

## Certificate of non-use of The Controlled Substances

Company name            Littelfuse, Inc.

Product Covered        Thyristor, TO-92 Package  
                              SIDAC, TO-92 Package  
                              SIDACtor<sup>®</sup> TO-92 Package

Issue Date                August 11, 2011

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 TO-92 RoHS-Compliant products series supplied by Littelfuse, Inc.  
Please see page 2-4 for the complete list of part number covered by this report.

< Homogeneous Materials used >

Please see figure and table 1 on page 5 and table 2 on page 6 of this document.

(2) The analytical data on all measurable substances

Please see annex 1 through 6, attached to this document

Remarks :

**1. Pb (lead) contained in die bonding solder (item 7 on page 5) and passivation glass (item 6) 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 Number covered by this report

TO-92 products manufactured by Littelfuse are categorized into four groups by Pb (lead) contents due to their design.

All products use the same raw materials and all products listed in this report meet RoHS requirement by using lead (Pb) exemptions, as well as Halogen-free requirement,.

Please follow table below to locate specific part number.

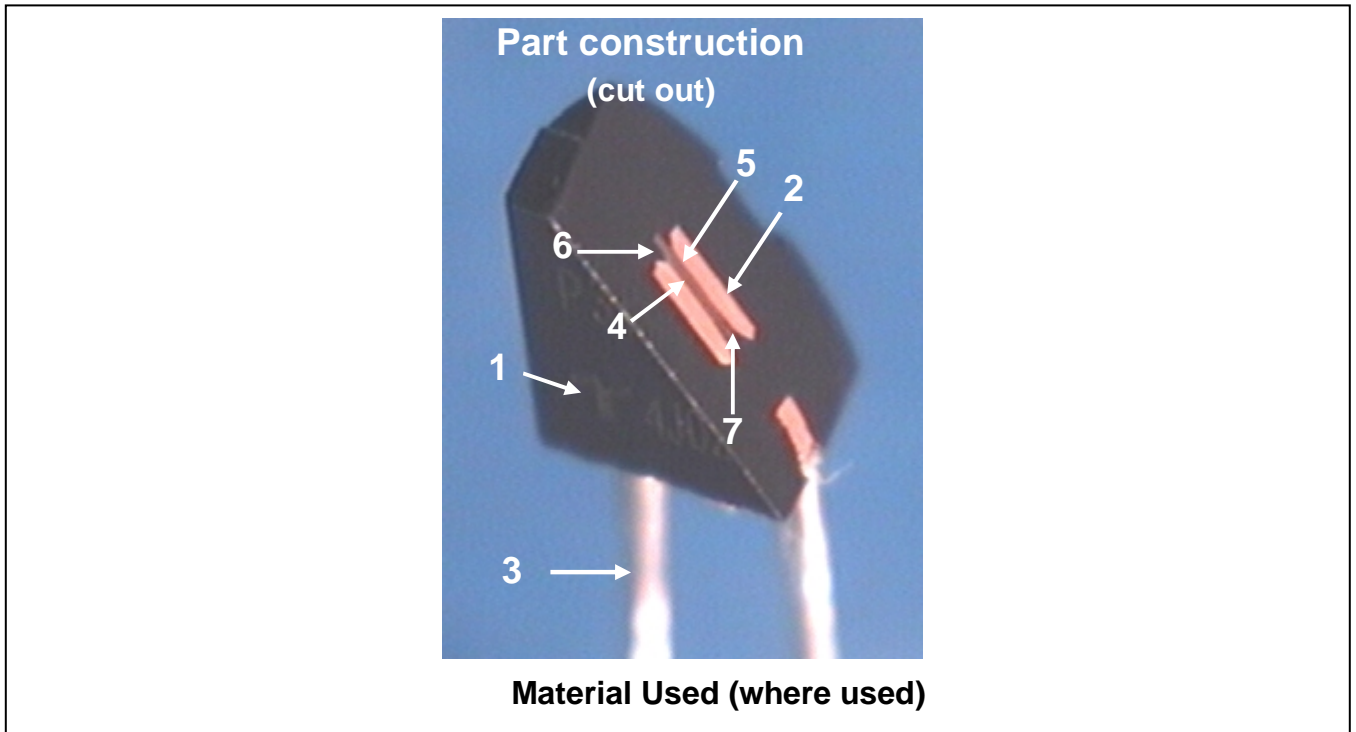
Group #	Package	Generic Description	P/N table
1	TO-92 (3-leaded)	Thyristor 2Nxxxx EC103xx LxxxEx QxxxEx SxxxEx TCR22-xx	See page 3
2	TO-92 (2-leaded)	SIDAC KxxxE70 SIDACtor PxxxxEAL PxxxxEBL PxxxxECL	See page 4

## GROUP 1: TO-92 Three-leaded

Standard (Catalog) Part Number				SPECIAL DEVICE P/N
2N5060	EC103D	L401E3	Q4X8E3	Any Special P/N that has base standard P/N listed in this table
2N5061	EC103D1	L401E5	Q4X8E4	
2N5062	EC103D2	L401E6	Q501E3	
2N5063	EC103D3	L401E8	Q501E4	
2N5064	EC103E	L4X8E3	Q601E3	
2N6504	EC103E1	L4X8E5	Q601E4	
2N6505	EC103E2	L4X8E6	Q6X8E3	
2N6506	EC103E3	L4X8E8	Q6X8E4	
2N6507	EC103M	L501E3		
2N6508	EC103M1	L501E5	S031E	
2N6564	EC103M2	L601E3	S051E	<b>OPTIONAL SUFFIX</b>
2N6565	EC103M3	L601E5	S101E	
	EC103Y	L601E6	S201E	Any Part Number listed here may be followed by suffix for packing options, such as "RP" or "AP", or lead form options such as "73", "75", etc.
EC103A	EC103Y1	L601E8	S401E	
EC103A1	EC103Y2	L6X8E3	S601E	
EC103A2	EC103Y3	L6X8E5		
EC103A3		L6X8E6	TCR22-2	
EC103B	L201E3	L6X8E8	TCR22-3	
EC103B1	L201E5		TCR22-4	
EC103B2	L201E6	Q201E3	TCR22-6	
EC103B3	L201E8	Q201E4	TCR22-8	
EC103C	L2X8E3	Q2X8E3		
EC103C1	L2X8E5	Q2X8E4		
EC103C2	L2X8E6	Q401E3		
EC103C3	L2X8E8	Q401E4		

