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Client: LONGI SOLAR TECHNOLOGY CO., LTD.

Contact Information: No.8369 Shangyuan Road, Xi'an Economic, Technological Development
Zone, Xi'an, Shaanxi, P.R. China
Contact Person: Melody Wu

**Identification/
Model No(s):** PV Modules
Please refer to page 2.

Sample obtaining method: Sending by customer

Condition at delivery: Test item complete and undamaged.

Sample Receiving date: 2025-01-22

Testing Period: 2025-01-22 to 2025-02-12

Place of testing: Chemical laboratory Shanghai

Test Specification:

Test result:

Customer's requirement:

1. Cadmium, Lead, Chromium (VI), Mercury, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE), ROHS Phthalates (BBP, DBP, DEHP, DIBP)
According to RoHS(recast): Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2011/65/EU Annex II and its amendment Directive (EU) 2015/863

PASS

Other information:

The report 326072172a 002 supersede report 326072172a 001.

For and on behalf of
TÜV Rheinland (Shanghai) Co., Ltd.


Lyn Li / Project Engineer

2025-03-12

Date

Name/Position

Sample information is provided by customer. Test result is drawn according to the kind and extent of tests performed.
This test report relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.
"Decision Rule" document announced in our website (<https://www.tuv.com/landingpage/en/qm-gcn/>) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report.

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Test Model No.:

LR7-72HVH-xxxM; LR7-72HTH-xxxM; LR7-72HGD-xxxM; LR7-72HGD-xxxM.

Additional Model No.:

LR7-60HTH-xxxM; LR7-54HTH-xxxM; LR7-72HTHF-xxxM; LR7-60HTHF-xxxM; LR7-54HTHF-xxxM;
LR7-60HTB-xxxM; LR7-54HTB-xxxM; LR7-60HVH-xxxM; LR7-54HVH-xxxM; LR7-72HVHF-xxxM;
LR7-60HVHF-xxxM; LR7-54HVHF-xxxM; LR7-60HVB-xxxM; LR7-54HVB-xxxM; LR7-48HGDT-xxxM;
LR8-48HGD-xxxM; LR7-72HTDR-xxxM; LR7-72HVD-xxxM; LR7-54HVD-xxxM; LR8-66HYD-xxxM;
LR8-66HGD-xxxM.

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Material List:

Item: PV Modules
 Please refer to page 2.

Material No.	Material	Color	Location	Remark
A001	Metal	silver	refer to photo	
A002	Metal	copper	refer to photo	
A003	Electronic components	dark grey	refer to photo	
A004	Plastic	black	refer to photo	
A005	Metal	silver	refer to photo	
A006	Metal	silver	refer to photo	
A007	Metal	silver	refer to photo	
A008	Metal	silver	refer to photo	
A009	Plastic	black	refer to photo	
A010	Plastic	dark grey	refer to photo	
A011	Glass	clear	refer to photo	
A012	Synthetic material	blue	refer to photo	RoHS test data refer to 326051396b A027
A013	Plastic	white	refer to photo	
A014	Glue	white	refer to photo	
A015	Plastic	clear	refer to photo	
A016	Plastic	clear	refer to photo	
A017	Plastic	white	refer to photo	
A018	Metal	silver	refer to photo	
A019	Plastic	grey	refer to photo	
A020	Plastic	grey	refer to photo	
A021	Glue	white	refer to photo	
A022	Synthetic material	blue	refer to photo	
A023	Metal	silver	refer to photo	
A024	Plastic	black	refer to photo	
A025	Glass	clear	refer to photo	

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A026	Metal	silver	refer to photo	
A027	Metal	silver	refer to photo	
A028	Plastic	white/black	refer to photo	

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1.Screening Test by XRF spectroscopy

Test Method: Cadmium, Lead, Mercury, Chromium, Bromine
 -- With reference to IEC 62321-3-1:2013

Test Result:

Material No.	Cd	Cr	Pb	Hg	Br
A001	BL	BL	BL	BL	n.a.
A002	BL	BL	BL	BL	n.a.
A003	BL	BL	BL	BL	d.(*1)
A004	BL	BL	BL	BL	BL
A005	BL	BL	BL	BL	n.a.
A006	BL	BL	BL	BL	n.a.
A007	BL	d.(*1)	BL	BL	n.a.
A008	BL	BL	BL	BL	n.a.
A009	BL	BL	BL	BL	BL
A010	BL	BL	BL	BL	BL
A011	BL	BL	BL	BL	n.a.
A012	BL	BL	BL	BL	n.a.
A013	BL	BL	BL	BL	BL
A014	BL	BL	BL	BL	BL
A015	BL	BL	BL	BL	BL
A016	BL	BL	BL	BL	BL
A017	BL	BL	BL	BL	BL
A018	BL	BL	BL	BL	n.a.
A019	BL	BL	BL	BL	BL
A020	BL	BL	BL	BL	BL
A021	BL	BL	BL	BL	BL
A022	BL	BL	BL	BL	BL
A023	BL	BL	BL	BL	n.a.
A024	BL	BL	BL	BL	BL
A025	BL	BL	BL	BL	n.a.
A026	BL	BL	BL	BL	n.a.
A027	BL	BL	BL	BL	n.a.
A028	BL	BL	BL	BL	BL

