

TEST REPORT



Report No.: A2505193-C03-R01

Date: May 29, 2025

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Applicant:

QUANZHOU STAR ELECTRONICS CO., LTD

Address:

Zhaolian Industrial Area, Beifeng, Quanzhou, Fujian, China

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

Sample Name	solar lights
Model No.	XX-QQ005
Manufacturer	QUANZHOU STAR ELECTRONICS CO., LTD
Sample Received Date	May 21, 2025
Testing Period	May 21 - 29, 2025
Test Method & Test Result	Please refer to following pages.

Test Requested

As specified by client, according to RoHS Directive 2011/65/EU with amendment (EU) 2015/863, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs), Phthalates(DBP, BBP, DEHP, DIBP) in the tested materials of the submitted sample(s).

Result

Pass

Tested by:

Yaya Wang

Approved by:

[Signature]

Reviewed by:

Tony Gmy

Date of issue:

May 29, 2025



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Test Method

(1) XRF screening limits for regulated elements according to IEC 62321-3-1:2013 (Unit: mg/kg)

Element	Polymers	Metals	Composite material
Pb	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$ $< (1500+3\sigma) \leq OL$
Cd	$BL \leq (70-3\sigma) < X$ $< (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X$ $< (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$ $< (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$ $< (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$
Br	$BL \leq (300-3\sigma) < X$	N/A	$BL \leq (250-3\sigma) < X$

(2) Chemical screening limits for PBBs, PBDEs

Test Item(s)	Screening limits(Unit: mg/kg)
Polybrominated Biphenyls (PBBs)	$BL \leq 200 < IN$
Polybrominated Diphenyl Ethers (PBDEs)	$BL \leq 200 < IN$

(3) Chemical screening limits for Phthalates

Test Item(s)	Screening limits(Unit: mg/kg)
Dibutyl phthalate(DBP)	$BL \leq 600 < IN$
Benzylbutyl phthalate(BBP)	$BL \leq 600 < IN$
Di-2-ethylhexyl phthalate(DEHP)	$BL \leq 600 < IN$
Diisobutyl phthalate(DIBP)	$BL \leq 600 < IN$

(4) Chemical Test

Test Item	Test Method	Test Instrument	MDL (mg/kg)	EU RoHS Limit (mg/kg)
Lead (Pb)	IEC 62321-5:2013	ICP-OES	2	1000
Cadmium (Cd)	IEC 62321-5:2013	ICP-OES	2	100
Mercury (Hg)	IEC 62321-4:2013 +AMD1:2017	ICP-OES	2	1000
Hexavalent Chromium (Cr(VI))	IEC 62321-7-2:2017 (non-metal)	UV-Vis	8	1000
	IEC 62321-7-1:2015 (metal)	UV-Vis	0.1($\mu\text{g}/\text{cm}^2$)	1000
Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS	5	1000
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS	5	1000
Phthalates(DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS	50	1000

Shenzhen Alpha Product Testing Co., Ltd.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China



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Tested Material Description

No.	Description	No.	Description
1	White plastic	13	Soldering tin
2	Brown hemp rope	14	Resistance
3	Red cloth	15	Red plastic
4	White cotton	16	Yellow plastic
5	Transparent wire sheath	17	Red plastic
6	Silvery metal	18	Yellow plastic
7	Silvery metal	19	Green plastic
8	Silvery metal	20	Silvery metal
9	Black plastic	21	Green paper
10	Black metal	22	Brown paper
11	Brown plastic	23	Silvery metal
12	Silvery metal	24	Transparent plastic

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Tested Result

(1) Screening Result

Tested Item(s)	Screening Result									
	1	2	3	4	5	6	7	8	9	10
Lead (Pb)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL*	BL	BL	BL	BL	N/A	N/A	N/A	BL	N/A
Dibutyl phthalate(DBP)	BL	BL	BL	BL	BL	N/A	N/A	N/A	BL	N/A
Benzylbutyl phthalate(BBP)	BL	BL	BL	BL	BL	N/A	N/A	N/A	BL	N/A
Di-2-ethylhexyl phthalate(DEHP)	BL	BL	BL	BL	BL	N/A	N/A	N/A	BL	N/A
Diisobutyl phthalate(DIBP)	BL	BL	BL	BL	BL	N/A	N/A	N/A	BL	N/A

