

## Certificate of non-use of The Controlled Substances

Company name            Littelfuse, Inc.

Product Covered        SIDACtor®, DO-214AC Package (SMA package)

Issue Date              August 7, 2012

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

It is also certified by Littelfuse, Inc., that the products listed in this report do not contain Halogens and their compounds judged per widely accepted industrial guidelines.

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

\_\_\_\_\_  
< K. Yoshimoto, Senior Product Engineer, Littelfuse, Inc.>

(1) Parts, sub-materials and unit parts

This document covers DO-214AC package (SMA package), RoHS-Compliant and Halogen-free series manufactured by Littelfuse Concord Wuxi Plant (Wuxi, China), supplied by Littelfuse, Inc. Please see page 2 for the complete list of part number covered by this report.

< Homogeneous Materials used >

Please see figure and table 1 on page 2 of this document.

(2) The analytical data on all measurable substances

Please see annex 1 through 6, attached to this document.

**Remarks :**

**Pb (lead) contained in die bonding solder (item 8 on page 2) and passivation glass (item 7) to be categorized as exempt in RoHS Annex III 7(a) and 7(c)-I.**

**Please refer to Annex 7 of this report for the extract of the applicable exemptions of RoHS (EU Directive 2011/65/EU)**

## Littelfuse Part Numbers covered by this report

### SIDACTor® Products

P0080S1ALRP	P0080S1BRLP
P1800S1ALRP	P3100S1BLRP
P2300S1ALRP	
P2600S1ALRP	
P3100S1ALRP	
P3500S1ALRP	

**Table 1: Homogeneous Material Used**

#	Description	Name of Material	Type	Analysis data
1	Molding compound	epoxy resin	plastic	annex 1
2	Lead frame	copper alloy	metal	annex 2 DO-214AC package uses same raw material and same supplier as TO-220. Report is from TO-220 material.
4	Matte-Tin plating	Tin	metal	annex 3
5	Silicon die	silicon	metal	annex 4, tested as Nickel-plated wafer.
6	Nickel electrode	nickel	metal	
7	Passivation glass	glass	glass	annex 5 Pb in this glass is exempted by RoHS Annex III 7(c)-I. Please refer to Annex 7 for the RoHS exemption.
8	Die bonding solder	solder	metal	annex 6 Pb in this solder is exempted by RoHS Annex III 7(a). Please refer to Annex 7 for the RoHS exemption.

**Table 2: RoHS-regulated substance in raw materials**

Components & Raw Materials	Analytical Test Result							
	Cd Cadmium	Cr Chromium	Hg Mercury	Pb Lead	PBB & PBDE	Total Halogen	Phthalates	HBCD
<b>As Component Total</b> Values of P3100S1ALRP* <sup>1</sup> , as representative products of all DO-214AC package.	< 2ppm	< 2ppm	< 2ppm	<10 ppm* <sup>2</sup> (3.0%* <sup>3</sup> )	< 5ppm	< 50ppm	< 100ppm	< 10ppm
<b>Molding compound</b> See Annex 1 for the detail.	< 2ppm	< 1ppm	< 2ppm	< 2ppm	< 5ppm	< 50ppm	< 100ppm	< 10ppm
<b>Lead frame</b> (Copper Alloy, KFC) See Annex 2 for the detail.	< 2ppm	< 2ppm	< 2ppm	< 2ppm	---	---	---	---
<b>Outside lead finish</b> (Sn 100%) See Annex 4 for the detail.	< 2ppm	< 2ppm	< 2ppm	92ppm* <sup>4</sup>	---	---	---	---
<b>Silicon Die</b> (Silicon + Ni electrode) See Annex 5 for the detail.	< 2ppm	< 1ppm	< 2ppm	31ppm* <sup>4</sup>	< 5ppm	---	---	---
<b>Passivation Glass</b> See Annex 6 for the detail.	< 2ppm	< 1ppm	< 2ppm	40% * <sup>5</sup>	< 5ppm	< 50ppm	---	---
<b>Die Bonding Solder</b> (Pb 92.5wt%) See Annex 7 for the detail.	< 2ppm	< 1ppm	< 2ppm	92.5% * <sup>6</sup>	< 5ppm	< 50ppm	< 100ppm	< 10ppm

- \*1 Other products may contain equal or less amount of Pb as P3100S1ALRP value shown here, but not more than the value shown here.
- \*2 Less than 10ppm Pb content overall, excluding Pb from the die bonding solder and the passivation glass on the silicon die.
- \*3 Maximum 3.0wt% or 3.0mg of Pb (lead) content overall, including the RoHS-exempted use of Pb
- \*4 Pb (lead) contained in outside plating and silicon die is not exempted from restriction by RoHS, but considered as process contamination or naturally-occurring impurity in raw materials. Littelfuse does not add Pb (lead) intentionally.
- \*5 Pb (lead) contained in passivation glass is exempted from restriction by RoHS Annex III 7(c)-I.
- \*6 Pb (lead) contained in die bonding solder is exempted from restriction by RoHS Annex III 7(a).  
Please refer to Annex 7 of this report for the applicable exemptions of RoHS (EU Directive 2011/65/EU)

# Annex 1: Analysis Result of Molding Compound (Page 1-4 of 11)

**Intertek**

Number : WJXH0009771

Applicant : CONCORD SEMICONDUCTOR(WUXI) CO., LTD. Date : Jul 26, 2012  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH DEVELOPMENT ZONE, WUXI,JIANGSU-CHINA  
 Attn : ZHANG XIAOPENG

Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **Grey Epoxy Molding Compound.**  
 Item Name : Epoxy Molding Compound.  
 Vendor :  
 Component Or Part No. : EME-E110C  
 Test Item : Cd,Pb,Hg,Cr(VI),PBs,PBDEs,F,O,Br,I,Phthalate,HCBC.

Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Summary:

Tested Sample	Standard	Result
Submitted Sample	With Reference To Test Method Of IEC 62321 Edition 1.0: 2008 And Maximum Concentration Limits Quoted From RoHS Directives 2002/95/EC And Amendment 2005/618/EC	Pass

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

*Jessica Lu*  
 Jessica Lu  
 General Manager

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**Intertek**

Number : WJXH0009771

Tests Conducted (As Requested By The Applicant)  
 1. RoHS Directives Test  
 (A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	ND
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg) (For Non-Metal)	ND
Polybrominated Biphenyls (PBBS)(mg/kg)	ND
Monobrominated Biphenyls (MonBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Nonabrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	ND
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Nonabrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND

Remark:  
 mg/kg = Milligram Per Kilogram = ppm  
 ND = Not Detected

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**Intertek**

Number : WJXH0009771

Tests Conducted (As Requested By The Applicant)  
 (B) RoHS Requirements:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>VI</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBS)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

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 Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb) Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg) Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>VI</sup> ) Content (For Non-Metal)	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-MSD And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

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**Intertek**

Number : WJXH0009771

Tests Conducted (As Requested By The Applicant)  
 (D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2008

```

    graph TD
        A[Sampling/Grinding Or Cutting] --> B[Cd/Pb/Hg]
        A --> C[CrVI]
        A --> D[Polymers / Electronics]
        A --> E[PBBS/PBDEs]
        
        B --> B1[For Different Material Digest The Sample With Appropriate Acid*]
        B1 --> B2[Confirm The Tested Samples Are Totally Dissolved]
        B2 -- No --> B1
        B2 -- Yes --> B3[Make Up With Deionized Water]
        B3 --> B4[Analyzed By ICP-OES]
        
        C --> C1[Weigh Sample And Add Alkaline Solution]
        C1 --> C2[Definite Temp. Extraction]
        C2 --> C3[Cool And Filter The Extract]
        C3 --> C4[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
        C4 --> C5[Analyzed By UV-VIS]
        
        D --> D1[Weigh Sample And Add Organic Solvent]
        D1 --> D2[SorNet Extraction Or Solvent Extraction]
        D2 --> D3[Concentrate The Extract And Make Up With Organic Solvent]
        D3 --> D4[Analyzed By GC-MSD]
        
        E --> E1[Weigh Sample And Add Organic Solvent]
        E1 --> E2[SorNet Extraction Or Solvent Extraction]
        E2 --> E3[Concentrate The Extract And Make Up With Organic Solvent]
        E3 --> E4[Analyzed By GC-MSD]
    
```

Chemist: Inorganic (Ann Luo)/Fred Wang/Ally Wan  
 Organic (Jenny Xu/Cherry Sun)


Remarks:  
 \*1. List of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> /HCL/HF/H <sub>2</sub> O <sub>2</sub> /H <sub>2</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> /HCL/HF
Electronics	HNO <sub>3</sub> /HCL/H <sub>2</sub> O <sub>2</sub> /HBF <sub>4</sub>

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# Annex 1: Analysis Result of Molding Compound (Page 5-8 of 11)



Number : WJXH00009771

Tests Conducted (As Requested By The Applicant)

2 Halogen Test

(1) Test Result Summary :

Halogen Content:

Testing Item	Result (ppm)
Fluorine (F) Content	ND
Chlorine (Cl) Content	ND
Bromine (Br) Content	ND
Iodine (I) Content	ND

Remarks : ppm = Parts Per Million = ng/kg  
ND = Not Detected

Date Sample Received : Jul 23, 2012  
Test Period: Jul 23, 2012 To Jul 26, 2012


(1) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F, Cl, Br, I) Content	With Reference To EN 14982:2007 By Combustion In A Calorimetric Bomb And Determined By Ion Chromatography	50 ppm

Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample

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Number : WJXH00009771

Tests Conducted (As Requested By The Applicant)

(1) Measurement Flowchart:  
Test For Halogen Content Reference Method: EN 14982:2007


```

    graph TD
      A[Sampling/Grinding Or Cutting] --> B[Add Absorbent In A Combustion Flask & Place Weighed Sample In]
      B --> C[Fill The Calorimetric Bomb With Oxygen]
      C --> D[Ignite Then Leave The Flask At Room Temperature]
      D --> E{Any Test Specimen In The Calorimetric Bomb?}
      E -- No --> F[Transfer The Absorbent Into A Volumetric Flask]
      E -- Yes --> B
      F --> G[Make Up With Deionized Water]
      G --> H([Analyzed By Ion Chromatography])
    
```

Chemist: Fred Wang/ Ally Wan Ally Wan

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Number : WJXH00009771

Tests Conducted (As Requested By The Applicant)

3 Phthalate Content Test

With Reference To EN14372, By Gas Chromatographic-Mass Spectrometric (GC-MSD) Analysis.

Tested Compound	Result (% W/W)	Limit (% W/W)
		(Max.)
Dibutyl Phthalate (DBP)	ND	---
Diethyl Hexyl Phthalate (DEHP)	ND	---
Benzyl Butyl Phthalate (BBP)	ND	---
Sum of Three Phthalates	ND	0.1
Di-Iso-Nonyl Phthalate (DINP)	ND	---
Di-N-Octyl Phthalate (DNOP)	ND	---
Di-Iso-Decyl Phthalate (DIDP)	ND	---
Sum of Three Phthalates	ND	0.1

Remark : The Above Limit Was Quoted According To Annex XVII Items 5, 6, 52 Of The Reach Regulation (EC) No. 1907/2006 (Formerly Known As Directive 2005/64/EC) For Phthalate Content In Toys And Children Care Articles.

Detection Limit = 0.01% (W/W)  
ND = Not Detected


Date Sample Received : Jul 23, 2012  
Testing Period : Jul 23, 2012 To Jul 26, 2012

Comment :

The Phthalate Content Test Result of Tested Sample Did Not Exceed The Limit of 0.1% By Weight As Stated In Annex XVII Items 5, 6, 52 Of The Reach Regulation (EC) No. 1907/2006 (Formerly Known As Directive 2005/64/EC) Relating To Restrictions On Phthalates In Toys And Children Care Articles.