## GROUP 2: TO-92 Two-leaded

Standard (Catalog) Part Number		SPECIAL DEVICE P/N
K0900E70	P0900ECL	Any Special P/N which has base standard P/N listed in this table.
K1050E70	P0900ECMCL	
K1100E70	P1100EAL	
K1200E70	P1100EBL	P637P2600EB
K1300E70	P1100ECL	P693P3100EC
K1400E70	P1100ECMCL	P694P3100EC
K1500E70	P1300EAL	
K2000E70	P1300EBL	
K2000EH70	P1300ECL	
K2200E70	P1300ECMCL	
K2200EH70	P1500EAL	
K2400E70	P1500EBL	
K2400EH70	P1500ECL	
K2500E70	P1500ECMCL	
K2500EH70	P1800EAL	
	P1800EBL	
P0080EAL	P1800ECL	
P0080EAMCL	P1800ECMCL	
P0080EBL	P2300EAL	
P0080EBMCL	P2300EBL	
P0080ECL	P2300ECL	
P0080ECMCL	P2300ECMCL	
P0300EAL	P2600EAL	
P0300EAMCL	P2600EBL	
P0300EBL	P2600ECL	
P0300EBMCL	P2600ECMCL	
P0300ECL	P3100EAL	
P0300ECMCL	P3100EBL	
P0640EAL	P3100ECL	
P0640EBL	P3100ECMCL	
P0640ECL	P3500EAL	
P0640ECMCL	P3500EBL	
P0720EAL	P3500ECL	
P0720EBL	P3500ECMCL	
P0720ECMCL		
P0720EC		Any Standard Part Number listed here may be followed by suffix for packing options, such as RP, RP1, RP2, RP3 or AP.
P0900EAL		
P0900EBL		



**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
3	Lead finish	tin alloy	metal	annex 3
4	Silicon die	silicon	metal	annex 4, tested as Nickel-plated wafer.
5	Nickel electrode	nickel	metal	
6	Passivation glass	glass	glass	annex 5. Pb in this glass is exempted by RoHS Annex III 7(c)-I.
7	Die bonding solder	solder	metal	annex 6. Pb in this solder is exempted by RoHS Annex III 7(a).

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

Components	Analysis Result						
	Cd Cadmium	Cr Chromium	Hg Mercury	Pb Lead	PBB	PBDE	TOTAL HALOGEN
<b>As Component Total</b> (Typical Value)	< 2ppm	< 2ppm	< 2ppm	<10 ppm <sup>*1</sup> (1.9% <sup>*2</sup> )	< 5 ppm	< 5 ppm	< 100ppm
<b>Epoxy Resin compound</b> (mixture of phenolix resin, epoxy resin, filler and non-brominated fire retardant) See Annex 1 for the detail..	< 2ppm	< 2ppm	< 2ppm	< 2ppm	< 5ppm	<5 ppm	88ppm
<b>Lead frame</b> (Copper Alloy KFC)  See Annex 2 for the detail.	< 2ppm	< 2ppm	< 2ppm	11 ppm <sup>*3</sup>	< 5ppm	<5 ppm	---
<b>Outside lead finish</b> (Matte-Tin plating)  See Annex 3 for the detail.	< 2ppm	< 2ppm	< 2ppm	22 ppm <sup>*3</sup>	< 5ppm	<5 ppm	
<b>Silicon Die</b> (Silicon + Ni electrode)  See Annex 4 for the detail	< 2ppm	< 2ppm	< 2ppm	58 ppm <sup>*3</sup>	< 5ppm	<5 ppm	---
<b>Passivation Glass</b>  See Annex 5 for the detail.	< 2ppm	< 2ppm	< 2ppm	41% <sup>*4</sup>	< 5ppm	<5 ppm	< 50ppm
<b>Die Bonding Solder</b> (Pb/Sn/Ag=88/10/2)  See Annex 6 for the detail	< 2ppm	< 2ppm	< 2ppm	88 wt% <sup>*5</sup>	< 5ppm	<5 ppm	84ppm

- \*1 Less than 10ppm Pb content overall, excluding Pb from the die bonding solder and the passivation glass on the silicon die.**
- \*2 Maximum 1.9wt% or 3.2mg of Pb (lead) content overall, including the RoHS-exempted use of Pb**
- \*3 Pb (lead) contained in lead frame, outside finish and silicon wafer is not exempted from restriction by RoHS, but considered as process contamination. Littelfuse does not add Pb (lead) intentionally.**
- \*4 Pb (lead) contained in passivation glass is exempted from restriction by RoHS Annex III 7(c)-I.**
- \*5 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 of 7)



TEST REPORT

Number : WUXH00005739

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 XIAOPENG

Date : Aug 05, 2011

Sample Description As Declared:

One (1) Piece Of Submitted Sample Said To Be : **Brown Epoxy Molding Compound.**

Item Name : Epoxy Molding Compound.  
Vendor : Cookson Electronics Semiconductor Products.  
Component Or Part No. : CK-2000A/CK-2000C.  
Test Item : Cd,Pb,Hg,CrVI,PBBs,PBDEs,F,Cl,Br,I.

