test Report No. LPCI/10219(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Solder Pill Sample Receiving Date : 2008/05/16

Testing Period : 2008/05/16 to 2008/05/26

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

Test Method : (1) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Cadmium

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2nd (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 8.5.1 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2<sup>rd</sup> (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results : Please refer to next page.

Analysts : Lim Meng Hoe & Jocelyn Christmas

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CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10219(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	MDL	Limit of
Cadmium(Cd)	(1)	N.D.		RoHS 100
Lead (Pb)	(2)	360	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI)		Negative	*	1000
Sum of Polybrominated Biphenyl (PBBs)	(4) (5)	-		1000
(Mono to Deca)		N.D.	•	1000
Monobromobiphenyl		N.D.	15	-
Dibromobiphenyl		N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl		N.D.	5	-
Pentabromobiphenyl		N.D.	15	-
Hexabromobiphenyl		N.D.	15	-
Heptabromobiphenyl		N.D.	15	-
Octabromobiphenyl		N.D.	5	-
Nonabromobiphenyl		N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether		N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether		N.D.	5	-
Pentabromodiphenyl ether		N.D.	5	-
Hexabromodiphenyl ether	1	N.D.	5	-
Heptabromodiphenyl ether		N.D.	5	-
Octabromodiphenyl ether		N.D.	5	-
Nonabromodiphenyl ether		N.D.	5	-
Decabromodiphenyl ether		N.D.	5	-

#### Test Part Description:

As per page 3

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN

B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10219(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26

Page: 3 of 4

Test Part Description:

Sample Description : Solder Pill



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) \*Detection limit = 1 mg/kg of Hexavalent Chromium on the tested areas Negative = less than detection limit

(e) This report supersedes report no. LPCI/10219(B)/08

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10219(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse

Date : 2008/05/26 Page

Page: 4 of 4

# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Sample Receiving and Registration
Sample Preparation
Spot-test (Qualitative)
Boiling-water-extraction
Analyses by UV- Spectrophotometer
Test Report

# 2. DETERMINATION OF LEAD CONTENT BY IEC 62321/2<sup>nd</sup> (111/95/CDV) Sample Receiving and Registration Cut sample in small pieces Weight sample (1.0g) into digestion vessel Wet digestion / Microwave digestion "Totally Dissolved" Filtration

#### 3. <u>DETERMINATION OF MERCURY CONTENT BY</u> IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)
"Totally Dissolved"

Filtration

↓
Analyses by ICP - OES

#### 4. <u>DETERMINATION OF CADMIUM CONTENT BY</u> <u>IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Analyses by ICP - OES

Sample Receiving and Registration

Cut sample in small pieces

Weight sample (1.0g)

Acid digestion

"Totally Dissolved"

Filtration

Analyses by ICP - OES

#### 5. <u>DETERMINATION OF PBB/PBDE WITH GC-MS</u> BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Cut sample in small pieces

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



**Test Report** No. LPCI/10228(B-AD)/08 Date: 2008/05/26 Page: 1 of 4

CTS Ref. CTS/08/2410/Littelfuse

LITTELFUSE INC. 800 E. NORTHWEST HIGHWAY DES PLAINES, IL 60016, USA

The following merchandise was (were) submitted and identified by the client as:

Sample Description Red Ink Sample Receiving Date 2008/05/16

Testing Period 2008/05/16 to 2008/05/26

Test Requested In accordance with the RoHS Directive 2002/95/EC, and its

amendment directives.

(1) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Cadmium Test Method

Content.

Analysis was performed by ICP - OES

(2) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Lead Content.

Analysis was performed by ICP - OES

(3) With reference to IEC 62321/2<sup>nd</sup> (111/95/CDV) for Mercury Content.

Analysis was performed by ICP - OES

(4) With reference to IEC 62321/2nd (111/95/CDV) Section 9 for

Hexavalent Chromium.

Analysis was performed by UV/Vis Spectrophotometry.

(5) With reference to IEC 62321/2nd (111/95/CDV). Determination of

PBBs and PBDEs by GC/MS.

