

Test Report

No. SHAEC1408574203

Date: 12 Sep 2014

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TOPDIODE MANUFACTURING COMPANY LIMITED

SHANGKENG INDUSTRIAL ROAD NO.3, SHANGKENG INDUSTRIAL PARK, CHANGPING TOWN, DONGGUAN, GUANGDONG, CHINA

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

SGS Job No. : SP14-014095 - SUZ
 Main Substance : Cu.Si.EPOXY
 Model No. : DIODE BRIDGE
 Client Ref. Information : R1、A-405、DO-34、DO-35、DO-41、DO-15、DO-27、DO-201AD、DO-201AE、R5、R6、R6M、HVM、HVO3、HVO7、MTO3、HT5M、FV5M、FV20M FH、DO-214AC、DO-214AA、DO-214AB、MINI-MELF (DO-213AA)、MELF (DO-213AB)、MBF、SOD-110、SOD-123、BTS、DL-41、SOD-80、SOD-323
 SOD-523、SOT-23、SOT-323、SOT-363、SOT-523、MB、MBS、MDB、DB、DBS、RC-2WOM、WOG、2WOG、BR、BR3、BR6、BR8、BR10、RS、DF、DFS
 KBP、KBPC、GBPC、KBPM、KBL、KBJ、KBU、RBU、GBC、GBU、TO-220AB、ITO-220AB、TO-220AC、ITO-220AC、TO-3P、TO-247、TO-252 (DPAK)
 TO-263 (D2PAK)、0805 (2012)、1206 (3216)、SM-1、SM-2、DB-IMS、DB-1SD、B-1、RB-15、RS-1、RS-2、RS-5、TBL、BR-25W、BR-6、BR-25L、KBK、HBL、MBR-25、MBR-25W、MP-6、MP-8/10、MB-25W、MMB-25、MMB-25W、SOD-123FL

Date of Sample Received : 15 May 2014
 Testing Period : 15 May 2014 - 24 May 2014
 Test Requested : Selected test(s) as requested by client.
 Test Method : Please refer to next page(s).
 Test Results : Please refer to next page(s).
 Conclusion : Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.



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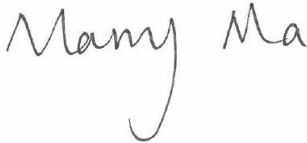
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Signed for and on behalf of
SGS-CSTC Ltd.



Marry Ma
Approved Signatory



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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA14-085742.001	SILVERY METAL
SN2	SHA14-085742.002	COPPER METAL
SN3	SHA14-085742.003	DARK-GREY SOLID
SN4	SHA14-085742.004	GREY-SOLID

Remarks :

- (1) 1 mg/kg = 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 62321-5:2013, determination of Cadmium by ICP-OES.
 - (2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
 - (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
 - (4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
 - (5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	Limit	Unit	MDL	003	004
Cadmium (Cd)	100	mg/kg	2	ND	ND
Lead (Pb)	1000	mg/kg	2	ND	ND
Mercury (Hg)	1000	mg/kg	2	ND	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	2	ND	ND
Sum of PBBs	1000	mg/kg	-	ND	ND
Monobromobiphenyl	-	mg/kg	5	ND	ND
Dibromobiphenyl	-	mg/kg	5	ND	ND
Tribromobiphenyl	-	mg/kg	5	ND	ND
Tetrabromobiphenyl	-	mg/kg	5	ND	ND
Pentabromobiphenyl	-	mg/kg	5	ND	ND
Hexabromobiphenyl	-	mg/kg	5	ND	ND
Heptabromobiphenyl	-	mg/kg	5	ND	ND
Octabromobiphenyl	-	mg/kg	5	ND	ND
Nonabromobiphenyl	-	mg/kg	5	ND	ND



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Test Item(s)	Limit	Unit	MDL	003	004
Decabromobiphenyl	-	mg/kg	5	ND	ND
Sum of PBDEs	1000	mg/kg	-	ND	ND
Monobromodiphenyl ether	-	mg/kg	5	ND	ND
Dibromodiphenyl ether	-	mg/kg	5	ND	ND
Tribromodiphenyl ether	-	mg/kg	5	ND	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND	ND
Octabromodiphenyl ether	-	mg/kg	5	ND	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND	ND
Decabromodiphenyl ether	-	mg/kg	5	ND	ND

Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II

RoHS Directive 2011/65/EU

Test Method : (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
 (2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
 (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
 (4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by spot test / Colorimetric Method using UV-Vis.

Test Item(s)	Limit	Unit	MDL	001	002
Cadmium (Cd)	100	mg/kg	2	ND	ND
Lead (Pb)	1000	mg/kg	2		ND
Mercury (Hg)	1000	mg/kg	2	ND	ND
Hexavalent Chromium (Cr(VI))	-	-	◇	Negative	Negative

Notes :

(1) The maximum permissible limit is quoted from directive 2011/65/EU, Annex II

(2) ◇Spot-test:

Negative = Absence of Cr(VI) coating, Positive = Presence of Cr(VI) 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 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 cm² sample surface area.



