Littelfuse
Expertise Applied | Answers Delivered

Certificate of non-use of The Controlled Substances

Company name Littelfuse, Inc.

Product Covered Thyristor, TO-92 Package
SIDAC, TO-92 Package
SIDACtor® TO-92 Package

Issue Date August 8, 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 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)

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Littelfuse Part Number covered by this report

TO-92 products supplied by Littelfuse are categorized into two groups, 3-leaded TO-92 and 2-leaded TO-92.
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 KxxxxE70 SIDACtor PxxxxEAL PxxxxEBL PxxxxECL	See page 4

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GROUP 1: TO-92 Three-leaded

Standard (Catalog) Part Number				SPECIAL DEVICE P/N
2N5060	EC103D	L401E3	Q4X8E3	
2N5061	EC103D1	L401E5	Q4X8E4	Any Special P/N that has base standard P/N listed in this table
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	**OPTIONAL SUFFIX**
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		

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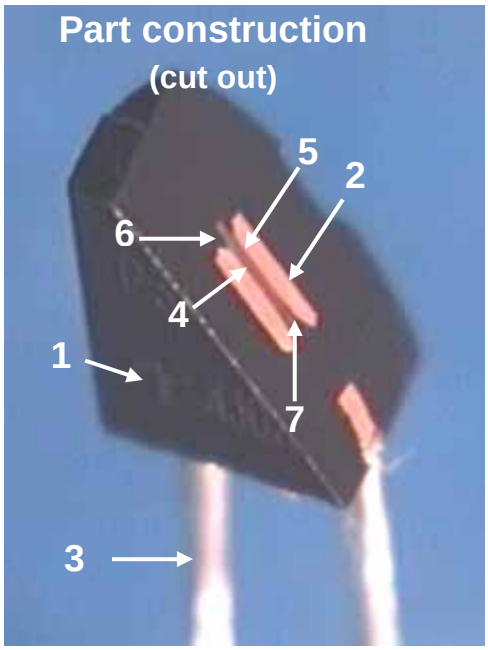
Expertise Applied | Answers Delivered

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		



Material Used (where used)

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 & 2A (two materials used)
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).

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Table 2: RoHS-regulated substance in raw materials

Components	Analysis Result							
	Cd Cadmium	Cr Chromium	Hg Mercury	Pb Lead	PBB & PBDE	Halogen (Total)	Phthalates	HBCD
As Component Total (Typical Value)	**< 2ppm**	**< 2ppm**	**< 2ppm**	**<10 ppm*1 (1.9%*2)**	**< 5ppm**	**< 50ppm**	**< 100ppm**	**< 10ppm**
Molding compound (mixture of phenolix resin, epoxy resin, filler and non-brominated fire retardant) See Annex 1 for the detail.	< 2ppm	< 1ppm	< 2ppm	< 2ppm	< 5ppm	<50ppm	< 100ppm	< 10ppm
Lead frame (Copper Alloy KFC or C194) See Annex 2 & 2A for the detail.	< 2ppm	< 2ppm	< 2ppm	18ppm *3	< 5ppm	---	---	---
Outside lead finish (Matte-Tin plating) See Annex 3 for the detail.	< 2ppm	< 2ppm	< 2ppm	20ppm *3	< 5ppm	---	---	---
Silicon Die (Silicon + Ni electrode) See Annex 4 for the detail	< 2ppm	< 1ppm	< 2ppm	31ppm *3	< 5ppm	---	---	---
Passivation Glass See Annex 5 for the detail.	< 2ppm	< 1ppm	< 2ppm	41% *4	< 5ppm	< 50ppm	---	---
Die Bonding Solder (Pb/Sn/Ag=88/10/2) See Annex 6 for the detail	< 2ppm	< 2ppm	< 2ppm	88 wt% *5	< 5ppm	< 50ppm	< 30ppm	< 10ppm

***1 Less than 10ppm Pb content overall, <u>excluding</u> 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 <u>not</u> 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).**

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

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

Intertek

Number : WUXH00009770

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 : Jul 26, 2012

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. : GK-2000A/GK-2000C.
Test Item : Cd,Pb,Hg,Cr(VI ,PBBs ,PBDEs ,F ,Cl ,Br ,I ,Phthalate ,HBCD.

