



ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: GDT

Product #: SL0902 Series

Issue Date: January 9, 2014

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (EU Directive 2002/95/EC, 2011/65/EU)-restricted substance nor such use, for materials to be used for unit parts, for packing/packaging materials, and for additives and the like in the manufacturing processes.

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

Issued by: 
JORDANUFF H. CABILAN

[Global EHS Engineer]

(1) Parts, sub-materials and unit parts

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

< Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

Remarks :

Table 1: List of Raw Materials covered by this report

| Total Parts | Raw Material Part Number | Raw Material Description | Page(s) |
|--------------------|---------------------------------|---------------------------------|----------------|
| 1 | NA | Ceramic | 3-8 |
| 2 | NA | Copper Electrode | 9-14 |
| 3 | NA | Silver Ring | 15-20 |
| 4 | NA | Blue Ink | 21-26 |

Test Report

No. CTSSA/08643-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

Date : 20/05/2013

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LITTELFUSE INC.
800E. 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 | : | 17/04/2013 |
| Testing Period | : | 17/04/2013 to 13/05/2013 |
| Date Completed | : | 13/05/2013 |
| Reporting Date | : | 20/05/2013 |

| | | |
|----------------|---|--|
| Test Requested | : | Selected test(s) as requested by client |
| Test Method | : | Please refer to next page(s). |
| Test Results | : | Please refer to next page(s). |
| Analysts | : | Ng Jing Wei, Cho Kar Yen, Tan Li Wei, Choong Lap Kit & Tay Siam Pine |

SGS LABORATORY SERVICES (M) SDN. BHD.



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

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Test Report

No. CTSSA/08643-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

Test results:

Test Part Description :

Sample Description : Ceramic

RoHS Directive 2011/65/EU Annex II

| Test Item(s): | Unit | Test Method | Results | MDL |
|----------------------------|-------|--|---------|-----|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Lead (Pb) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Mercury (Hg) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Hexavalent Chromium (CrVI) | mg/kg | With reference to IEC 62321:2008, and performed by UV-Vis | N.D. | 2 |
| Sum of PBBs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

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Test Report

No. CTSSA/08643-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

| | | | | |
|--------------------------|-------|--|------|---|
| Sum of PBDEs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) - = Not regulated

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SGS Laboratory Services (M) Sdn. Bhd.
(Company No. 63972-M)

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Test Report

No. CTSSA/08643-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

Date : 20/05/2013

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Test result:

Test Part Description :

Sample Description : Ceramic

Optional: RoHS Directive 2011/65/EU, priority substances

| Test Item(s): | Unit | Test Method | Results | MDL |
|-------------------------------------|-------|---|---------|-----|
| Hexabromocyclododecane (HBCDD) | mg/kg | Based on IEC 62321:2008, and performed by GC-MS | N.D. | 10 |
| Bis (2-ethylhexyl) phthalate (DEHP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Butyl benzyl phthalate (BBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Dibutyl phthalate (DBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |

Note:

- (a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.
- (b) mg/kg = ppm; 0.1wt% = 1000ppm
- (c) N.D. = Not detected
- (d) MDL = Method Detection Limit
- (e) - = not regulated

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CTS Ref. CTSSA/13/1281/Littelfuse

Test Part Description :

Sample Description : Ceramic

LITTELFUSE INC.
CTSSA/08643-1(B)/13



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[Handwritten Signature]

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CTS Ref. CTSSA/13/1281/Littelfuse

1. DETERMINATION OF CADMIUM CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008

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

5. DETERMINATION OF PBB/PBDE WITH GC-MS

BY IEC 62321 2008

Cut sample in small pieces
↓
Weight sample (0.5-4.0g) 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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Test Report

No. CTSSA/08644-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

LITTELFUSE INC.
800E. 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 | : | 17/04/2013 |
| Testing Period | : | 17/04/2013 to 13/05/2013 |
| Date Completed | : | 13/05/2013 |
| Reporting Date | : | 20/05/2013 |

| | | |
|----------------|---|--|
| Test Requested | : | Selected test(s) as requested by client |
| Test Method | : | Please refer to next page(s). |
| Test Results | : | Please refer to next page(s). |
| Analysts | : | Ng Jing Wei, Cho Kar Yen, Tan Li Wei, Choong Lap Kit & Tay Siam Pine |

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CTS Ref. CTSSA/13/1281/Littelfuse

Test results:

Test Part Description :

Sample Description : Copper Electrode

RoHS Directive 2011/65/EU Annex II

| Test Item(s): | Unit | Test Method | Results | MDL |
|---|-------|--|----------|-----|
| Cadmium(Cd) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Lead (Pb) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Mercury (Hg) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional) # | --- | With reference to IEC 62321:2008 | Negative | - |
| Sum of PBBs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

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Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

| | | | | |
|--------------------------|-------|--|------|---|
| Sum of PBDEs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) # = **Spot-Test:**

a. Negative means the absence of Cr(VI) on the tested areas

b. Positive means the presence of Cr(VI) on the tested areas

(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:

a. Negative means the absence of Cr(VI) on the tested areas

b. Positive means the presence of Cr(VI) on the tested areas;

