



No.: P2020092702

# Test report

Product(Sample)	eArc module
Application Dept.	Production department
Applicant	Xiaowen Liu
Test Company	<u>SUNMAN(ZHENJIANG) CO.,LTD.</u>
Test Date	2021-11-12
Tester	
Auditor	
Approved by	
Date of issue	2021-12-24



### 1. Purpose of the testing:

To confirm the effect of eArc module's upper film creases on aging and long-term reliable performance.

### 2. Test definitions

2.1 Damp & heat aging test: to test the thermal stress while the modules are exposed to high humidity and the ability to resist the long-term penetration of moisture, thus reproduce the damage caused by the environment.

2.2 Wet Leakage: to evaluate the insulation of the modules under humid operating conditions and confirm that moisture from rain, fog, frost or snowmelt will not enter the moving parts of the module circuit.

### 3. Testing instrument

#### 3.1 Damp & heat aging test instrument:



Instrument Name: Damp & Heat Testing Chambers  
Instrument manufacturer: Shanghai Houyao  
Model: HY-BRS-DH-9

#### 3.2 Wet Leakage test instrument:



Instrument Name: Electrical Safety Tester  
Instrument manufacturer: Good Will Instrument Co., Ltd  
Model: GEO925909

### 4. Test standard:

#### 4.1 Damp & heat aging standard

4.1.1 Test conditions: with the temperature  $85\pm 2^{\circ}\text{C}$ , relative humidity:  $85\pm 5\%$

testing time: 1000H

4.1.2 Judging criteria: no serious appearance defects, the maximum output power degradation does not exceed 5% of the test value before the experiment.

#### 4.2 Wet leakage standard:

4.2.1 Test conditions: Soak in the solution with a resistivity of less than 3500Ω·CM for 48hours

4.2.2 Judging criteria: For modules with an area greater than 0.1m<sup>2</sup>, the test insulation resistance multiplied by the module area should not be less than 40MΩ·m<sup>2</sup>.

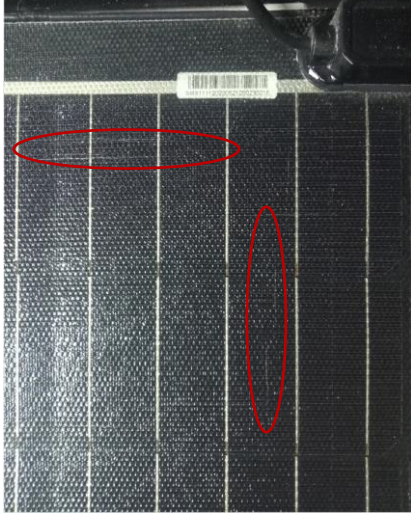
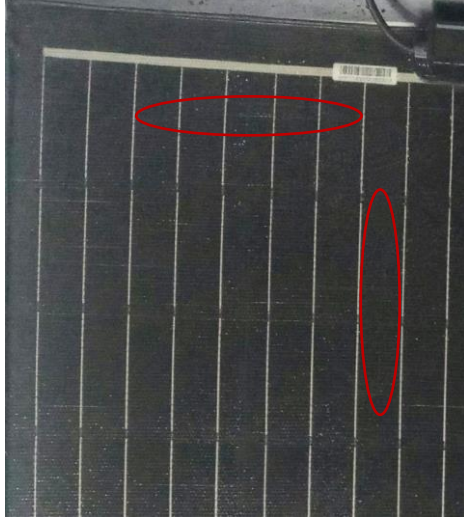
Remarks: The test standard refers to IEC 61215;GB/T 7122-1996 standard.

**5. Samples information:**

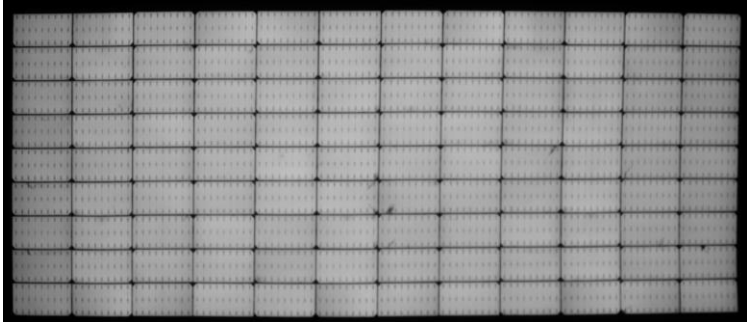
No.	Lot No.	Model	Serial Number	Structure
1	N/A	9*12 cut cell	SMS111120200521050230016	eArc

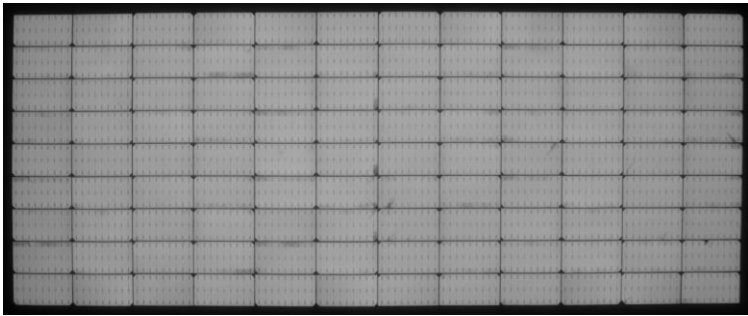
**6. Test results:**

6.1 Appearance:



No.	Lot No.	Before aging		After aging		Analysis & Judgement
		Images	Note	Images	Note	
1	N/A		Normal		Color: Normal  No obvious abnormalities on the creases area	Pass

6.2 EL test:

No.	Test period	Images	Note	Judgement
1	Before testing		Normal	Pass

	1*IEC		No abnormalities	Pass
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6.3 Power:



No.	Test period	Images	Note	Judgement
1	Before testing		Power: 292.568W	Pass
	1* IEC		Power: 284.446W Degradation : -2.78%	Pass

6.3.1 Power loss:

No.	Test period	VOC (V)	Vmp (V)	Isc (A)	Imp (A)	Pmp (W)	RS (Ω)	FF (%)	Degradation
1	Before testing	40.369	33.981	9.235	8.610	292.568	0.39	78.5	/
	1* IEC	39.780	33.330	9.336	8.534	284.446	0.41	76.6	2.78%

6.4 Wet leakage :

- 6.4.1 Test conditions: Soak in the solution with a resistivity of less than 3500Ω·CM for 48hours after DH1000 hours
- 6.4.2 Test Voltage :1000V

No.	Test period	The actual resistance value of the soaking solution (Ω.CM)	Images	Insulation resistance value (MΩ)	Module area (m <sup>2</sup> )	Resistance value*area (MΩ·m <sup>2</sup> )	Pass criteria (MΩ·m <sup>2</sup> )	Judgement
1	Before testing	2923		1997	1.3975	2762	≥40	Pass
	1*IEC	2765		365	1.3975	510	≥40	Pass

## 7. Conclusion:

After DH1000h, the power degradation is less than 5%, and no obvious abnormalities on the creases area, the power and wet leakage tests both meet the requirements;

Therefore, it is determined that the creases on the surface do not affect the performance, durability or reliability of the modules .