Tested Item(s)	Screening Result									
	11	12	13	14	15	16	17	18	19	20
Lead (Pb)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	N/A
Dibutyl phthalate(DBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	N/A
Benzylbutyl phthalate(BBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	N/A
Di-2-ethylhexyl phthalate(DEHP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	N/A
Diisobutyl phthalate(DIBP)	BL	N/A	N/A	BL	BL	BL	BL	BL	BL	N/A

Tested Item(s)	Screening Result			
	21	22	23	24
Lead (Pb)	BL	BL	BL	BL
Cadmium (Cd)	BL	BL	BL	BL
Mercury (Hg)	BL	BL	BL	BL
Total Chromium (Cr(VI))	BL	BL	BL	BL
Total Bromine (PBBs & PBDEs)	BL	BL	N/A	BL
Dibutyl phthalate(DBP)	BL	BL	N/A	BL
Benzylbutyl phthalate(BBP)	BL	BL	N/A	BL
Di-2-ethylhexyl phthalate(DEHP)	BL	BL	N/A	BL
Diisobutyl phthalate(DIBP)	BL	BL	N/A	BL

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Remark: N.D = Not Detected (< MDL or LOQ), MDL = Method Detection Limit
IN= Inconclusive, Further chemical test, X = The range of needing to do further testing
BL = Below the screening limit, OL = Over the screening limit.
N/A= Not applicable
3σ= The reproducibility of analytical instruments
* = The screened result was found and further chemical test
When conducting the test for PBBs&PBDEs, XRF was introduced to screen Br exclusively, and then chemical screening was conducted if the XRF result is X.
When conducting the test for Hexavalent Chromium, XRF was introduced to screen Chromium exclusively.
LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10 µg/cm²
LOD= Detection limit
mg/kg = ppm = parts per million, 1000 mg/kg = 0.1%



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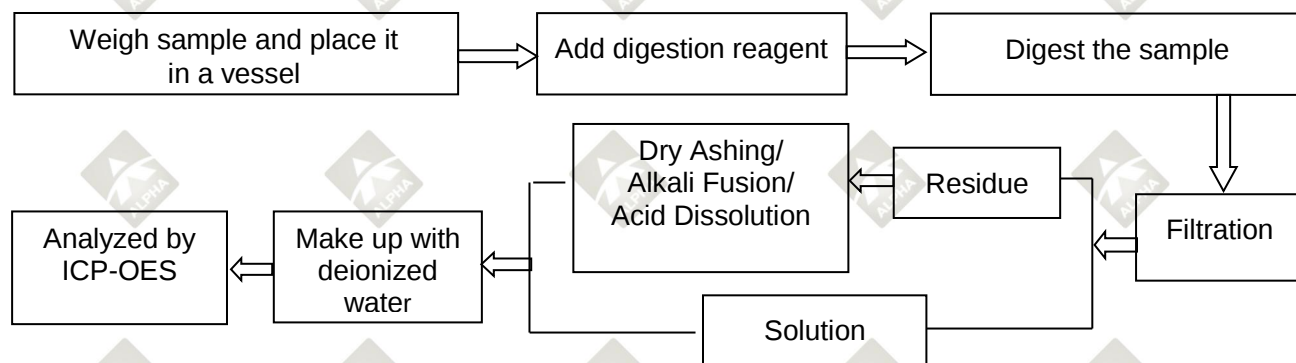
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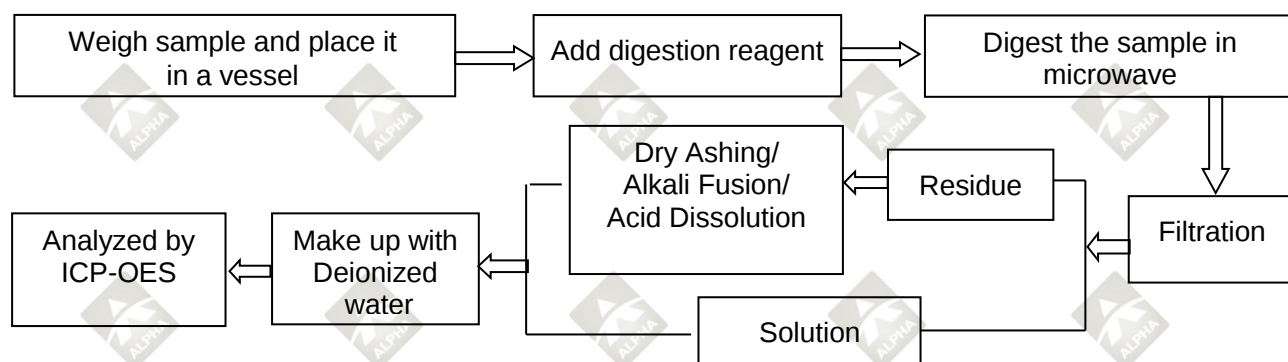
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Test Process

