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检测  
TESTING  
CNAS L0128



W02391600138E

# 检测报告

## Test Report

*(Relatório de testes em laboratório)*



KbSEAnY3

<b>Name of Sample</b>	<b>PV module</b>
<i>Nome da amostra</i>	<i>Módulos Fotovoltaicos</i>
<b>Type</b>	
<i>Tipo de modulo</i>	<b>SR-72M570NHLPro, SR-54M435NHLProD</b>
<b>Applicant</b>	
<i>Requerente</i>	<b>Sunrise Energy Co., Ltd.</b>
<b>Test Purpose</b>	<b>Entrusted Tests</b>
<i>Finalidade do teste</i>	<i>Teste de delegação</i>

上海市质量监督检验技术研究院  
Shanghai Institute of Quality Inspection and Technical Research




# Shanghai Institute of Quality Inspection and Technical Research

## Test Report

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Name of Sample <i>Nome da amostra</i>	PV module <i>Módulos Fotovoltaicos</i>	Test Purpose <i>Finalidade do teste</i>	Entrusted Tests <i>Teste de delegação</i>
Type <i>Tipo de módulo</i>	SR-72M570NHLPro, SR-54M435NHLProD	Trade Mark <i>Marca</i>	
Grade <i>Nível</i>	Qualified products <i>Produtos qualificados</i>		
Applicant <i>Requerente</i>	Sunrise Energy Co., Ltd.		
Tested Company <i>Testado empresa</i>	/		
Producer <i>Produtor</i>	Sunrise Energy Co., Ltd.		
Number of Client <i>Número de cliente</i>	6009138	Entrusting/Sampling Date <i>Data De entrega</i>	2023.09.20
Reception Date <i>Data de recepção:</i>	2023.09.20	Sampling Spot <i>Local de amostragem</i>	/
Sample Quantity <i>Quantidade de amostra</i>	4 pcs	Sum of Sample <i>Soma de amostra</i>	/
Date of Production <i>Data De produção</i>	/	Original Number <i>Número de serie</i>	/
Situation of Sample <i>Situação Da amostra</i>	Intact Sent by client <i>Está como estava Enviado pelo cliente</i>		
Testing Place <i>Local de realização dos testes:</i>	No.900 Jiangyue Rd, Shanghai		
Test Standard <i>Padrão de testes</i>	IEC 61215-2:2021 Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures		
Judgement Rules <i>Regras de Acórdãos</i>	PORTARIA Nº 140, DE 21 DE MARÇO DE 2022		
Date of Testing <i>Data do teste</i>	2023.09.25 to 2023.09.27		
Conclusion <i>Conclusão</i>	<p>The test report only offers a single testing conclusion; See the details on the page of summary. <i>O relatório de teste fornece apenas uma conclusão de teste. Veja a página de resumo para detalhes.</i></p> <p style="text-align: right;">(Test Report Badge) Issued Date: 2023.10.08</p>		
Client's Message <i>Mensagem do cliente</i>	Add. <i>Endereço</i>	No.20 Tongzi River West Road, Zhonglou Development Zone, Changzhou 213023 Jiangsu, P.R China	
	Zip Code <i>Código postal</i>	/	Tel. <i>O telefone</i> 15305181015



Approved by: 陈苏声  
*Aprovado por:* 副主任

陈苏声

Checked by:  
*Revisor:*

李松刚

Tested by:  
*O testador:*

石艳婷

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<b>Collection of The Test Results</b>					
<i>Coleção de testes</i>					
No. <i>Número</i>	Test Items <i>Itens de teste</i>	Technical Requirements <i>Requisitos técnicos</i>	Test Results <i>Resultados de teste</i>	Judgements by Single Item <i>Juizos de valor por item único</i>	Remarks <i>Observações</i>
1	Visual inspection (MQT 01) <i>Inspeção visual(MQT 01)</i>	For the tested PV module, major visual defects do not exist. <i>O modulo não pode apresentar defeitos visuais evidentes.</i>	Page 6 <i>Página 6</i>	Complies <i>Elegível para</i>	/
2	Initial Stabilization (MQT 19.1) <i>Estabilização Inicial (MQT 19.1)</i>	Initial stabilization of c-Si modules shall be obtained by exposing to sunlight with an irradiation dose level of $\geq 10$ kWh/m <sup>2</sup> . As a result, modules have reached stabilized electrical power output. <i>A estabilização inicial dos módulos c-Si deve ser obtida pela exposição à luz solar com um nível de dose de radiação de <math>\geq 10</math> kWh/m<sup>2</sup>. Como resultado, módulos alcançaram uma produção de energia elétrica estabilizada.</i>	Page 7 <i>Página 7</i>	Complies <i>Elegível para</i>	/

