



Applicant: Shenzhen Growatt New Energy Co., Ltd.

Contact information: 4-13/F,Building A,Sino-German(Europe) Industrial Park,Hangcheng Ave,Bao'an District,

Shenzhen, China

The following sample(s) was (were) submitted and identified by client as:

Sample Name : Shine4G-X Model No. : Shine4G-X

Manufacturer : Guangdong Growatt New Energy Co., Ltd.

Address : Growatt Industrial Park, No.17 Pingheng Road Pingtan Town, Huiyang District,

Huizhou, Guangdong, China

Received Date : Jan. 17, 2022

Testing Period : From Jan. 17, 2022 to Jan. 20, 2022

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

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

Shen Zhen UONE Test Co., LTD.

Prepared by

Lili Zeng

Checked by

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Approved by

Lin Zhu

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Levent Liang



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Summary of test results:

TEST REQUEST

RoHS Directive 2011/65/EU and its subsequent amendments Directive (EU) 2015/863

To determine Lead (Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)),

(1) Polybrominated Biphenyls (PBBs) and Polybrominated DiphenylEthers (PBDEs) content by screening test and chemical test

(2) To determine Phthalates (DBP, BBP, DEHP, DIBP) content by chemical test

PASS



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Test Material List

Material No.	Description (Location)	Photo(s) of tested materials
10 1 10 PM	Silver label	OLD OLD OLD OLD
2	Black plastic (housing)	
3	White label	
4	White soft plastic (seal)	
5	Black soft plastic (washer)	Table 1 State
6	Black plastic (nut)	2,
47	Silver metal (screws)	
10,8 10,	Silver metal (USB socket)	101, 101, 101, 101,
9	Blue inner plastic	
10	Copper-colored metal (pin)	THE THE THE THE
11	Blue printing (capacitor, PCB)	20, 10, 10, 10,
_12	Silver metal shell (capacitor, PCB)	4. 4. 4. 4
0 13	Black rubber base (capacitor, PCB)	MO. THO. THO. THO
14	Silver metal pins (capacitor, PCB)	9
15	Silver foil (capacitor, PCB)	alle alle alle all
16	Dark silver foil (capacitor, PCB)	8-10 11-17 18 19 20 21-23 24 25
17	Yellow paper with liquid (capacitor, PCB)	
18	Black body (transistor, PCB)	
19	Brown body (capacitor, PCB)	
20	Black body (resistor, PCB)	
21	Silver metal (card slot)	
22	Copper-colored metal (pin)	26 27 28 29 30
23	Black plastic (card slot)	alle alle alle alle
24	Silver metal (nut)	10, 10, 10, 10,
25	Black foam	4 4 4 4
26	Black body (EC, PCB)	OHI OHI OHI OH
27	Silver metal (pin)	0 0 0 0
28	Black plastic (socket)	at the star star
29	White body (capacitor, PCB)	10. 110, 110, 110,
30	Black plastic sheet	4 6 6 2

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Material No.	Description (Location)	Photo(s) of tested materials
31	Green PCB	at at at
32	White label	101, 1101, 1101, 1101
33	Yellow body (LED light)	31 32 33 34 35 36 37 38 39 40
34	Gold Metal (terminal)	3
35	Silver metal cover	SIH760E
36	White paper	PM 52-(80/02-2188) PM 52-(80/02-
37	White glass glue	Mary 51 971
38	Black plastic (cable wire)	
39	Silver Metal (solder)	20, 110, 110, 110,
40	Silver wire	ste ste ste s
41	Green PCB	41 42 43
42	Black plastic (socket)	S +01 222 € REST
43	Copper-colored metal (pin)	CONTROL CONTRO
44	Black body (EC, PCB)	
45	Brown body (capacitor, PCB)	44 45 46 47 48 49 50
46	Black body (resistor, PCB)	
47	Black body (integrated circuit, PCB)	
48	White body (capacitor, PCB)	
49	Black body (transistor, PCB)	
50	Silver metal (solder)	



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Test Result(s):

(1) Lead (Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls (PBBs) and Polybrominated DiphenylEthers (PBDEs)

<u>Test Method:</u> IEC62321-3-1: 2013, IEC62321-4: 2013+A1:2017, IEC62321-5: 2013, IEC62321-6: 2015, IEC 62321-7-1:2015, IEC 62321-7-2: 2017, analyzed by EDXRF & ICP-OES & GC-MS & UV-Vis.