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

Intertek Testing Services Wuxi Ltd.
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Wuxi 214101, Jiangsu, China
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Intertek

Number : WUXH00009770

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^{6+}) 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

Number : WUXH00009770

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^{6+})	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^{6+}) 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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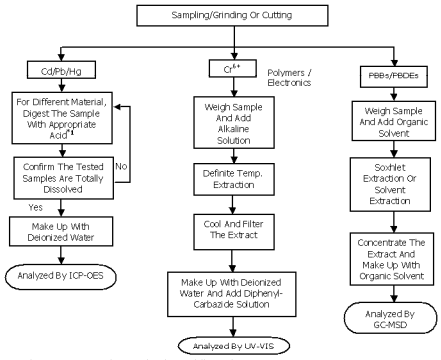
Intertek

Number : WUXH00009770

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_3,HCl ,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCl ,HF
Electronics	HNO_3,HCl ,H_2O_2,HBF_4

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

Intertek

Number : WUXH00009770

Tests Conducted (As Requested By The Applicant)
2 Halogen Test
(I) 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

(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

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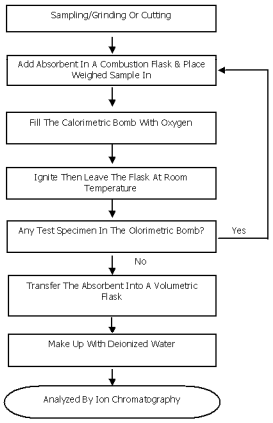
Intertek

Number : WUXH00009770

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

Number : WUXH00009770

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 51 & 52 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%(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 51 & 52 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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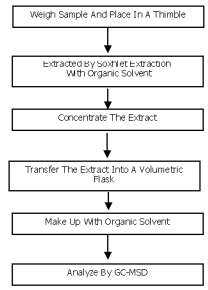
Intertek

Number : WUXH00009770

Tests Conducted (As Requested By The Applicant)

Measurement Flowchart:

Test For Phthalates Contents



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 : WUXH00009770

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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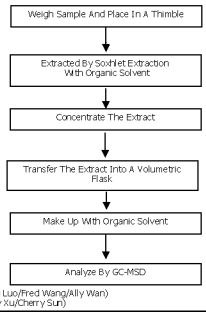
Intertek

Number : WUXH00009770

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



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

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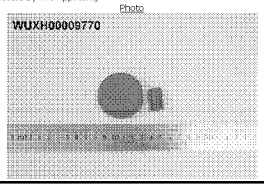
Intertek

Number : WUXH00009770

Tests Conducted (As Requested By The Applicant)

Photo



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

SGS

Test Report No. SHAEC1202411207 Date: 07 Mar 2012 Page 1 of 4

The following sample(s) was/were submitted and identified on behalf of the clients as : Lead frame

SGS Job No. :	SP12-005087 - SH
Model No. :	
Material No. :	KFC
Date of Sample Received :	01 Mar 2012
Testing Period :	01 Mar 2012 - 07 Mar 2012
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 of Lead, Mercury, Cadmium, Hexavalent chromium comply with the limits as set by RoHS Directive 2011/65/EU Annex II, recasting 2002/95/EC.

Signed for and on behalf of
SGS-CSTC Ltd.

Fan Jingjie, JJ
Approved Signatory

SGS

Test Report No. SHAEC1202411207 Date: 07 Mar 2012 Page 2 of 4

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-024112.007	Copper metal

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

RoHS Directive 2011/65/EU

Test Method : With reference to IEC 62321:2008
(1) Determination of Cadmium by ICP-OES.
(2) Determination of Lead by ICP-OES.
(3) Determination of Mercury by ICP-OES.
(4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.

Test Item(s)	Limit	Unit	MDL	007
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	13
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative

Notes :
(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II
(2) ◇ = a. Positive means the presence of CrVI on the tested areas;
b. Negative means the absence of CrVI on the tested areas
For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

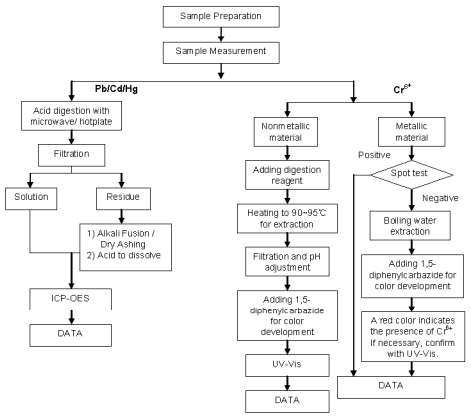
SGS

Test Report No. SHAEC1202411207 Date: 07 Mar 2012 Page 3 of 4

ATTACHMENTS

RoHS Testing Flow Chart

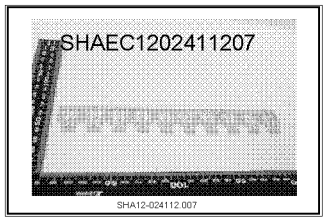
1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao
2) Name of the person in charge of testing: Jeff Zhang/George Xu
3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)