Abbreviation: Pb = Lead
 Cd = Cadmium
 Hg = Mercury
 Cr = Chromium
 Br = Bromine
 n.a. = Not applicable
 BL = Below limit
 OL = Over limit
 d. = Detected

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Remark:

- (*1) The screening result was detected in the inconclusive region or over limits, thus the further wet chemistry tests are suggested.
- (*2) Component(s)/ materials(s) with an area of less than 2 mm x 2 mm will not be selected for testing according to RoHS Directive 2011/65/EU due to technical reason.
 For the test sample does not have detail materials information provided by client, visually identical materials (e.g. wire insulation, solder points, etc.) will be considered as the same material.
 Solder points on a printing circuit board will be examined several times based on optical anomalies or discoloration of the solder point(s) unless the solder point(s) is obviously generated automatically during production.
 All other materials will be sampled and tested at one test point representatively.

XRF Screening limits for different matrices :

Material	Concentration (%)				
	Cd	Cr	Pb	Hg	Br
Polymeric	$BL \leq 0.006 < X < 0.014 \leq OL$	$BL \leq 0.064 < X$	$BL \leq 0.067 < X < 0.133 \leq OL$	$BL \leq 0.066 < X < 0.134 \leq OL$	$BL \leq 0.029 < X$
Metallic	$BL \leq 0.006 < X < 0.014 \leq OL$	$BL \leq 0.064 < X$	$BL \leq 0.067 < X < 0.133 \leq OL$	$BL \leq 0.066 < X < 0.134 \leq OL$	n.a.
Composite materials	$BL \leq 0.004 < X < 0.016 \leq OL$	$BL \leq 0.044 < X$	$BL \leq 0.047 < X < 0.153 \leq OL$	$BL \leq 0.046 < X < 0.154 \leq OL$	$BL \leq 0.024 < X$

Remark: The symbol "X" marks the region where further investigation is necessary.

	Cd	Cr(VI)	Pb	Hg	PBBs	PBDEs
Maximum permissible Limit (%)	0.01	0.1	0.1	0.1	0.1	0.1

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Cadmium, Lead, Chromium (VI), Mercury, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE)

Test Method: Total Cadmium, Lead, Mercury, Chromium
 - Ref. to IEC 62321-4:2013+AMD1:2017 and IEC 62321-5:2013

Chromium (VI)
 - For Metal material - Ref. to IEC 62321-7-1:2015
 - For Polymer, Electronic material or others materials – Ref. to IEC 62321-7-2:2017

PBBs, PBDEs – Ref. to IEC 62321-6:2015

Test Result:

	Cd	Cr(VI)	Pb	Hg	PBBs	PBDEs
Maximum Permissible Limit (%)	0.01	0.1	0.1	0.1	0.1	0.1

Material No.	(%)					
	Cd	Cr [^]	Pb	Hg	PBBs	PBDEs
	RL (%)					
	0.001	0.001	0.001	0.001	0.01	0.01
A003	n.a.	n.a.	n.a.	n.a.	< RL	< RL

Material No.	Chromium VI content for metal materials (µg/cm²) (*1) RL: 0.10 µg/cm²
A007	negative

Abbreviation:

- Pb = Lead
- Cd = Cadmium
- Hg = Mercury
- Cr = Chromium
- Cr (VI) = Chromium (VI)
- PBBs = Total Polybrominated Biphenyls
- PBDEs = Total Polybrominated Diphenyl Ethers
- < = Less than
- RL = Reporting Limit
- n.a. = Not Applicable
- ^ = The total Chromium have been determined
- % = Percentage

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Remark:

- (*1) The Chromium (VI) content of metal sample in surface layer have been confirmed with reference to IEC 62321-7-1:2015 Annex.