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Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

Lead

Test Method : Titration method

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Lead (Pb)	0.1	%	-	91.80▲

Notes :

▲=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).

Remark:The test results are taken from report SHAEC1408574202.



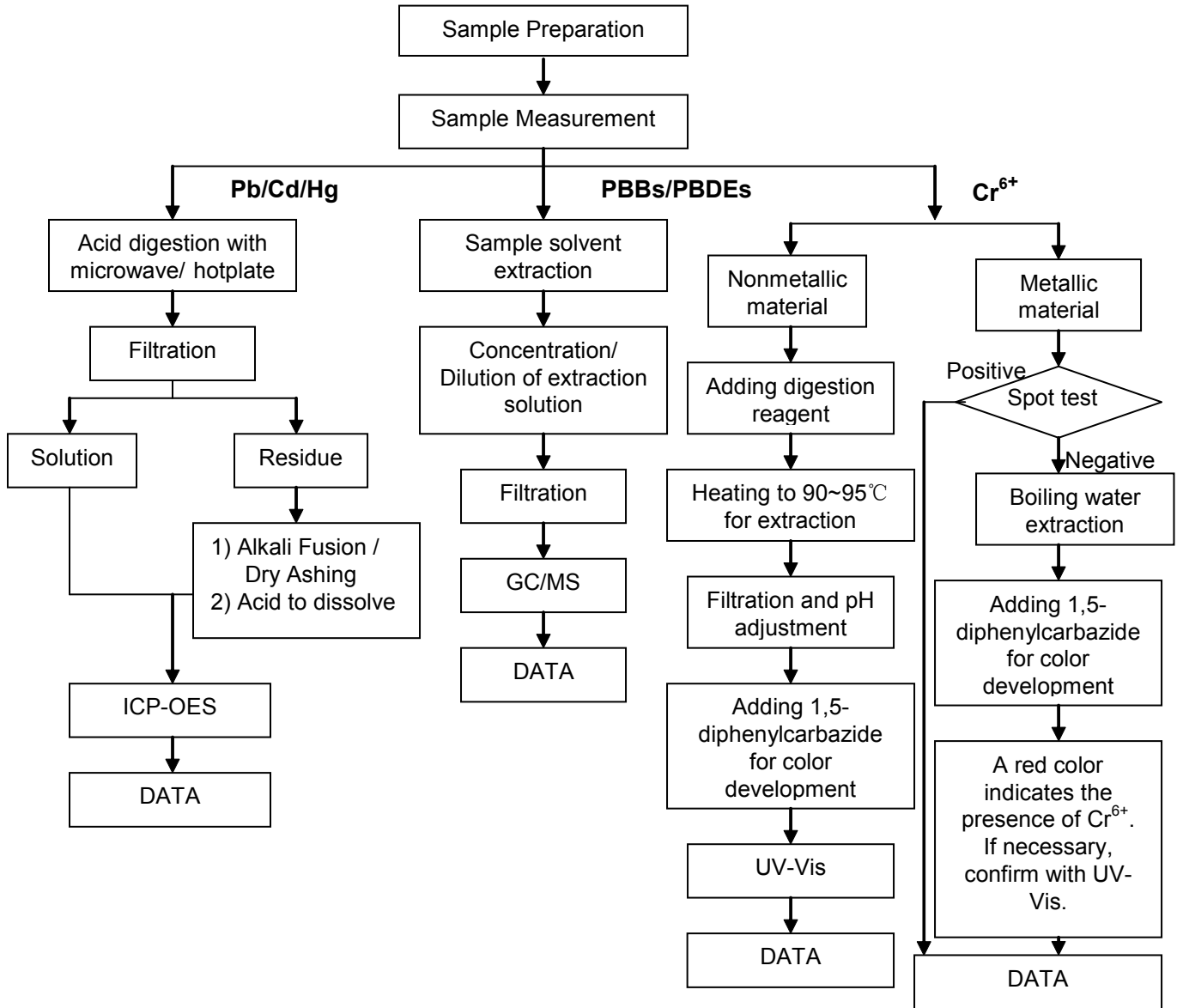
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RoHS Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs test method excluded)

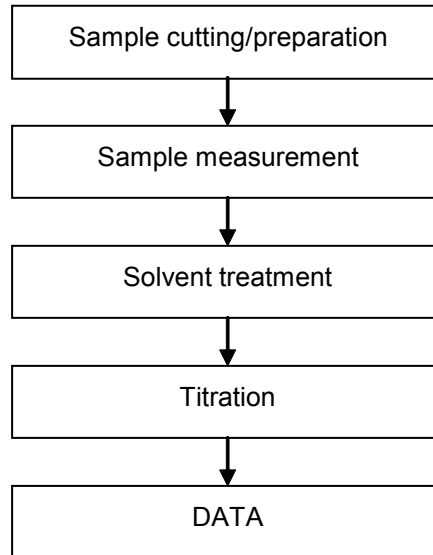


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Titration Testing Flow Chart



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Sample photo:



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