The detected concentration in 50 mL boiling water extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

(e) - = Not regulated

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No. CTSSA/08644-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

Date : 20/05/2013

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Test result:

Test Part Description :

Sample Description : Copper Electrode

Optional: RoHS Directive 2011/65/EU, priority substances

| Test Item(s): | Unit | Test Method | Results | MDL |
|-------------------------------------|-------|---|---------|-----|
| Hexabromocyclododecane (HBCDD) | mg/kg | Based on IEC 62321:2008, and performed by GC-MS | N.D. | 10 |
| Bis (2-ethylhexyl) phthalate (DEHP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Butyl benzyl phthalate (BBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Dibutyl phthalate (DBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |

Note:

- Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.
- mg/kg = ppm; 0.1wt% = 1000ppm
- N.D. = Not detected
- MDL = Method Detection Limit
- = not regulated

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SENIOR LAB MANAGER

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Test Report

No. CTSSA/08644-1(B)/13

Date : 20/05/2013

Page: 5 of 6

CTS Ref. CTSSA/13/1281/Littelfuse

Test Part Description :

Sample Description : Copper Electrode



SGS authenticate the photo on original report only

SGS LABORATORY SERVICES (M) SDN. BHD.

Chong Kien Len

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SGS Laboratory Services (M) Sdn. Bhd.
(Company No. 63972-M)

No.26 Jalan Anggerik Vanilla 31/93 Kota Kemuning 40460 Shah Alam, Selangor Darul Ehsan, Malaysia
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Test Report

No. CTSSA/08644-1(B)/13

Date : 20/05/2013

Page: 6 of 6

CTS Ref. CTSSA/13/1281/Littelfuse

1. DETERMINATION OF CADMIUM CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008

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

5. DETERMINATION OF PBB/PBDE WITH GC-MS

BY IEC 62321 2008

Cut sample in small pieces
↓
Weight sample (0.5-4.0g) 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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Test Report

No. CTSSA/08656-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

LITTELFUSE INC.
800E. 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 | : | 17/04/2013 |
| Testing Period | : | 17/04/2013 to 16/05/2013 |
| Date Completed | : | 16/05/2013 |
| Reporting Date | : | 20/05/2013 |

| | | |
|----------------|---|--|
| Test Requested | : | Selected test(s) as requested by client |
| Test Method | : | Please refer to next page(s). |
| Test Results | : | Please refer to next page(s). |
| Analysts | : | Ng Jing Wei, Cho Kar Yen, Tan Li Wei, Choong Lap Kit & Tay Siam Pine |

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Test Report

No. CTSSA/08656-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

Date : 20/05/2013

Page: 2 of 6

Test results:

Test Part Description :

Sample Description : Silver Ring

RoHS Directive 2011/65/EU Annex II

| Test Item(s): | Unit | Test Method | Results | MDL |
|---|-------|--|----------|-----|
| Cadmium(Cd) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Lead (Pb) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Mercury (Hg) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional) # | --- | With reference to IEC 62321:2008 | Negative | - |
| Sum of PBBs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

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Test Report

No. CTSSA/08656-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

| | | | | |
|--------------------------|-------|--|------|---|
| Sum of PBDEs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) # = **Spot-Test:**

a. Negative means the absence of Cr(VI) on the tested areas

b. Positive means the presence of Cr(VI) on the tested areas

(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:

a. Negative means the absence of Cr(VI) on the tested areas

b. Positive means the presence of Cr(VI) on the tested areas;

The detected concentration in 50 mL boiling water extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

(e) - = Not regulated

(f) Upon Customer's request, this report has been issued in more than one original. Only the first original is a legally binding document and may be used for any legal purpose, including payment. (Original 2-2)

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Test Report

No. CTSSA/08656-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

Test result:

Test Part Description :

Sample Description : Silver Ring

Optional: RoHS Directive 2011/65/EU, priority substances

| Test Item(s): | Unit | Test Method | Results | MDL |
|-------------------------------------|-------|---|---------|-----|
| Hexabromocyclododecane (HBCDD) | mg/kg | Based on IEC 62321:2008, and performed by GC-MS | N.D. | 10 |
| Bis (2-ethylhexyl) phthalate (DEHP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Butyl benzyl phthalate (BBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Dibutyl phthalate (DBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |

Note:

- (a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.
- (b) mg/kg = ppm; 0.1wt% = 1000ppm
- (c) N.D. = Not detected
- (d) MDL = Method Detection Limit
- (e) - = not regulated