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Number : WJXH00009771

Tests Conducted (As Requested By The Applicant)

Measurement Flowchart:  
Test For Phthalates Contents

```

    graph TD
      A[Weigh Sample And Place In A Thimble] --> B[Extracted By Soxhlet Extraction With Organic Solvent]
      B --> C[Concentrate The Extract]
      C --> D[Transfer The Extract Into A Volumetric Flask]
      D --> E[Make Up With Organic Solvent]
      E --> F[Analyze By GC-MSD]
    
```

Chemist: Inorganic (Ann Luo)/Fred Wang/Ally Wan  
Organic (Jenny Xu/Cherry Sun)

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# Annex 1: Analysis Result of Molding Compound (Page 9-11 of 11)

**Intertek**

Number : WUXH0009771

Tests Conducted (As Requested By The Applicant)  
4. HBCD (Hexabromocyclododecane)

(A) Test Result Summary:

Testing Item	Result(ppm)
HBCD (Hexabromocyclododecane)	ND

Remarks:  
ppm = Parts Per Million = mg/kg  
ND = Not Detected

(B) Test Method :

Testing Item	Testing Method	Reporting Limit
HBCD (Hexabromocyclododecane)	With Reference To US EPA 3540C, By Solvent Extraction And Determined By GC-MSD	10 ppm

Date Sample Received : Jul 23, 2012  
Testing Period : Jul 23, 2012 To Jul 26, 2012

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**Intertek**

Number : WUXH0009771

Tests Conducted (As Requested By The Applicant)  
Measurement Flowchart:  
Test For HBCD (Hexabromocyclododecane) Content

```

graph TD
    A[Weigh Sample And Place In A Thimble] --> B[Extracted By Soxhlet Extraction With Organic Solvent]
    B --> C[Concentrate The Extract]
    C --> D[Transfer The Extract Into A Volumetric Flask]
    D --> E[Make Up With Organic Solvent]
    E --> F[Analyse By GC-MSD]
  
```

Chemist: Inorganic (Ann Luo/Fred Wang/Ally Wan)  
Organic (Jimmy Xu/Cherry Sun)

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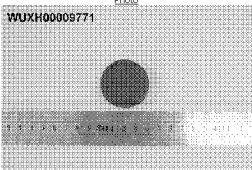
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**Intertek**

Number : WUXH0009771

Tests Conducted (As Requested By The Applicant)

Photo




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## Annex 2: Analysis Result of Lead frame (Page 1-4 of 4)



Number : WUXH00009747

Applicant : CONCORD SEMICONDUCTOR(WUXI) CO., LTD.      Date : Jul 26, 2012  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG  
 INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH  
 DEVELOPMENT ZONE, WUXI,JIANGSU,CHINA  
 Attn : ZHANG YAOPENG


Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **Copper Metal**.  
 Item Name : Lead Frame,Lead Frame Matrix/TO-220 Lead Frame/HeatSink/Copper Plug  
 Vendor :  
 Component Or Part No. : Copper  
 Test Item : Cu,Pb,Hg,CrVI


Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Summary:


Tested Sample	Standard	Result
Submitted Sample	With Reference To Test Method Of IEC 62321 Edition 1.0: 2008 And Maximum Concentration Limits Quoted From RoHS Directives 2002/95/EC And Amendment 2005/618/EC	Pass

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

  
 Jessica Lu  
 General Manager

  
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Number : WUXH00009747

Tests Conducted (As Requested By The Applicant)

1. RoHS Directives Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	ND
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Result (By Boiling Water Extraction On Metal) (mg/kg With 50cm <sup>2</sup> )	N

Remark:  
 mg/kg = Milligram Per kilogram = ppm  
 mg/kg With 50cm<sup>2</sup> = Milligram Per kilogram With 50 Square Centimeter  
 ND = Not Detected  
 N=Negative

(B)RoHS Requirement:


Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>VI</sup> )	0.1% (1000 mg/kg)

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 Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>VI</sup> ) Content (For Metal)	With Reference To IEC 62321 Edition 1.0: 2008, By Boiling Water Extraction And Determined By UV-VIS Spectrophotometer	0.02mg/kg With 50cm <sup>2</sup> (In Testing Solution)

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

  
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Page 2 of 4



Number : WUXH00009747

Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2008


```

    graph TD
        A[Sampling/Grinding Or Cutting] --> B[CrVI/Hg]
        A --> C[CrVI]
        B --> D[For Different Material, Digest The Sample With Appropriate Acid]
        D --> E{Confirm The Tested Samples Are Totally Dissolved}
        E -- No --> D
        E -- Yes --> F[Make Up With Deionized Water]
        F --> G[Analyzed By ICP-OES]
        C --> H[Metal]
        H --> I[Get 50cm² Samples]
        I --> J[Boiling Water Extraction]
        J --> K[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
        K --> L[Analyzed By UV-VIS]
    
```


Chemist: Inorganic (Ann Luo/Fred Wang/Ally Wan)

Remarks:  
 \*1. List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> , HCL, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> O <sub>2</sub>
Metals	HNO <sub>3</sub> , HCL, HF
Electronics	HNO <sub>3</sub> , HCL, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub>

  
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Number : WUXH00009747

Tests Conducted (As Requested By The Applicant)

Photo




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Page 4 of 4

## Annex 3: Analysis Result of Matte-Tin plating (page 1-4 of 4)




Number : WUXH0009778

Applicant : CONCORD SEMICONDUCTOR (WUXI) CO., LTD.      Date : Jul 27, 2012  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG  
 INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH  
 DEVELOPMENT ZONE, WUXI, JIANGSU, CHINA  
 Attn : ZHANG XIAOPENG

Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **Black Plastic With Silvery Metal Pin.**  
 Item Name : Tin Plating(SMD)  
 Vendor :  
 Component Or Part No. : Pure Matte Tin.  
 Test Item : Cd/Pb/Hg/Cr<sup>6+</sup>


Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

  
 Jessica Lu  
 General Manager

**Intertek Testing Services Wuxi Ltd.**  
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Page 1 Of 4



Number : WUXH0009778

Tests Conducted (As Requested By The Applicant)  
 1. RoHS Directives Test  
 (A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content / Plating	ND
Lead (Pb) Content / Plating	ND
Mercury (Hg) Content / Plating	ND
Chromium (VI) (Cr <sup>6+</sup> ) Result (By Boiling Water Extraction On Metal) (mg/kg With 50cm <sup>2</sup> )	N

Remark:  
 mg/kg = Milligram Per kilogram = ppm  
 mg/kg With 50cm<sup>2</sup> = Milligram Per kilogram With 50 Square Centimeter  
 ND = Not Detected  
 N=Negative  
 The Result Is For Reference Only.  
 Tested Component: Metal Pin Plating.

(B)RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>6+</sup> )	0.1% (1000 mg/kg)

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: 2006, By Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb) Content	With Reference To IEC 62321 Edition 1.0: 2006, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg) Content	With Reference To IEC 62321 Edition 1.0: 2006, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>6+</sup> ) Content (For Metal)	With Reference To IEC 62321 Edition 1.0: 2006, By Boiling Water Extraction And Determined By UV-VIS Spectrophotometer	0.02mg/kg With 50cm <sup>2</sup> (In Testing Solution)

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

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Page 2 Of 4



Number : WUXH0009778

Tests Conducted (As Requested By The Applicant)  
 (D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2006

```

    graph TD
      A[Sampling/Grinding Or Cutting] --> B[Cd/Pb/Hg]
      A --> C[Cr6+]
      B --> D[For Different Material, Digest The Sample With Appropriate Acid*]
      D --> E{Confirm The Tested Samples Are Totally Dissolved?}
      E -- No --> D
      E -- Yes --> F[Make Up With Deionized Water]
      F --> G[Analyzed By ICP-OES]
      C --> H[Metal]
      H --> I[Get 50cm² Samples]
      I --> J[Boiling Water Extraction]
      J --> K[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
      K --> L[Analyzed By UV-VIS]
    
```


Chemist: Inorganic (Ann Luo/Fred Wang/Ally Wan)

Remarks:  
 \*1. List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HF

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Page 3 Of 4



Number : WUXH0009778

Tests Conducted (As Requested By The Applicant)

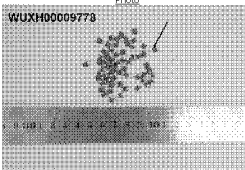


Photo  
WUXH0009778

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Page 4 Of 4



# Annex 4: Analysis Result of Ni-plated Wafer (Page 1-4 of 5)

**Intertek**

Number : WUXH00009738

Applicant : CONCORD SEMICONDUCTOR(WUXI) CO., LTD.  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG  
 INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH  
 DEVELOPMENT ZONE, WUXI,JIANGSU,CHINA  
 Attn : ZHANG XIOPENG

Date : Jul 26, 2012

Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **Silvery Grey Metal.**  
 Item Name : Silicon Wafer With Nickel Plating  
 Vendor :  
 Component Or Part No. : Silicon+Nickel  
 Test Item : Cd/Pb/Hg/Cr/VI PBBs PBDEs  
 Remark : As Requested By The Applicant, Tested As A Whole And Sampled Randomly.

Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

Page 1 of 5

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 Wuxi 214021, Jiangsu, China  
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**Intertek**

Number : WUXH00009738

Tests Conducted (As Requested By The Applicant)

1. RoHS Directives Test

(A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	31
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	ND
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Monobrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	ND
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Monobrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND

Remark:  
 mg/kg = Milligram Per Kilogram = ppm  
 ND = NOT Detected

Page 2 of 5

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**Intertek**

Number : WUXH00009738

Tests Conducted (As Requested By The Applicant)

(B) RoHS Requirement

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>VI</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

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 Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb) Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg) Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>VI</sup> ) Content (For Non-Metal)	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-MSD And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

Page 3 of 5

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**Intertek**

Number : WUXH00009738

Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2008

```

    graph TD
        Start[Sampling/Grinding Or Cutting] --> CdPbHg[Cd/Pb/Hg]
        Start --> CrVI[CrVI]
        Start --> PBBsPBDEs[PBBs/PBDEs]

        CdPbHg --> Digest[For Different Material, Digest The Sample With Appropriate Acid*]
        CrVI --> WeighAlk[Weigh Sample And Add Alkaline Solution]
        PBBsPBDEs --> WeighOrg[Weigh Sample And Add Organic Solvent]

        Digest --> Confirm[Confirm The Tested Samples Are Totally Dissolved]
        Confirm -- No --> Digest
        Confirm -- Yes --> MakeUp1[Make Up With Deionized Water]
        MakeUp1 --> Analyzed1[Analyzed By ICP-OES]

        WeighAlk --> Definite[Definite Temp. Extraction]
        Definite --> CoolFilter[Cool And Filter The Extract]
        CoolFilter --> MakeUp2[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
        MakeUp2 --> Analyzed2[Analyzed By UV-VIS]

        WeighOrg --> Soxhlet[Soxhlet Extraction Or Solvent Extraction]
        Soxhlet --> Concentrate[Concentrate The Extract And Make Up With Organic Solvent]
        Concentrate --> Analyzed3[Analyzed By GC-MSD]
    
```

Chemist: Inorganic (Ann Luo/Fred Wang/Ally Wan)  
 Organic (Jenny Xu/Cherry Sun)

Remarks:  
 \*1: List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub>
Metal	HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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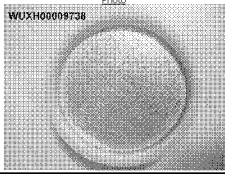
## Annex 4: Analysis Result of Ni-plated Wafer (Page 5 of 5)