10/11	10%	EDX	RF Resu	ılt ⁽¹⁾	10/2	Chemical Result (2)	OB 10 10 10 10 10 10 10 10 10 10 10 10 10	Conclusion
No.	Pb	Cd	Hg	Cr	Br	(mg/kg)	Remark ⁽³⁾	
1	BL	BL	BL	BL	BL	OHE - OHE	OME -OME	PASS
2	BL	BL	BL	BL	BL	12 - 12 "	2 72	PASS
3	BL	BL	BL	BL	BL	11 - 11E	- NE - NE	PASS
4	BL	BL	BL	BL	BL	10, 10,	20, 20,	PASS
5	BL	BL	BL	BL	BL	16-16	& - &	PASS
6	BL	BL	BL	BL	BL	11012 -1012 "	10p. 40p.	PASS
7	BL	BL	BL	BL	NA	1 1.	1 1.	PASS
8	BL	BL	BL	BL	NA	190 - 190 I	10HV .TOHV	PASS
9	BL	BL	BL	BL	BL	2 2	2	PASS
10	BL	BL	BL	BL	NA	OHE - OHE	ME -ME	PASS
11	BL	BL	BL	BL	BL	120 -120 "	20 20	PASS
12	BL	BL	BL	BL	NA	JE - JE	JE - JE	PASS
13	BL	BL	BL	BL	BL	10, 10,	20, 20,	PASS
14	BL	BL	BL	BL	NA	16 - 16	4 - 4	PASS
15	BL	BL	BL	BL	BL	104 -104	10 14 14 OLA	PASS
16	BL	BL	BL	BL	BL	7 7.	A	PASS
17	BL	BL	BL	BL	BL	10 HE - 10 HE	10 Hz 10 Hz	PASS
18	BL	BL	BL	BL	BL	2 2	0 0	PASS
19	BL	BL	BL	BL	BL	ME - ME	ME -ME	PASS
20	BL	BL	BL	BL	BL	110 -110 "	20 70	PASS
21	BL	BL	BL	BL	NA	JE - JE	de - de	PASS
22	BL	BL	BL	BL	NA	10, -10, "	10, 40,	PASS
23	BL	BL	BL	BL	BL	20 - 20	4 - 4	PASS

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No.		EDX	(RF Resi	ılt ⁽¹⁾	120	Chemical Result (2)	D (3)	Canalysis
No.	Pb	Cd	Hg	Cr	Br	(mg/kg)	Remark ⁽³⁾	Conclusion
24	BL	BL	BL	BL	NA	10, 10,	10, 40,	PASS
25	BL	BL	BL	BL	BL	4 4.	4 4.	PASS
26	BL	BL	BL	BL	BL	10/10/10/10/10	10 In 1-10 In	PASS
27	BL	BL	BL	BL	NA			PASS
28	BL	BL	BL	BL	BL	· OHE - OHE	OHE -OHE	PASS
29	BL	BL	BL	BL	BL	2000	2 0	PASS
30	BL	BL	BL	BL	BL	- NE - NE	all -all	PASS
31	BL	BL	BL	BL	BL	110, -110, 1	20, 20,	PASS
32	BL	BL	BL	BL	BL	& - &	£ -£	PASS
33	BL	BL	BL	BL	BL	11012 -1012	10, 20,	PASS
34	BL	BL	BL	BL	NA	6 - 6	6 - 6	PASS
35	BL	BL	BL	BL	NA	10Hr -10Hr	OHI TOHI	PASS
36	BL	BL	BL	BL	BL		2	PASS
37	BL	BL	BL	BL	BL	OHE - OHE	WE -WE	PASS
38	BL	BL	BL	BL	BL	20 - 200 "	20 70	PASS
39	BL	BL	BL	BL	NA	16 - 16	16 - 16	PASS
40	BL	BL	BL	BL	NA	10, 70,	10. 10.	PASS
41	BL	BL	BL	BL	BL	36 - 36	do - 30	PASS
42	BL	BL	BL	BL	BL	110 p10 p. !	1012 TOL	PASS
43	BL	BL	BL	BL	NA	6 - 6	A	PASS
44	BL	BL	BL	BL	BL	10HF -10HF	10HP -10HP	PASS
45	BL	BL	BL	BL	BL	2 2	0 0	PASS
46	BL	BL	BL	BL	BL	Mr - Mr	OHE -WE	PASS
47	BL	BL	BL	BL	BL	110 -110 1	2 22	PASS
48	BL	BL	BL	BL	BL	JE - JE	JE - JE	PASS
49	BL	BL	BL	BL	BL	10, 10,	10, 20,	PASS
50	BL	BL	BL	BL	NA	2 - 2	20 - 20	PASS