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Collection of The Test Results					
<i>Coleção de testes</i>					
No. <i>Número</i>	Test Items <i>Itens de teste</i>	Technical Requirements <i>Requisitos técnicos</i>	Test Results <i>Resultados de teste</i>	Judgements by Single Item <i>Juízos de valor por item único</i>	Remarks <i>Observações</i>
3	Maximum Power Determination (MQT 02) <i>Determinação de Potência Máxima</i> (MQT 02)	The measured power of the PV module shall not be less than 100% or more than 105%. <i>Os módulos não podem apresentar medida de potência menor que 100% ou maior que 105%.</i>	Page 8 <i>Página 8</i>	Complies <i>Elegível para</i>	/
4	Insulation test (MQT 03) <i>Teste de isolamento de</i> (MQT 03)	For modules area $\geq 0.1 \text{ m}^2$ , measured insulation resistance shall be $\geq 40 \text{ M}\Omega \cdot \text{m}^2$ . Otherwise, the insulation resistance shall be $\geq 400 \text{ M}\Omega$ . <i>Com valor de resistência elétrica <math>\geq 40 \text{ M}\Omega \cdot \text{m}^2</math>, Para módulos com área maior que <math>0.1 \text{ m}^2</math>. Caso contrário, e resistência <math>\geq 400 \text{ M}\Omega</math>.</i>	Page 9 <i>Página 9</i>	Complies <i>Elegível para</i>	/
5	Wet leakage current test (MQT 15) <i>Teste de fuga de corrente molhada de</i> (MQT 15)	Requirements are the same as Insulation test. <i>Os requisitos são os mesmos dos Teste de isolamento de.</i>	Page 10 <i>Página 10</i>	Complies <i>Elegível para</i>	/
Supplementary information: none <i>Informação suplementar: nenhuma</i>					

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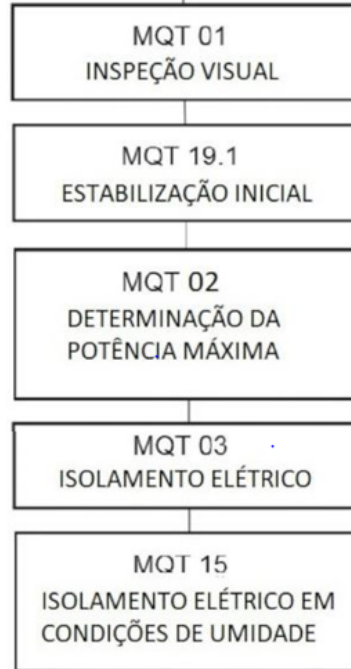
## Test item description

### Teste item descrição

Figura 1 - Fluxograma de ensaios de módulos

1 MÓDULO  
(CONTROLE)

1 MÓDULO  
(PROVA)



List of Test Samples:

Lista de amostras:

Sample # <i>Amostra</i>	Model <i>Modelo</i>	S/N	Remark <i>Observações</i>
1.	SR-72M570NHLPro	H72MAA23091810003	Control <i>Controlo</i>
2.	SR-72M570NHLPro	H72MAA23091810002	Test <i>PROVA</i>
3.	SR-54M435NHLProD	H54MHA23091830008	Control <i>Controlo</i>
4.	SR-54M435NHLProD	H54MHA23091830009	Test <i>PROVA</i>

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<b>Abbreviations:</b> <i>Abreviaturas:</i>		
Pmax– Maximum power	STC – Standard Test Conditions	Voc – Open Circuit Voltage
<i>Pmax- Potência máxima</i>	<i>STC- Condições normais de ensaio</i>	<i>Voc –Circuito aberto de tensão</i>
Vmp – Maximum Power Voltage	FF –Fill Factor	Imp – Maximum Power Current
<i>Vmp –Potência máxima</i>	<i>FF- Enches o Factor</i>	<i>Imp- Potência máxima actual</i>
Isc – Short Circuit Current	<i>Isc- Curto circuito atual</i>	
<b>Possible test case verdicts:</b> <i>Caso verdicts:</i>		
- test case does not apply to the test object .....	N/A	
<i>O caso do teste não é aplicado ao teste object.....:</i>	<i>N/A</i>	
- test object does meet the requirement .....	P (Pass)	
<i>O teste object conhece a requisição .....</i>	<i>P (Passe isso)</i>	
- test object does not meet the requirement .....	F (Fail)	
<i>- O teste object não conhece a requisição.....:</i>	<i>F (Não passou)</i>	
-test case provides measured values .....	—	
<i>- O caso de ensaio é um valor medido .....</i>	<i>—</i>	
<b>Remarks:</b> <i>Observações:</i>		
1、 The test report only offers the conclusions for the tested items according to the relevant testing standards which are not included the conclusions of the untested items or performances. <i>O relatório de teste fornece as conclusões do projeto de teste com base apenas nos critérios de teste relevantes e não inclui conclusões de projetos não testados ou desempenho.</i>		
2、 The test report has two versions, one in English, the other in Portuguese. The English one is in priority. <i>O relatório de teste está disponível em duas versões, uma em inglês e outra em português. A grã - bretanha tem prioridade.</i>		
3、 Notices, Statement and Subordinate Units of SQI are the parts of this report. <i>Notas, declarações e subordinados do SQI fazem parte deste relatório.</i>		

