

## Certificate of non-use of The Controlled Substances

Company name            Littelfuse, Inc

Product Covered        Thyristor TO-92 Package EV series (Wire-Bonded)

Issue Date              January 11, 2011

It is hereby certified by Littelfuse, Inc, that there is neither RoHS (EU Directive 2002/95/EC)-restricted substance nor such use, for materials to be used for unit parts, for packing/package materials, and for additives and the like in the manufacturing processes. In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/package materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

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.

Issued by \_\_\_\_\_

< Koichiro Yoshimoto, Senior Product Engineer, Littelfuse, Inc.>

(1) Parts, sub-materials and unit parts

This document covers Thyristor TO-92 Package EV series, supplied by Littelfuse, LP. Please see table 1 on page 2 for the list of products covered.

< Materials used >

Please see table 2 on page 3 and table 3 on page 4 of this document.

(2) The ICP data on all measurable substances

Please see annex 1 through 6 attached to this document.

Remarks :

**1. Pb (lead) contained in passivation glass on silicon wafer (item 6) to be categorized as exempt in RoHS Annex 7.**

**Please refer to Annex 7 of this report for the extract of the applicable exemptions of RoHS (EU Directive 2002/95/EC)**

**Table 1: Littelfuse Part Number covered by this report**

Standard (Catalog) Part Number		SPECIAL DEVICE P/N
L0103DE	MCR100-6	Any Special P/N which has base standard P/N listed in this table.
L0103ME	MCR100-8	
L0103NE	S402ES	
L0107DE	S4X8ES	S887S6X8ESRP
L0107ME	S4X8ES1	S890S4X8ES1
L1017NE	S4X8ES2	S891S6X8ES1
L0109DE	S602ES	
L0109ME	S6X8ES	
L0109NE	S6X8ES1	
LX803DE	S6X8ES2	
LX803ME	S8X8ES	
LX807DE	S8X8ES1	
LX807ME	S8X8ES2	
	Any Standard Part Number listed here may be followed by suffix for packing options, such as RP or AP.	

**Table 2: Homogeneous Material Used**

#	Description	Name of Material	Type	Analysis data
1	Lead finish	Hot solder dip	metal	annex 1.
2	Molding compound	Epoxy resin	plastic	annex 2.
3	Die bonding solder	Solder	metal	annex 3.
4	Die bonding wire	Gold	metal	annex 4
5	Lead frame	copper alloy	metal	annex 5.
6	Silicon wafer	silicon	metal	annex 6 Pb is from in passivation glass on wafer and is exempted by RoHS Annex 7. Please refer to Annex 7 for the RoHS exemption.
		aluminum	metal	
		glass	glass	

**Table 3: RoHS-regulated substance in raw materials**

Components	Analysis Result						
	Cd Cadmium	Cr Chromium	Hg Mercury	Pb Lead	PBB	PBDE	Total Halogens
<b>As Component Total</b> (Typical Values)	< 2ppm	< 2ppm	< 2ppm	<5 ppm* <sup>1</sup>	< 5 ppm	< 5 ppm	<200ppm
<b>Outside lead finish</b> (Hot-Tin dipping)  See Annex 1 for the detail.	< 2ppm	< 2ppm	< 2ppm	53ppm* <sup>2</sup>	< 5ppm	< 5ppm	---
<b>Epoxy Resin compound</b> (Mixture of resin, filler and fire retardant)  See Annex 2 for the detail.	< 0.5ppm	< 1ppm	< 2ppm	< 5ppm	< 5ppm	< 5ppm	277 ppm
<b>Die Bonding Solder</b>  See Annex 3 for the detail.	< 2ppm	< 2ppm	< 2ppm	88wt%* <sup>3</sup>	< 5ppm	< 5ppm	---
<b>Die-bonding Wire</b> (Au wire)  See Annex 4 for the detail.	< 0.5ppm	< 1ppm	< 2ppm	< 5ppm	< 5ppm	< 5ppm	---
<b>Lead frame</b> (Copper Alloy, KFC )  See Annex 5 for the detail.	< 2ppm	< 2ppm	< 2ppm	< 2ppm	---	---	---
<b>Silicon Die</b> (Silicon + Metal electrode + passivation glass)  See Annex 6 for the detail.	< 2ppm	< 2ppm	< 2ppm	1.9%* <sup>4</sup>	< 5ppm	< 5ppm	< 50ppm

\*1 Less than 5ppm Pb content overall, excluding Pb from passivation glass on the silicon die.

\*2 Pb (lead) contained in outside finish is not exempted from restriction by RoHS, but considered as process contamination. Littelfuse does not add Pb (lead) intentionally.

\*3 Pb (lead) contained in die-bonding solder is exempted from restriction by RoHS Annex 7.

\*4 Pb (lead) contained in Silicon wafer is from passivation glass and is exempted from restriction by RoHS Annex 5.

**Please refer to Annex 7 of this report for the applicable exemptions of RoHS (EU Directive 2002/95/EC)**

# Annex 1: Analysis Result of Outside Lead Finish Material (Page 1 of 5)



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## TEST REPORT

Number: BKKH10052519

Applicant: KOKI PRODUCTS CO., LTD.  
 9/1 MOO 4, SOI TEEDINTHAI, TEPARAK RD.,  
 BANGPLEEYAI, BANGPLEE, SAMUTPRAKARN 10540  
 ATTN: K.THUNYATHORN

Date: Nov 02, 2010

### Sample description:

One (1) group of submitted sample said to be Solder Alloy, Tin

Item name: Lead free solder; Bar, Extrude bar, Flux core solder wire, Solid wire,  
 Ball, Half ball, Anode, Billet,  
 Tin: Bar, Extrude bar, Flux core solder wire, Solid wire, Ball, Half ball,  
 Anode, Billet

Alloy:	Sn	Tin
	Sn-Ag	(SA03, SA1, SA3, SA35, SA37, SA4, SA5)
	Sn-Ag-Bi-Cu	(SABC25-1-05, SABC2-1-05, SABC2-75-05, SABC2-2-05, SABC2-3-075)
	Sn-Ag-Cu	(SAC0307, SAC1005, SAC1007, SAC1040, SAC1240, SAC2005, SAC2060, SAC3002, SAC3005, SAC3005P, SAC3007, SAC3505, SAC3507, SAC35075, SAC3510, SAC3807, SAC3810, SAC3906, SAC4005, SAC4009, SAC0540, SAC0505)
	Sn-Ag-Cu-Sb	(SACsb335-07-03)
	Sn-Ag-Zn	(SAZ3504)
	Sn-Bi	(SB58)
	Sn-Bi-Ag	(SBA5710, SBA1025)
	Sn-Cu	(SC07, SC075, SC1, SC3, SC4)
	Sn-Cu-Ni	(SCN3002, SCN3005)
	Sn-Cu-Sb	(SCsb0703)
	Sn-Sb	(SB5, SBb007)
	Sn-Zn-Bi	(SZB8030, SZB7530)
	Sn-Zn	(SZ9)
	Sn-In	(SI52)
	Sn-In-Ag-Bi	(SIAB40-35-05, SIAB80-35-05)

To be continued

Authorized by :  
 For Intertek Testing Services (Thailand)

