



Technical Report No. 704062108033

Rev.00

Dated 2022-09-15

Client: Risen Energy Co., Ltd.
Meilin, Ninghai, 315609 Ningbo, Zhejiang, PEOPLE'S REPUBLIC OF CHINA

Risen Energy (CHANGZHOU) Co., Ltd. (101449)
No.1, Shuinan Road, zhixi industrial park, Jintan District 213251
Changzhou City PEOPLE'S REPUBLIC OF CHINA

Risen Energy (YIWU) Co., Ltd.(106291)
No. 599 Sufu Road, Suxi Town, Yiwu City, Zhejiang Province, 322000,
PEOPLE'S REPUBLIC OF CHINA

Factory: Risen Energy (Anhui) Co., Ltd. (113068)
No.325, East Tongling Road Economic and Technological Development
Zone 239000 Chuzhou City, Anhui Province, PEOPLE'S REPUBLIC OF CHINA

Risen Energy (Ningbo) Co., Ltd. (115158)
No.1 Middle Xingke Road ,Ninghai,315609, Ningbo,Zhejiang, PEOPLE'S
REPUBLIC OF CHINA

RISEN SOLAR TECHNOLOGY SDN. BHD. (115943)
No.3, Jalan Hi-Tech 14, Zon Industri Fasa 4 Kulim, Hi-Tech Park,
09090 Kulim, Kedah Malaysia.
Contact person: Mr. Yang Shubo

Test object: Product: Photovoltaic modules
Type: mono module; 132 pcs cells
RSM132-8-660BMDG

Test specification: IEC 61215-2:2016, Visual inspection (MQT 01)
IEC 61215-2:2016, Performance at STC (MQT 06.1)
IEC 61215-2:2016, Insulation test (MQT 03)
IEC 61215-2:2016, Wet leakage current (MQT 15)
IEC 61215-2:2016, Hail test (MQT 17)
According to client requirements.

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Purpose of examination: • Testing and evaluation (visual / partial) according to the test specification.

Test result: The test results show that the presented product is in compliance with the specified requirements.

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1 Description of the test subject

1.1 Picture(s)

N/A

1.2 Function

Manufacturer's specification for intended use:

The PV modules for electricity generation systems with max. voltage of 1500 VDC

Manufacturer's specification for predictive use:

N/A

1.3 Consideration of the foreseeable misuse

- ☒ Not applicable
- ☐ Covered through the applied standard
- ☐ Covered by the following comment
- ☐ Covered by attached risk analysis

1.4 Technical Data

Sample #	Model	Sample S/N	Remark/Constructional characteristics
471521I2507321	RSM132-8-660BMDG	471521I2507321	2384x1303x35mm
471521I2507530	RSM132-8-660BMDG	471521I2507530	2384x1303x35mm

2 Order

2.1 Date of Purchase Order, Customer's Reference (if available)

2021-09-10

2.2 Test Sample(s) (Add details)

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- Reception date(s):
2022-06-05
- Location(s) of reception:
Risen Energy Co., Ltd.
No.23 Middle Xingke Road, Ninghai, 315609, Ningbo, Zhejiang, PEOPLE'S
REPUBLIC OF CHINA
- Condition of test sample(s):
In good condition

2.3 Date(s) of Testing 2022-06-06 to 2022-06-10

2.4 Location(s) of Testing Risen Energy Co., Ltd.
No.23 Middle Xingke Road, Ninghai, 315609, Ningbo,
Zhejiang, PEOPLE'S REPUBLIC OF CHINA

2.5 Points of Non-Compliance or Exceptions of the Test Procedure

- None

3 Test Results

- "Decision rule according to IEC Guide 115:2021, clause 4.4.3, 4.5.1 was applied."
- "Decision rule (based on ILAC-G8) for an upper specification limit (A lower limit or specification with an up-per and a lower limit is treated similarly.):
 - Inconclusive result: If a measurement result plus/minus the expanded uncertainty with a 95 % coverage probability overlaps the limit it will be stated that it is not possible to state compliance or non-compliance."

3.1 Positive Test Results

- See below details

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3.1	TABLE: Visual inspection		P
Test Date [YYYY/MM/DD].....:		2022/06/06	—
Sample No.	Nature and position of initial findings – comments or attach photos		Verdict
471521I2507321	No major visual defects		P
471521I2507530	No major visual defects		P
Supplementary information:N/A			

3.2	TABLE: Performace at STC					P
Test Date [YYYY/MM/DD]:		2022/06/06				—
Irradiance (W/m ²)		1000				—
Module temperature [°C]		25				—
Sample No	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
471521I2507321 front	45.508	38.040	18.150	17.006	646.908	78.321
471521I2507530 front	45.498	38.019	18.174	16.984	645.727	78.091
471521I2507321 back	44.933	38.660	12.540	11.556	446.765	79.287
471521I2507530 back	45.015	38.775	12.426	11.602	449.868	80.426
Supplementary information:N/A						