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<b>4.1</b>	<b>Visual inspection</b> <b>INSPEÇÃO VISUAL</b>	<b>P</b>
Test date [DD/MM/YYYY] <i>Data de realização dos testes [DD/MM/AAAA]</i>	25/09/2023	—
Sample # <i>Amostra #</i>	Nature and position of findings <i>Natureza e localização dos desvios</i>	—
2	No visual defects acc. to PORTARIA Nº 140, DE 21 DE MARÇO DE 2022 <i>Sem Defeitos visuais de acordo com PORTARIA Nº 140, DE 21 DE MARÇO DE 2022</i>	P
4	No visual defects acc. to PORTARIA Nº 140, DE 21 DE MARÇO DE 2022 <i>Sem Defeitos visuais de acordo com PORTARIA Nº 140, DE 21 DE MARÇO DE 2022</i>	P
Supplementary information: none <i>Informação suplementar: nenhuma</i>		

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<b>4.19.5</b>		<b>Initial Stabilization</b> <b>ESTABILIZAÇÃO INICIAL</b>						P
Light exposure method <i>Método de exposição à luz</i>				<input checked="" type="checkbox"/> Solar simulator <input type="checkbox"/> Natural sunlight <i>Simulador solar</i> <i>Luz solar natural</i>				
Stabilization criterion x per IEC 61215-1-x <i>Critério de estabilização x por IEC 61215-1-x</i>				1				
Sample # <i>Amostra #</i>	2	Test date [DD/MM/YYYY] start-end <i>Data de realização dos testes</i> <i>[DD/MM/AAAA] início/fim</i>			25/09/2023-27/09/2023			
Test cycle <i>Ciclo de teste</i>	Integrated irradiation (kWh/m <sup>2</sup> ) <i>Irradiação integrada (kWh/m<sup>2</sup>)</i>	Irradiance (W/m <sup>2</sup> ) <i>Irradiância (W/m<sup>2</sup>)</i>	Module temperature (°C) <i>Temperatura do módulo(°C)</i>	Resistive load <i>Carga resistiva</i>	P <sub>max</sub> (W) at the end of cycle <i>Pmax (W) no final do ciclo</i>	(P <sub>max</sub> - P <sub>min</sub> ) / P <sub>average</sub> (%) <i>(Pmax - Pmin) / Paverage (%)</i>	Stable (Yes/No) <i>Estábulo (Sim/Não)</i>	
Initial <i>Inicial</i>	—	—	—	—	573.63	—	—	
1	5	1000	50±10	MPPT	573.03	—	—	
2	10	1000	50±10	MPPT	572.40	0.21	Yes	
3	—	—	—	—	—	—	—	
4	—	—	—	—	—	—	—	
Sample # <i>Amostra #</i>	4	Test date [DD/MM/YYYY] start-end <i>Data de realização dos testes</i> <i>[DD/MM/AAAA] início/fim</i>			25/09/2023-27/09/2023			
Test cycle <i>Ciclo de teste</i>	Integrated irradiation (kWh/m <sup>2</sup> ) <i>Irradiação integrada (kWh/m<sup>2</sup>)</i>	Irradiance (W/m <sup>2</sup> ) <i>Irradiância (W/m<sup>2</sup>)</i>	Module temperature (°C) <i>Temperatura do módulo(°C)</i>	Resistive load <i>Carga resistiva</i>	P <sub>max</sub> (W) at the end of cycle <i>Pmax (W) no final do ciclo</i>	(P <sub>max</sub> - P <sub>min</sub> ) / P <sub>average</sub> (%) <i>(Pmax - Pmin) / Paverage (%)</i>	Stable (Yes/No) <i>Estábulo (Sim/Não)</i>	
Initial <i>Inicial</i>	—	—	—	—	437.08	—	—	
1	5	1000	50±10	MPPT	436.91	—	—	
2	10	1000	50±10	MPPT	436.31	0.18	Yes	
3	—	—	—	—	—	—	—	
4	—	—	—	—	—	—	—	
Supplementary information: The following formula shall be taken as the criterion: (P <sub>max</sub> - P <sub>min</sub> ) / P <sub>average</sub> < x, where x=1% for c-Si modules. <i>Informação suplementar: A seguinte fórmula deve ser considerada como critério: (Pmax - Pmin) / Pmédia &lt; x, onde x=1% para módulos c-Si.</i>								