Tests Conducted:

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

Summary:

<b>Tested Sample</b>	<b>Standard</b>	<b>Result</b>
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

Page 1 Of 7

**Intertek Testing Services Wuxi Ltd.**

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## Annex 1: Analysis Result of Molding Compound (Page 2 of 7)



TEST REPORT

Number : WUXH00005739

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>2+</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	
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)	
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 Testing Services Wuxi Ltd.**  
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 Wuxi 214101, Jiangsu, China  
 Tel: +86 510 8821 4567 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com



## Annex 1: Analysis Result of Molding Compound (Page 3 of 7)

**Intertek**

TEST REPORT

Number : WUXH00005739

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>6+</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 Acid Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>6+</sup> ) Content (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: Aug 01, 2011

Testing Period: Aug 01, 2011 To Aug 05, 2011

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## Annex 1: Analysis Result of Molding Compound (Page 4 of 7)

**Intertek**

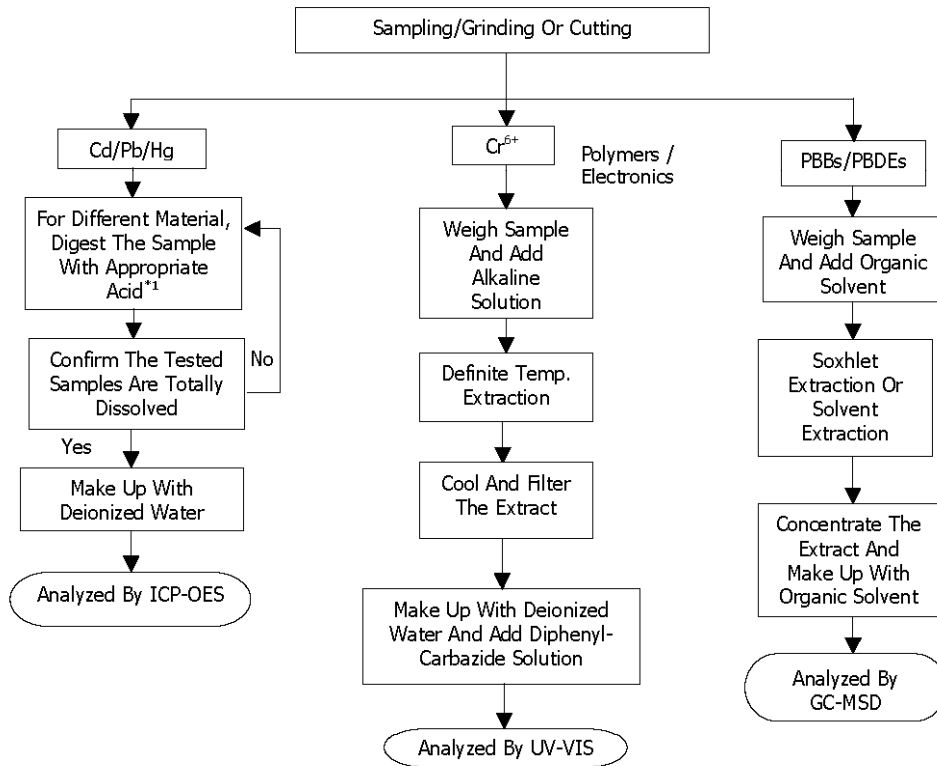
TEST REPORT

Number : WUXH00005739

Tests Conducted (As Requested By The Applicant)

(D) Measurement Flowchart:

Reference Standard: IEC 62321 Edition 1.0: 2008



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>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCL, HF
Electronics	HNO <sub>3</sub> , HCL, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

## Annex 1: Analysis Result of Molding Compound (Page 5 of 7)

**Intertek**

TEST REPORT

Number : WUXH00005739

Tests Conducted (As Requested By The Applicant)

2 Halogen Test

(I) Test Result Summary :

Halogen Content:

Testing Item	Result (ppm)
Fluorine (F) Content	ND
Chlorine (Cl)Content	88
Bromine (Br) Content	ND
Iodine (I) Content	ND

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

Date Sample Received: Aug 01, 2011

Testing Period: Aug 01, 2011 To Aug 05, 2011

(II) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F,Cl, Br,I) Content	With Reference EN 14582:2007 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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## Annex 1: Analysis Result of Molding Compound (Page 6 of 7)

**Intertek**

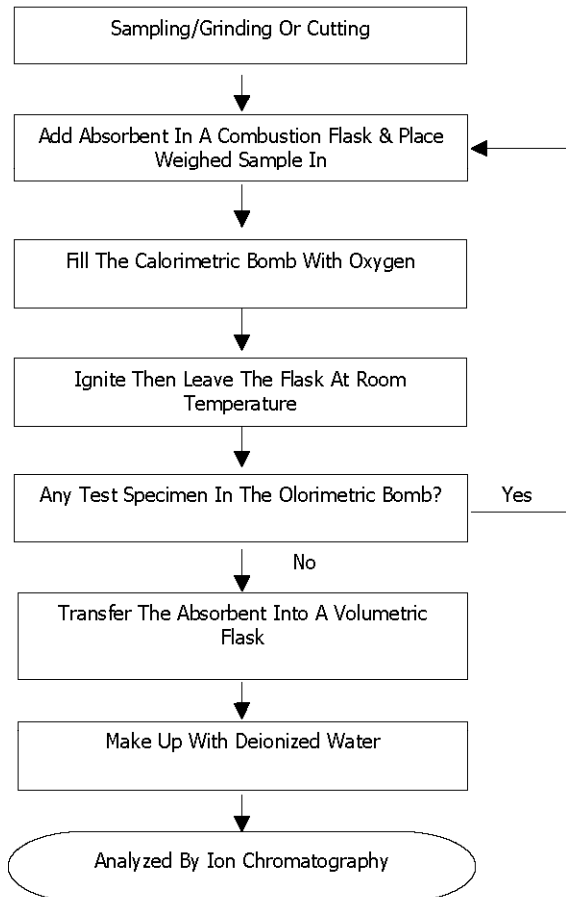
TEST REPORT

Number : WUXH00005739

Tests Conducted (As Requested By The Applicant)

(III) Measurement Flowchart:

Test For Halogen Content Reference Method: EN 14582:2007



Chemist: Fred Wang/ Ally Wan Ally Wan

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**Intertek Testing Services Wuxi Ltd.**

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## Annex 1: Analysis Result of Molding Compound (Page 7 of 7)

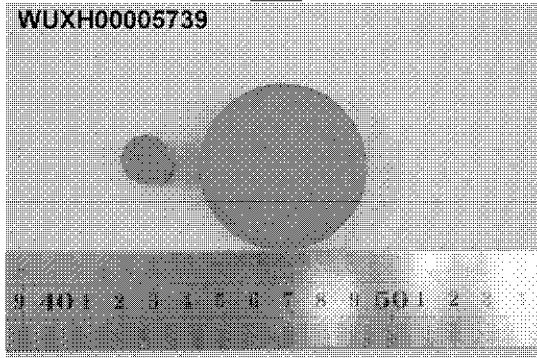
**Intertek**

TEST REPORT

Number : WUXH00005739

Tests Conducted (As Requested By The Applicant)

