

Test Report

Number: SHAH01612841

Applicant: SUNOVA SOLAR TECHNOLOGY CO.,LTD
BUILDING H AND BUILDING E (PRODUCTION),
PHASE II OF STANDARD PLANT,
RUNZHOU ROAD, HUISHAN INDUSTRIAL
TRANSFORMATION CLUSTER, WUXI
Attn: Mary miao

Date: 09 Oct, 2023

Sample Description:

One(1) group of submitted sample said to be :
Item Name : Crystalline Silicon Terrestrial Photovoltaic (PV) Modules.
Item No. : Single glass and Double glass.

Tests Conducted:

As requested by the applicant, for details refer to attached page(s).

Conclusion:

<u>Tested Samples</u>	<u>Standard</u>	<u>Result</u>
Screened components of Submitted Sample	Restriction of the use of certain hazardous substance in electrical and electronic equipment (RoHS Directive 2011/65/EU and (EU) 2015/863)	Pass

Prepared And Checked By:
For Intertek Testing Services Wuxi Ltd.



Bill Zhang
General Manager



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1 Certain Hazardous Substance in Electrical and Electronic Equipment

Cadmium (Cd), Lead (Pb), Mercury (Hg), Chromium (Cr) and bromine (Br) content were measured with reference to IEC 62321-3-1 Edition 1.0:2013 by XRF spectroscopy and chemical confirmation test for RoHS restricted substances. And Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) and Phthalates content were determined by Gas Chromatographic-Mass Spectrometric (GC-MS).

(A) Results:

Part No.	Screened Components	Refer information	Items	XRF Results	Screened Results (phthalates)	Chemical Confirmation result(mg/kg)	Conclusion on RoHS
1	Metal sheet (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	
2	Radiating plate (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	
3	Glue (white nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	



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4	Glass (transparent nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
5	Plastic film (gray nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
6	Plastic sheet (white nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	



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7	Glass (blue nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
8	Solder (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	
9	Metal wire (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	



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10	Plastic bracket (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
11	Pin (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	
12	Rubber ring (red nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	



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13	Plastic shell (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	X		PBBs=ND&PBDEs=ND	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
14	Plastic cover (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
15	Plastic shell (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	



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16	Glue (white nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
17	Plastic shell (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	X		PBBs=ND&PBDEs=ND	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
18	Pin (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	



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19	Plastic bracket (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
20	Wire skin (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	
21	Wire core (silver metal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	NA		/	
			DEHP	NA	NA	/	
			BBP	NA	NA	/	
			DBP	NA	NA	/	
			DIBP	NA	NA	/	



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22	Plastic shell (black nonmetal)	/	Cd	P	NA	/	Pass
			Pb	P		/	
			Hg	P		/	
			Cr	P		/	
			Br	P		/	
			DEHP	NA	P	/	
			BBP	NA	P	/	
			DBP	NA	P	/	
			DIBP	NA	P	/	

P = Pass (Below the lower screening limits of table (B1 or B2))

X = Inconclusive result (Further chemical test was suggested (see table (B1 or B2).)

F = Fail (Exceeded the upper screening limits of table (B1))

NA = Not applicable

ND = Not detected

µg/cm² = Microgram per square centimeter

NT = Not tested

Negative = The Cr (VI) concentration is less than 0.10 µg/cm².The sample is negative for Cr (VI).

Inconclusive = The Cr (VI) concentration is between 0.10 µg/cm² and 0.13 µg/cm² .The result is considered to be inconclusive.
Unavoidable coating variations may influence the determination.

(B) Screening Limits

(B1) XRF Screening Limits in mg/kg for Regulated Elements in Various Matrices (mg/kg):

Element	Polymer Materials	Metallic Materials	Composite Materials
Cd	P ≤70 < X < 130 ≤ F	P ≤ 70 < X < 130 ≤ F	P ≤ 70 < X < 150 ≤ F
Pb	P ≤ 700 < X < 1300 ≤ F	P ≤ 700 < X < 1300 ≤ F	P ≤ 500 < X < 1500 ≤ F
Hg	P ≤ 700 < X < 1300 ≤ F	P ≤ 700 < X < 1300 ≤ F	P ≤ 500 < X < 1500 ≤ F
Cr	P ≤ 700 < X	P ≤ 700 < X	P ≤ 500 < X
Br	P ≤ 300 < X	Not applicable	P ≤ 250 < X

(B2) Preliminary screening test will used for phthalates, if the results exceed the warning area in the following table, further chemical methods will conduct to confirm the exact content by GC/MS. (mg/kg)

Phthalates	Polymer
Bis(2-ethylhexyl)phthalate(DEHP)	P ≤600 < X
Butyl benzyl phthalate(BBP)	P ≤600 < X
Dibutyl phthalate(DBP)	P ≤600 < X
Diisobutyl phthalate(DIBP)	P ≤600 < X



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(C) Estimated Detection Limits in mg/kg for Regulated Elements in Various Matrices (mg/kg):

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:

This XRF Screening and Chemical Confirmation Test Report is for reference purposes only. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF Screening and Chemical Confirmation Test Report is sufficient for its/his/her purposes.

The results shown in this XRF Screening and Chemical Confirmation Test 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 is required to obtain quantitative data.