Remark:

- (1) ①Results are obtained by EDXRF for primary screening, and further wet chemical testing by ICP-OES (for Cd, Pb, Hg), UV-VIS (for Cr(VI)) and GC/MS (for PBBs, PBDEs) is recommended to be performed, if an inconclusive result was found (as "X" in below table) (unit: mg/kg).
 - ②OL = Over Limit, BL = Below Limit, X = Inconclusive, NA = Not Applicable.
 - ③The EDXRF screening test for RoHS elements The reading may be different to the actual content in the sample be of non-uniformity composition.

Element	Polymer	Metal	Composite Materials
Cd	BL ≤(70-3σ)< X <(130+3σ)≤ OL	BL ≤(70-3σ)< X <(130+3σ)≤ OL	LOD < X <(150+3σ)≤ OL
- DI	BL ≤(700-3σ)< X <(1300+3σ)≤	BL - (700-3σ)< X <(1300+3σ)<	BL ≤(500-3σ)< X
Pb	OL OL	OL)	<(1500+3σ)≤ OL
	BL ≤(700-3σ)< X <(1300+3σ)≤	BL ≤(700-3σ)< X <(1300+3σ)≤	BL ≤(500-3σ)< X
Hg	OL OL	S OL S	<(1500+3σ)≤ OL
Br	BL ≤ (300-3σ)< X	NA	BL \leq (250-3 σ) $<$ X
Cr	BL < (700-3σ)< X	BL ≤ (700-3σ)< X	BL ≤ (500-3σ)< X

Units and limits in EU RoHS Directive 2011/65/EU:

E	Element	Pb	Cd	Hg	Cr(VI)	PBBs(single)	PBDEs(single)
	Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
11	Limit	1000	100	1000	1000	1000	1000

- (2) ① mg/kg = ppm = 0.0001%, N.D. = Not Detected (Less than MDL).
- 2 Unit and MDL (Method detection limit) in wet chemical test.

Element	Pb	Cd	Hg	Cr(VI)	PBBs(single)	PBDEs(single)
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	2	2	2	8	5 10	5

③According to IEC 62321-7-1:2015, result on Cr(VI) for metal sample is shown as Positive/Negative.

Negative = Absence of Cr(VI) coating, Positive = Presence of Cr(VI) coating.

Storage condition and production date of the tested sample are unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

- According to IEC 62321-3-1:2013, this column represents the results of wet chem test.
- (3) This column represents the exempted decoration of material or other related testing sample's information.



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(2) Phthalates (DBP, BBP, DEHP, DIBP) content

Test Method: IEC 62321-8: 2017, analyzed by gas chromatographic- mass spectrometer (GC-MS).