Photo



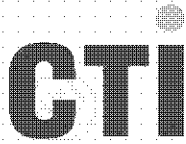
Page 7 Of 7

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



# Test Report

Report No. RLSZD000935670003

Page 1 of 4

Applicant NINGBO ESC PHOTOELECTRON CO.,LTD

Address ECONOMIC & TECHNICAL DEVELOPMENT ZONE,NO.88 YICHENG RD,XIAOGANG NINGBO,CHINA

**Report on the submitted sample(s) said to be**

Sample Name LEAD FRAME  
 Sample Description Cupreous/Silver color metal  
 Part No. TO LEAD FRAME CU SERIES  
 Material KFC  
 Sample Received Date Jun. 11, 2011  
 Testing Period Jun. 11, 2011 to Jun. 13, 2011

**Test Requested**

- As specified by client, to determine the Lead(Pb), Cadmium(Cd), Mercury(Hg), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs) content in the submitted sample.
- As specified by client, to identify if there is the Hexavalent Chromium in the submitted sample.

**Test Method**

Test Item(s)	Test Method	Measured Equipment(s)	MDL
Lead(Pb)	IEC 62321:2008 Ed.1 Sec.9	ICP-OES	2 mg/kg
Cadmium(Cd)	IEC 62321:2008 Ed.1 Sec.9	ICP-OES	2 mg/kg
Mercury(Hg)	IEC 62321:2008 Ed.1 Sec.7	ICP-OES	2 mg/kg
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex B	UV-Vis	/
Polybrominated Biphenyls(PBBs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5 mg/kg
Polybrominated Diphenyl Ethers(PBDEs)	IEC 62321:2008 Ed.1 Annex A	GC-MS	5 mg/kg

**Test Result(s)** Please refer to the following page(s).

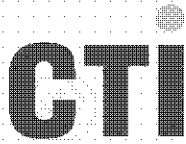
Tested by   
 Approved by   
 Technical Manager

Inspected by Vargas  
 Date Jun. 13, 2011

No. 15504265



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



# Test Report

Report No. RLSZD000935670003

Page 2 of 4

**Test Result(s)**

Tested Item(s)	Content
Lead(Pb)	N.D.
Cadmium (Cd)	N.D.
Mercury(Hg)	N.D.

Tested Item(s)	Conclusion
Hexavalent Chromium(Cr(VI))	Negative

Tested Item(s)	Content
<b>Polybrominated Biphenyls(PBBs)</b>	
Monobromobiphenyl	N.D.
Dibromobiphenyl	N.D.
Tribromobiphenyl	N.D.
Tetrabromobiphenyl	N.D.
Pentabromobiphenyl	N.D.
Hexabromobiphenyl	N.D.
Heptabromobiphenyl	N.D.
Octabromobiphenyl	N.D.
Nonabromobiphenyl	N.D.
Decabromobiphenyl	N.D.

Tested Item(s)	Content
<b>Polybrominated Diphenyl Ethers(PBDEs)</b>	
Monobromodiphenyl ether	N.D.
Dibromodiphenyl ether	N.D.
Tribromodiphenyl ether	N.D.
Tetrabromodiphenyl ether	N.D.
Pentabromodiphenyl ether	N.D.
Hexabromodiphenyl ether	N.D.
Heptabromodiphenyl ether	N.D.
Octabromodiphenyl ether	N.D.
Nonabromodiphenyl ether	N.D.
Decabromodiphenyl ether	N.D.

**Note:** The sample had been dissolved totally tested for Lead, Cadmium, Mercury.  
 -MDL = Method Detection Limit  
 -N.D. = Not Detected (<MDL )  
 -mg/kg = ppm = parts per million  
 -Negative = Absence of Cr(VI) , the detected Cr(VI) concentration in the boiling water extraction solution is less than 0.02 mg/kg with 50cm<sup>2</sup> sample surface area used.



## Annex 2: Analysis Result of Lead frame (Page 3 of 4)

# CTI

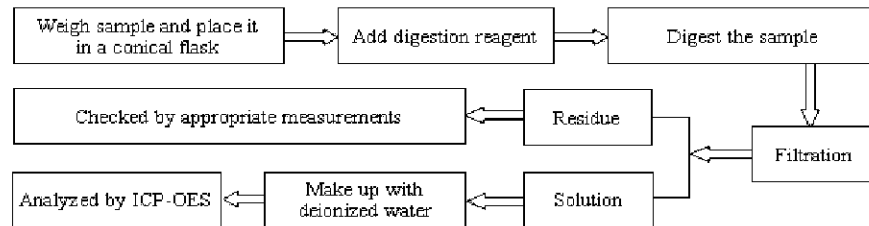
## Test Report

Report No. RLSZD000935670003

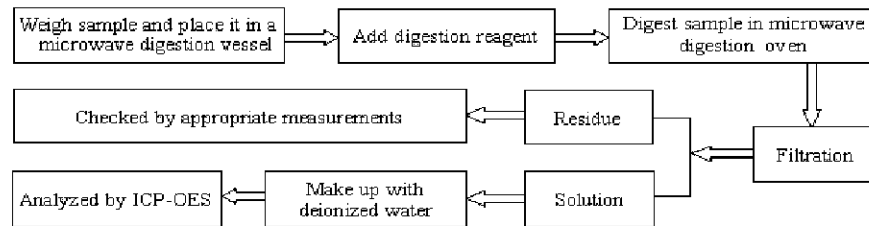
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### Test Process

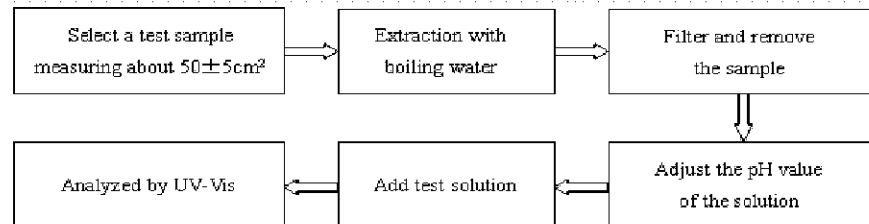
#### 1. Lead(Pb), Cadmium(Cd)