*Phanit H.*

Phanit Hitapong  
 Division Manager  
 Toys & Hardlines Division

*For the attention of  
 KEC ( Thailand ) Co.,Ltd.  
 --Pb free soder bar SAC3005, SA3, Tin bar--  
 Issue date 26-Nov-10*

Page 1 of 5

Intertek Testing Services (Thailand) Limited  
 5/1, Phahon Yothin 28, Phahon Yothin Road, Lat Yao, Chatuchak, Bangkok 10900 Thailand  
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 E-mail Address: [itf.thailand@intertek.com](mailto:itf.thailand@intertek.com)

# Annex 1: Analysis Result of Outside Lead Finish Material (Page 2 of 5)



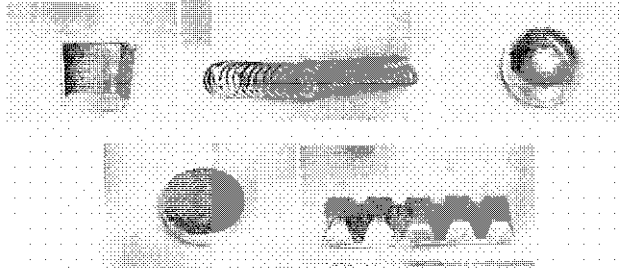
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## TEST REPORT

Number: BKKH10052519

Core Flux: KK#13, KK#17, KK#28, KK#28B, KK#28BC, KK#33, KK#33A, KK#57-R,  
(For Pb free Flux: core wire) KK#70, KK#81, KK#101RMA, KK#102, KK#103, KK#103B-HF, KK#105YS,  
KK#108, KK#109, KK#115A, KK#213CF, KK#218CF, KK#81, KK#82,  
KK#303BZ and KK#309

Date sample received: October 29, 2010  
Testing period: October 29, 2010 to November 02, 2010



### Test conducted:

As requested by the applicant, for details please refer to attached page(s)  
Type of test: RoHS wet chemical Analysis

**For the attention of  
KEC ( Thailand ) Co.,Ltd.  
--Pb free solder bar SAC3005, SA3, Tin bar--  
Issue date 26-Nov-10**

# Annex 1: Analysis Result of Outside Lead Finish Material (Page 3 of 5)



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## TEST REPORT

Test conducted :

Number: BKKH10052519

(A) Test result summary:

Testing item	Result
	Submitted samples
Cadmium (Cd) Content (mg/kg)	ND
Lead (Pb) Content (mg/kg)	53
Mercury (Hg) Content (mg/kg)	ND
Chromium VI (Cr <sup>VI</sup> ) Content (by spot test on metal)	Negative
Chromium VI (Cr <sup>VI</sup> ) Content (by boiling water Extraction on metal) (mg/kg with 50cm <sup>2</sup> )#	Negative (<0.02 mg/kg)
Polybrominated Biphenyls (PBBs) (mg/kg)	
Monobromobiphenyl (MonoBB)	ND
Dibromobiphenyl (DiBB)	ND
Tribromobiphenyl (TriBB)	ND
Tetrabromobiphenyl (TetraBB)	ND
Pentabromobiphenyl (PentaBB)	ND
Hexabromobiphenyl (HexaBB)	ND
Heptabromobiphenyl (HeptaBB)	ND
Octabromobiphenyl (OctaBB)	ND
Nonabromobiphenyl (NonaBB)	ND
Decabromobiphenyl (DecaBB)	ND
Polybrominated Diphenyl Ethers (PBDEs) (mg/kg)	
Monobromodiphenyl Ether (MonoBDE)	ND
Dibromodiphenyl Ether (DiBDE)	ND
Tribromodiphenyl Ether (TriBDE)	ND
Tetrabromodiphenyl Ether (TetraBDE)	ND
Pentabromodiphenyl Ether (PentaBDE)	ND
Hexabromodiphenyl Ether (HexaBDE)	ND
Heptabromodiphenyl Ether (HeptaBDE)	ND
Octabromodiphenyl Ether (OctaBDE)	ND
Nonabromodiphenyl Ether (NonaBDE)	ND
Decabromodiphenyl Ether (DecaBDE)	ND

Name of operation: Kritsana T.

mg/kg = Milligram per kilogram based on weight of sample = ppm

mg/kg with 50cm<sup>2</sup> = Milligram per kilogram with 50 square centimeter

< = Less than

ND = Not Detected

Positive = A positive test result indicates the presence of Cr(VI) equal to or greater than threshold of 1 mg/kg for spot test procedures or 0.02 mg/kg for boiling-water-extraction procedure with a sample surface area of 50cm<sup>2</sup> used. However, it shall not be interpreted as the Cr(VI) concentration in the coating layer of the sample and should not be used as a method detection limit for this qualitative test.

Negative = A negative test result indicates no above positive appearance has been found. When the spot test shows a negative result, the boiling-water-extraction procedure shall be used to verify the result. When the boiling-water-extraction procedure cannot indicate the positive result, the result is negative

# = According to IEC 62321, a positive result indicates the presence of Cr(VI) coating. It is the Cr(VI) concentration detected in the boiling-water-extraction solution and should not be interpreted as the Cr(VI) concentration in the coating layer of the sample.

Tested component: Mixed metal part

\*\*\*\*\*

**Intertek Testing Services (Thailand) Limited**  
 5/1, Phahon Yothin 28, Phahon Yothin Road, Lat Yeo, Chatuchak, Bangkok 10900 Thailand  
 Tel.: (662) 930.6554, (662) 939-0681 Fax: (662) 939-0191  
 E-mail Address: [th.thailand@intertek.com](mailto:th.thailand@intertek.com)

# Annex 1: Analysis Result of Outside Lead Finish Material (Page 4 of 5)



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## TEST REPORT

Number: BKKH10052519

Test conducted:

(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	Limit of quantification
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 and AAS	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 metal)	With reference to IEC 62321 Edition 1.0 : 2008, by SPOT test	Positive/ Negative (threshold of 1 mg/kg)
Chromium VI (Cr <sup>6+</sup> ) Content (for metal)	With reference to IEC 62321 Edition 1.0 : 2008, by boiling water extraction and determined By UV-VIS Spectrophotometer	Positive/ Negative (threshold of 0.02mg/kg with 50cm <sup>2</sup> area)
Polybrominated Biphenyls (PBBs) & Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321 Edition 1.0 : 2008, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg

Remark : Reporting limit = Quantitation limit of Analyte in sample

*For the attention of  
 KEC ( Thailand ) Co.,Ltd.  
 --Pb free solder bar SAC3005, SA3, Tin bar--  
 Issue date 26-Nov-10*