1. Lead(Pb), Cadmium(Cd), Chromium(Cr)

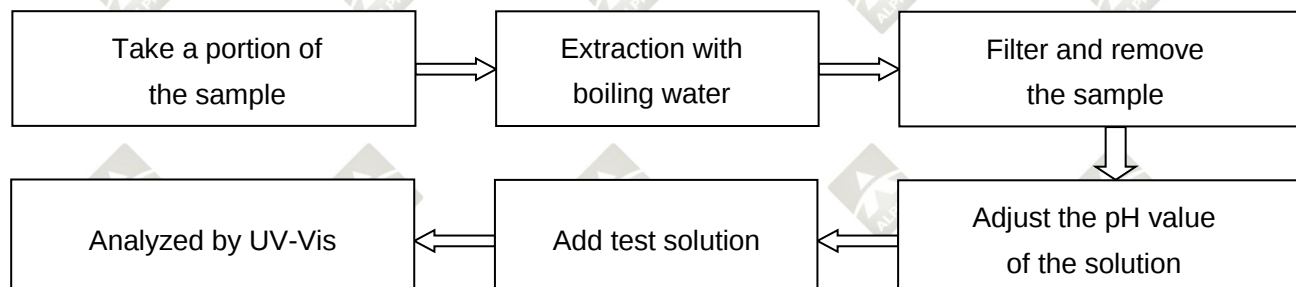


2. Mercury(Hg)



3. Hexavalent Chromium (Cr (VI))

Plating/Metal sample(s)