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4.2		Maximum Power Determination <i>Determinação de Potência Máxima</i>				P <sup>1</sup>
Test date [DD/MM/YYYY] <i>Data de realização dos testes [DD/MM/AAAA]</i>		27/09/2023				—
Radiant Source <i>Radiante da fonte</i>		<input checked="" type="checkbox"/> Solar Simulator <i>Do simulador Solar</i>		<input type="checkbox"/> Natural Sunlight <i>Natural de luz do sol</i>		—
Module temperature [°C] <i>Temperatura do módulo [°C]</i>		25.0 ± 0.5				—
Irradiance [W/m <sup>2</sup> ] <i>Irradiação [W/m<sup>2</sup>]</i>		1000 ± 5				—
Sample # <i>Amostra #</i>	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmax [W]	FF [%]
2	51.86	43.96	13.69	13.02	572.40	80.63
4	39.16	33.13	13.80	13.17	436.31	80.75
<p>Supplementary information: <i>Informação suplementar:</i></p> <p>Measurements were performed at standard test conditions (STC) with a flash light solar simulator class AAA acc. to IEC 61215-2:2021. <i>As medições foram realizadas em condições padrão (STC) com um simulador solar de flash (flasher) classe AAA de acordo com a IEC 61215-2:2021.</i></p> <p>measured graphs see IV curves in Photos of modules. <i>para os valores medidos ver curvas IV no Fotos dos módulos.</i></p> <p>The measured power of the PV module shall not be less than 100% or more than 105%. <i>Os módulos não podem apresentar medida de potência menor que 100% ou maior que 105%.</i></p> <p>The measuring uncertainty of Pmax is ≤ ±2.1%. <i>A incerteza de medição para Pmax é ≤ ±2.1%.</i></p> <p>The measuring uncertainty of Isc is ≤ ±2.0%. <i>A incerteza de medição para Isc é ≤ ±2.0%.</i></p> <p>The measuring uncertainty of Voc is ≤ ±0.8%. <i>A incerteza de medição para Voc é ≤ ±0.8%.</i></p> <p>Measuring uncertainty includes spectral mismatch error. <i>A incerteza de medição inclui os erros por desvios no espectro.</i></p>						

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4.3		Insulation test <i>Teste de isolamento</i>				P
Test date [DD/MM/YYYY] <i>Data de realização dos testes [DD/MM/AAAA]</i>		27/09/2023				—
Maximum system voltage [V <sub>DC</sub> ] <i>Voltagem máxima do sistema [V<sub>DC</sub>]</i>		1500				—
High voltage applied [V <sub>DC</sub> ] <i>Alta tensão aplicada [V<sub>DC</sub>]</i>		8000				—
Insulation resistance measured at [V <sub>DC</sub> ] <i>Valor da medição da resistência de isolamento [V<sub>DC</sub>]</i>		1500				—
Sample # <i>Amostra #</i>	Area <i>Área</i>	Required <i>Valores-limite</i>	Measured <i>Medida</i>	Dielectric breakdown <i>Quebra dielétrica</i>		Result* <i>Resultado*</i>
	m <sup>2</sup>	MΩ	MΩ	Yes (description) <i>Sim (descrição)</i>	No(description) <i>Não</i>	
2	2.58	≥15.5	17650	/	No <i>Não</i>	P
4	2.00	≥20.0	22570	/	No <i>Não</i>	P
*Supplementary information: Minimum requirement acc. to the standard is 40.0 MΩ*m <sup>2</sup> . <i>*Informação suplementar: Os requisitos mínimos de acordo com a norma são 40.0 MΩ*m<sup>2</sup></i>						

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4.15		Wet leakage current test <i>Teste de fuga de corrente molhada</i>		P
Test date [DD/MM/YYYY] <i>Data de realização dos testes [DD/MM/AAAA]:</i>		27/09/2023		—
Insulation resistance measured at [V <sub>DC</sub> ] <i>Valor da medição da resistência de isolamento [V<sub>DC</sub>]</i>		1500		—
Solution temperature [°C] <i>Temperatura da solução [°C]</i>		22±2	22.1	—
Solution resistivity [Ω cm] <i>Resistencia da solução [Ω cm]</i>		≤3500	1855	—
Sample # <i>Amostra #</i>	Area <i>Área</i> [m <sup>2</sup> ]	Required <i>Valores-limite</i> [MΩ]	Measured <i>Medida</i> [MΩ]	Result* <i>Resultado*</i>
2	2.58	≥15.5	5764	P
4	2.00	≥20.0	1964	P
*Supplementary information: Minimum requirement acc. to the standard is 40.0 MΩ*m <sup>2</sup> . <i>*Informação suplementar: Os requisitos mínimos de acordo com a norma são 40.0 MΩ*m<sup>2</sup></i>				