# Annex 1: Analysis Result of Outside Lead Finish Material (Page 5 of 5)



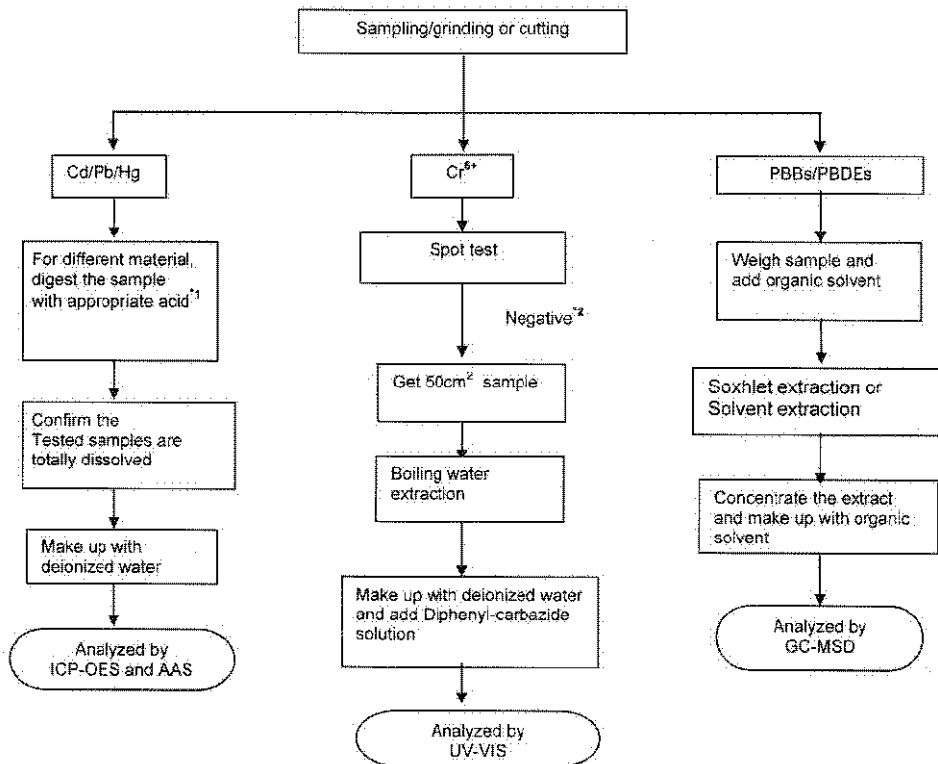
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## TEST REPORT

Number: BKKH10052519

(D) Measurement Flowchart

Test for Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Contents  
Reference Standard : IEC 62321 Edition 1.0:2008



Remarks:

\*1: List of appropriate Acid:

Material	Acid added for Digestion
Metals	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub>

\*2: If the result of Spot Test is positive, Chromium VI would be determined as detected

\*\*\*\*\*/DE/RD/SAN



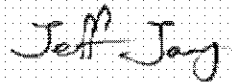
**Annex 2: Analysis Result of Molding Compound (Page 1 of 6)****Test Report No. F690501/LF-CTSAYAA10-04587**

Issued Date: February 18, 2010 Page 1 of 6

**To:** KCC CO., LTD  
846, Yongam-ri  
Bongdong-eub  
Wanju-gun  
JEONBUK  
Korea

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

**SGS File No.** : AYAA10-04587  
**Product Name** : KTMC-1050G(+)  
**Item No./Part No.** : N/A  
**Received Date** : February 08, 2010  
**Test Performing Date** : February 09, 2010  
**Test Performed** : SGS Testing Korea tested the sample(s) selected by applicant with following results  
**Test Results** : For further details, please refer to following page(s)

**Pluto Kim**  
**Cindy Park/ Testing Person****SGS Testing Korea Co. Ltd.****Jeff Jang / Chemical Lab Mgr**

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Orders otherwise stated the results shown in this report refer only to the samples tested and such results are related to IVD data only.

F052 Version3

SGS Testing Korea Co., Ltd.

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## Annex 2: Analysis Result of Molding Compound (Page 2 of 6)



**Test Report No.** F690501/LF-CTSAYAA10-04587

**Issued Date:** February 18, 2010 **Page 2 of 6**

**Sample No.** : AYAA10-04587.001

**Sample Description** : KTMC-1050G(+)

**Item No./Part No.** : N/A

### Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.
Antimony (Sb)	mg/kg	With reference to EPA 3050B(1996), US EPA 6010B(1996), ICP	10	17.4

### Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) \*\* = Qualitative analysis (No Unit)

(6) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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## Annex 2: Analysis Result of Molding Compound (Page 3 of 6)



**Test Report No.** F690501/LF-CTSAYAA10-04587

**Issued Date:** February 18, 2010 **Page 3 of 6**

**Sample No.** : AYAA10-04587.001

**Sample Description** : KTMC-1050G(+)

**Item No./Part No.** : N/A

**Flame Retardants-PBBs/PBDEs**

Test Items	Unit	Test Method	MDL	Results
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

**Halogen Contents**

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	With reference to ASTM D 7359-08, IC	30	N.D.
Chlorine(Cl)	mg/kg	With reference to ASTM D 7359-08, IC	30	277
Fluorine(F)	mg/kg	With reference to ASTM D 7359-08, IC	30	N.D.
Iodine(I)	mg/kg	With reference to ASTM D 7359-08, IC	50	N.D.

- NOTE:
- (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) \*\* = Qualitative analysis (No Unit)
  - (6) \* = Boiling-water-extraction:  
 Negative = Absence of CrVI coating  
 Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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SGS Testing Korea Co.,Ltd.

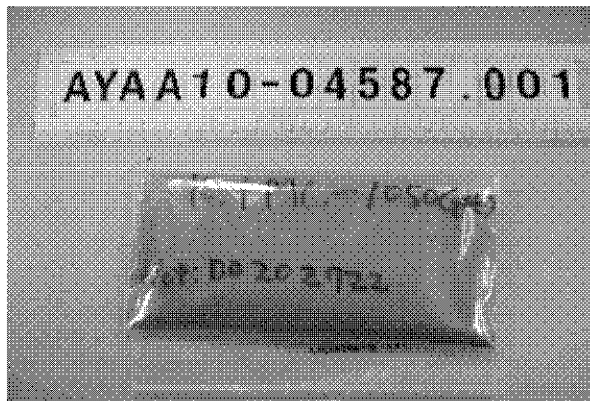
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**Annex 2: Analysis Result of Molding Compound (Page 4 of 6)****Test Report No. F690501/LF-CTSAYAA10-04587**

Issued Date: February 18, 2010 Page 4 of 6

Picture of Sample as Received:



- NOTE: (1) N.D. = Not detected.(<MDL)  
(2) mg/kg = ppm  
(3) MDL = Method Detection Limit  
(4) - = No regulation  
(5) \*\* = Qualitative analysis (No Unit)  
(6) \* = Boiling-water-extraction:  
Negative = Absence of CrVI coating  
Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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## Annex 2: Analysis Result of Molding Compound (Page 5 of 6)



**Test Report No. F690501/LF-CTSAYAA10-04587**      Issued Date: February 18, 2010      Page 5 of 6

**Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr<sup>6+</sup>/PBBs&PBDEs Testing**

Cd/Pb/Hg	PBBs/PBDEs	Cr <sup>6+</sup>	Cr <sup>6+</sup>
Mechanic_Sample	Mechanic_Sample	Mechanic_Sample	Mechanic_Sample
Sample Measurement	Sample Measurement	Sample Measurement	Sample Measurement
Acid Digestion with Microwave/Hotplate	Solvent Extraction of the Sample	Nonmetallic Material	Metallic Material
Filtration	Clean-up with Florisil Column	Adding Extraction Solution	Spot Test / Boiling Water Extraction
Residue	Concentration/Dilution of Extraction Solution	Heating to 90~95°C for Extraction	Adding 1,5-Diphenylcarbazide for Color Development
Total Digestion	Filtration	Filtration and pH Adjustment	A Red Color Indicates the Presence of Cr <sup>6+</sup>
ICP-AES/AAS	GC/MS	Adding 1,5-Diphenylcarbazide for Color Development	Confirm with UV-Vis
DATA	DATA	UV-Vis	DATA
		DATA	

The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.