SGS

Test Report No. SHAEC1202411207 Date: 07 Mar 2012 Page 4 of 4

Sample photo:



SGS authenticate the photo on original report only

*** End of Report ***

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Annex 2A: Analysis Result of Lead frame (C194, Page 1-4 of 5)

SGS

测试报告 No. NGBML1200946701 日期: 2012年06月15日 第1页,共5页

以下测试之样品是由申请者所提供及确认：引线框架

SGS工作编号： NBMLC120600059 - NB
产品规格：
材质牌号： C194
制造商：
样品接收日期： 2012年06月08日
测试周期： 2012年06月08日 - 2012年06月15日
测试要求： 根据客户要求测试
测试方法： 请参见下一页
测试结果： 请参见下一页

通标标准技术服务有限公司
授权签名

LiuXiaoRong,Sharon刘晓荣
批准签署人

SGS

测试报告 No. NGBML1200946701 日期: 2012年06月15日 第2页,共5页

测试结果：

测试样品描述：

样品编号	SGS样品ID	描述
1	NGB12-009467.001	铜色/白色金属片

备注：
(1) 1 mg/kg = 1 ppm = 0.0001%
(2) MDL = 检测极限值
(3) ND = 未检出 (< MDL)
(4) "-" = 未规定

RoHS指令2011/65/EU

测试方法： 参考IEC 62321:2008:
(1) 用ICP-OES测定镉的含量.
(2) 用ICP-OES测定铅的含量.
(3) 用ICP-OES测定汞的含量.
(4) 用点测试法/紫外-可见分光光度计比色法测定六价铬的含量.
(5) 用GC-MS测定PBBs(多溴联苯)和PBDEs(多溴二苯醚) 的含量.

测试项目	限值	单位	MDL	001
镉 (Cd)	100	mg/kg	2	ND
铅(Pb)	1000	mg/kg	2	18
汞 (Hg)	1000	mg/kg	2	ND
六价铬(CrVI)	-	-	◇	阴性
多溴联苯之和(PBBs)	1000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND

SGS

测试报告 No. NGBML1200946701 日期: 2012年06月15日 第3页,共5页

测试项目	限值	单位	MDL	001
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND

备注：
(1) 最大允许极限值引用自指令2011/65/EU 附录II.
(2) ◇ 点测试法:
阴性 = 镀层中未检测到六价铬, 阳性 = 镀层中检测到六价铬.
(当点测试结果为阴性或无法确定时,将采用沸水萃取法作进一步的结果验证.)
◇ 沸水萃取法:
阴性 = 镀层中未检测到六价铬.
阳性 = 镀层中检测到六价铬, 表明50 cm^2 表面积的被测试样品的沸水萃取液中六价铬的浓度等于或大于0.02 mg/kg.
针对金属表面的防腐涂层:由于未获知样品的存储条件和生产日期,样品的六价铬测试结果仅代表测试时样品的状态.