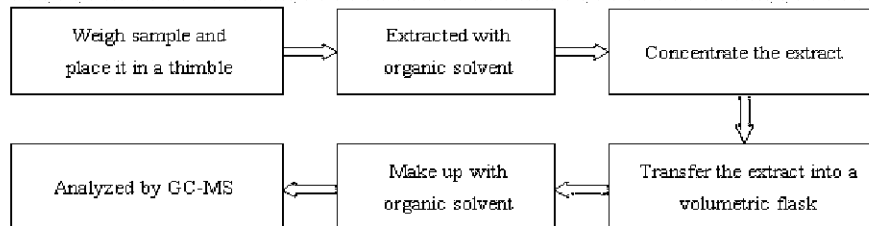
#### 2. Mercury(Hg)



#### 3. Hexavalent Chromium(Cr(VI))



#### 4. Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs)





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

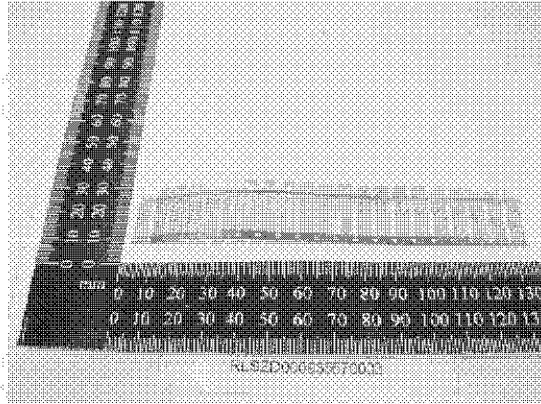
**CTI**

### Test Report

Report No. RLSZD000935670003

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Photo(s) of the sample(s)



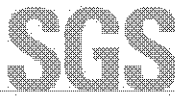
\*\*\* End of report \*\*\*

This report is considered invalidated without the Special Seal for Inspection of the CTI. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of CTI, this test report shall not be copied except in full and published as advertisement.

Building C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen



### Annex 3: Analysis Result of Lead finish (page 1 of 5)



**Test Report**

No. CANEC1005451006

Date: 04 Jan 2011

Page 1 of 5

GAOXIN STANNUM INDUSTRY (HUIZHOU) CO.,LTD.  
 XIANAN INDUSTRIAL CENTRE,YUANZHOU TOWN,BOLUO COUNTY,HUIZHOU CITY  
 516123, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as :  
 Solder Ball 99.9%

- SGS Job No. : 12868209 - SZ
- SGS Internal Reference No. : 15.5
- Date of Sample Received : 29 Dec 2010
- Testing Period : 29 Dec 2010 - 04 Jan 2011
- 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).
- Conclusion : Based on the performed tests on submitted sample(s), the results **comply with** the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of  
 SGS-CSTC Ltd.



Alpher Qiu  
 Approved Signatory

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## Annex 3: Analysis Result of Lead finish (page 2 of 5)



### Test Report

No. CANEC1005451006

Date: 04 Jan 2011

Page 2 of 5

#### Test Results:

ID for specimen 1 : CAN10-054510.002  
 Description for specimen 1 : Silvery metal ball

#### RoHS Directive 2002/95/EC

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium (Cd)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	100
Lead (Pb)	mg/kg	IEC 62321:2008, ICP-OES	22	2	1000
Mercury (Hg)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	1000
Hexavalent Chromium (CrVI) by boiling water extraction	-	IEC 62321:2008, UV-Vis	Negative	◇	#
Sum of PBBs	mg/kg	-	N.D.	-	1000
Monobromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Sum of PBDEs	mg/kg	-	N.D.	-	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	

#### Note:

1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit
4. ◇ = Spot-Test:

Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;

(The tested sample should be further verified by boiling-water-extraction method if the spot test result is negative or cannot be confirmed.)

#### Boiling-water-extraction:

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## Annex 3: Analysis Result of Lead finish (page 4 of 5)