(D) Chemical Test Methods:

Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0: 2013, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0: 2013, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321-4 Edition 1.1: 2017, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI) (Cr ⁶⁺) Content	With reference to IEC 62321-7-1 Edition 1.0:2015, by boiling water extraction and determined by UV-VIS spectrophotometer	Positive(>0.13 g/cm ²) / Negative(<0.10 g/cm ²) / Inconclusive(0.10 g/cm ² --0.13 g/cm ²)
Chromium (VI)(Cr ⁶⁺) Content	With reference to IEC 62321-7-2 Edition 1.0:2017, by alkaline digestion and determined by UV-VIS Spectrophotometer	10 mg/kg
Polybrominated Biphenyls (PBBs) & Polybrominated Diphenyl Ethers (PBDEs) Content	With reference to IEC 62321-6 Edition 1.0:2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg
Phthalates (DEHP, BBP, DBP, DIBP) Content	With reference to IEC 62321-8 Edition 1.0:2017,by solvent extraction and determined by GC/MS	100mg/kg



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(E) RoHS Requirement:

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr ⁶⁺)	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)
Phthalates(DEHP, BBP, DBP, DIBP)	0.1% (1000 mg/kg)

The above limits were quoted from 2011/65/EU and (EU) 2015/863 for homogeneous material.

Date Sample Received: 18 Sep, 2023

Testing Period: 18 Sep, 2023 To 09 Oct, 2023



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Photo

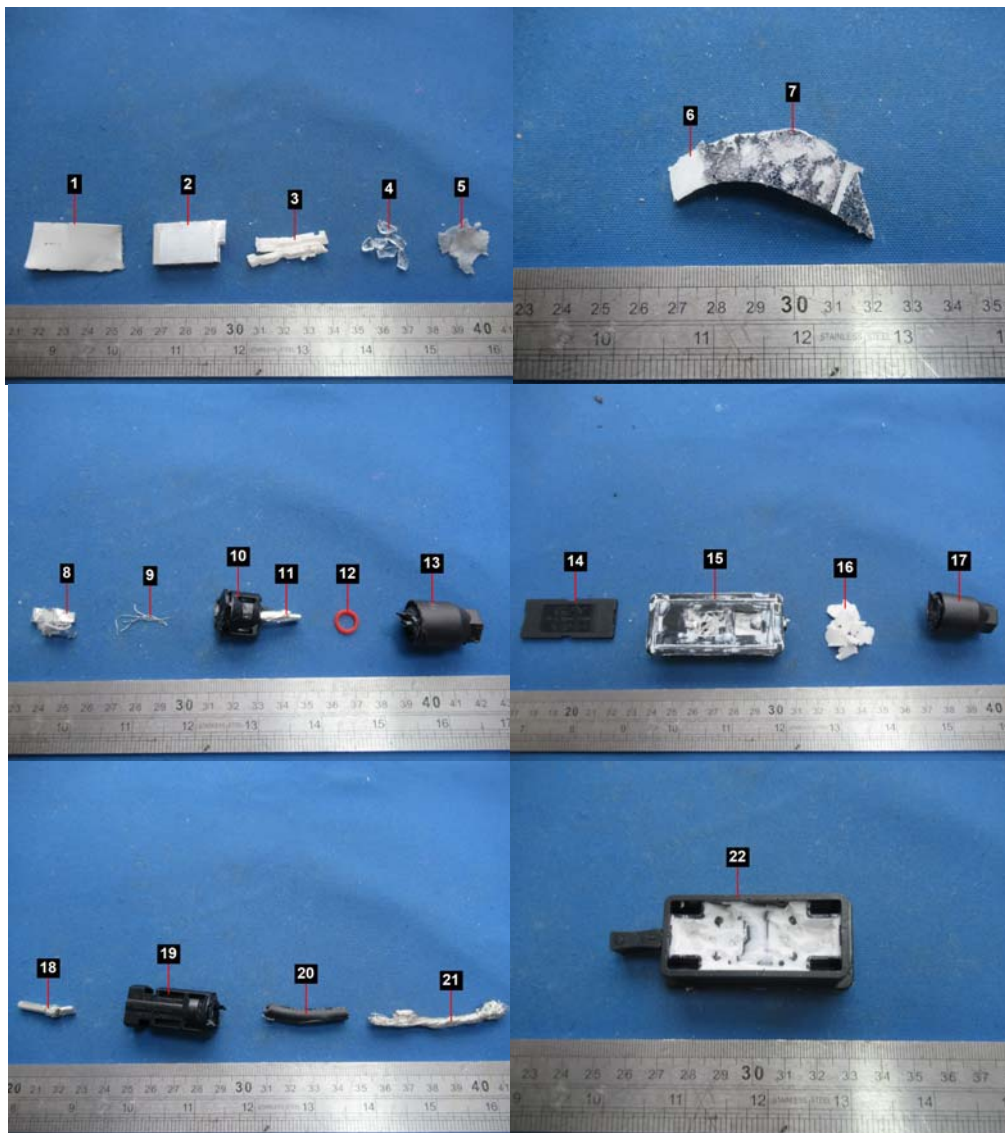




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End Of Report

The statements of conformity reported have considered the decision rule agreed, namely that Intertek have taken account of measurement uncertainty as calculated by Intertek, and applied according to ILAC-G8/09:2019 (Non-binary acceptance based on guard band $w = U$) except designation from the customer, regulation or test specification. This decision rule only applies to the numeric test results.

The sample(s) and sample information hereto are provided by the client who shall be solely responsible for the authenticity and integrity thereof. The results shown in this report relate only to the sample(s) received and tested. It is not intended to be a recommendation for any particular course of action. Intertek does not accept a duty of care or any other responsibility to any person other than the Client in respect of this report and only accepts liability to the Client insofar as is expressly contained in the terms and conditions governing Intertek's provision of services to you. Intertek makes no warranties or representations either express or implied with respect to this report save as provided for in those terms and conditions. We have aimed to conduct the review on a diligent and careful basis and we do not accept any liability to you for any loss arising out of or in connection with this report, in contract, tort, by statute or otherwise, except in the event of our gross negligence or wilful misconduct. This report shall not be reproduced unless with prior written approval from Intertek Testing Services Wuxi Ltd.