**Intertek**

Number : WUXH0009738

Tests Conducted (As Requested By The Applicant)

Photo




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Page 5 Of 5

# Annex 5: Analysis Result of Passivation Glass (Page 1-4 of 7)



Number : WUXH00009741


Applicant : CONCORD SEMICONDUCTOR(WUXI) CO., LTD.  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG  
 INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH  
 DEVELOPMENT ZONE, WUXI,JIANGSU,CHINA  
 Attn : ZHANG XIOPENG

Date : Jul 26, 2012

Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **White Powder.**  
 Item Name : Wafer Passivation  
 Vendor :  
 Component Or Part No. : Propriety  
 Test Item : Cd,Pb,Hg,Cr(VI),PBBs,PBDEs,F,Cl,Br,I


Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

  
 Jessica Lu  
 General Manager

Page 1 of 7

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Number : WUXH00009741


Tests Conducted (As Requested By The Applicant)  
 1. RoHS Directives Test  
 (A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	142.300
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	ND
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Monobrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	ND
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Monobrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND

Remark:  
 mg/kg = Milligram Per Kilogram = ppm  
 ND = NOT Detected

Page 2 of 7

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Number : WUXH00009741

Tests Conducted (As Requested By The Applicant)  
 (B)RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>VI</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

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 Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>VI</sup> ) Content(For Non-Metal)	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-MSD And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

Page 3 of 7

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 Tel: +86 510 8821 4867 Fax: +86 510 8820 0428 E-mail: consumer.products@intertek.com



Number : WUXH00009741

Tests Conducted (As Requested By The Applicant)  
 (D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2008

```

    graph TD
        Start[Sampling/Grinding Or Cutting] --> CdPbHg[Cd/Pb/Hg]
        Start --> Cr6[CrVI]
        Start --> PBBsPBDEs[PBBs/PBDEs]
        
        CdPbHg --> Digest[For Different Material, Digest The Sample With Appropriate Acid*]
        Digest --> Confirm[Confirm The Tested Samples Are Totally Dissolved]
        Confirm -- No --> Digest
        Confirm -- Yes --> MakeUp1[Make Up With Deionized Water]
        MakeUp1 --> Analyzed1[Analyzed By ICP-OES]
        
        Cr6 --> Weigh1[Weigh Sample And Add Alkaline Solution]
        Weigh1 --> Definite[Definite Temp. Extraction]
        Definite --> Cool[Cool And Filter The Extract]
        Cool --> MakeUp2[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
        MakeUp2 --> Analyzed2[Analyzed By UV-VIS]
        
        PBBsPBDEs --> Weigh2[Weigh Sample And Add Organic Solvent]
        Weigh2 --> Soxhlet[Soxhlet Extraction Or Solvent Extraction]
        Soxhlet --> Concentrate[Concentrate The Extract And Make Up With Organic Solvent]
        Concentrate --> Analyzed3[Analyzed By GC-MSD]
    
```

Chemist: Inorganic (Ann Luo/Fred Wang/Ally Wan)  
 Organic (Jenny Xu/Cherry Sun)


Remarks:  
 \*1: List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> ,HCl, HF, H <sub>2</sub> O <sub>2</sub> ,H <sub>2</sub> SO <sub>4</sub>
Metal	HNO <sub>3</sub> ,HCl, HF
Electronics	HNO <sub>3</sub> ,HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

Page 4 of 7

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## Annex 5: Analysis Result of Passivation Glass (Page 5-7 of 7)



Number : WUXH0009777

Tests Conducted (As Requested By The Applicant)

2. Halogen Test

(1) Test Result Summary :

Halogen Content:

Testing Item	Result (ppm)	Submitted Samples
Fluorine (F) Content	ND	
Chlorine (Cl) Content	ND	
Bromine (Br) Content	ND	
Iodine (I) Content	ND	

Remarks : ppm = Parts Per Million = mg/kg  
ND = Not Detected

Date Sample Receive : Jul 23, 2012  
Test Period: Jul 23, 2012 To Jul 26, 2012


(1) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F, Cl, Br, I) Content	With Reference To EN 14982:2007 By Combustion In A Calorimetric Bomb And Determined By Ion Chromatography	50 ppm

Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample

Page 5 of 7

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Number : WUXH0009777

Tests Conducted (As Requested By The Applicant)

(1) Measurement Flowchart:

Test For Halogen Content Reference Method: EN 14982:2007


```

    graph TD
      A[Sampling/Grinding Or Cutting] --> B[Add Absorbent In A Combustion Flask & Place Weighed Sample In]
      B --> C[Fill The Calorimetric Bomb With Oxygen]
      C --> D[Ignite Then Leave The Flask At Room Temperature]
      D --> E{Any Test Specimen In The Calorimetric Bomb?}
      E -- Yes --> B
      E -- No --> F[Transfer The Absorbent Into A Volumetric Flask]
      F --> G[Make Up With Deionized Water]
      G --> H([Analyzed By Ion Chromatography])
    
```

Chemist: Fred Wang/ Ally Wan Ally Wan


Page 6 of 7

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Number : WUXH0009777

Tests Conducted (As Requested By The Applicant)



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Page 7 of 7

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# Annex 6: Analysis Result of Die Bonding Solder (Page 1-4 of 11)

**Intertek**

Number : WUXH00009758

Applicant : CONCORD SEMICONDUCTOR (WUXI) CO., LTD.  
 EAST 1# ZHENFA 6 ROAD, SHUO FANG  
 INDUSTRIAL PARK WUXI NATIONAL HIGH-TECH  
 DEVELOPMENT ZONE, WUXI,JIANGSU,CHINA  
 Attn : ZHANG XIOPENG

Date : Jul 27, 2012

Sample Description As Declared:  
 One (1) Piece Of Submitted Sample Said To Be : **Gray Paste.**  
 Item Name : SOLDER PASTE.  
 Vendor :  
 Component Or Part No. : AG-3-D-SMC237-6(Pb-Sn)Ag=90.5/S-0.5)  
 Test Item : Cd/Pb/Hg/Cr(VI), PBBs, PBDEs, P, D, Br, J, Phthalate, HBCDD.