3.3	Initial Insulation test			P
Test Date [YYYY-MM-DD]		2022/06/06		—
Test Voltage applied [V]		8000/1500		—
Size of module [m ²]		3.11		—
Required Resistance [MΩ].....:		12.86		—
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
471521I2507321	31900	No Dielectrical breakdown	x	P

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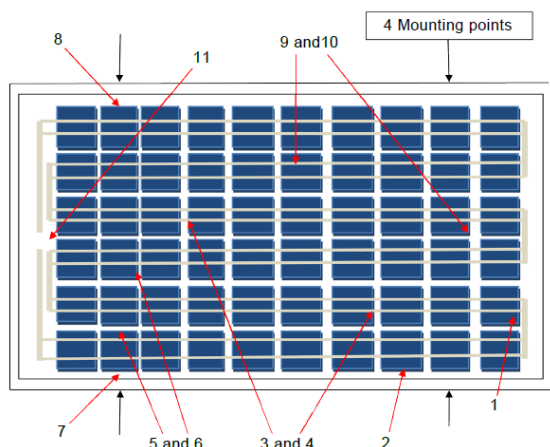
471521I2507530	32300	No Dielectrical breakdown	x	P
Supplementary information: N/A				

3.4	Initial Wet leakage current test			P
Test Date [YYYY-MM-DD]		2022/06/06		—
Test Voltage applied [V]		1500		—
Solution resistivity [Ω cm).....	< 3,500 Ω cm at 22 $\pm$ 2°C	1703.6		—
Solution temperature [°C]	22.6			—
Size of module [m²].....	3.11			—
Sample #	Required Resistance [M Ω]	Measured [M Ω]		Result
471521I2507321	12.86	11500		P
471521I2507530	12.86	10700		P
Supplementary information: N/A				

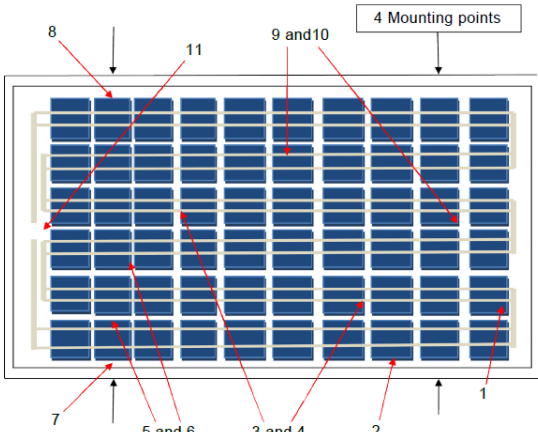
3.5: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....	2022/06/10						—
Sample #	471521I2507321						—
Ice ball size [mm].....	1	2	3	4	5	6	—
	43.72	43.12	43.08	44.11	43.46	44.26	
	7	8	9	10	11	/	
	42.13	44.07	43.11	43.02	43.47	/	
Ice ball weight [g].....	1	2	3	4	5	6	—
	43.52	42.58	42.29	42.82	42.32	42.36	
	7	8	9	10	11	/	
	42.03	43.15	42.57	42.54	42.24	/	
Ice ball velocity [m/s]	1	2	3	4	5	6	—
	31.05	30.19	30.67	31.71	30.95	30.22	

	7	8	9	10	11	/	
	31.75	31.12	30.83	31.89	32.16	/	
Number of impact locations	11						—

Supplementary information:



3.6: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD].....:	2022/06/10						—
Sample #	47152112507530						—
Ice ball size [mm].....:	1	2	3	4	5	6	—
	42.84	43.10	43.36	44.03	43.29	44.01	
	7	8	9	10	11	/	
	43.93	43.81	43.92	43.32	44.29	/	
Ice ball weight [g].....:	1	2	3	4	5	6	—
	44.22	41.95	42.92	42.44	42.14	42.72	
	7	8	9	10	11	/	
	42.02	42.38	42.12	41.85	43.00	/	
Ice ball velocity [m/s]	1	2	3	4	5	6	—
	31.50	31.88	31.88	29.59	30.15	31.44	
	7	8	9	10	11	/	

	30.28	31.88	32.02	31.86	30.62	/	
Number of impact locations :	11						—
Supplementary information: (impact location descriptions)							
							

3.9	TABLE: Performacne at STC (Final)							P
Test Date [MM/DD/YYYY]		2022/06/10						—
Module temperature [°C]		25						—
Irradiance [W/m ²]		1000						—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	Degradation [%]	Limit [%]
471521I2507321 front	45.517	38.512	18.058	16.775	646.020	78.595	-0.14	-5
471521I2507530 front	45.523	38.520	18.041	16.734	644.615	78.488	-0.17	-5
471521I2507321 back	44.950	38.753	12.395	11.495	445.445	79.952	-0.30	-
471521I2507530 back	44.937	38.726	12.348	11.590	448.843	80.892	-0.23	-
Supplementary information: N/A								