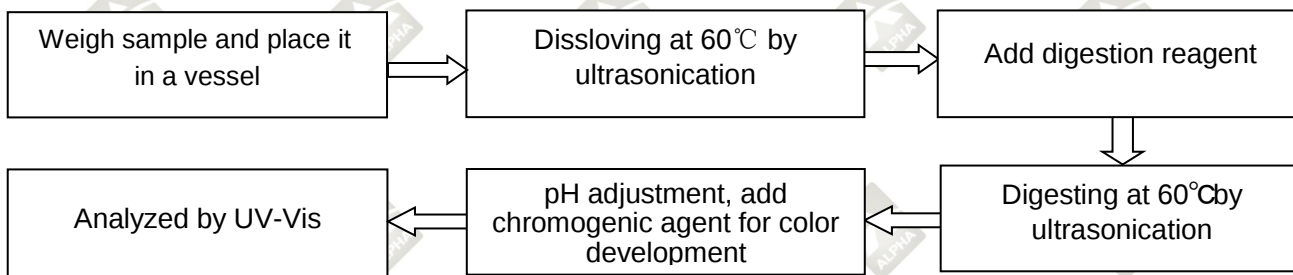
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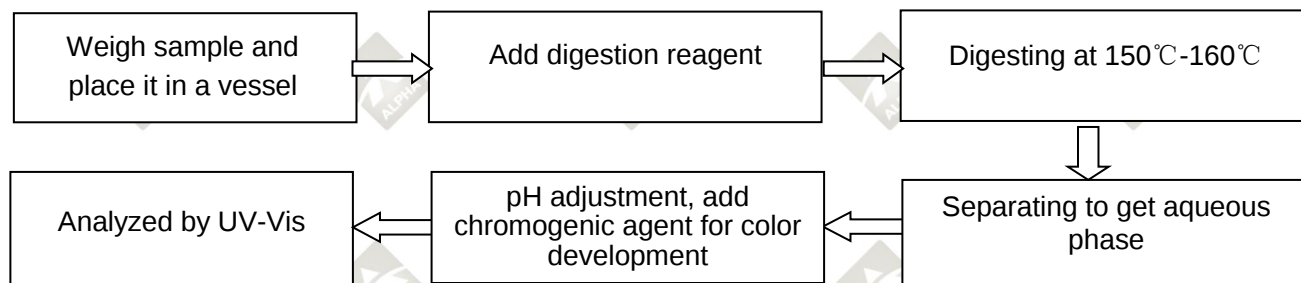
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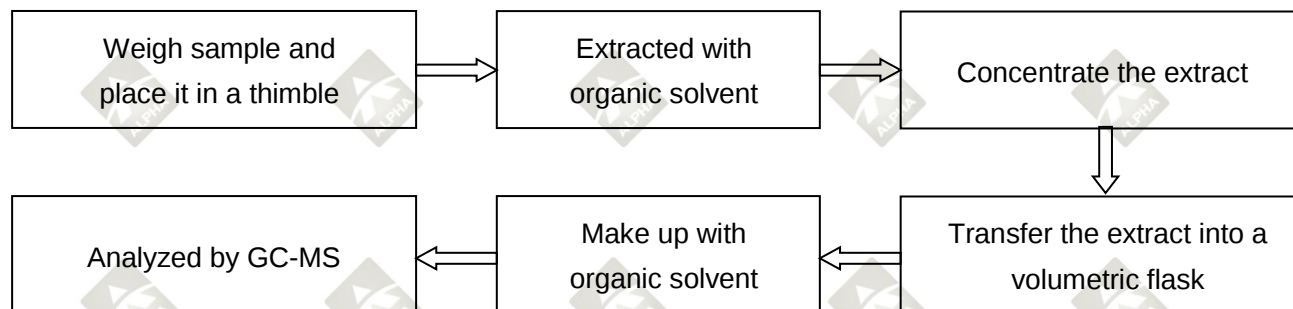
Non-metal sample(s) (Material ABS/PC/PVC)



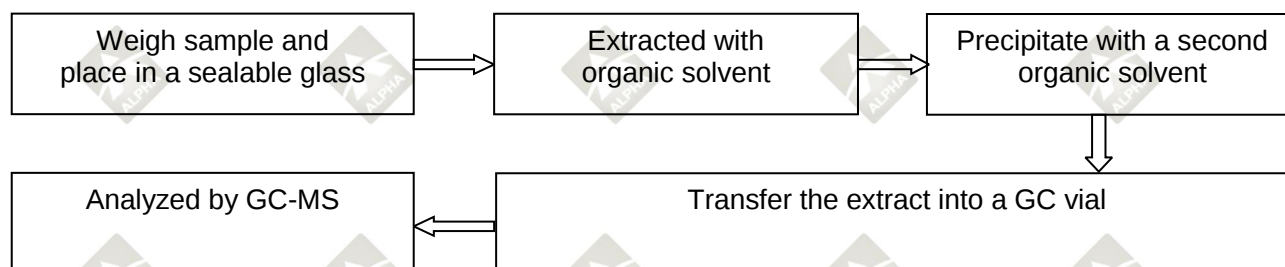
Non-metal sample(s) (Others)



4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



5. Phthalates(DBP/BBP/DEHP/DIBP)



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Tested sample photo(s)



--- End of report ---

Statement:

1. The sample(s) and sample Information was/were provided by the client who should be responsible for the authenticity which ALPHA hasn't verified.
2. The result(s) shown in this report refer(s) only to the sample(s) tested.
3. Without written approval of ALPHA, this report can't be reproduced except in full.
4. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.