### Test Report

No. CANEC1005451006

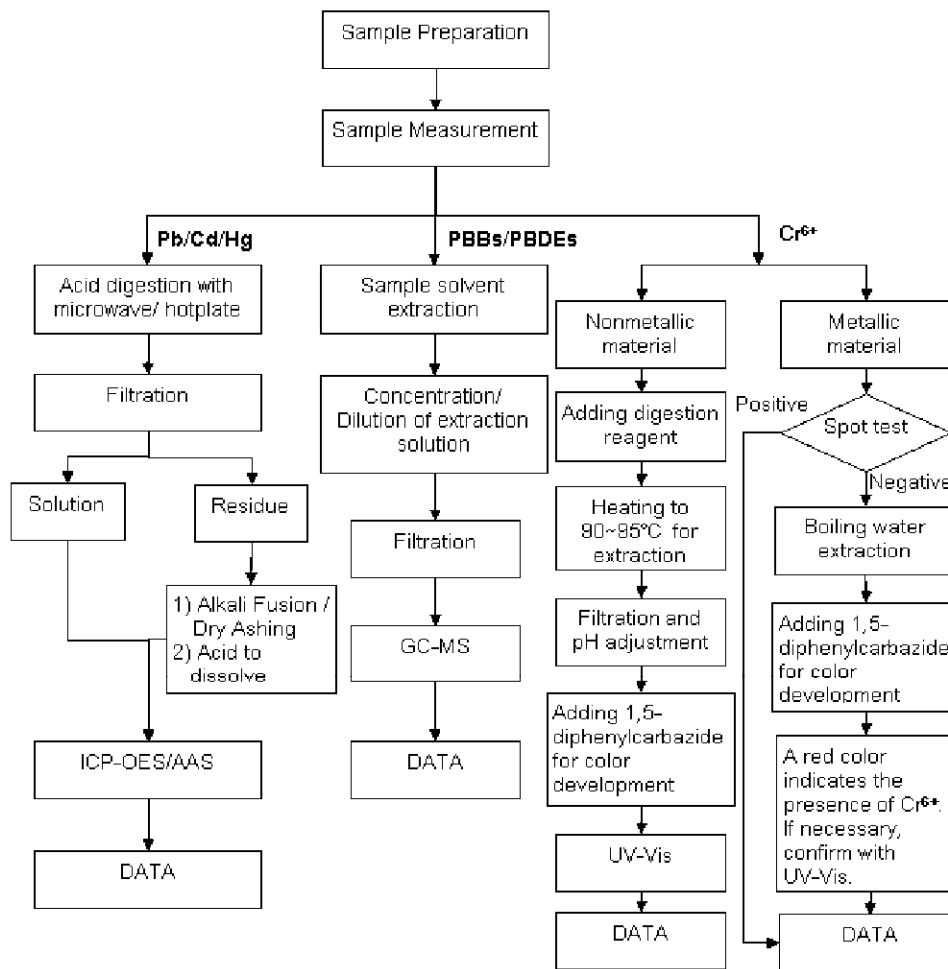
Date: 04 Jan 2011

Page 4 of 5

### ATTACHMENTS

#### RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bella Wang / Cutey Yu / Ross Zhan
- 2) Name of the person in charge of testing: Adams Yu / Ryan Yang
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr6+ and PBBs/PBDEs test method excluded).



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### Annex 3: Analysis Result of Lead finish (page 5 of 5)



**Test Report**

No. CANEC1005451006

Date: 04 Jan 2011

Page 5 of 5

Sample photo:



SGS authenticate the photo on original report only

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

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

TEST REPORT

Number : WUXH00005703

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 XIAOPENG

Date : Aug 04, 2011

## Sample Description As Declared:

One (1) Piece Of Submitted Sample Said To Be : **Silvery Grey Metal.**

Item Name : Silicon Wafer With Nickel Plating.

Vendor : Concord.

Component Or Part No. : Silicon + Nickel.

Test Item : Cd,Pb,Hg,CrVI,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.



Jessica Lu  
General Manager

Page 1 Of 5

**Intertek Testing Services Wuxi Ltd.**No.8 Fubei Road, Xishan Economic Development Zone,  
Wuxi 214101, Jiangsu, China

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## Annex 4: Analysis Result of Ni-plated Wafer (Page 2 of 5)

**Intertek**

TEST REPORT

Number : WUXH00005703

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)	48
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	
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)	
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



## Annex 4: Analysis Result of Ni-plated Wafer (Page 3 of 5)



TEST REPORT

Number : WUXH00005703

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>6+</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 Acid Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>6+</sup> ) Content (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 IEC 62321 Edition 1.0: 2008, By Solvent Extraction And Determined By GC/MS And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Aug 01, 2011

Testing Period: Aug 01, 2011 To Aug 04, 2011

Page 3 Of 5

**Intertek Testing Services Wuxi Ltd.**

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Tel: +86 510 8821 4567 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

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

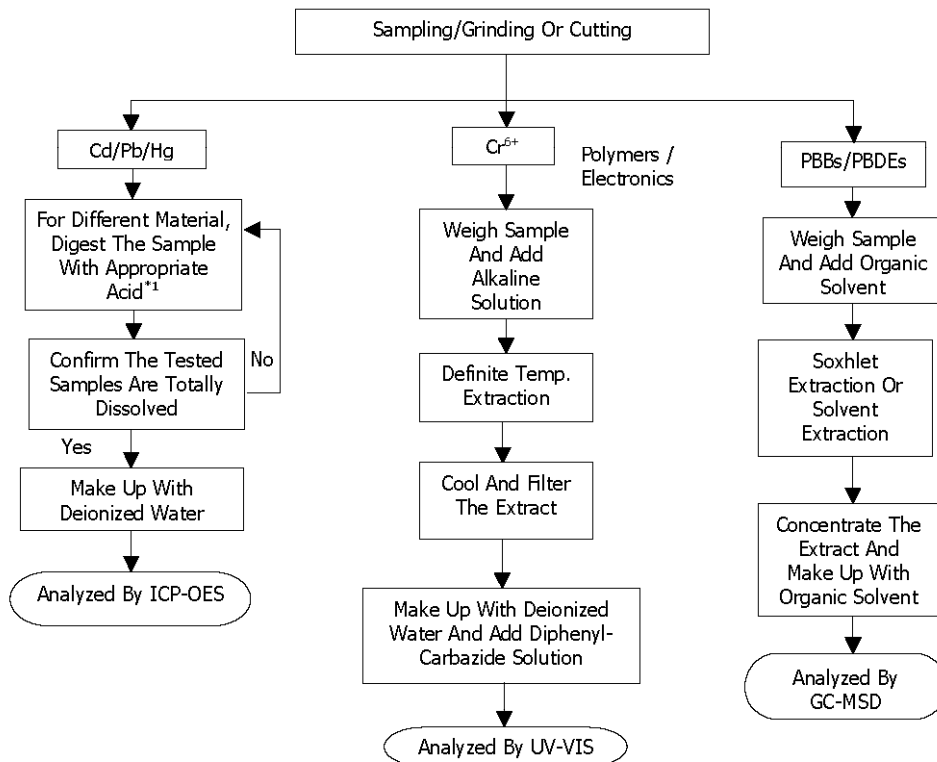
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TEST REPORT

Number : WUXH00005703

Tests Conducted (As Requested By The Applicant)

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



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>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCL, HF
Electronics	HNO <sub>3</sub> , HCL, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

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

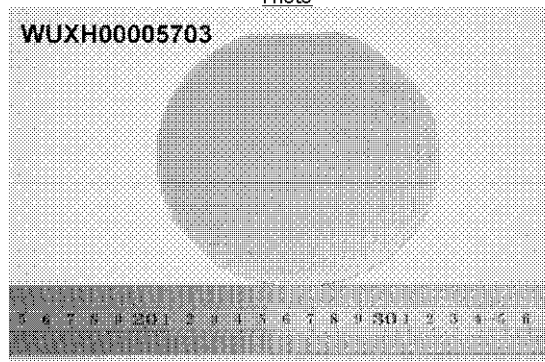
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TEST REPORT

Number : WUXH00005703

Tests Conducted (As Requested By The Applicant)

Photo



Page 5 Of 5

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**Annex 5: Analysis Result of Passivation Glass (Page 1 of 7)****Intertek**

TEST REPORT

Number : WUXH00005704

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 XIAOPENG

Date : Aug 05, 2011

## Sample Description As Declared:

One (1) Piece Of Submitted Sample Said To Be : **White Power.**

Item Name : Wafer Passivation.  
Vendor : Propriety.  
Component Or Part No. : Propriety.  
Test Item : Cd, Pb, Hg, CrVI, 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

**Intertek Testing Services Wuxi Ltd.**No.8 Fubei Road, Xishan Economic Development Zone,  
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## Annex 5: Analysis Result of Passivation Glass (Page 2 of 7)

**Intertek**

TEST REPORT

Number : WUXH00005704

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)	185100
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr <sup>VI</sup> ) Content (mg/kg)(For Non-Metal)	ND
Polybrominated Biphenyls (PBBs)(mg/kg)	
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)	
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  
 # = The Result Is For Reference Only.