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## Photos of modules

*Fotos dos módulos*

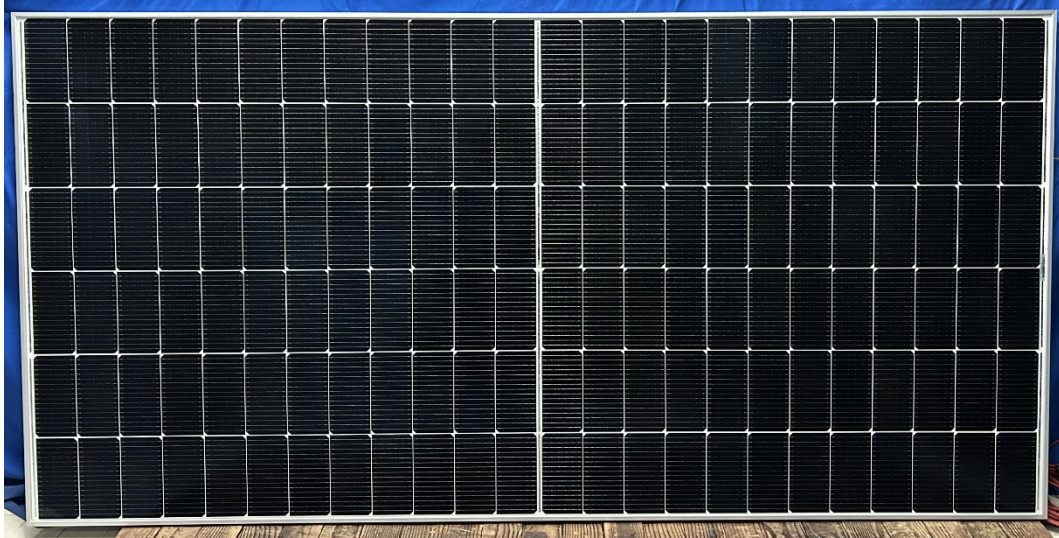


Fig. 1: Front view of module type SR-72M570NHLPro

*Fig. 1: Vista frontal do tipo de módulo SR-72M570NHLPro*

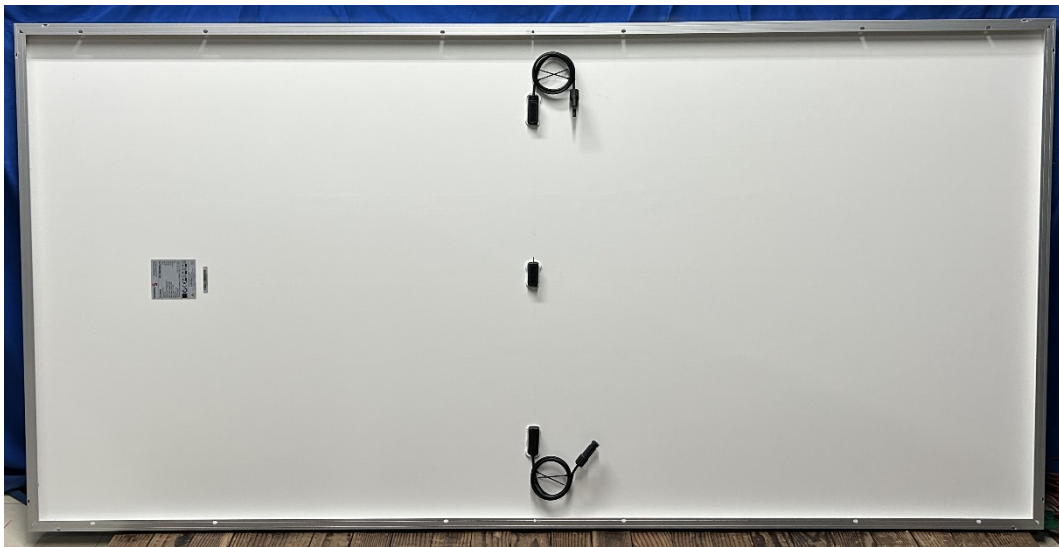


Fig. 2: Rear view of module type SR-72M570NHLPro

*Fig. 2: Vista da parte traseira do tipo de módulo SR-72M570NHLPro*

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## Photos of modules

### Fotos dos módulos



Fig. 3: View of junction box of module type SR-72M570NHLPro

Fig. 3: Vista detalhada da caixa de junção do tipo de módulo SR-72M570NHLPro








		<b>Aquaman Series</b> <a href="http://www.sunriseenergy.cn">www.sunriseenergy.cn</a>
<b>PV Model</b>	<b>SR-72M570NHLPro</b>	
Standard Power:	570W	
Tolerance:	0~+5W	
Open Circuit Voltage(Voc):	50.92V	
Short Circuit Current(Isc):	14.31A	
Max.Power Voltage(Vmp):	42.07V	
Max.Power Current(Imp):	13.55A	
Max.System Voltage:	DC1500V	
Max.Fuse:	25A	
Number of Cells:	144	
Size of Module:	2278×1133mm	
At Standard Test Conditions: E=1000W/m <sup>2</sup> , AM=1.5, Tc=25°C		
     		
<p><b>WARNING.ELECTRICAL HAZARD</b>  <b>Module application class A</b>  <b>Sunrise Energy Co., Ltd.</b></p> <p>ADD:NO.20 Tongzi River West Road, Zhonglou Development Zone,          Changzhou Jiangsu, 213023 P.R.China</p> <p>Tel:+86-519-83906506 Email:info@sunriseenergy.cn</p>		