Tests Conducted:  
 As Requested By The Applicant, For Details Refer To Attached Pages

Prepared And Checked By:  
 For Intertek Testing Services Wuxi Ltd.

*Jessica Lu*  
 Jessica Lu  
 General Manager

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**Intertek**

Number : WUXH00009758

Tests Conducted (As Requested By The Applicant)  
 1. RoHS Directives Test  
 (A) Test Result Summary:

Testing Item	Result
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	920/400
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	ND
Monobrominated Biphenyls (MonoBB)	ND
Dibrominated Biphenyls (DiBB)	ND
Tribrominated Biphenyls (TriBB)	ND
Tetrabrominated Biphenyls (TetraBB)	ND
Pentabrominated Biphenyls (PentaBB)	ND
Hexabrominated Biphenyls (HexaBB)	ND
Heptabrominated Biphenyls (HeptaBB)	ND
Octabrominated Biphenyls (OctaBB)	ND
Nonabrominated Biphenyls (NonaBB)	ND
Decabrominated Biphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)	ND
Monobrominated Diphenyl Ethers (MonoBDE)	ND
Dibrominated Diphenyl Ethers (DiBDE)	ND
Tribrominated Diphenyl Ethers (TriBDE)	ND
Tetrabrominated Diphenyl Ethers (TetraBDE)	ND
Pentabrominated Diphenyl Ethers (PentaBDE)	ND
Hexabrominated Diphenyl Ethers (HexaBDE)	ND
Heptabrominated Diphenyl Ethers (HeptaBDE)	ND
Octabrominated Diphenyl Ethers (OctaBDE)	ND
Nonabrominated Diphenyl Ethers (NonaBDE)	ND
Decabrominated Diphenyl Ether (DecaBDE)	ND

Remark:  
 mg/kg = Milligram Per Kilogram = ppm  
 ND = NOT Detected

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**Intertek**

Number : WUXH00009758

Tests Conducted (As Requested By The Applicant)  
 (B)RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr <sup>VI</sup> )	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

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 Add Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Add Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>VI</sup> ) Content(For Non-Metal)	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-MSD And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Jul 23, 2012  
 Testing Period: Jul 23, 2012 To Jul 26, 2012

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**Intertek**

Number : WUXH00009758

Tests Conducted (As Requested By The Applicant)  
 (D) Measurement Flowchart:  
 Reference Standard: IEC 62321 Edition 1.0: 2008

```

    graph TD
        Start[Sampling/Grinding Or Cutting] --> CdPbHg[Cd/Pb/Hg]
        Start --> CrVI[CrVI]
        Start --> PBBsPBDEs[PBBs/PBDEs]
        
        CdPbHg --> Digest[For Different Material, Digest The Sample With Appropriate Acid*]
        Digest --> Confirm[Confirm The Tested Samples Are Totally Dissolved]
        Confirm -- No --> Digest
        Confirm -- Yes --> MakeUp1[Make Up With Deionized Water]
        MakeUp1 --> Analyzed1[Analyzed By ICP-OES]
        
        CrVI --> Weigh1[Weigh Sample And Add Alkaline Solution]
        Weigh1 --> Definite[Definite Temp. Extraction]
        Definite --> Cool[Cool And Filter The Extract]
        Cool --> MakeUp2[Make Up With Deionized Water And Add Diphenyl-Carbazide Solution]
        MakeUp2 --> Analyzed2[Analyzed By UV-VIS]
        
        PBBsPBDEs --> Weigh2[Weigh Sample And Add Organic Solvent]
        Weigh2 --> Soxhlet[Soxhlet Extraction Or Solvent Extraction]
        Soxhlet --> Concentrate[Concentrate The Extract And Make Up With Organic Solvent]
        Concentrate --> Analyzed3[Analyzed By GC-MSD]
    
```

Chemist: Inorganic (Ann Lu)/Fred Wang/Ally Wan)  
 Organic (Jenny Xu/Cherry Sun)

Remarks:  
 \*1: List Of Appropriate Acid:

Material	Acid Added For Digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub>
Metal	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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## Annex 6: Analysis Result of Die Bonding Solder (Page 5-8 of 11)

**Intertek**

Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)

2. Halogen Test

(1) Test Result Summary :

Halogen Content:

Testing Item	Result (ppm)	Submitted Samples
Fluorine (F) Content	ND	
Chlorine (Cl) Content	ND	
Bromine (Br) Content	ND	
Iodine (I) Content	ND	

Remarks : ppm = Parts Per Million = mg/kg  
ND = Not Detected

Date Sample Received : Jul 23, 2012  
Test Period : Jul 23, 2012 To Jul 26, 2012

(1) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F, Cl, Br, I) Content	With Reference To EN 14982:2007 By Combustion In A Calorimetric Bomb And Determined By Ion Chromatography	50 ppm

Remarks : Reporting Limit = Quantitation Limit Of Analyte In Sample

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**Intertek**

Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)

(1) Measurement Flowchart:

Test For Halogen Content Reference Method: EN 14982:2007

```

    graph TD
      A[Sampling/Grinding Or Cutting] --> B[Add Absorbent In A Combustion Flask & Place Weighed Sample In]
      B --> C[Fill The Calorimetric Bomb With Oxygen]
      C --> D[Ignite Then Leave The Flask At Room Temperature]
      D --> E{Any Test Specimen In The Calorimetric Bomb?}
      E -- Yes --> B
      E -- No --> F[Transfer The Absorbent Into A Volumetric Flask]
      F --> G[Make Up With Deionized Water]
      G --> H([Analyzed By Ion Chromatography])
  
```

Chemist: Fred Wang/ Ally Wan/ Ally Wan

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**Intertek**

Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)

3. Phthalate Content Test

With Reference To EN14372, By Gas Chromatography-Mass Spectrometric (GC-MSD) Analysis.