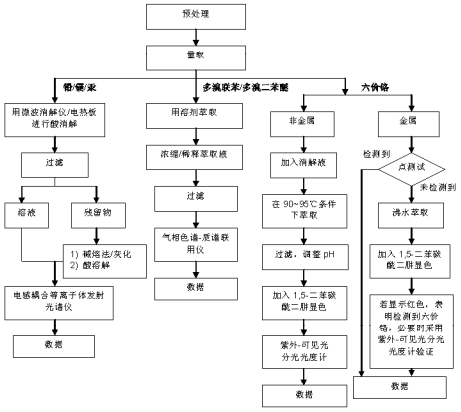
SGS

测试报告 No. NGBML1200946701 日期: 2012年06月15日 第4页,共5页

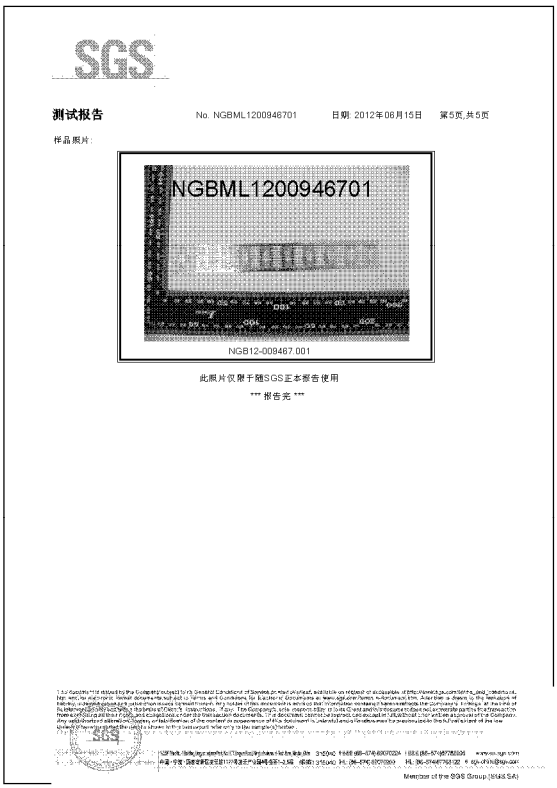
附件

RoHS 测试流程图

1) 分析人员：朱再晖/李科健/周平勇
2) 项目负责人：刘晓荣
3) 样品按照下述流程被完全消解（六价铬和多溴联苯/多溴二苯醚测试除外）。



Annex 2A: Analysis Result of Lead frame (C194, Page 5 of 5)



SGS

测试报告 No. NGBML1200946701 日期: 2012年08月15日 第5页,共5页

样品照片:

NGB12-009467.001

此照片仅用于随SGS正本报告使用

*** 报告完 ***

Annex 3: Analysis Result of Lead finish (page 1-4 of 6)

SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 1 of 6

The following sample(s) was/were submitted and identified on behalf of the clients as : Lead Free Solder Ball 99.98

SGS Job No. :	CP11-014621 - SZ
Date of Sample Received :	04 Jan 2012
Testing Period :	04 Jan 2012 - 05 Jan 2012
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).

Signed for and on behalf of SGS-CSTC Ltd.

Almay Gao
Approved Signatory

SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 2 of 6

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	CAN12-000116.005	Silvery metal ball

Remarks :

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

Elementary Analysis & Flame Retardants

Test Method : With reference to IEC 62321:2008
(1) Determination of Cadmium by ICP-OES.
(2) Determination of Lead by ICP-OES.
(3) Determination of Mercury by ICP-OES.
(4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method using UV-Vis.
(5) Determination of PBBs / PBDEs by GC-MS.

Test Item(s)	Unit	MDL	005
Cadmium (Cd)	mg/kg	2	ND
Lead (Pb)	mg/kg	2	20
Mercury (Hg)	mg/kg	2	ND
Hexavalent Chromium (CrVI)	-	◇	Negative
Sum of PBBs	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	mg/kg	-	ND
Monobromodiphenyl ether	mg/kg	5	ND

SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 3 of 6

Test Item(s)	Unit	MDL	005
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)◇= a. Negative means the absence of CrVI on the tested areas;
b. Positive means the presence of CrVI on the tested areas.
For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

Halogen

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

Test Item(s)	Unit	MDL	005
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Remark: Results & photo(s) of this report refer to test report CANEC1200011604.

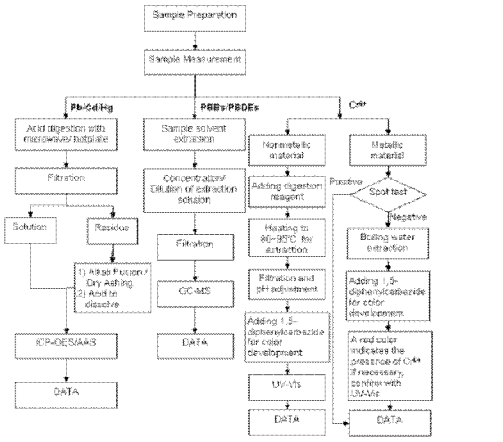
SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 4 of 6

ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Bella Wang / Gulley 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 PBEs/PBDEs test method excluded)



Annex 3: Analysis Result of Lead finish (page 5-6 of 6)