Fig. 4: View of type label of module type SR-72M570NHLPro

Fig.4: Vista detalhada da placa de características do tipo de módulo SR-72M570NHLPro



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## Photos of modules

### *Fotos dos módulos*

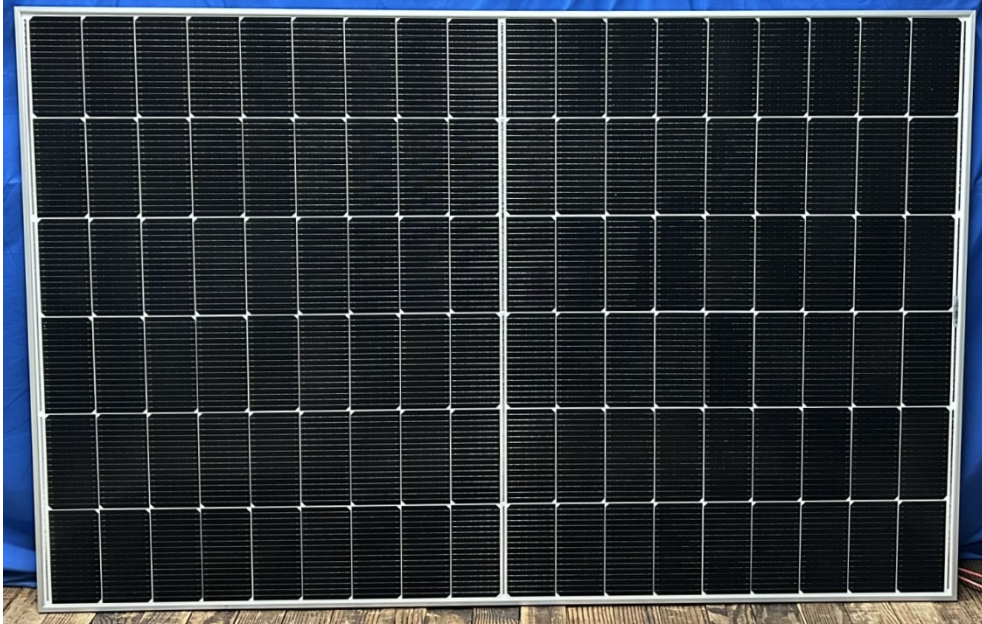


Fig. 5: Front view of module type SR-54M435NHLProD

*Fig. 5: Vista frontal do tipo de módulo SR-54M435NHLProD*



Fig. 6: Rear view of module type SR-54M435NHLProD

*Fig. 6: Vista da parte traseira do tipo de módulo SR-54M435NHLProD*

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## Photos of modules

### Fotos dos módulos



Fig. 7: View of junction box of module type SR-54M435NHLProD

Fig. 7: Vista detalhada da caixa de junção do tipo de módulo SR-54M435NHLProD











		<b>Aquaman Series</b> <a href="http://www.sunriseenergy.cn">www.sunriseenergy.cn</a>
<b>PV Model</b>	<b>SR-54M435NHLProD</b>	
Standard Power:	435W	
Tolerance:	0~+5W	
Open Circuit Voltage(Voc):	38.79V	
Short Circuit Current(Isc):	14.34A	
Max.Power Voltage(Vmp):	32.05V	
Max.Power Current(Imp):	13.58A	
Max.System Voltage:	DC1500V	
Max.Fuse:	25A	
Number of Cells:	108	
Size of Module:	1762×1133mm	
At Standard Test Conditions: E=1000W/m <sup>2</sup> , AM=1.5, Tc=25°C		
        		
<p><b>WARNING.ELECTRICAL HAZARD</b>  <b>Module application class A</b>  <b>Sunrise Energy Co., Ltd.</b>                  ADD:NO.20 Tongzi River West Road, Zhonglou Development Zone,                  Changzhou Jiangsu, 213023 P.R.China                  Tel:+86-519-83906506 Email:info@sunriseenergy.cn</p>		

Fig.8: View of type label of module type SR-54M435NHLProD

Fig.8: Vista detalhada da placa de características do tipo de módulo SR-54M435NHLProD

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Electroluminescence images

*Imagens de eletroluminescência*

Analysis of electroluminescence images with respect to micro cracks (EL photos)

*Análise de imagens de eletroluminescência referente a Microfissuras*

Test date [DD/MM/YYYY] <i>Data de realização dos testes [DD/MM/AAAA]</i>		27/09/2023
Sample # <i>Amostra #</i>	Reverse current applied [A] <i>Corrente inversa aplicada [A]</i>	Attributes <i>Atributos</i>
2	Isc ± 5%	N/A
4	Isc ± 5%	N/A
Supplementary information: none <i>Informação suplementar: nenhuma</i>		



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## Energy efficiency class

### Classe de eficiência energética

Sample # Amostra #	Module width Largura do módulo [mm]	Module length Comprimento do módulo [mm]	Module area área módulo [m <sup>2</sup> ]	Module power potência módulo [W]	Module efficiency eficiência do módulo [%]
2	1133	2278	2.58	570	22.08
4	1133	1762	2.00	435	21.79

