



RoHS Screening Analysis Report

Number : TWNC00256902

Applicant: i-Energy Corporation Ltd.
7F.-4, No.128, Sec.3,
Minsheng E. Rd., Taipei City 105,
Taiwan (R.O.C.)

Date : May 28, 2012

Sample Description:

One (1) group of submitted samples said to be :
Sample Description : PV Micro inverter
Style / Item No. : GT260
Date Sample Received : May 14, 2012
Date Test Started : May 14, 2012

Test Conducted:

As requested by the applicant, for details please refer to attached pages.

Conclusion:

<u>Tested Samples</u>	<u>Standard</u>	<u>Result</u>
Screening components of submitted samples	With reference to test method of IEC 62321 edition 1.0:2008 chapter 6, screening by XRF spectroscopy and chemical confirmation test for RoHS directive (2002/95/EC)	Pass

Remark:

As requested by the applicant, only components shown in this report were screened by XRF spectroscopy for 2002/95/EC. Other components were not screened in this report.

Chemical confirmation tests were conducted to verify the inconclusive results of XRF tests.

Authorized By:
On Behalf Of Intertek Testing Services
Taiwan Limited



K. Y. Liang
Director

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approval of the laboratory.



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Test Conducted

RoHS Screening Analysis

Determination of total value of regulated substances in electro technical products, elements of cadmium (Cd), lead (Pb), mercury (Hg), chromium (Cr) and bromine (Br) content were measured by XRF spectroscopy for RoHS restricted substances. The analyzer is therefore unable to determine if it is PBB, PBDE, Cr(VI) or non restricted bromine and chromium substances in the sample.

(I) Test Result Summary:

Screened Component	XRF Result			Chemical Confirmation Result (ppm)
	Element	Screened Result (ppm)	Conclusion	
(1)	Cd	ND	BL	Pb:454
	Pb	705	Inconclusive	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	NA	NA	
(2)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(3)	Cd	ND	BL	Cr ⁶⁺ : Negative(<0.02) (#1)
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	150200	Inconclusive	
	Br	NA	NA	
(4)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(5)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	



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(I) Test Result Summary:

Screened Component	XRF Result			Chemical Confirmation Result (ppm)
	Element	Screened Result (ppm)	Conclusion	
(6)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(7)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(8)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	387	BL	
	Br	ND	BL	
(9)	Cd	ND	BL	Pb:29956 (#2)
	Pb	27371	OL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	NA	NA	
(10)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(11)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(12)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	



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(I) Test Result Summary:

Screened Component	XRF Result			Chemical Confirmation Result (ppm)
	Element	Screened Result (ppm)	Conclusion	
(13)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(14)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(15)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	NA	NA	
(16)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(17)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(18)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(19)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	NA	NA	

Test Conducted

(I) Test Result Summary:

Screened Component	XRF Result			Chemical Confirmation Result (ppm)
	Element	Screened Result (ppm)	Conclusion	
(20)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(21)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(22)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(23)	Cd	ND	BL	Cr ⁶⁺ : ND
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	1888	Inconclusive	
	Br	ND	BL	
(24)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	NA	NA	
(25)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(26)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	



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(I) Test Result Summary:

Screened Component	XRF Result			Chemical Confirmation Result (ppm)
	Element	Screened Result (ppm)	Conclusion	
(27)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(28)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(29)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	
(30)	Cd	ND	BL	Not Tested
	Pb	ND	BL	
	Hg	ND	BL	
	Cr	ND	BL	
	Br	ND	BL	



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Test Conducted

(I) Test Result Summary:

Remarks: ppm = Parts per million = mg/kg
ND = Not detected and pass, the screened sample is found to be under detection limit of table III.
Inconclusive = the screened component may have potential non-compliance and confirmation Test by wet chemical analysis may be desired to obtain a quantitative result.
NA = Not applicable
BL = Below Limit. The screened component is found to be equal or below the lower screening threshold limit of table II.
OL = Over Limit. The screened component exceeds the defined threshold (see table II) and may present non-compliance. Confirmation Test by wet chemical analysis may be desired to obtain a quantitative result.
1 = Due to the surface area $50\pm 5 \text{ cm}^2$ as required by the IEC 62321 test method was not available from the submitted samples, reduced surface area from actual samples was used for Test directly by necessary adjustment of dilution factor. The test result by using this non-standardized method is for reference only.
2 = As claimed by the declaration submitted by the client, the tested component was within the scope of RoHS exception: lead as copper alloy containing up to 4% lead by weight was exempted from the prohibition of RoHS directive 2002/95/EC.
Negative = A negative test result indicated positive observation was not found at the time of Test.