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Test Report

No. CTSSA/08656-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

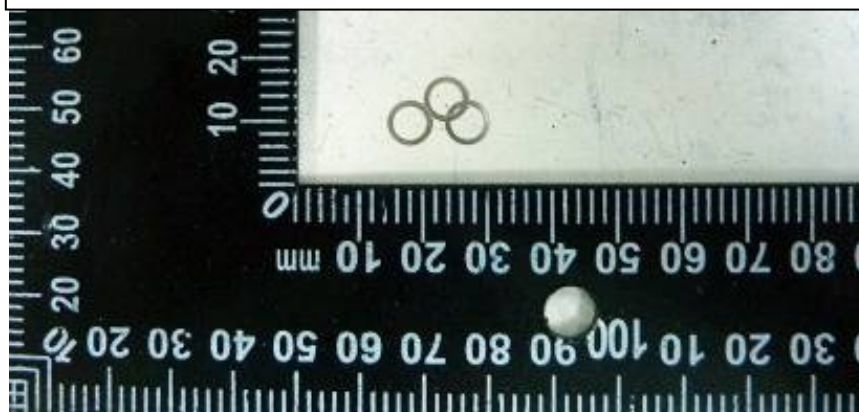
Date : 20/05/2013

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Test Part Description :

Sample Description : Silver Ring

LITTELFUSE INC.
CTSSA/08656-1(B)/13



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[Signature]

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Test Report

No. CTSSA/08656-1(B)/13

Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

1. DETERMINATION OF CADMIUM CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008

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

5. DETERMINATION OF PBB/PBDE WITH GC-MS

BY IEC 62321 2008

Cut sample in small pieces
↓
Weight sample (0.5-4.0g) 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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Test Report

No. CTSSA/08640-1(B)/13

Date : 20/05/2013

Page: 1 of 6

CTS Ref. CTSSA/13/1281/Littelfuse

LITTELFUSE INC.
800E. 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 | : | 17/04/2013 |
| Testing Period | : | 17/04/2013 to 10/05/2013 |
| Date Completed | : | 10/05/2013 |
| Reporting Date | : | 20/05/2013 |

| | | |
|----------------|---|--|
| Test Requested | : | Selected test(s) as requested by client |
| Test Method | : | Please refer to next page(s). |
| Test Results | : | Please refer to next page(s). |
| Analysts | : | Ng Jing Wei, Cho Kar Yen, Tan Li Wei, Choong Lap Kit & Tay Siam Pine |

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Test Report

No. CTSSA/08640-1(B)/13

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CTS Ref. CTSSA/13/1281/Littelfuse

Test results:

Test Part Description :

Sample Description : Blue Ink

RoHS Directive 2011/65/EU Annex II

| Test Item(s): | Unit | Test Method | Results | MDL |
|----------------------------|-------|--|---------|-----|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Lead (Pb) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Mercury (Hg) | mg/kg | With reference to IEC 62321:2008, and performed by ICP-OES | N.D. | 2 |
| Hexavalent Chromium (CrVI) | mg/kg | With reference to IEC 62321:2008, and performed by UV-Vis | N.D. | 2 |
| Sum of PBBs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

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Date : 20/05/2013

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CTS Ref. CTSSA/13/1281/Littelfuse

| | | | | |
|--------------------------|-------|--|------|---|
| Sum of PBDEs | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | - |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321:2008, and performed by GC-MS | N.D. | 5 |

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) - = Not regulated

(e) Testing based on original basis

(f) Upon Customer's request, this report has been issued in more than one original. Only the first original is a legally binding document and may be used for any legal purpose, including payment. (Original 2-2)

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SENIOR LAB MANAGER

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Test Report

No. CTSSA/08640-1(B)/13
CTS Ref. CTSSA/13/1281/Littelfuse

Date : 20/05/2013

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Test result:

Test Part Description :

Sample Description : Blue Ink

Optional: RoHS Directive 2011/65/EU, priority substances

| Test Item(s): | Unit | Test Method | Results | MDL |
|-------------------------------------|-------|---|---------|-----|
| Hexabromocyclododecane (HBCDD) | mg/kg | Based on IEC 62321:2008, and performed by GC-MS | N.D. | 10 |
| Bis (2-ethylhexyl) phthalate (DEHP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Butyl benzyl phthalate (BBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |
| Dibutyl phthalate (DBP) | mg/kg | Based on EN 14372: 2004, and performed by GC-MS | N.D. | 30 |

Note:

- (a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.
- (b) mg/kg = ppm; 0.1wt% = 1000ppm
- (c) N.D. = Not detected
- (d) MDL = Method Detection Limit
- (e) - = not regulated
- (f) Testing based on original basis

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CTS Ref. CTSSA/13/1281/Littelfuse

Test Part Description :

Sample Description : Blue Ink



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Signature of Chong Kien Len

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CTS Ref. CTSSA/13/1281/Littelfuse

1. DETERMINATION OF CADMIUM CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Sample Preparation
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Sample Preparation
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY

IEC 62321 2008

Sample Receiving and Registration
↓
Sample Preparation
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM

BY IEC 62321 2008

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

5. DETERMINATION OF PBB/PBDE WITH GC-MS

BY IEC 62321 2008

Sample Preparation
↓
Weight sample (0.5-4.0g) 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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