Test Results Please refer to next page.

Analysts Lim Meng Hoe & Jocelyn Christmas

SGS LABORATORY SERVICES (M) SDN. BHD.

CHONG KIEN LEN B.Sc.(HONS) AMIC LAB MANAGER



No. LPCI/10228(B-AD)/08 CTS Ref. CTS/08/2410/Littelfuse Date: 2008/05/26 Page: 2 of 4

Test results by chemical method (Unit: mg/kg)

Test Item(s):	Method (refer to)	Result	<u>MDL</u>	Limit of RoHS
Cadmium(Cd)	(1)	N.D.	2	100
Lead (Pb)	(2)	N.D.	2	1000
Mercury (Hg)	(3)	N.D.	2	1000
Hexavalent Chromium (CrVI	(4)	N.D.	2	1000
Sum of Polybrominated Biphenyl (PBBs)	(5)	N.D.	_	1000
(Mono to Deca)			_	1000
Monobromobiphenyl	_	N.D.	5	-
Dibromobiphenyl	_	N.D.	5	-
Tribromobiphenyl		N.D.	5	-
Tetrabromobiphenyl		N.D.	5	-
Pentabromobiphenyl		N.D.	5	-
Hexabromobiphenyl		N.D.	5	-
Heptabromobiphenyl		N.D.	5	-
Octabromobiphenyl	]	N.D.	5	-
Nonabromobiphenyl	1	N.D.	5	-
Decabromobiphenyl		N.D.	5	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Deca)		N.D.	-	-
Sum of Polybrominated Diphenylethers (PBDEs) (Mono to Nona)		N.D.	-	1000
Monobromodiphenyl ether		N.D.	5	-
Dibromodiphenyl ether	1	N.D.	5	-
Tribromodiphenyl ether		N.D.	5	-
Tetrabromodiphenyl ether	1	N.D.	5	-
Pentabromodiphenyl ether	1	N.D.	5	-
Hexabromodiphenyl ether		N.D.	5	-
Heptabromodiphenyl ether	]	N.D.	5	-
Octabromodiphenyl ether	7	N.D.	5	-
Nonabromodiphenyl ether	7	N.D.	5	-
Decabromodiphenyl ether		N.D.	5	

Test Part Description:

As per page 3

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Test Part Description:

Sample Description : Red Ink



Note: (a) mg/kg = ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) Testing based on original basis

(e) This report supersedes report no. LPCI/10228(B)/08

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# 1. <u>DETERMINATION OF HEXAVALENT CHROMIUM</u> <u>BY IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Sample Preparation

Add colour-developing reagent

Acidify with H<sub>2</sub>SO<sub>4</sub>

Let stand for 5-10 min

Analyses by UV- Spectrophotometer (540 nm)

IEC 62321/2<sup>rd</sup> (111/95/CDV)
Sample Receiving and Registration
Sample Preparation
Weight sample (1.0g) into digestion vessel
Wet digestion / Microwave digestion
"Totally Dissolved"
Filtration
Analyses by ICP - OES

2. DETERMINATION OF LEAD CONTENT BY

## 3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Receiving and Registration

Sample Preparation

Weight sample (0.5 - 1.0g) into digestion vessel

Acid digestion (Microwave)

"Totally Dissolved"

Filtration

Analyses by ICP - OES

#### 4. <u>DETERMINATION OF CADMIUM CONTENT BY</u> <u>IEC 62321/2<sup>nd</sup> (111/95/CDV)</u>

Sample Receiving and Registration

Sample Preparation

Weight sample (1.0g)

Acid digestion

"Totally Dissolved"

Filtration

Analyses by ICP - OES

# 5. <u>DETERMINATION OF PBB/PBDE WITH GC-MS</u> BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

BY IEC 62321/2<sup>nd</sup> (111/95/CDV)

Sample Preparation

Weight sample (2g) into extraction thimble

Soxhlet Extraction with Toluene

Filter through 0.45 um membrane filter

Analyses by GC-MS (with appropriate dilution)

\*\*\*\* End of Report \*\*\*\*

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