Supplementary information: \*see rating label in Photos of modules

Informação suplementar: \*Ver a etiqueta de classificação no Fotos dos módulos

Sample # Amostra #	Module type Tipo de módulo	Module efficiency eficiência do módulo [%]	Energy efficiency class Classe de eficiência energética
2	SR-72M570NHLPro	22.08	A
4	SR-54M435NHLProD	21.79	A

Supplementary information: Energy efficiency > 20.0% : classes A;

Informação suplementar: Eficiência Energética > 20.0%: Classe A;

### Energy efficiency classes

#### Classe de Eficiência Energética

A ≥ 20.0%

18.0% ≤ B < 20.0%

16.0% ≤ C < 18.0%

14.0% ≤ D < 16.0%

E < 14.0%

# Test Report

## Figures números

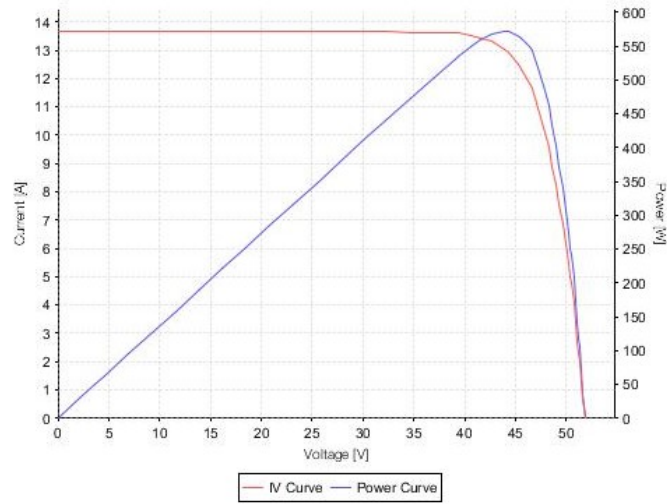


Fig. 9 IV curve of module No.2 Serial number: H72MAA23091810002

Fig. 9 IV curva de módulo No.2 Número de série: H72MAA23091810002

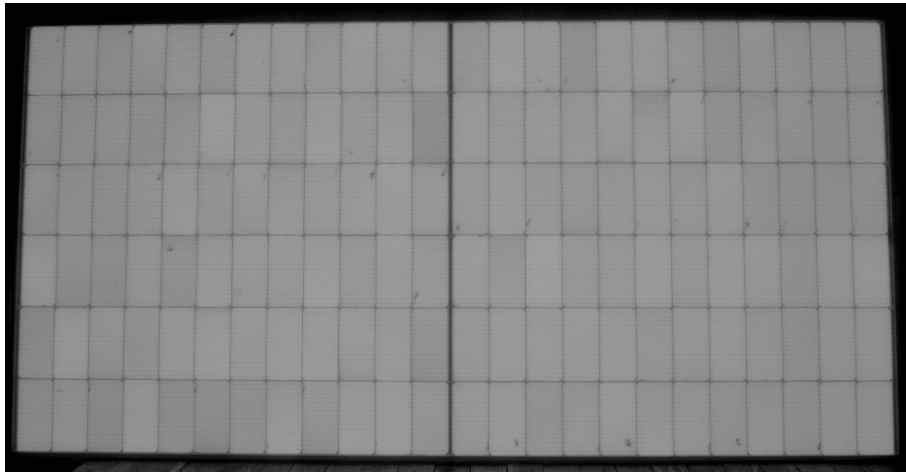


Fig. 10 EL photo of module No.2 Serial number: H72MAA23091810002

Fig. 10 EL fotografia de módulo No.2 Número de série: H72MAA23091810002

# Test Report

## Figures números

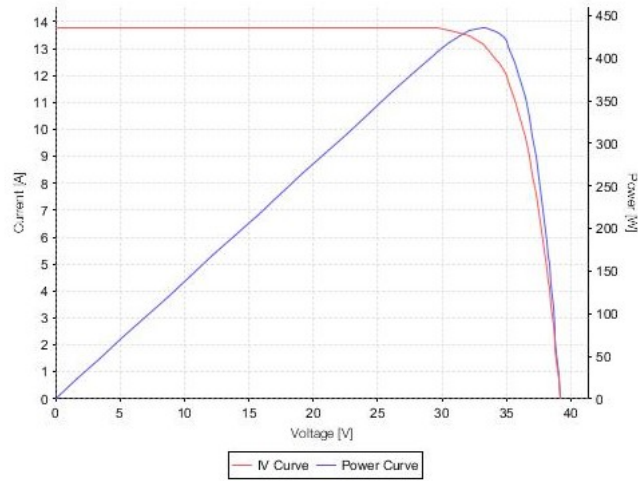


Fig. 11 IV curve of module No.4 Serial number: H54MHA23091830009

Fig. 11 IV curva de módulo No.4 Número de série: H54MHA23091830009

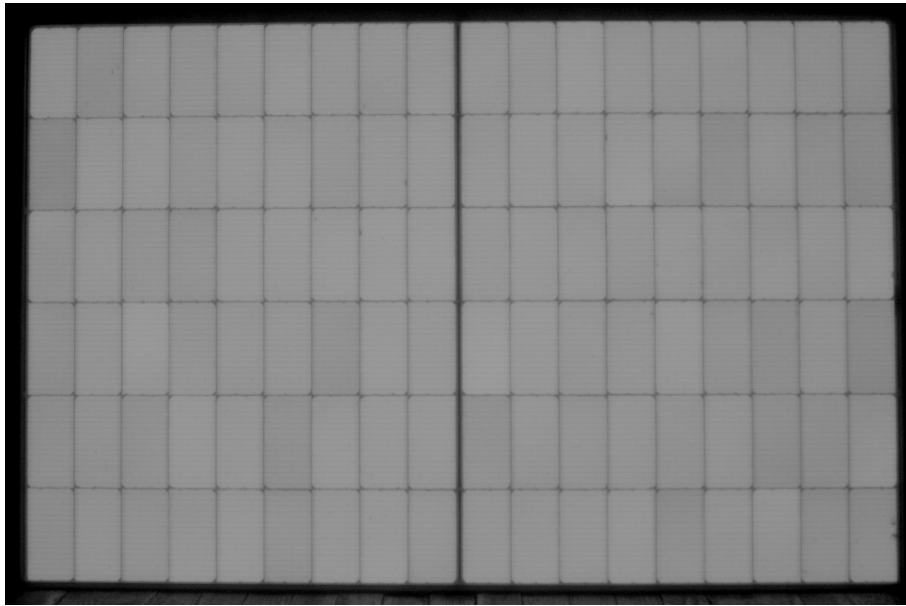


Fig. 12 EL photo of module No.4 Serial number: H54MHA23091830009

Fig. 12 EL fotografia de módulo No.4 Número de série: H54MHA23091830009

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## List of measurement equipment *Lista de equipamentos de medição*

Clause Item	Measurement / testing <i>Ensaios/ Procedimentos</i>	Testing / measuring equipment / material used, (Equipment ID) <i>Equipamento / material de teste / medição usado (ID do dispositivo)</i>	Range used <i>Escopo a ser usado</i>	Last Calibration date <i>Data da última calibração</i>	Calibration due date <i>Data de expiração da calibração</i>