Operator      Dami Yeom  
Section Chief      Jeff Jang

NOTE: (1) N.D. = Not detected.(<MDL)  
(2) mg/kg = ppm  
(3) MDL = Method Detection Limit  
(4) - = No regulation  
(5) \*\* = Qualitative analysis (No Unit)  
(6) \* = Boiling-water-extraction:  
Negative = Absence of Cr(VI) coating  
Positive = Presence of Cr(VI) coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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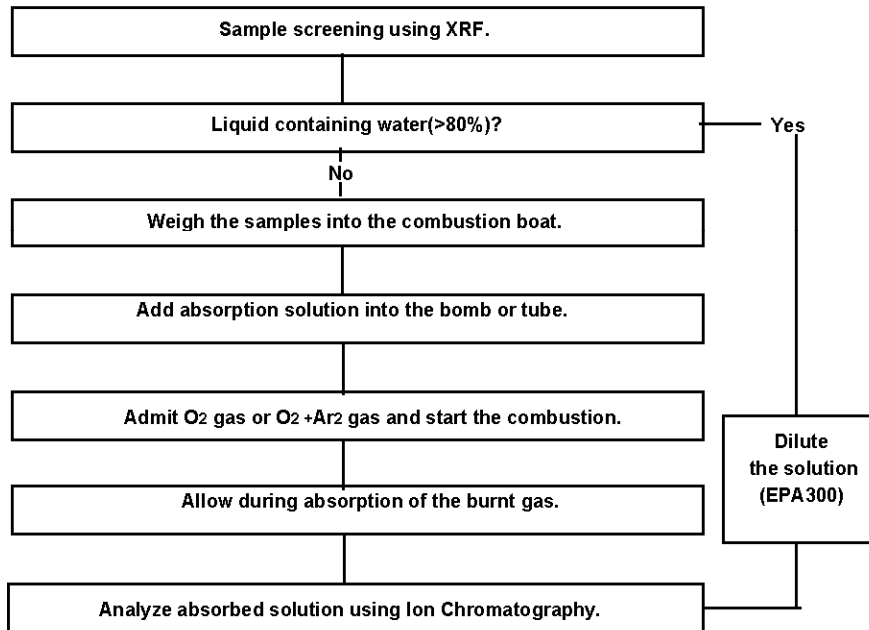
## Annex 2: Analysis Result of Molding Compound (Page 6 of 6)



Test Report No. F690501/LF-CTSAYAA10-04587

Issued Date: February 18, 2010 Page 6 of 6

### Flow Chart for Halogen Test



\*\*\* End \*\*\*

- NOTE:
- (1) N.D. = Not detected.(<MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) \*\* = Qualitative analysis (No Unit)
  - (6) \* = Boiling-water-extraction:  
 Negative = Absence of CrVI coating  
 Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

## Annex 3: Analysis Result of Die-Bonding Solder (Page 1 of 6)

**Test Report**

No: 10211878(6) R1

Date: 02-Nov-10

Page 1 of 6

Heraeus Materials Singapore Pte Ltd  
No. 2 Corporation Road, #06-15/16/17 Corporation Place, Singapore 618494

THIS REPORT IS TO SUPERSEDE TEST REPORT NO. 10211878(6) DATED 14-OCT-2010

The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description : PbSn10Ag2 Solder Wire

Sample Receiving Date : 05-Oct-10  
Testing Period : 07-Oct-10 to 13-Oct-10

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

---

Test Result(s) : 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 Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Laboratory Manager

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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## Annex 3: Analysis Result of Die-Bonding Solder (Page 2 of 6)



### Test Report

No: 10211878(6) R1

Date: 02-Nov-10

Page 2 of 6

#### Test Result(s):

Sample Description : PbSn10Ag2 Solder Wire

Test Item(s):	Unit	Method	Results	MDL	RoHS Limit
Cadmium(Cd)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	n.d.	2	100
Lead (Pb)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	860512.8 <sup>†</sup>	2	1000
Mercury (Hg)	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES	n.d.	2	1000
Hexavalent Chromium (CrVI) (By spot test / boiling water extraction)	---	With reference to IEC62321, Ed1:2008 and performed by Spot test / boiling water extraction method. (see Note 9)	Negative	0.02 mg/kg with 50 cm <sup>2</sup> surface area	#
<b>Sum of PBBs</b>	mg/kg	With reference to IEC62321, Ed1:2008. Analysis was performed by GC/MS	n.d.	-	1000
Monobromobiphenyl	mg/kg		n.d.	5	-
Dibromobiphenyl	mg/kg		n.d.	5	-
Tribromobiphenyl	mg/kg		n.d.	5	-
Tetrabromobiphenyl	mg/kg		n.d.	5	-
Hexabromobiphenyl	mg/kg		n.d.	5	-
Pentabromobiphenyl	mg/kg		n.d.	5	-
Heptabromobiphenyl	mg/kg		n.d.	5	-
Octabromobiphenyl	mg/kg		n.d.	5	-
Nonabromobiphenyl	mg/kg		n.d.	5	-
Decabromobiphenyl	mg/kg		n.d.	5	-
<b>Sum of PBDEs</b>	mg/kg		n.d.	-	1000
Monobromodiphenyl ether	mg/kg		n.d.	5	-
Dibromodiphenyl ether	mg/kg		n.d.	5	-
Tribromodiphenyl ether	mg/kg	n.d.	5	-	
Tetrabromodiphenyl ether	mg/kg	n.d.	5	-	
Pentabromodiphenyl ether	mg/kg	n.d.	5	-	
Hexabromodiphenyl ether	mg/kg	n.d.	5	-	
Heptabromodiphenyl ether	mg/kg	n.d.	5	-	
Octabromodiphenyl ether	mg/kg	n.d.	5	-	
Nonabromodiphenyl ether	mg/kg	n.d.	5	-	
Decabromodiphenyl ether ##	mg/kg	n.d.	5	-	

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

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## Annex 3: Analysis Result of Die-bonding Solder (Page 3 of 6)



### Test Report

No: 10211878(6) R1

Date: 02-Nov-10

Page 3 of 6

- Note:
- (1) mg/kg = ppm ; 0.1wt% = 1000ppm
  - (2) n.d.= Not Detected
  - (3) MDL = Method Detection Limit
  - (4) ## = The exemption of DecaBDE in polymeric application according 2005/717/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008.
  - (5) “-“ = Not regulated
  - (6) “---“: No unit (Qualitative Test)
  - (7) \* : Exceeds limit
  - (8) # : Positive means the presence of Cr(VI) on the tested areas.  
Negative means the absence of Cr(VI) on the tested areas.
  - (9) Spot-test:  
Negative = Absence of Cr(VI) coating / surface layer  
Positive = Presence of Cr(VI) coating / surface layer  
The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.  
Boiling-water extraction:  
Negative = Absence of Cr(VI) coating / surface layer  
Positive = Presence of Cr(VI) coating / surface layer  
the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