Substances	DBP	BBP	DEHP	DIBP	1011 1019
CAS No.	84-74-2	85-68-7	117-81-7	84-69-5	0 0
Limit (mg/kg)	1000	1000	1000	1000	Conclusion
MDL (mg/kg)	20	20	20	20	110 110
Material No.	all all	Result	(mg/kg)	NE NE	ale ale
10, 110,	N.D.	N.D.	N.D.	N.D.	PASS
2	N.D.	N.D.	N.D.	N.D.	PASS
3 0	N.D.	N.D.	N.D.	N.D.	PASS
4	N.D.	N.D.	N.D.	N.D.	PASS
5 0	N.D.	N.D.	N.D.	N.D.	PASS
6	N.D.	N.D.	N.D.	N.D.	PASS
9	N.D.	N.D.	N.D.	N.D.	PASS
11 11	N.D.	N.D.	N.D.	N.D.	PASS
13	N.D.	N.D.	N.D.	N.D.	PASS
15	N.D.	N.D.	N.D.	N.D.	PASS
16	N.D.	N.D.	N.D.	N.D.	PASS
17 0	N.D.	N.D.	N.D.	N.D.	PASS
18	N.D.	N.D.	N.D.	N.D.	PASS
19	N.D.	N.D.	N.D.	N.D.	PASS
20	N.D.	N.D.	N.D.	N.D.	PASS
23	N.D.	N.D.	N.D.	N.D.	PASS
25	N.D.	N.D.	N.D.	N.D.	PASS
26	N.D.	N.D.	N.D.	N.D.	PASS
28	N.D.	N.D.	N.D.	N.D.	PASS
29	N.D.	N.D.	N.D.	N.D.	PASS
30	N.D.	N.D.	N.D.	N.D.	PASS
31	N.D.	N.D.	N.D.	N.D.	PASS

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Substances	DBP	BBP	DEHP	DIBP	120 120
CAS No.	84-74-2	85-68-7	117-81-7	84-69-5	ale a
Limit (mg/kg)	1000	1000	1000	1000	Conclusion
MDL (mg/kg)	20	20	20	20	4.
Material No.	104, 104	Result	(mg/kg)	1011, 1010	1011 10
32	N.D.	N.D.	N.D.	N.D.	PASS
33	N.D.	N.D.	N.D.	N.D.	PASS
36	N.D.	N.D.	N.D.	N.D.	PASS
37	N.D.	N.D.	N.D.	N.D.	PASS
38	N.D.	N.D.	N.D.	N.D.	PASS
41	N.D.	N.D.	N.D.	N.D.	PASS
42	N.D.	N.D.	N.D.	N.D.	PASS
44	N.D.	N.D.	N.D.	N.D.	PASS
45	N.D.	N.D.	N.D.	N.D.	PASS
46	N.D.	N.D.	N.D.	N.D.	PASS
47	N.D.	N.D.	N.D.	N.D.	PASS
48	N.D.	N.D.	N.D.	N.D.	PASS
49	N.D.	N.D.	N.D.	N.D.	PASS

Note

- 1. mg/kg = milligram per kilogram (ppm).
- 2. MDL= method detection limit.
- N.D.=not detected(less than MDL).



Test Process Flow 1. Lead, Cadmium, Mercury Cut and Weigh the Add Digested Reagents or Completely dissolved and Cool Solutions Samples the Digested Solution Analyzed by ICP-OES Filter the Digested Solution Data process 2. Hexavalent Chromium (Non-metal) Add Digested Reagents or Cut and Weigh the Heat Samples at Proper Samples Solutions temperature Adjust pH value to 7.5±0.5 Add the DI Water and Cool and then Filter the use Nitric acid solution Solution Dipthenylcarbazide Adjust pH value to 2.0±0.5 Analyzed by UV-Vis use Sulfur acid solution Hexavalent Chromium (Metal) Heat Water to boil and keeping Cut sample (50+5) Add 50mL DI water to beaker cm² Add 1mL color Add 1mL orthophosphoric acid Complement the water to 50mL developing reagent Analyzed by UV-Vis

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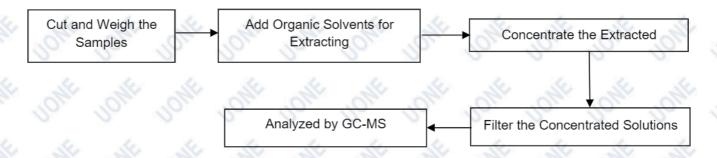
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Test Process Flow (Continued):

3. PBBs & PBDEs, Phthalates



Photo(s) of Sample:



End of Report



Statement

- The information as listed on the first page of this test report was all provided by the client except the
 received date, testing period, test result(s) and test request. The client shall be responsible for the
 representativeness of sample and authenticity of materials, for which UONE shall bear no
 responsibilities.
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