3.10	Insulation test (Final)							P
Test Date [YYYY-MM-DD]		2022/06/10						—
Test Voltage applied [V]		8000/1500						—
Size of module [m ²]		3.11						—

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Required Resistance [MΩ].....:		12.86	—	
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
471521I2507321	27500	No Dielectrical breakdown	x	P
471521I2507530	26800	No Dielectrical breakdown	x	P
Supplementary information: N/A				

3.11	Wet leakage current test (Final)			P
Test Date [YYYY-MM-DD]	2022/06/10			—
Test Voltage applied [V].....	1500			—
Solution resistivity [Ωcm)	< 3,500 Ω cm at 22 ± 2°C	1672.2		—
Solution temperature [°C].....	22.1			—
Size of module [m²]	3.11			—
Sample #	Required Resistance [MΩ]	Measured [MΩ]		Result
471521I2507321	12.86	7290		P
471521I2507530	12.86	6910		P
Supplementary information: N/A				

3.2 Points of Non-Compliance according to the test specification

- None

4 Remark

4.1 General

The user manual has been examined according to the minimum requirements described in the product standard. The manufacturer is responsible for the accuracy of further particulars as well as of the composition and layout.

4.2 Factory surveillance cycle

Your production facility is currently on a

- ☒ Annual (12 month)
☐ Bi-Annual (6 month)
☐ Quarterly (3 month)
☐ surveillance cycle.

4.3 Additional information for routine tests to be performed by the factory(ies)

Routine tests for electrical appliances / equipment:

Routine test requirements for production are described in annual inspection test reports.

5 Documentation

Appendix 1: List of measurement equipment

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Last Calibration date	Calibration due date
1	Visual inspection	RS-DZ-30-LU02	2022.05.27	2023.05.26
2	Performance at STC	0201595	2022.03.03	2023.03.02
3	Insulation test	0201596	2021.09.26	2022.09.25
4	Wet leakage current test	0201596	2021.09.26	2022.09.25
		RS-DZ-30-DD01		
5	Hail test	RS-DZ-30-CS69	2022.05.19	2023.05.18

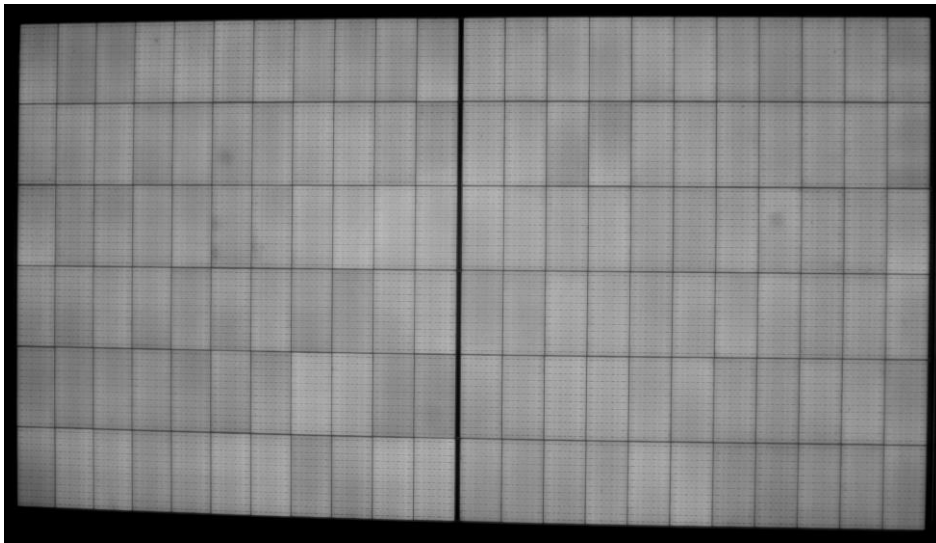
Appendix 2: Statement of the estimated uncertainty of the test results(K=2).