**\*Exemption: The received sample is exempted under directive 2002/95/EC Annex Article 7: lead in high melting temperature solder type solders (i.e. tin-lead solder alloys containing more than 85% of lead).**

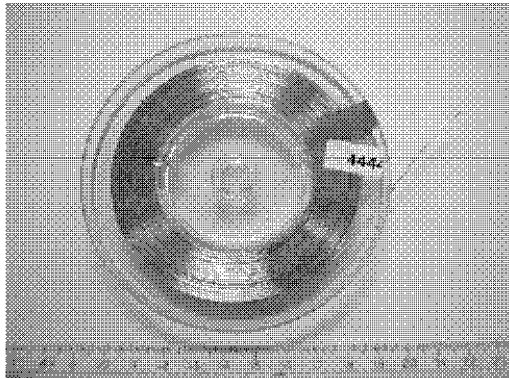
Lab Analyst(s): Jojo and Eileen

Remarks: Sample received was totally dissolved by preconditioning method.

**Sample photo:**

Sample Description : PbSn10Ag2 Solder Wire

SGS authenticate the photo on original report only



Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944

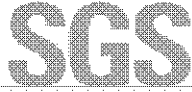
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## Annex 3: Analysis Result of Die-Bonding Solder (Page 4 of 6)



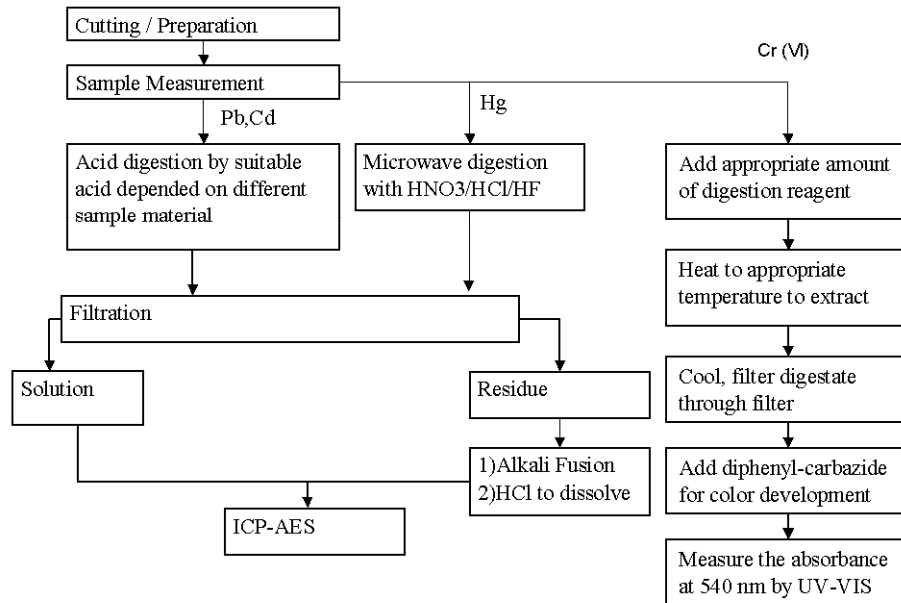
Test Report

No: 10211878(6) R1

Date: 02-Nov-10

Page 4 of 6

**Process Flow of IEC 62321 (Pb, Cd, Hg & Cr<sup>6+</sup>)**



Remarks: Sample received was totally dissolved by preconditioning method.(CrVI method excluded)

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## Annex 3: Analysis Result of Die-Bonding Solder (Page 5 of 6)

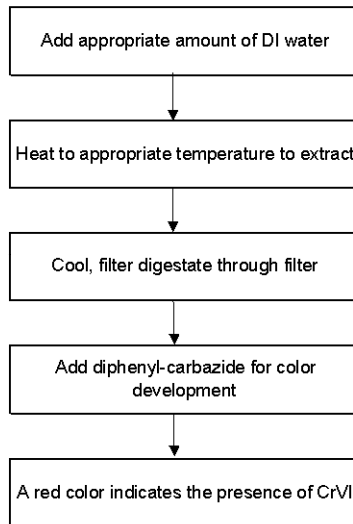
# SGS

**Test Report**

No: 10211878(6) R1

Date: 02-Nov-10

Page 5 of 6

**Process Flow of Cr(VI) by Boiling Water Extraction (IEC62321)**

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



Test Report

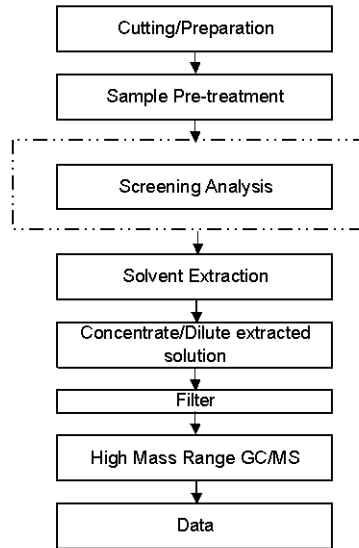
No: 10211878(6) R1

Date: 02-Nov-10

Page 6 of 6

### Process Flow of PBBs and PBDEs by GC/MS (IEC 62321)

First Testing Process → Optional screen process ..... Confirmation process ...→



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

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## Annex 4: Analysis Result of Die-bonding Wire (Page 1 of 4)

**Test Report No.** F690501/LF-CTSAYAA10-14357

Issued Date: April 26, 2010

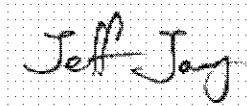
Page 1 of 4

**To:** HEESUNG METAL LTD  
693-1  
Gojan-dong  
Namdong-gu  
INCHEON 405-820  
Korea

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

**SGS File No.** : AYAA10-14357  
**Product Name** : Gold Bonding Wire (4N)  
**Item No./Part No.** : Gold Bonding Wire (4N)  
**Received Date** : April 21, 2010  
**Test Performing Date** : April 22, 2010  
**Test Performed** : SGS Testing Korea tested the sample(s) selected by applicant with following results  
**Test Results** : For further details, please refer to following page(s)

Pluto Kim  
Cindy Park/ Testing Person

**SGS Testing Korea Co. Ltd.**

Jeff Jang / Chemical Lab Mgr

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In case of errors, please refer to the results shown in this test report being only to the company's files and such documents are retained for 100 days only.

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## Annex 4: Analysis Result of Die-bonding Wire (Page 2 of 4)



**Test Report No.** F690501/LF-CTSAYAA10-14357

**Issued Date:** April 26, 2010

Page 2 of 4

**Sample No.** : AYAA10-14357.001  
**Sample Description** : Gold Bonding Wire (4N)  
**Item No./Part No.** : Gold Bonding Wire (4N)  
**Comments** : Material is gold.

### Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI) By boiling water extraction*	**	With reference to IEC 62321:2008	-	Negative

### Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

NOTE: (1) N.D. = Not detected (<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) \*\* = Qualitative analysis (No Unit)

(6) \* = Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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## Annex 4: Analysis Result of Die-bonding Wire (Page 3 of 4)



**Test Report No.** F690501/LF-CTSAYAA10-14357

**Issued Date:** April 26, 2010

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**Sample No.** : AYAA10-14357.001  
**Sample Description** : Gold Bonding Wire (4N)  
**Item No./Part No.** : Gold Bonding Wire (4N)  
**Comments** : Material is gold.

**Picture of Sample as Received:**



**NOTE:** (1) N.D. = Not detected.(<MDL)  
(2) mg/kg = ppm  
(3) MDL = Method Detection Limit  
(4) - = No regulation  
(5) \*\* = Qualitative analysis (No Unit)  
(6) \* = Boiling-water-extraction:  
Negative = Absence of CrVI coating  
Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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## Annex 4: Analysis Result of Die-bonding Wire (Page 4 of 4)

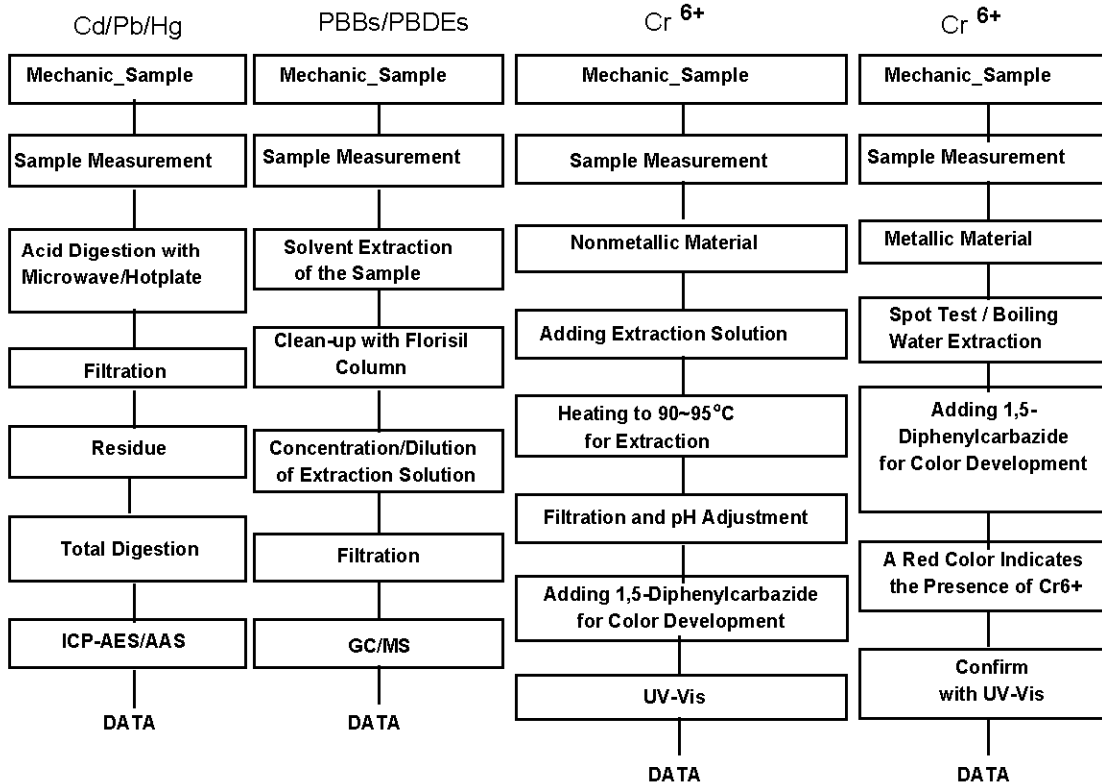


Test Report No. F690501/LF-CTSAYAA10-14357

Issued Date: April 26, 2010

Page 4 of 4

### Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr<sup>6+</sup>/PBBS&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.

Operator Dami Yeom

Section Chief Jeff Jang

\*\*\* End \*\*\*

- NOTE:
- (1) N.D. = Not detected.( <MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) \*\* = Qualitative analysis (No Unit)
  - (6) \* = Boiling-water-extraction:  
 Negative = Absence of Cr(VI) coating  
 Positive = Presence of Cr(VI) coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.



## Annex 5: Analysis Result of Lead Frame (page 1 of 4)



**Test Report**                      1783903                      Date : 5-Mar-2010                      Page 1 of 4

**Client : TSP - T Co.,Ltd.**  
**Northern Region Industrial Estate 123 Moo 4,**  
**T.Bankang, A. Muang, Lamphun 51000 Thailand**

The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description : Lead Frame  
 Sample No. : 1828980  
 Sample Condition : As per attached photograph  
 Part No. : TO-92 Ag (0.381T)  
 Lot No. : I-A100205-1  
 Manufacturer : POONGSAN  
 Buyer : KEC-T  
 Sample Receiving Date : 2-Mar-2010  
 Testing Period : 02-Mar-2010 to 05-Mar-2010  
 Test Requested : In accordance with the RoHS Directive 2002/95/EC and its amendment directives  
 Test Method : (1) With reference to IEC 62321:2008 for Lead content, Analysis was performed by ICP-OES.  
 (2) With reference to IEC 62321:2008 for Cadmium content, Analysis was performed by ICP-OES.  
 (3) With reference to IEC 62321:2008 for Mercury content, Analysis was performed by ICP-OES.  
 (4) With reference to IEC 62321:2008 for Hexavalent Chromium by Colorless and Colored Chromate Coating on Metals/ Colorimetric Method, Analysis was performed by UV-Vis spectrometry.  
 Test Results : Please refer to next page.

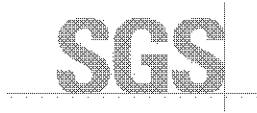
Signed for and on behalf of  
 SGS (Thailand) Limited



Pornpana Lirathpong  
 Hardlines Testing Manager

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## Annex 5: Analysis Result of Lead Frame (page 2 of 4)



Test Report

1783903

Date : 5-Mar-2010

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### TEST RESULTS

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

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Lead (Pb)	(1)	n.d.	2	1000
Cadmium (Cd)	(2)	n.d.	2	100
Mercury (Hg)	(3)	n.d.	2	1000
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional)	(4)	Negative	-	#

Test Part Description  
Result (1) metal

Note :

- (a) mg/kg = ppm ; 0.1wt% = 1000 ppm
- (b) n.d. = Not Detected
- (c) MDL = Method Detection Limit
- (d) # : Positive means the presence of CrVI on the tested areas  
Negative means the absence of CrVI on the tested areas
- (e) "-" = Not regulated

1485616

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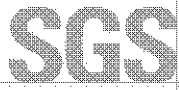
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## Annex 5: Analysis Result of Lead Frame (page 3 of 4)