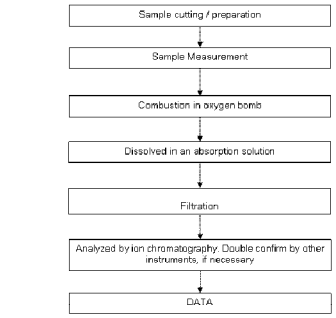
SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 5 of 6

ATTACHMENTS

Halogen Testing Flow Chart

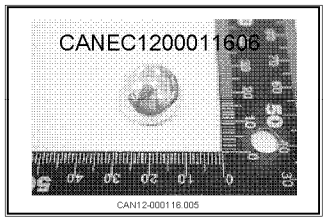
1) Name of the person who made testing: Bob Song
2) Name of the person in charge of testing: Rain Qiao



SGS

Test Report No. CANEC1200011606 Date: 05 Jan 2012 Page 6 of 6

Sample photo:



CAN12-000116.005

SGS authenticate the photo on original report only

*** End of Report ***

Littelfuse
Expertise Applied | Answers Delivered

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 XIAOPENG

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.

Jessica Lu
General Manager

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

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^{6+}) 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

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

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^{6+})	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^{6+}) 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

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
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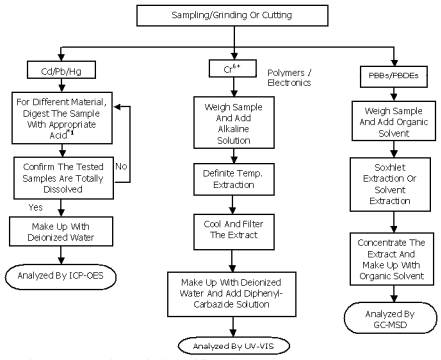
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

Intertek

Number : WUXH00009738

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_3,HCl ,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCl ,HF
Electronics	HNO_3,HCl ,H_2O_2,HBF_4

Intertek Testing Services Wuxi Ltd.
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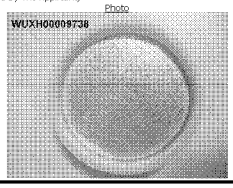
Annex 4: Analysis Result of Ni-plated Wafer (Page 5 of 5)

Intertek

Number : WUXH00009738

Tests Conducted (As Requested By The Applicant)

Photo



Intertek Testing Services Wuxi Ltd.
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Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4867 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

Littelfuse
Expertise Applied | Answers Delivered

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

Intertek

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 XIAOPENG

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,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

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

Intertek

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)	142100
Mercury (Hg) Content (mg/kg)	ND
Chromium (VI) (Cr^{6+}) 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

Intertek Testing Services Wuxi Ltd.
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Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

Intertek

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^{6+})	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^{6+}) 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

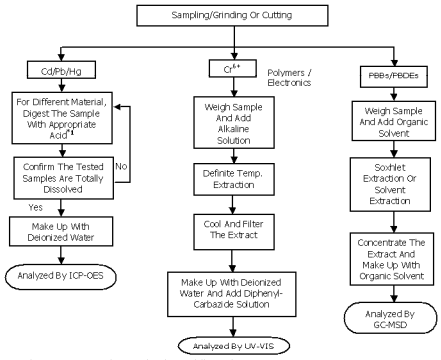
Date Sample Received: Jul 23, 2012
Testing Period: Jul 23, 2012 To Jul 26,2012

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

Intertek

Number : WUXH00009741

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_3,HCL,HF,H_2O_2,H_3BO_3
Metals	HNO_3,HCL,HF
Electronics	HNO_3,HCL,H_2O_2,HBF_4

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
Wuxi 214101, Jiangsu, China
Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

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

Intertek

Number : WUXH00009741

Tests Conducted (As Requested By The Applicant)

2 Halogen Test

(I) 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

(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

Intertek Testing Services Wuxi Ltd.
No.8 Fubei Road, Xishan Economic Development Zone,
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Tel: +86 510 8821 4967 Fax: +86 510 8820 0428 E-mail: consumergoods.wuxi@intertek.com