Responsibility of Chemist: Irene Chiou / Kevin Liu / Cathy Chen

Date Sample Received : May 14, 2012
Test Period : May 14, 2012 To May 23, 2012



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Test Conducted

(II) XRF screening limits in mg/kg for regulated elements in various materials.

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	BL ≤ 70 < X < 130 ≤ OL	BL ≤ 70 < X < 130 ≤ OL	BL ≤ 70 < X < 150 ≤ OL
Pb	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 500 < X < 1500 ≤ OL
Hg	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 500 < X < 1500 ≤ OL
Cr	BL ≤ 700 < X	BL ≤ 700 < X	BL ≤ 500 < X
Br	BL ≤ 300 < X	Not Applicable	BL ≤ 250 < X

Remark: mg/kg = Milligram per kilogram = ppm
 BL = Below Limit
 X = Inconclusive result
 OL = Over Limit

(III) Estimated detection limits in mg/kg for regulated elements in various matrices.

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	50	70	70
Pb	100	200	200
Hg	100	200	200
Cr	100	200	200
Br	200	Not Applicable	200

Disclaimers:

The numerical test data of this XRF screening report is for reference purposes only due to the data variation incurred from various factors as described in next paragraph. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF screening report is sufficient for its/his/her purposes.

The results shown in this XRF screening report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.

Test Conducted

(IV) Test Method

<u>Test Item</u>	<u>Test Method</u>	<u>Reporting Limit</u>
Lead (Pb) content	With reference to IEC 62321 edition 1.0:2008 in clause 8/9/10, by microwave digestion until the tested samples are totally dissolved and determined by ICP-OES.	2 ppm
Chromium VI (Cr ⁶⁺) content (for non-metal)	With reference to IEC 62321 edition 1.0:2008 in annex C, by alkaline digestion and determined by UV-Vis spectrophotometer.	1 ppm
Chromium VI (Cr ⁶⁺) content (by boiling water extraction on metal) (mg/kg with 50cm ²)	With reference to IEC 62321 edition 1.0:2008 in annex B, by boiling water extraction and determined by UV-Vis spectrophotometer.	0.02 mg/kg with 50cm ²

Remark : Reporting Limit = Quantitation limit of analyte in sample

(V) RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 ppm)
Lead (Pb)	0.1% (1000 ppm)
Mercury (Hg)	0.1% (1000 ppm)
Chromium (VI) (Cr ⁶⁺)	0.1% (1000 ppm)
Polybrominated Biphenyls (PBBs)	0.1% (1000 ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 ppm)

The above limits were quoted from 2002/95/EC and amendment 2005/618/EC for homogeneous material.

Tested Components:

- (1) Silvery Metal Casing
- (2) Black Cable Insulator
- (3) Silvery Metal Screw For Casing
- (4) Black Plastic Cover
- (5) Black Plastic Connector
- (6) Black Plastic Nut
- (7) Black Plastic Connector
- (8) Grey Plastic Trnon
- (9) Silvery Metal Pin
- (10) Grey Soft Plastic Washer
- (11) Black Soft Plastic Inner Tube
- (12) Blue Cable Jacket
- (13) Brown Cable Jacket
- (14) Green/Yellow Cable Jacket
- (15) Brass Metal Wire
- (16) Black Cable Jacket
- (17) Black Plastic Connector
- (18) Capacitor - White/Brown Plastic Sleeve
- (19) Capacitor - Silvery Metal Can
- (20) Capacitor - Black Rubber Seal
- (21) Dark Grey Soft Plastic Seal Ring
- (22) Black Plastic Insulation Sheet
- (23) Light Green Soft Plastic Pad
- (24) Silvery Metal Screw For PCBA
- (25) Blue Plastic Terminal Sleeve
- (26) Black Heat Shrink Tube
- (27) Electronic Component - Blue Body Part
- (28) Black Soft Plastic Ring
- (29) Transparent Plastic Indicator
- (30) LED - Translucent Body Part

End of Report

Test Conducted

Photo



Test Conducted

Photo

