

# SM8eu/SOT89eu ICP Analysis Note

The appended ICP Analysis reports demonstrate compliance with EC directives 2002/95/EC (Restriction of the use of certain hazardous substances "RoHS") and the 24<sup>th</sup> amendment to 76/769/EEC (Restrictions on the marketing and use of certain dangerous substances and preparations).

This analysis was performed to independently verify that the content of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PDBE) present is within the permitted levels set.

**Note:** This report is a composite of the reports for the individual, homogenous parts of the product. The table below is a summary of the data in the following pages.

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K. J. Chthero

K.Clithero Group Quality Manager

RoHS Substance	Result (ppm)
Lead	0
Mercury	Not detected
Cadmium	Not detected
Hexavalent Chromium	Not detected
Polybrominated Biphenyls (PBB)	Not detected
Polybrominated Diphenyl Ethers (PDBE)	Not detected

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This analysis was performed to independently verify that the content of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PDBE) present is within the permitted levels set.

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K. J. Chthero

K.Clithero Group Quality Manager

RoHS Substance	Result (ppm)
Lead	25
Mercury	Not detected
Cadmium	Not detected
Hexavalent Chromium	Not detected
Polybrominated Biphenyls (PBB)	Not detected
Polybrominated Diphenyl Ethers (PDBE)	Not detected

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Zetex GmbH	Zetex Inc	Zetex (Asia) Ltd	Diodes Zetex Semiconductors Limited
Kustermann-Park	700 Veterans Memorial Highway	3701-04 Metroplaza Tower 1	Zetex Technology Park,
Balanstrasse 59, 8th Floor	Hauppauge, NY 11788	Hing Fong Road, Kwai Fong	Chadderton, Oldham, OL9 9LL
D-81541 München, Germany	USA	Hong Kong	United Kingdom
Tel: (49) 89 45 49 49 0	Tel: (1) 631 360 2222	Tel: (852) 26100 611	Tel: (44) 161 622 4444
Fax: (49) 89 45 49 49 49	Fax: (1) 631 360 8222	Fax: (852) 24250 494	Fax: (44) 161 622 4446
email: europe.sales@zetex.com	email: usa.sales@zetex.com	email: asia.sales@zetex.com	email: hq@zetex.com

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ZETEX SEMICONDUCTORS PLC ZETEX TECHNOLOGY PARK, CHADDERTON, OLDHAM. OL9 9LL. UNITED KINGDOM

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

Sample Description	:	WAFER
Buyer/Order No.	:	65637
Sample Receiving Date	:	2008/04/30
Testing Period	:	2008/04/30 TO 2008/05/08

:

\_\_\_\_\_

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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 NO. 136-1, Wu Kung Road, WuKu Industrial Zone, Taipei county, Taiwan.

 t(886-2) 22993939 f(886-2) 2299-3237
 www.sgs.com.tw



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ZETEX SEMICONDUCTORS PLC ZETEX TECHNOLOGY PARK, CHADDERTON, OLDHAM. OL9 9LL. UNITED KINGDOM

#### Test Result(s)

PART NAME NO.1 : WAFER

Test Item (s):	Unit	Method	MDL	Result
Cadmium (Cd)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Cadmium by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Lead by ICP- AES.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Mercury by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Hexavalent Chromium for non-metallic samples by UV/Vis Spectrometry.	2	n.d.
Antimony (Sb)	mg/kg	With reference to US EPA Method 3050B for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.
Halogen-Chlorine (Cl) (CAS No.: 007782-50-5)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC method for Chlorine content.	50	n.d.
Halogen-Bromine (Br) (CAS No.: 007726-95-6)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC method for Bromine content.	50	n.d.