Test Report

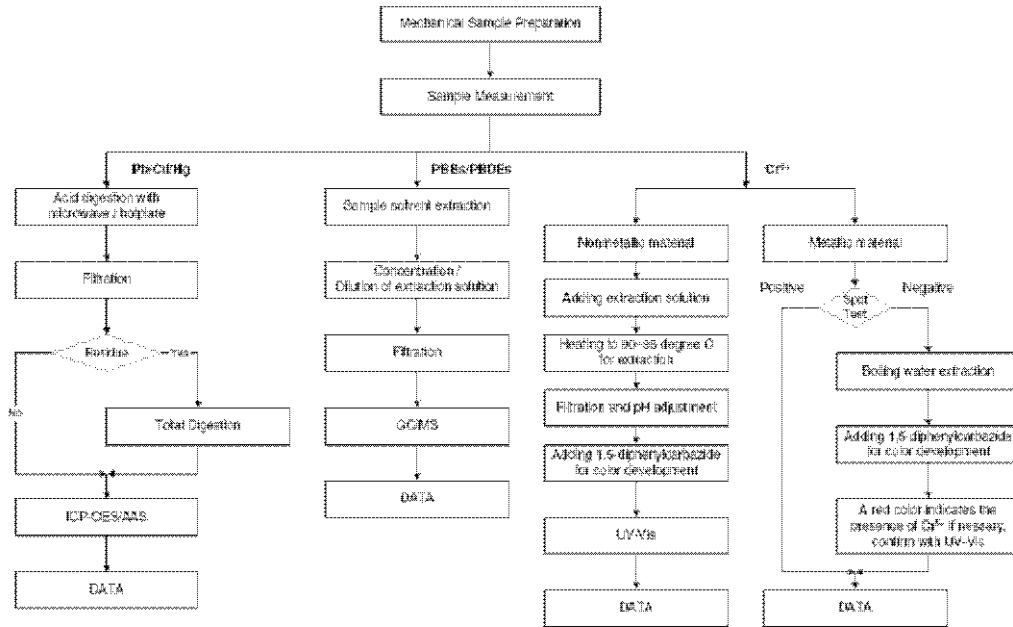
1783903

Date : 5-Mar-2010

Page 3 of 4

Flow Chart for RoHS : Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing

1. Operator : Wannisa Seakew
2. Section Chief : Laddawan Braapit
3. The sample was dissolved totally by pre-conditioning method according to below flowchart. (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)



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



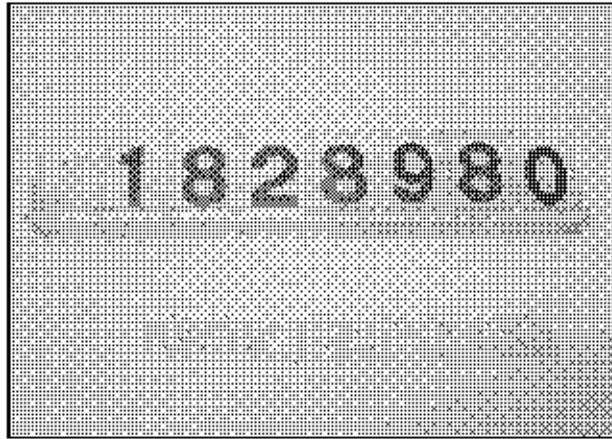
**Test Report**

1783903

Date : 5-Mar-2010

Page 4 of 4

SAMPLE/ATTACHMENT PICTURE



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

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# Annex 6: Analysis Result of Silicon Wafer (Page 1 of 7)



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## Test Report

No. : CE/2010/B2372 Date : 2010/11/18 Page : 1 of 7


LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description	: WAFER
Style/Item No.	: THYRISTOR
Sample Receiving Date	: 2010/11/11
Testing Period	: 2010/11/11 TO 2010/11/18

Test Result(s) : Please refer to next page(s).



Chenyu Kung / Operation Manager  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei

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## Annex 6: Analysis Result of Silicon Wafer (Page 2 of 7)



### Test Report

No. : CE/2010/B2372 Date : 2010/11/18 Page : 2 of 7

LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



#### Test Result(s)

PART NAME No.1 : WAFER

Test Item (s):	Unit	Method	MDL	Result No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	19200
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
<b>Sum of PBBs</b>			-	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl			5	n.d.
Tribromobiphenyl			5	n.d.
Tetrabromobiphenyl			5	n.d.
Pentabromobiphenyl			5	n.d.
Hexabromobiphenyl			5	n.d.
Heptabromobiphenyl			5	n.d.
Octabromobiphenyl			5	n.d.
Nonabromobiphenyl			5	n.d.
Decabromobiphenyl			5	n.d.
<b>Sum of PBDEs</b>			-	n.d.
Monobromodiphenyl ether			5	n.d.
Dibromodiphenyl ether			5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether			5	n.d.
Pentabromodiphenyl ether			5	n.d.
Hexabromodiphenyl ether			5	n.d.
Heptabromodiphenyl ether			5	n.d.
Octabromodiphenyl ether			5	n.d.
Nonabromodiphenyl ether			5	n.d.
Decabromodiphenyl ether			5	n.d.

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## Annex 6: Analysis Result of Silicon Wafer (Page 3 of 7)



### Test Report

No. : CE/2010/B2372 Date : 2010/11/18 Page : 3 of 7

LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



Test Item (s):	Unit	Method	MDL	Result
				No.1
<b>Halogen</b>				
Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)			50	n.d.
Halogen-Bromine (Br) (CAS No.: 010097-32-2)			50	n.d.
Halogen-Iodine (I) (CAS No.: 014362-44-8)			50	n.d.

**Note :**

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

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## Annex 6: Analysis Result of Silicon Wafer (Page 4 of 7)



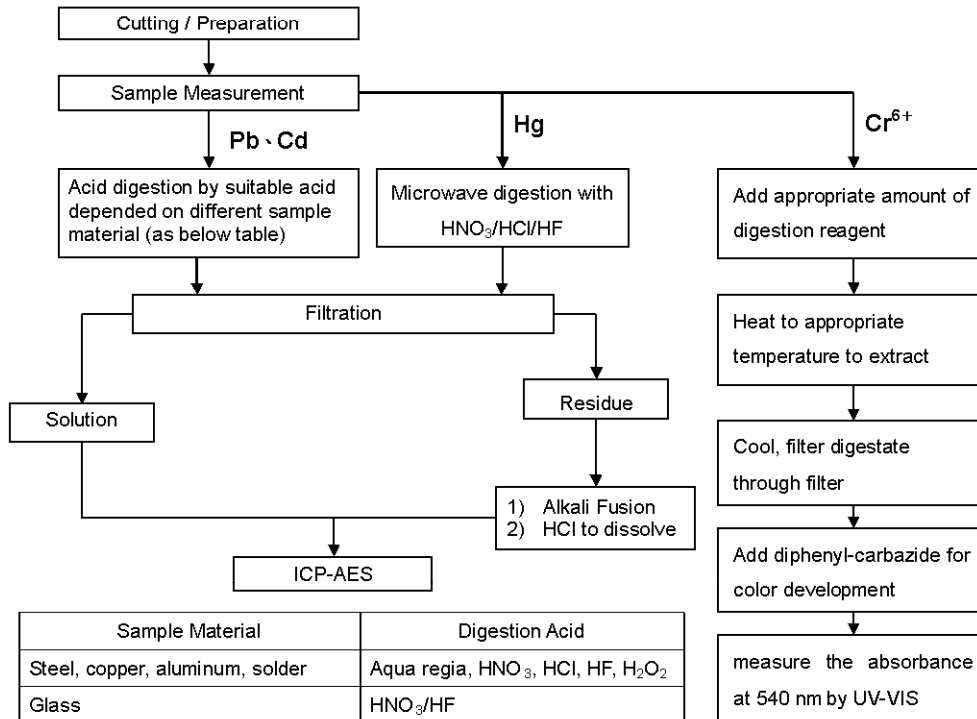
### Test Report

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LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.  
(Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