Tested Compound	Result (% WW)	Limit (% WW)
		(Max)
Dibutyl Phthalate (DBP)	ND	---
Diethyl Hexyl Phthalate (DEHP)	ND	---
Benzyl Butyl Phthalate (BBP)	ND	---
Sum of Three Phthalates	ND	0.1
Di-Iso-Nonyl Phthalate (DINP)	ND	---
Di-N-Octyl Phthalate (DNOP)	ND	---
Di-Iso-Decyl Phthalate (DIDP)	ND	---
Sum of Three Phthalates	ND	0.1

Remark : The Above Limit Was Quoted According To Annex XVII Items 5.1.8. 5.2 Of The Reach Regulation (EC) No. 1907/2006 (Formerly Known As Directive 2005/84/EC) For Phthalate Content In Toys And Children Care Articles.

Detection Limit = 0.01% (WW)  
ND = Not Detected

Date Sample Received : Jul 23, 2012  
Testing Period : Jul 23, 2012 To Jul 26, 2012

Comment :  
The Phthalate Content Test Result Of Tested Sample Did Not Exceed The Limit Of 0.1% By Weight As Stated In Annex XVII Items 5.1.8. 5.2 Of The Reach Regulation (EC) No. 1907/2006 (Formerly Known As Directive 2005/84/EC) Relating To Restrictions On Phthalates In Toys And Children Care Articles.

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Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)

Measurement Flowchart:

Test For Phthalates Contents

```


    graph TD
      A[Weigh Sample And Place In A Thimble] --> B[Extracted by Soxhlet Extraction With Organic Solvent]
      B --> C[Concentrate The Extract]
      C --> D[Transfer The Extract Into A Volumetric Flask]
      D --> E[Make Up With Organic Solvent]
      E --> F([Analyze By GC-MSD])
  
```

Chemist: Inorganic (Ann Lu)/Fred Wang/Ally Wan)  
Organic (Jenny Xu/Cherry Sun)

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## Annex 6: Analysis Result of Die Bonding Solder (Page 9-11 of 11)



Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)  
4. HBCD (Hexabromocyclododecane)

(A) Test Result Summary:

Testing Item	Result(ppm)
HBCD (Hexabromocyclododecane)	ND

Remarks:  
ppm = Parts Per Million = mg/kg  
ND = Not Detected

(B) Test Method :


Testing Item	Testing Method	Recording Limit
HBCD (Hexabromocyclododecane)	With Reference To US EPA 3540C, By Solvent Extraction And Determined By GC-MSD	10 ppm

Date Sample Received : Jul 23, 2012  
Testing Period : Jul 23, 2012 To Jul 26, 2012

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Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)  
Measurement Flowchart:  
Test For HBCD (Hexabromocyclododecane) Content

```


    graph TD
      A[Weigh Sample And Place In A Thimble] --> B[Extracted By Soxhlet Extraction With Organic Solvent]
      B --> C[Concentrate The Extract]
      C --> D[Transfer The Extract Into A Volumetric Flask]
      D --> E[Make Up With Organic Solvent]
      E --> F[Analyze By GC-MSD]
    
```

Chemist: Inorganic (Amin Luo/Fred Wang/Ally Wan)  
Organic (Jimmy Xu/Cherry Sun)

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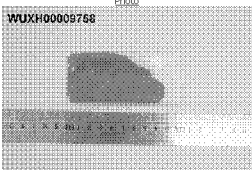
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Number : WUXH0009758

Tests Conducted (As Requested By The Applicant)

Photo



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# Annex 7: Applicable RoHS exemptions (2011/65/EU Annex III)

L 17493 EN Official Journal of the European Union 1.7.2011

**DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAM AND OF THE COUNCIL**  
**of 8 June 2011**  
**on the restriction of the use of certain hazardous substances in electrical and electronic equipment**  
**(recast)**  
**(Text with EEA relevance)**

THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 114 thereof,

Having regard to the proposal from the European Commission,

Having regard to the opinion of the European Economic and Social Committee (1),

Having regard to the opinion of the Committee of Regions (2),

Acting in accordance with the ordinary legislative procedure (3),

Whereas:

(1) A number of substantial changes are to be made to Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2002 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (1). In the interest of clarity, that Directive should be recast.

(2) The disparities between the laws or administrative measures adopted by the Member States regarding the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) could create barriers to trade and distort competition in the Union and may thereby have a direct impact on the establishment and functioning of the internal market. It therefore appears necessary to lay down rules in this field and to contribute to the protection of human health and the environmentally sound recovery and disposal of waste EEE.

(3) Directive 2002/95/EC provides that the Commission shall review the provisions of that Directive, in particular, in order to include in its scope equipment which falls within certain categories and to study the need to adapt the list of restricted substances on the basis of scientific progress, taking into account the precautionary principle, as endorsed by Council Resolution of 4 December 2000.

(4) The available evidence indicates that measures on the collection, treatment, recycling and disposal of waste EEE as set out in Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2002 on waste electrical and electronic equipment (WEEE) (2) are necessary to reduce the waste management problems associated with the heavy metals and flame retardants concerned. In spite of those measures, however, significant parts of waste EEE will continue to be found in the current disposal routes inside or outside the Union. Even if waste EEE were collected separately and submitted to recycling processes, its content of mercury, cadmium, lead, chromium VI, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) would be likely to pose risks to health or the environment, especially when mixed in less than optimal conditions.

(5) It is 1312, 22.11.2008, p. 3.

(6) OJ C 10, 4.1.1988, p. 1.

(7) OJ L 158, 10.4.2004, p. 7.

(8) OJ L 27, 13.2.2003, p. 24.

(9) OJ C 106, 16.12.2009, p. 36.