Page 2 Of 7

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## Annex 5: Analysis Result of Passivation Glass (Page 3 of 7)

**Intertek**

TEST REPORT

Number : WUXH00005704

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>6+</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 Acid Digestion And Determined By ICP-OES	2 mg/kg
Lead (Pb)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Mercury (Hg)Content	With Reference To IEC 62321 Edition 1.0: 2008, By Acid Digestion And Determined By ICP-OES	2 mg/kg
Chromium (VI) (Cr <sup>6+</sup> ) Content (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 IEC 62321 Edition 1.0: 2008, By Solvent Extraction And Determined By GC/MS And Further HPLC Confirmation When Necessary.	5 mg/kg

Date Sample Received: Aug 01, 2011

Testing Period: Aug 01, 2011 To Aug 04, 2011

Page 3 Of 7

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

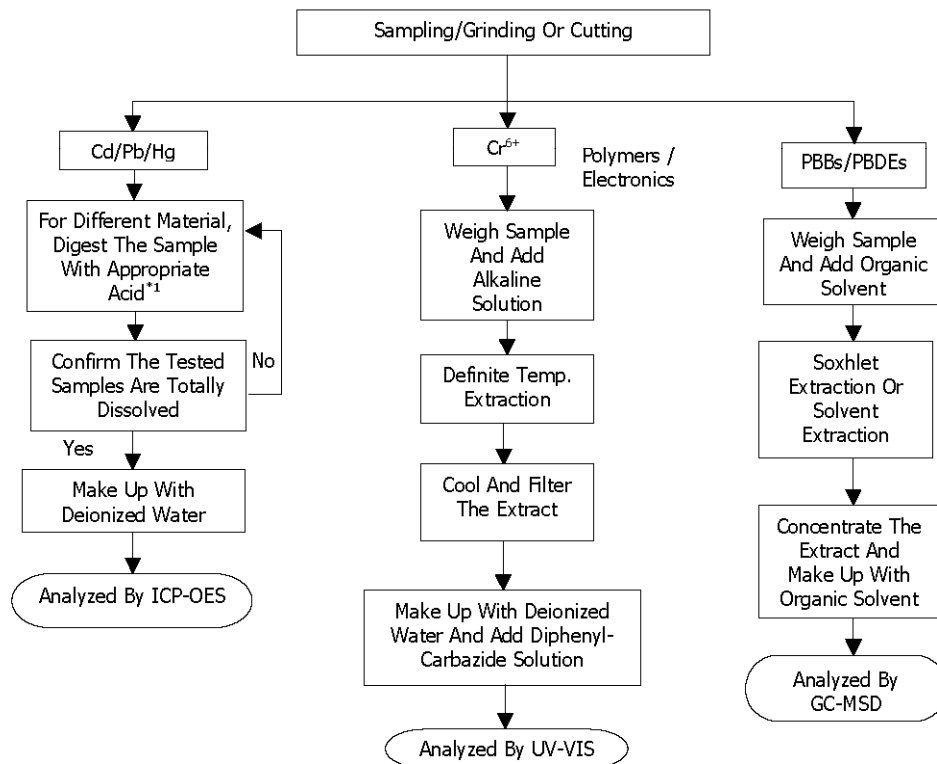
**Intertek**

TEST REPORT

Number : WUXH00005704

Tests Conducted (As Requested By The Applicant)

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



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>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCL, HF
Electronics	HNO <sub>3</sub> , HCL, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

2 Halogen Test  
(I) Test Result Summary :

Page 4 Of 7

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**Annex 5: Analysis Result of Passivation Glass (Page 5 of 7)****Intertek**

TEST REPORT

Number : WUXH00005704

## Tests Conducted (As Requested By The Applicant)

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 = mg/kg  
ND = Not DetectedDate Sample Received: Aug 01, 2011  
Testing Period: Aug 01, 2011 To Aug 05, 2011

## (II) Test Method :

Testing Item	Testing Method	Reporting Limit
Halogen (F, Cl, Br, I) Content	With Reference To EN 14582:2007 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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## Annex 5: Analysis Result of Passivation Glass (Page 6 of 7)

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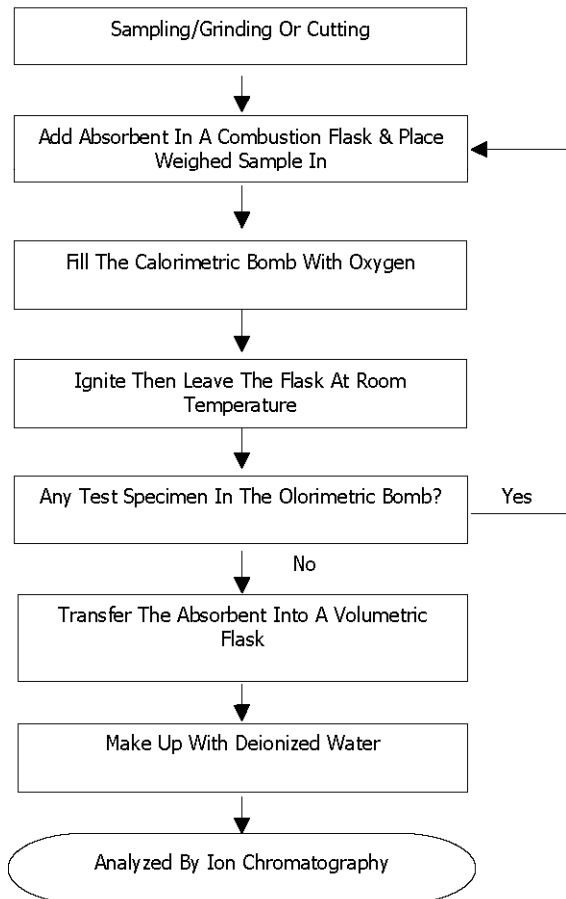
TEST REPORT