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No. : CE/2008/49068 Date : 2008/05/08

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Test Item (s):	Test Item (s): Unit Method	Method MDI	Result	
	Onic	method	MDE	No.1
Sum of PBBs		-	-	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl	T		5	n.d.
Tribromobiphenyl	1		5	n.d.
Tetrabromobiphenyl	1		5	n.d.
Pentabromobiphenyl	1		5	n.d.
Hexabromobiphenyl	T		5	n.d.
Heptabromobiphenyl	T		5	n.d.
Octabromobiphenyl	T		5	n.d.
Nonabromobiphenyl	T		5	n.d.
Decabromobiphenyl	]	With reference to IEC	5	n.d.
Sum of PBDEs (Mono to Nona)	ma/ka	62321/2nd CDV (111/95/CDV).	-	n.d.
(Note 4)	iiig/kg	Determination of PBB and		
Monobromodiphenyl ether	Ĩ	PBDE by GC/MS.	5	n.d.
Dibromodiphenyl ether	]		5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether	Ĩ		5	n.d.
Pentabromodiphenyl ether			5	n.d.
Hexabromodiphenyl ether	Ĩ		5	n.d.
Heptabromodiphenyl ether	T		5	n.d.
Octabromodiphenyl ether	T		5	n.d.
Nonabromodiphenyl ether	]		5	n.d.
Decabromodiphenyl ether	]		5	n.d.
Sum of PBDEs (Mono to Deca)			-	n.d.

Note : 1. mg/kg = ppm

2. n.d. = Not Detected

3. MDL = Method Detection Limit

4. According to 2005/717/EC DecaBDE is exempt.

5. " - " = Not Regulated

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 (1886-2) 22993939 f(886-2) 2299-3237
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No. SH8015479/ CHEM

Date: Feb. 14, 2008

Page 1 of 5

MITSUI HIGH-TEC(SHANGHAI)CO., LTD NO.2001 XINJIN QIAO RD JINQIAO EXPORT PROCESSING ZONE PUDONG SHANGHAI CHINA

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

Sample Name	: LEAD FRAME
SGS Ref No.	: 10845832-2
Part No	: EFTECT 64(SILVER)
Sample Receiving Date	: Feb.03, 2008
Testing Period	: Feb.03 — 14, 2008
Test Requested	: To determine the Cadmium, Lead, Mercury, Hexavalent Chromium, PBBs(Polybrominated biphenyls) and PBBEs(PBDEs) (Polybrominated biphenyl ethers) Content of the submitted sample.
Test Method	<ul> <li>(1) With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) for Cadmium content Analysis was performed by ICP.</li> <li>(2) With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) for Lead content Analysis was performed by ICP and AAS.</li> <li>(3) With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) for Mercury content Analysis was performed by ICP.</li> <li>(4) With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) for Hexavalent Chromium by spot test / Colorimetric Method.</li> <li>(5) With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) for PBBs / PBDEs Content. Analysis was performed by GC/MS</li> </ul>

**Test Results** 

: Please refer to next pages

Signed for and on behalf of SGS-CSTC Chemical Laboratory

Ella Zhang / Section Manager

Signed for and on behalf of SGS-CSTC Chemical Laboratory

011

Sandy/Hao Lab Manager

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No. SH8015479/ CHEM

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

Test Item(s):	Method (refer to)	<u>1*</u>	MDL
Cadmium(Cd)	(1)	ND	2
Lead (Pb)	(2)	ND	2
Mercury (Hg)	(3)	ND	2
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction	(4)	Negative	See Note (4)
Sum of PBBs	332 93	ND	
Monobromobiphenyl	1.5	ND	5
Dibromobiphenyl	69	ND	5
Tribromobiphenyl	9	ND	5
Tetrabromobiphenyl		ND	5
Pentabromobiphenyl	902 9	ND	5
Hexabromobiphenyl	1 5	ND	5
Heptabromobiphenyl	192	ND	5
Octabromobiphenyl	9	ND	5
Nonabromobiphenyl		ND	5
Decabromobiphenyl	(5)	ND	5
Sum of PBDEs		ND	- C,
Monobromodiphenyl ether	3 6	ND	5
Dibromodiphenyl ether	a) 201	ND	5
Tribromodiphenyl ether		ND	5
Tetrabromodiphenyl ether	- Se	ND	5
Pentabromodiphenyl ether	65	ND	5
Hexabromodiphenyl ether	9	ND	5
Heptabromodiphenyl ether	2× 20	ND	5
Octabromodiphenyl ether		ND	5
Nonabromodiphenyl ether	19	ND	5
Decabromodiphenyl ether	1.00	ND	5