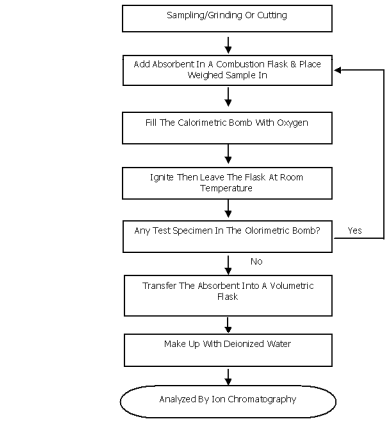
Intertek

Number : WUXH00009741

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

Intertek Testing Services Wuxi Ltd.
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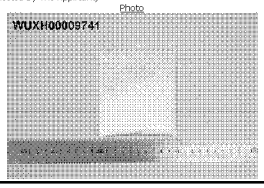
Intertek

Number : WUXH00009741

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 1-4 of 12)

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 1 of 12

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

SGS Job No. :	CP12-023053 - SZ
Model No. :	(ES-660、ES-610、ES-620、ES-630、ES-640、ES-650、ES-662、ES500、ES-510、ES-520、ES-530、ES-540、ES-550(Sn5Pb92.5Ag2.5、Sn5Pb95、Sn5Pb93.5Ag1.5、Sn10Pb90、Sn10Pb88Ag2、Sn20Pb78Ag2、Sn1.5Pb87.5Ag1、Sn5Pb93Ag2)Mixture
Date of Sample Received :	21 May 2012
Testing Period :	21 May 2012 - 24 May 2012
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 of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of SGS-CSTC Ltd.

Fan Jingjie, JJ
Approved Signatory

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 2 of 12

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA12-079730.001	grey solder paste

Remarks :

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

RoHS Directive 2011/65/EU

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 using UV-Vis
(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)	1000	mg/kg	2	ND
Lead (Pb)	0.1	%	-	90.91 ▲
Hexavalent Chromium (Cr(VI))	1000	mg/kg	2	ND
Sum of PBBs	1000	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

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 3 of 12

Test Item(s)	Limit	Unit	MDL	001
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
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	6	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II
(2) ▲=According to the declaration from the client, Lead (Pb) in No.001 is exempted by EU RoHS Directive 2011/65/EU based on: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead).

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	ND
Iodine (I)	mg/kg	50	ND

Polynuclear Aromatic Hydrocarbons (PAH)

Test Method : With reference to ZEK 01.2-08 of German ZLS and its amendments, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	001
Total 18 PAHs	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.2	ND

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 4 of 12

Test Item(s)	Unit	MDL	001
Acenaphthylene(ANY)	mg/kg	0.2	ND
Acenaphthene(ANA)	mg/kg	0.2	ND
Fluorene(FLU)	mg/kg	0.2	ND
Phenanthrene(PHE)	mg/kg	0.2	ND
Anthracene(ANT)	mg/kg	0.2	ND
Fluoranthene(FLT)	mg/kg	0.2	ND
Pyrene(PYR)	mg/kg	0.2	ND
Benzo(a)anthracene(BaA)	mg/kg	0.2	ND
Chrysene(CHR)	mg/kg	0.2	ND
Benzo(b)fluoranthene(BbF) Benzo(j)fluoranthene(BjF)	mg/kg	0.4	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.2	ND
Benzo(a)pyrene(BaP)	mg/kg	0.2	ND
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.2	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.2	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.2	ND
Benzo(e)pyrene(BeP)	mg/kg	0.2	ND

Hexabromocyclododecane (HBCDD)

Test Method : Determination of HBCDD by GC-MS based on IEC 62321:2008.

Test Item(s)	Unit	MDL	001
Hexabromocyclododecane (HBCDD)	mg/kg	10	ND

Notes :

Littelfuse
Expertise Applied | Answers Delivered

Annex 6: Analysis Result of Die Bonding Solder (Page 5-8 of 12)

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 5 of 12

(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC:
Hexabromocyclododecane (HBCDD) is considered as a priority for risk evaluation and substance restriction.

Phthalates

Test Method : Determination of phthalates by GC-MS based on EN 14372:2004.

Test Item(s)	Unit	MDL	001
Dibutyl Phthalate (DBP)	%	0.003	ND
Benzylbutyl Phthalate (BBP)	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	%	0.003	ND

Notes :
(1) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC:
Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

Remark: Result shown is of the total weight of wet sample.