	Chromium (VI) concentration	Qualitative result
Negative	$<0.1\mu\text{g}/\text{cm}^2$	The sample is negative (-ve) for Cr(VI). The Cr(VI) concentration is below the limit of quantification. The coating is considered a non-Cr(VI) based coating
Inconclusive	$\geq 0.1\mu\text{g}/\text{cm}^2$ and $\leq 0.13\mu\text{g}/\text{cm}^2$	The result is considered to be inconclusive. Unavoidable coating variations may influence the determination. Recommendation: if additional samples are available, perform a total of 3 trials to increase sampling surface area. Use the averaged result of the 3 trials for the final determination.
Positive	$>0.13\mu\text{g}/\text{cm}^2$	The sample is positive (+ve) for Cr(VI). Concentration is above the limit of quantification and the statistical margin of error. The sample coating is considered to contain Cr(VI).

* The reporting limit for each individual PBBs and individual PBDEs are :

Reporting Limit (%)		
PBBs	Bromobiphenyl	0.0005
	Dibromobiphenyl	0.0005
	Tribromobiphenyl	0.0005
	Tetrabromobiphenyl	0.0005
	Pentabromobiphenyl	0.0005
	Hexabromobiphenyl	0.0005
	Heptabromobiphenyl	0.0005
	Octabromobiphenyl	0.0005
	Nonabromobiphenyl	0.0005
	Decabromobiphenyl	0.0005
PBDEs	Bromodiphenylether	0.0005
	Dibromodiphenyl ether	0.0005
	Tribromodiphenyl ether	0.0005
	Tetrabromodiphenyl ether	0.0005
	Pentabromodiphenyl ether	0.0005
	Hexabromodiphenyl ether	0.0005
	Heptabromodiphenyl ether	0.0005
	Octabromodiphenyl ether	0.0005
	Nonabromodiphenyl ether	0.0005
	Decabromodiphenyl ether	0.0005

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BBP, DBP, DEHP, DIBP content

Test Method: ref. to IEC 62321-8:2017

Test Result:

	BBP	DBP	DEHP	DIBP
Maximum permissible Limit (%)	0.1	0.1	0.1	0.1

Test No.	Material No.	RL (%)			
		BBP	DBP	DEHP	DIBP
		RL (%)			
		0.005	0.005	0.005	0.005
T001	A004 + A009 + A010	< RL	< RL	< RL	< RL
T002	A012	< RL	< RL	< RL	< RL
T003	A013 + A015	< RL	< RL	< RL	< RL
T004	A014 + A021	< RL	< RL	< RL	< RL
T005	A016 + A017 + A019	< RL	< RL	< RL	< RL
T006	A020 + A024 + A028	< RL	< RL	< RL	< RL
T007	A022	< RL	< RL	< RL	< RL

Abbreviation: BBP= Benzylbutyl phthalate
 DBP= Dibutyl phthalate
 DEHP= Bis(2-ethylhexyl) phthalate
 DIBP= Diisobutyl phthalate
 < = less than
 RL = Reporting Limit
 %= percentage

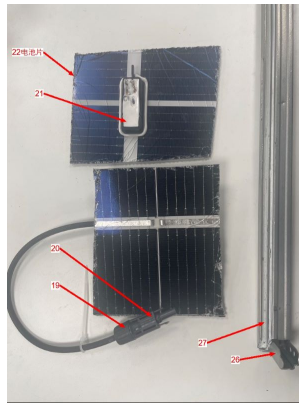
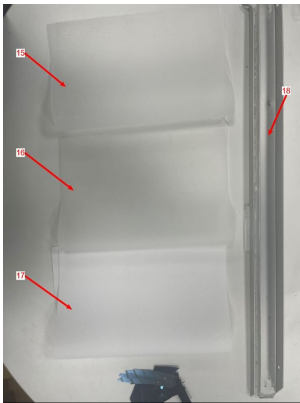
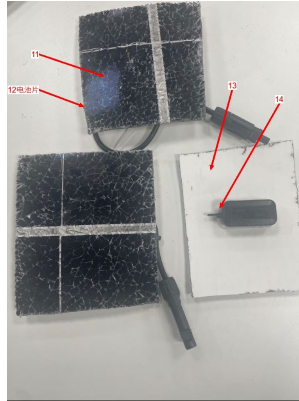
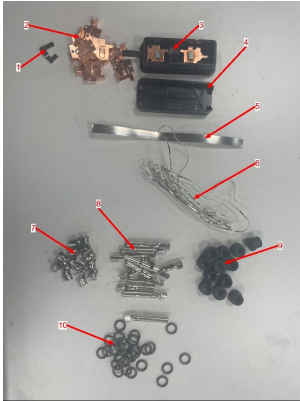
Remark:

- * The maximum permissible limit is required from the amendment (EU) 2015/863 of RoHS Directive 2011/65/EU.

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Sample Photos



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Sample Photos



LR7-72HVV



LR7-72HGD



LR7-72HGD

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