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## Annex 6: Analysis Result of Silicon Wafer (Page 5 of 7)

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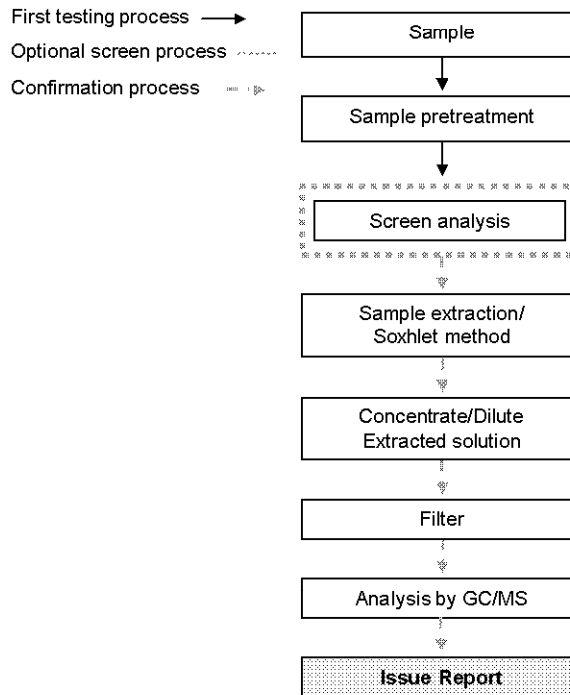
No. : CE/2010/B2372 Date : 2010/11/18 Page : 5 of 7

LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



#### PBB/PBDE analytical FLOW CHART

- 1) Name of the person who made measurement: Roman Wong
- 2) Name of the person in charge of measurement: Troy Chang



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## Annex 6: Analysis Result of Silicon Wafer (Page 6 of 7)

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### Test Report

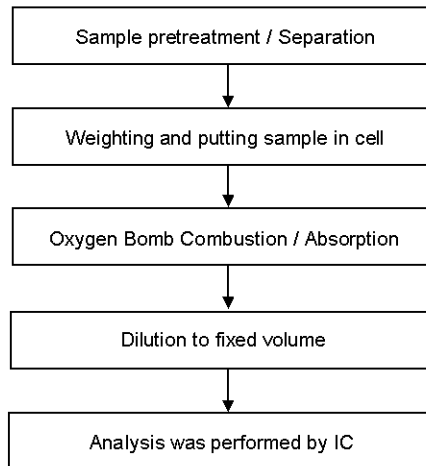
No. : CE/2010/B2372 Date : 2010/11/18 Page : 6 of 7

LITE-ON SEMICONDUCTOR CORP.  
28-1, WU SHIN STREET, TA WU LUNG, KEELUNG, TAIWAN



#### Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Rita Chen
- 2) Name of the person in charge of measurement: Troy Chang



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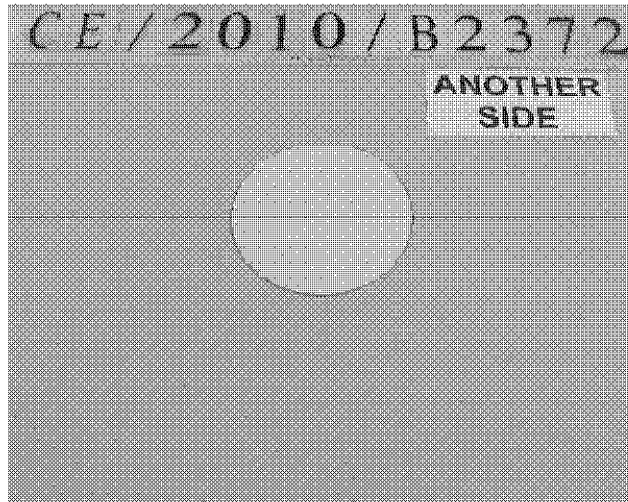
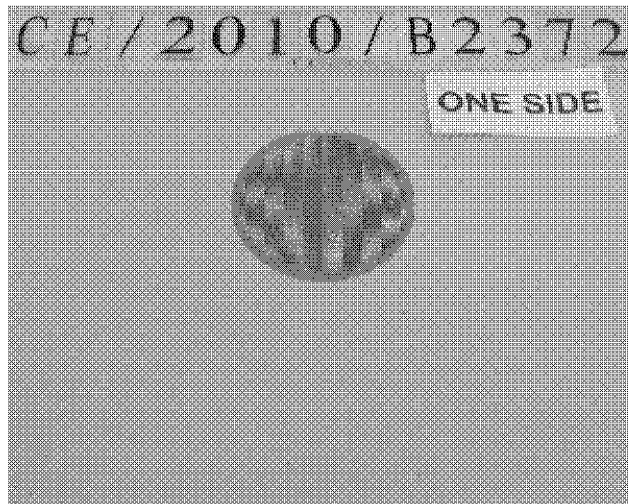
## Annex 6: Analysis Result of Silicon Wafer (Page 7 of 7)

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

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## Annex 7: Applicable RoHS exemptions

13.2.2003 EN Official Journal of the European Union L 37/19

**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**

13.2.2003 EN Official Journal of

Article 4

**Prevention**

1. Member States shall ensure that, from 1 July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). National measures restricting or prohibiting the use of these substances in electrical and electronic equipment which were adopted in line with Community legislation before the adoption of this Directive may be maintained until 1 July 2006.

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 Reso-

13.2.2 EN Official Journal of the European Union L 37/23

2. Paragraph 1 shall not apply to the applications listed in the Annex.

ANNEX

**Applications of lead, mercury, cadmium and hexavalent chromium, which are exempted from the requirements of Article 4(1)**

1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp.
2. Mercury in straight fluorescent lamps for general purposes not exceeding:
 

— halophosphate	10 mg
— triphosphate with normal lifetime	5 mg
— triphosphate with long lifetime	8 mg.
3. Mercury in straight fluorescent lamps for special purposes.
4. Mercury in other lamps not specifically mentioned in this Annex.
5. Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.
6. Lead as an alloying element in steel containing up to 0,35 % lead by weight, aluminium containing up to 0,4 % lead by weight and as a copper alloy containing up to 4 % lead by weight.
7. — Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85 % lead),
  - lead in solders for servers, storage and storage array systems (exemption granted until 2010),
  - lead in solders for network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunication,
  - lead in electronic ceramic parts (e.g. piezoelectric devices).
8. Cadmium plating except for applications banned under Directive 91/338/EEC (\*) amending Directive 76/769/EEC (\*\*) relating to restrictions on the marketing and use of certain dangerous substances and preparations.