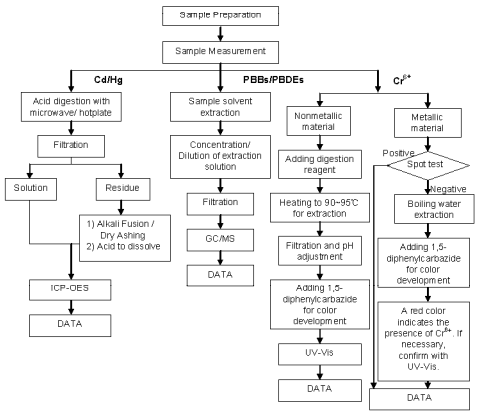
SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 6 of 12

ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Linda Li
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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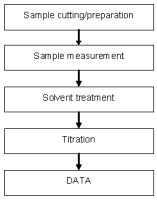
Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 7 of 12

Titration Testing Flow Chart

1) Name of the person who made testing: Hassan Xu
2) Name of the person in charge of testing: George Xu



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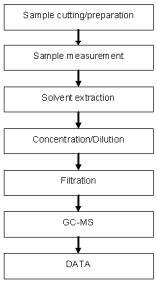
Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 8 of 12

Phthalates Testing Flow Chart

1) Name of the person who made testing: Elyn Yao
2) Name of the person in charge of testing: Rachel Zhang



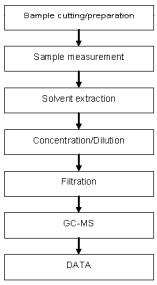
Annex 6: Analysis Result of Die Bonding Solder (Page 9-12 of 12)

SGS

Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 9 of 12

HBCDD Testing Flow Chart

1) Name of the person who made testing: Gary Xu
2) Name of the person in charge of testing: Linda Li



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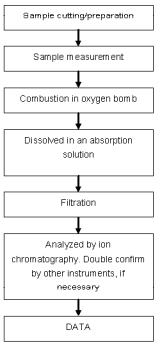
Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 10 of 12

Halogen Testing Flow Chart

1) Name of the person who made testing: Sisily Yin
2) Name of the person in charge of testing: Zirco Yu



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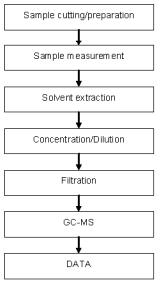
Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 11 of 12

PAHs Testing Flow Chart

1) Name of the person who made testing: Lisa Duan
2) Name of the person in charge of testing: Jessie Huang



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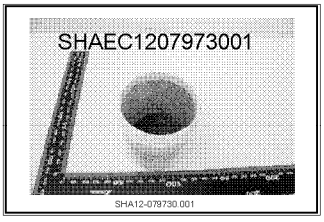
Test Report No. SHAEC1207973001 Date: 24 May 2012 Page 12 of 12

Sample photo:



SGS authenticate the photo on original report only

*** End of Report ***

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

DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT 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 PARLIAMENT 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 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (4). 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) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste (5) gives first priority to prevention in waste legislation. Prevention is defined, inter alia, as measures that reduce the content of harmful substances in materials and products.

(5) Council Resolution of 25 January 1988 on a Community action programme to combat environmental pollution by cadmium (6) invited the Commission to pursue without delay the development of specific measures for such a programme. Human health also has to be protected and an overall strategy that in particular restricts the use of cadmium and stimulates research into substitutes should therefore be implemented. The Resolution stresses that the use of cadmium should be limited to cases where suitable alternatives do not exist.

(6) Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants (7) recalls that the objective of protecting the environment and human health from persistent organic pollutants cannot be sufficiently achieved by the Member States, owing to the transboundary effects of those pollutants, and can therefore be better achieved at Union level. Pursuant to that Regulation, releases of persistent organic pollutants, such as dioxins and furans, which are unintentional by-products of industrial processes, should be identified and reduced as soon as possible with the ultimate aim of elimination, where feasible.

(7) The available evidence indicates that measures on the collection, treatment, recycling and disposal of waste EEE as set out in Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) (8) 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 treated in less than optimal conditions.

(1) OJ C 106, 16.12.2009, p. 36.
(2) OJ C 141, 29.5.2010, p. 55.
(3) 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.
(4) OJ L 37, 13.2.2003, p. 19.
(5) OJ L 312, 22.11.2008, p. 3.
(6) OJ C 30, 4.2.1988, p. 1.
(7) OJ L 158, 30.4.2004, p. 7.
(8) OJ L 37, 13.2.2003, p. 24.

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 auditable 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 Annexes 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 substitutes 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. Life-cycle 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 point (a) 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 dates 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 dates 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.

ANNEX II

Restricted substances referred to in Article 4(1) and maximum concentration values tolerated 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 %)

	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. piezoelectronic 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