#### Test Part Description:

1. Copper metal with white (mix all)

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#### Note:

- (1) mg/kg = ppm
- (2) ND = Not Detected
- (3) MDL = Method Detection Limit
- (4) Spot-test:

Negative = Absence of CrVI coating, Positive = Presence of CrVI coating; (The tested sample should be further verified by boiling-water-extraction method if the spot test

- result is Negative or cannot be confirmed.)
- Boiling-water-extraction:
- 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.

(5) \*The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value.

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# Test Report No. SH8050865/CHEM Date: Apr. 16, 2008 Page 1 of 5

HERAEUS ZHAOYUAN PRECIOU METAL MATERIALS CO., LTD/ HERAEUS ZHAOYUAN (CHANGSHU) ELECTRONIC MATERIAL CO., LTD NO.238 LINGLONG ROAD, ZHAOYUAN SHANGDONG/ NO.248 HUANGHE ROAD CHANGSHU, JIANGSU

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

Sample Name	: GOLD BONDING WIRE HD
SGS Ref No.	: 10960194
Main Substance	: GOLD

Sample Receiving Date : Apr.15, 2008 Testing Period : Apr.15 – 16, 2008

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

Test Method : With reference to IEC 62321/2<sup>nd</sup> CDV (111/95/CDV) Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products (1) Determination of Cadmium by ICP.

- (2) Determination of Lead by ICP
- (3) Determination of Mercury by ICP.
- (4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method.
- (5) Determination of PBBs and PBDEs by GC/MS.

Test Results : Please refer to next pages

Conclusion

: Based on the performed tests on submitted samples, the results comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of SGS-CSTC Chemical Laboratory

Ella Zhang

Section Manager

Signed for and on behalf of SGS-CSTC Chemical Laboratory

sandy

Sandy Hao Lab Manager



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Date: Apr. 16, 2008

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

Test Item(s):	<u>Method</u>	1	МП	<u>RoHS</u>
<u>rest item(s).</u>	(refer to)	<u> </u>		<u>Limit</u>
Cadmium(Cd)	(1)	ND	2	100
Lead (Pb)	(2)	ND	2	1000
Mercury (Hg)	(3)	ND	2	1000
Hexavalent Chromium (CrVI) by spot test / boiling-water extraction	(4)	Negative	See Note (5)	#
Sum of PBBs		ND	-	1000
Monobromobiphenyl		ND	5	-
Dibromobiphenyl		ND	5	-
Tribromobiphenyl		ND	5	-
Tetrabromobiphenyl		ND	5	-
Pentabromobiphenyl		ND	5	-
Hexabromobiphenyl		ND	5	-
Heptabromobiphenyl		ND	5	-
Octabromobiphenyl		ND	5	-
Nonabromobiphenyl		ND	5	-
Decabromobiphenyl		ND	5	-
Sum of PBDEs (Note 4)	(5)	ND	-	1000
Monobromodiphenyl ether		ND	5	-
Dibromodiphenyl ether		ND	5	-
Tribromodiphenyl ether		ND	5	-
Tetrabromodiphenyl ether		ND	5	-
Pentabromodiphenyl ether		ND	5	-
Hexabromodiphenyl ether		ND	5	-
Heptabromodiphenyl ether		ND	5	-
Octabromodiphenyl ether		ND	5	-
Nonabromodiphenyl ether		ND	5	-
Decabromodiphenyl ether		ND	5	-
Sum of PBDEs (Mono to Deca)		ND	-	-

Test Part Description:

1. Golden metal thread



#### No. SH8050865/CHEM

Date: Apr. 16, 2008

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Note:

- (1) mg/kg = ppm
- (2) ND = Not Detected
- (3) MDL = Method Detection Limit
- (4) Sum of Mono to NonaBDE & according to 2005/717/EC DecaBDE is exempt.
- (5) Spot-test:

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

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

Boiling-water-extraction:

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.