MQT 01	Visual Inspection <i>Inspeção Visual</i>	Digital illuminometer <i>Fotômetro digital</i> DZ-B-A1-0200	0~2000lux	2023-02-08	2024-02-07
		Band tape <i>Fita métrica</i> DZ-B-A1-0014	3.5m	2021-09-02	2024-09-01
MQT 19.1	Initial Stabilization <i>Estabilização Inicial</i>	Pulse solar simulator <i>Simulador solar pulsado</i> DZ-A-A2-0156	200~1200W/m <sup>2</sup>	2023-09-21	2024-09-20
		Steady state solar simulator <i>Simulador solar de estado estacionário</i> DZ-A-A2-0024	800~1000W/m <sup>2</sup>	2023-03-16	2024-03-15
MQT 03	Insulation test <i>Teste de isolamento Elétrico</i>	Insulation tester <i>Resistor de isolamento</i> DZ-A-A1-0258	0~6kV, 1~50GΩ	2023-07-05	2024-07-04
		Withstand voltage tester <i>Testador de tensão suportável</i> DZ-A-A1-0238	0~10kV	2023-02-15	2024-02-14
MQT 02	Maximum Power Determination <i>Determinação de Potência Máxima</i>	Pulse solar simulator <i>Simulador solar pulsado</i> DZ-A-A2-0156	200~1200W/m <sup>2</sup>	2023-09-21	2024-09-20
		Reference module <i>Módulo de referência</i> DZ-B-A2-0122	182mm Topcon	2023-08-24	2024-08-23
MQT 15	Wet leakage current <i>Resistência de</i>	Insulation tester <i>Resistor de isolamento</i> DZ-A-A1-0258	0~6kV, 1~50GΩ	2023-07-05	2024-07-04

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	<i>Isolamento em Condições Úmidas</i>	<i>Conductivity meter Medidor de condutividade DZ-B-A2-0055</i>	<i>0μS/cm~100mS /cm, 0.0~60.0 °C</i>	<i>2023-06-08</i>	<i>2024-06-07</i>
/	<i>EL image Imagens de eletroluminescência</i>	<i>EL camera Câmera de eletroluminescência DZ-A-A1-0274</i>	<i>/</i>	<i>2019-08-27</i>	<i>2029-08-26</i>
		<i>Power supply Fonte de alimentação cc DZ-B-A2-0111</i>	<i>150V 20A</i>	<i>2023-09-02</i>	<i>2024-09-01</i>

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*O abaixo está em branco*

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