Number : WUXH00005704

Tests Conducted (As Requested By The Applicant)

(III) Measurement Flowchart:

Test For Halogen Content Reference Method: EN 14582:2007



Chemist: Fred Wang/ Ally Wan Ally Wan

Page 6 Of 7

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

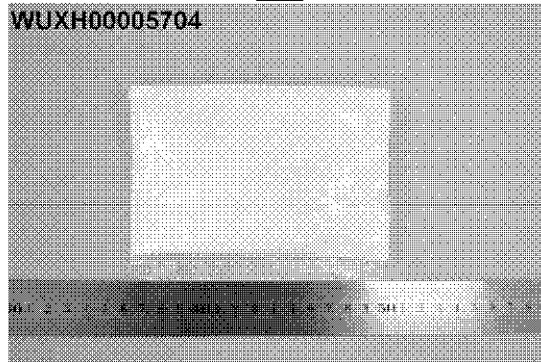
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TEST REPORT

Number : WUXH00005704

Tests Conducted (As Requested By The Applicant)

Photo



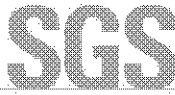
Page 7 Of 7

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



### Test Report

No. SHAEC1107551802

Date: 31 May 2011

Page 1 of 4

SHENZHEN EARLYSUN TECHNOLOGY CO.,LTD

6F,BUILDING OF BAODAZHOU,INTERCHANGE OF LONGZHU AVENUE AND LONGZHU  
3ROAD,TAOYUAN STREET,NANSHAN,SHENZHEN,CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : High-temperature Solder Paste

SGS Job No. : SZ13136369 - SZ  
Model No. : (ES-660,ES-500,ES-610,ES-620,ES-510,ES-520(Sn5Pb92.5Ag2.5,Sn5Pb95,Sn5Pb93.5Ag1.5,Sn10Pb90,Sn10Pb88Ag2,Sn20Pb78Ag2,Sn3Pb97,Sn5Pb93Ag2) mixture)  
Date of Sample Received : 23 May 2011  
Testing Period : 23 May 2011 - 31 May 2011  
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).  
Conclusion : Based on the performed tests on submitted samples, the results comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of  
SGS-CSTC Ltd.



Fan Jingjie, JJ  
Approved Signatory

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## Annex 6: Analysis Result of Die Bonding Solder (Page 2 of 4)



### Test Report

No. SHAEC1107551802

Date: 31 May 2011

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Test Results :

#### Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA11-075518.001	Grey solid

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected ( < MDL )
- (4) "-" = Not Regulated

#### RoHS Directive 2002/95/EC

- Test Method :
- (1) With reference to IEC 62321:2008 for Cadmium content. Analysis was performed by ICP-OES.
  - (2) With reference to IEC 62321:2008 for Mercury content. Analysis was performed by ICP-OES.
  - (3) Titration method
  - (4) With reference to IEC 62321:2008 for Hexavalent Chromium by Colorimetric Method. Analysis was performed by UV/Vis Spectrophotometer.
  - (5) With reference to IEC 62321:2008 for PBBs / PBDEs content. Analysis was performed by GC/MS.

Test Item(s)	Limit	Unit	MDL	001
Cadmium (Cd)	100	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Lead (Pb)	-	%	-	90.82▲
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND

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## Annex 6: Analysis Result of Die Bonding Solder (Page 3 of 4)



### Test Report

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Test Item(s)	Limit	Unit	MDL	001
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

#### Notes :

- (1) The maximum permissible limit is quoted from the document 2005/618/EC amending RoHS directive 2002/95/EC
- (2) \*As declared by the applicant, the materials fall into exemption items according to EU directive 2002/95/EC (RoHS), and its subsequent amendments.

#### Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	001
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	84
Iodine (I)	mg/kg	50	ND

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**Annex 6: Analysis Result of Die Bonding Solder (Page 4 of 4)**



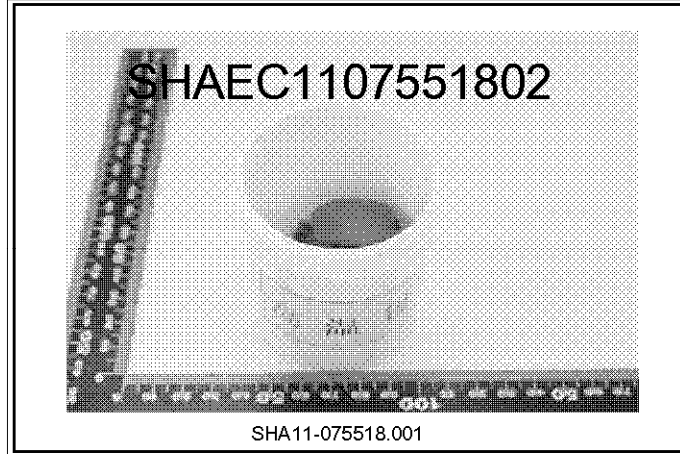
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Sample photo:



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

1.7.2011

EN

Official Journal of the European Union

L 174/103

Exemption		Scope and dates of applicability
6(a)	Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0,35 % lead by weight	
6(b)	Lead as an alloying element in aluminium containing up to 0,4 % lead by weight	
6(c)	Copper alloy containing up to 4 % lead by weight	
7(a)	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)	
7(b)	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications	
7(c)-I	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)-II	Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher	
7(c)-III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013
8(a)	Cadmium and its compounds in one shot pellet type thermal cut-offs	Expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012
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-press compliant pin connector systems	May be used in spare parts for EEE placed on the market before 24 September 2010
11(b)	Lead used in other than C-press compliant pin connector systems	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013
12	Lead as a coating material for the thermal conduction module C-ring	May be used in spare parts for EEE placed on the market before 24 September 2010
13(a)	Lead in white glasses used for optical applications	
13(b)	Cadmium and lead in filter glasses and glasses used for reflectance 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 80 % and less than 85 % by weight	Expired on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011