- (6) # = Positive indicates the presence of Hexavalent Chromium on the tested areas.
- Negative indicates the absence of CrVI on the tested areas.
- (7) "-" = Not Regulated
- (8) The maximum permissible limit is quoted from the document 2005/618/EC amending RoHS directive 2002/95/EC



No. SH8050865/CHEM

Date: Apr. 16, 2008

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#### ATTACHMENTS

- 1) Name of the person who made measurement: Cathy Cai/George Xu/Diane Wang
- 2) Name of the person in charge of measurement: Terry Wang/Tracy Yue
- 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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		Page: 1 of 4
Report No. RT08R-2779-0	Date: Apr. 11, 2008	
Sample Description	: The following submitted sample(s)	said to be:-
Name/Type of Product	: KTMC-1050(+)	
Sample ID No.	: RT08R-2779-006	
Manufacturer/Vender	: KCC Corporation	
Sample received	: Apr. 08, 2008	
Testing Date	: Apr. 08, 2008 ~ Apr. 11, 2008	
Testing Laboratory	: Intertek Testing Center	
Testing Environment	: Temperature : ( 22 ~ 26 ) $^\circ \!$	Relative Humidity: ( 55 $\sim$ 65 ) %
Test Method(s)	: Please see the following page(s).	
Test Result(s)	: Please see the following page(s).	

\* Note 1 : The test results presented in this report relate only to the object tested.

\* Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.

Approved by,

mpt

E.Y.Lee / Lab. Technical Manager

Authorized by,

H.W.Yoo / Lab. General Manager

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#### Intertek Testing Center

Seoul Office : Tel : 02-2109-1250 Fax : 02-2109-1259 Gumi Office : Tel : 054-462-7647 Fax : 054-462-7657 Web Site : www.Intertek.co.kr Seoul Lab. : #709, 7Fl, Ace Techno Tower V, 197-22, Guro-3Dong, Guro-Gu, Seoul 152-766 Korea Tel : 02-2109-1260 Fax : 02-2109-1258 Ulsan Lab. : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun, Ulsan 689-865 Korea Tel : 052-257-6754 Fax : 052-276-6792



Report No. RT08R-2779-006

Page: 2 of 4 Date: Apr. 11, 2008

Sample ID No. : RT08R-2779-006 Sample Description : KTMC-1050(+)

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	5	N.D.
Mercury (Hg)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Hexavalent Chromium (Cr <sup>6+</sup> )	mg/kg	US EPA 3060A and determined by UV-visible	1	N.D.
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg		5	N.D.
Dibromobiphenyl	mg/kg		5	N.D.
Tribromobiphenyl	mg/kg		5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to LIS FPA	5	N.D.
Pentabromobiphenyl	mg/kg	3540C, by solvent extraction and determined by GC/MS Analysis	5	N.D.
Hexabromobiphenyl	mg/kg		5	N.D.
Heptabromobiphenyl	mg/kg		5	N.D.
Octabromobiphenyl	mg/kg		5	N.D.
Nonabromobiphenyl	mg/kg		5	N.D.
Decabromobiphenyl	mg/kg		5	N.D.
Polybrominated Diphenyl Ether (P	BDEs)	l .		1
Monobromodiphenyl ether	mg/kg		5	N.D.
Dibromodiphenyl ether	mg/kg		5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg		5	N.D.
Pentabromodiphenyl ether	mg/kg		5	N.D.
Hexabromodiphenyl ether	mg/kg		5	N.D.
Heptabromodiphenyl ether	mg/kg	Analysis	5	N.D.
Octabromodiphenyl ether	mg/kg		5	N.D.
Nonabromodiphenyl ether	mg/kg		5	N.D.
Decabromodiphenyl ether	mg/kg		5	N.D.