(10) OJ C 141, 29.12.2010, p. 55.

(11) Position of the European Parliament of 24 November 2010 (not yet published in the Official Journal) and decision of the Council of 27 May 2011.

(12) OJ L 37, 13.2.2003, p. 19.

1.7.2011 EN Official Journal of the European Union L 17493

3. Paragraph 1 shall apply to medical devices and monitoring and control instruments which are placed on the market from 22 July 2014, to in vitro diagnostic medical devices which are placed on the market from 22 July 2016 and to industrial monitoring and control instruments which are placed on the market from 22 July 2017.

4. Paragraph 1 shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of the following:

(a) EEE placed on the market before 1 July 2006;

(b) medical devices placed on the market before 22 July 2014;

(c) in vitro diagnostic medical devices placed on the market before 22 July 2016;

(d) monitoring and control instruments placed on the market before 22 July 2014;

(e) industrial monitoring and control instruments placed on the market before 22 July 2017.

(f) EEE which benefited from an exemption and which was placed on the market before that exemption expired as far as that specific exemption is concerned.

5. Paragraph 1 shall not apply to reused spare parts, recovered from EEE placed on the market before 1 July 2006 and used in equipment placed on the market before 1 July 2016, provided that reuse takes place in suitable closed-loop business-to-business return systems, and that the reuse of parts is notified to the consumer.

6. Paragraph 1 shall not apply to the applications listed in Annex III and IV.

**Article 5**  
**Adaptation of the Annexes to scientific and technical progress**

1. For the purposes of adapting Annexes III and IV to scientific and technical progress, and in order to achieve the objectives set out in Article 1, the Commission shall adopt by means of individual delegated acts in accordance with Article 20 and subject to the conditions laid down in Articles 21 and 22, the following measures:

(a) inclusion of materials and components of EEE for specific applications in the lists in Annexes III and IV, provided that such inclusion does not weaken the environmental and health protection afforded by Regulation (EC) No 1907/2006 and where any of the following conditions is fulfilled:

- their elimination or substitution via design changes or materials and components which do not require any of the materials or substances listed in Annex II is scientifically or technically impracticable;
- the reliability of substances is not ensured;
- the total negative environmental, health and consumer safety impacts caused by substitution are likely to outweigh the total environmental, health and consumer safety benefits thereof.

Decisions on the inclusion of materials and components of EEE in the lists in Annexes III and IV and on the duration of any exemptions shall take into account the availability of substitutes and the socioeconomic impact of substitution. Decisions on the duration of any exemptions shall take into account any potential adverse impacts on innovation. Lifecycle thinking on the overall impacts of the exemption shall apply, where relevant.

(b) deletion of materials and components of EEE from the lists in Annexes III and IV where the conditions set out in paragraph 6 are no longer fulfilled.

2. Measures adopted in accordance with point (a) of paragraph 1 shall, for categories 1 to 7, 10 and 11 of Annex I, have a validity period of up to 5 years and, for categories 8 and 9 of Annex I, a validity period of up to 7 years. The validity periods are to be decided on a case-by-case basis and may be renewed.

For the exemptions listed in Annex III as at 21 July 2011, the maximum validity period, which may be renewed, shall, for categories 1 to 7 and 10 of Annex I, be 5 years from 21 July 2011 and for categories 8 and 9 of Annex I, 7 years from the relevant date laid down in Article 4(3), unless a shorter period is specified.

For the exemptions listed in Annex IV as at 21 July 2011, the maximum validity period, which may be renewed, shall be 7 years from the relevant date laid down in Article 4(3), unless a shorter period is specified.

3. An application for granting, renewing or revoking an exemption shall be made to the Commission in accordance with Annex V.

4. The Commission shall:

(a) acknowledge receipt of an application in writing within 15 days of its receipt. The acknowledgement shall state the date of receipt of the application;

(b) inform the Member States of the application without delay and make the application and any supplementary information supplied by the applicant available to them;

(c) make a summary of the application available to the public;

(d) evaluate the application and its justification;

5. An application for renewal of an exemption shall be made no later than 18 months before the exemption expires.

The Commission shall decide on an application for renewal of an exemption no later than 6 months before the expiry date of the existing exemption, unless specific circumstances justify other deadlines. The existing exemption shall remain valid until a decision on the renewal application is taken by the Commission.

L 174100 EN Official Journal of the European Union 1.7.2011

**ANNEX II**

**Restricted substances referred to in Article 4(1) and maximum concentration values indicated by weight in homogeneous materials**

Lead (0.1 %)

Mercury (0.1 %)

Cadmium (0.01 %)

Hexavalent chromium (0.1 %)

Polybrominated biphenyls (PBB) (0.1 %)

Polybrominated diphenyl ethers (PBDE) (0.1 %)

1.7.2011 EN Official Journal of the European Union L 174103

Exemption	Scope and date of applicability
4(6)	Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35 % lead by weight
4(6)	Lead as an alloying element in aluminium containing up to 0.4 % lead by weight
6(1)	Copper alloy containing up to 4 % lead by weight
7(a)	Lead in high melting temperature type solders (i.e. lead based alloy containing 85 % by weight or more lead)
7(b)	Lead in solders for servers, storage and storage area systems, network infrastructure equipment for switching, signalling, transmission, and network management for tele-communications
7(c)	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound
7(c)(i)	Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher
7(c)(ii)	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC
8(a)	Cadmium and its compounds in one shot pellet type thermal contacts
8(b)	Cadmium and its compounds in electrical contacts
9	Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0.75 % by weight in the cooling solution
9(b)	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications
11(a)	Lead used in C-prest compliant pin connector systems
11(b)	Lead used in other than C-prest compliant pin connector systems
12	Lead as a coating material for the thermal conduction module Ciring
13(a)	Lead in white glasses used for optical applications
13(b)	Cadmium and lead in filter glasses and glasses used for reflection standards
14	Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 85 % and less than 85 % by weight