P_{max} measurement uncertainty: 2.4%
 V_{oc} measurement uncertainty: 1.3%
 I_{sc} measurement uncertainty: 2.5%

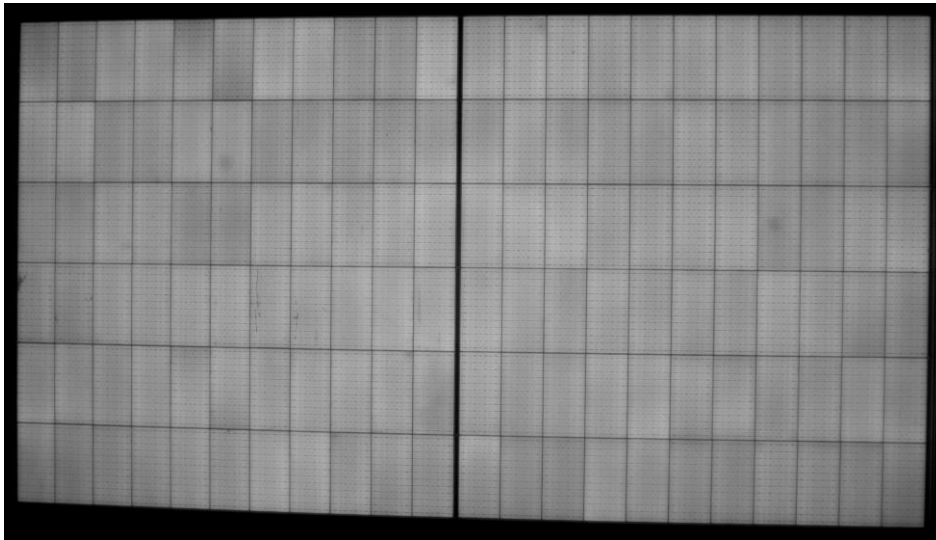
Appendix 3:

EL photos before hail test

471521I2507321

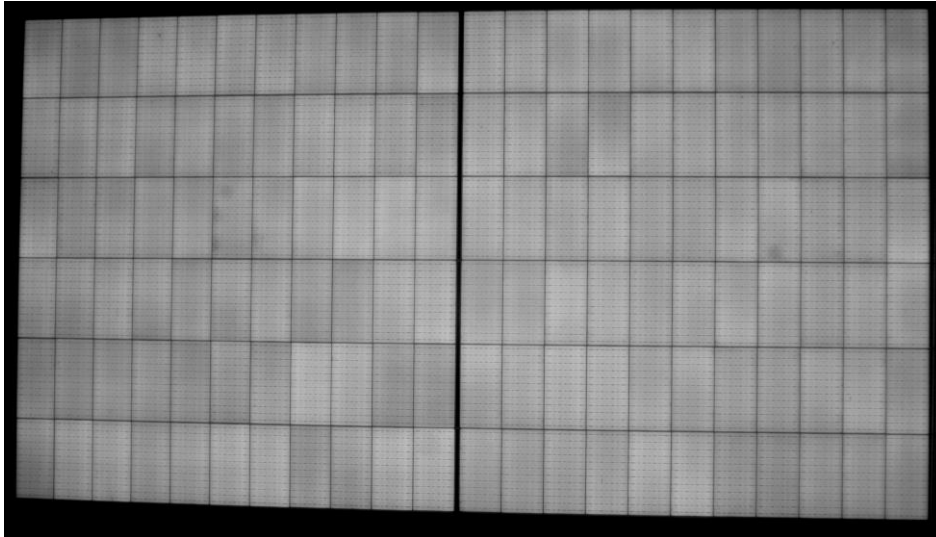


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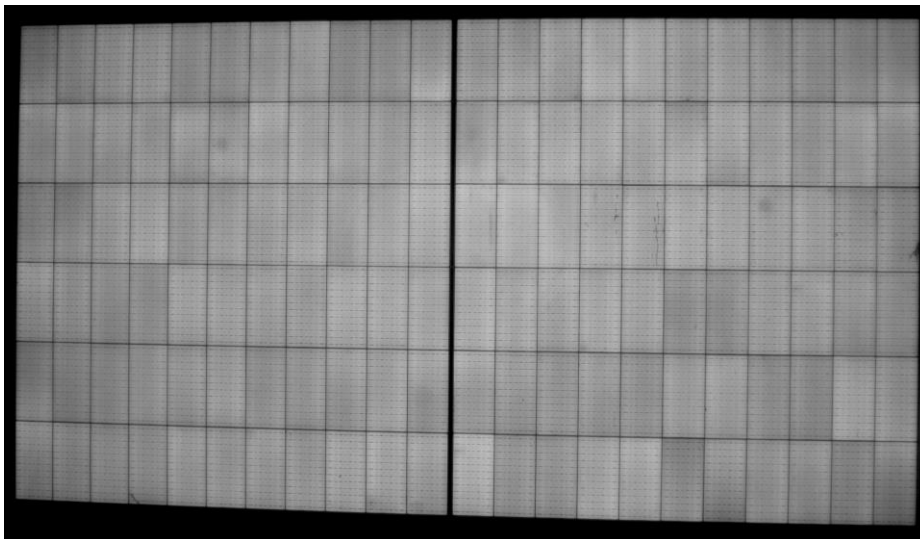


EL photos after hail test

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471521I2507530



6 Summary

The test specification is met.

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TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Tested by: Yang Chen 

Approved by: Gang Huang 