Tested by : Y.K Cho / H.J Kim / W.H Park

Notes : mg/kg = ppm = parts per million < = Less than N.D. = Not detected ( <MDL ) MDL = Method detection limit

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Report No. RT08R-2779-006

Sample ID No. : RT08R-2779-006 Sample Description : KTMC-1050(+)

\* View of sample as received;-



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Page: 3 of 4 Date: Apr. 11, 2008



Report No. RT08R-2779-006

Page: 4 of 4 Date: Apr. 11, 2008

Sample ID No. : RT08R-2779-006 Sample Description : KTMC-1050(+)



\*\* Remarks : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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

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No. SH8075804/CHEM

Date: May. 31, 2008

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SHANGHAI YUANHAO SURFACE FINISHING CO., LTD. NO.8, LANE18, SANZHUANG ROAD, SONGJIANG EXPORT PROCESSING ZONE, SHANGHAI

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

Sample Name	: MATTE TIN
SGS Ref No.	: 11051414
Main Substance	: PURE TIN
Sample Receiving Date	: May.28, 2008
Testing Period	: May.28 – 31, 2008
Test Requested	: In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.
Test Method	With reference to IEC 62321/2 <sup>nd</sup> CDV (111/95/CDV)
	Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products
	(1) Determination of Cadmium by ICP.
	(2) Determination of Lead by ICP and AAS.
	(3) Determination of Mercury by ICP.
	(4) Determination of Hexavalent Chromium by Spot test / Colorimetric Method.
Test Results	Please refer to next pages
Conclusion	Based on the performed tests on submitted samples, the results comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of SGS-CSTC Chemical Laboratory

1

Ella Zhang Section Manager

Signed for and on behalf of SGS-CSTC Chemical Laboratory

Sandy

Sandy Hao Lab Manager

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 SHCHEM 1937290

 Ltd
 3rd Building,No.889,Yishan Road,Shanghai,China
 200233
 tE&E:(86-21) 61402553
 fE&E:(86-21) 64953679
 www.en.sgs.com

 Hangy
 中国・上海・宜山路889号3号楼
 邮编: 200233
 HL:(86-21) 61402594
 HL:(86-21) 54500353
 e sgs.china@sgs.com



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

Test Item(s)-	<u>Method</u> (refer to)	1	MDL	RoHS Limit
Cadmium(Cd)	(1)	ND	2	100
Lead (Pb)	(2)	ND	2	1000
Mercury (Hg)	(3)	ND	2	1000
Hexavalent Chromium (CrVI) by spot test / boiling-water extraction	(4)	Negative	See Note (4)	#

Test Part Description:

Silvery-white metal part 1.

Note:

- (1) mg/kg = ppm
- (2) ND = Not Detected
- (3) MDL = Method Detection Limit
- (4) Spot-test:

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

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

Boiling-water-extraction:

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.

- (5) # = Positive indicates the presence of Hexavalent Chromium on the tested areas. Negative indicates the absence of CrVI on the tested areas.
- (6) The maximum permissible limit is quoted from the document 2005/618/EC amending RoHS directive 2002/95/EC

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#### **ATTACHMENTS**

1) Name of the person who made measurement: Cathy Cai/George Xu

2) Name of the person in charge of measurement: Terry Wang



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200233 邮编: 200233

tE&E:(86-21) 61402553 fE&E:(86-21) 64953679 HL:(86-21) 61402594 HL:(86-21) 54500353 e sgs.china@sgs.com



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Sample photo:



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邮编: 200233

HL:(86-21) 61402594 HL:(86-21) 54500353 e sgs.china@sgs.com

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