



TC-6168

# Test Report

## Solex Energy Ltd

REPORT NUMBER: 4790618738.12.1-NABL-S1

PROJECT NUMBER: 4790618738.12.1

ULR NUMBER: TC616823100000044F



### Select the applicable test

#### locations:

#### LOCATION 1:

UL India Private Limited,  
Laboratory building, Kalyani  
Platina Campus, Sy.no.129/4,  
EPIP Zone, Phase II, Whitefield,  
Bangalore - 560 066  
P:91-80-41384400

#### LOCATION 2:

UL India Private Limited,  
Oak building, Kalyani Platina  
Campus, Sy.No.129/4,  
EPIP Zone, Phase II, Whitefield,  
Bangalore, Karnataka - 560 066

#### LOCATION 3:

UL India Private Limited, 30/A, I  
Stage, Vishveshwarya Industrial  
Estate, Doddanekkundi Industrial  
Area, Bangalore - 560048



**TEST DISCIPLINE: ELECTRONICS**  
**PRODUCT GROUP: SOLAR PANEL**

**General details**

<b>Customer / Applicant</b>	SOLEX ENERGY LTD. RS #938 KIM - MANDVI ROAD, NEAR GENERAL POLYTEX TADKESHWAR, GUJARAT, 394170, INDIA		
<b>Manufacturer</b>	SOLEX ENERGY LTD PLOT NO 1 A BLOCK 938, TADKESHWAR, KIM MANDVI ROAD, MANDVI, SURAT, GUJARAT, GUJARAT, 394110		
<b>Program</b>	<b>NABL</b>		
<b>Item Under Test</b>	Crystalline Silicon Solar PV Module		
<b>Model</b>	SMF72HM10-545		
<b>Number of Samples</b>	01(One)		
<b>UL. Sample Identification</b>	5622388	<b>Refer Summary of Test results for multiple samples</b>	
<b>Manufacturer Serial Number (if any)</b>	SA22110012035		
<b>Condition of IUT on receipt</b>	Good		
<b>Date of Receipt</b>	13 December 2022		
<b>Applicable Standard</b>	IEC 61215-2:2016, CL 4.2 Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures (Maximum power determination (MQT 02)) / IEC 60904-1:2020 Photovoltaic devices – Part 1: Measurement of photovoltaic current- voltage characteristics.		
<b>Date of Testing (Start date)</b>	20 January 2023	<b>End Date</b>	25 January 2023
<b>UL. general^ ambient condition</b>	<b>Temperature in °C</b>		23 ±5°C
	<b>Relative humidity in %</b>		<70 %
<b>Date of Issue</b>	31 January 2023		
<b>Test In-charge</b>	Naveen kumar N		

# Fill in the rows with information or add hyphen (-)

Form-ULID-003262



Kantha raju H S Senior Project Engineer	N Srimathy Project Engineer
<b>Reviewed by</b>	<b>Authorized signatory</b>

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### General Remarks (If any)

### Description of Item under Test (IUT)

Photovoltaic PV Modules – SMF72HM10-545 (5622388)

### Summary of Test Results

Test No.	Test Parameter	Standard & Clause Number	UL Sample Identification	Result
1	Visual inspection	IEC 61215-2:2016, CL 4.1	5622388	Refer Observation
2	Stabilization	IEC 61215-2:2016, CL 4.19		Refer Observation
3	Maximum power determination	IEC 61215-2:2016, CL 4.2		Refer Observation

**P: Meets the requirements    F: Does not meet the requirement    NA: Not applicable**



## Master Equipment and Calibration details

Test Name	Id Number	Description	Expiration Date
Visual Inspection	201099	Measuring Tool, Tape Measure	2023-06-10
Visual Inspection	160912	Fixture, For Testing, Table	NA
Visual Inspection	68610	Datalogger, RH & Temperature	2023-12-30
Visual Inspection	211906	Meter and/or Sensor, Light	2023-10-09
Visual Inspection	76645	Magnifying Lens, Without Ruler	NA
Maximum power determination	199796	Apparatus, Solar Simulator	NA
Maximum power determination	64832	Datalogger, RH & Temperature	2023-09-07
Maximum power determination	199638	Thermometer, Infrared	2023-04-05
Maximum power determination	226647	Reference Standard, Voltage or Current	2023-11-08
Stablization 1	54584	Apparatus, Pyranometer, Solar Diffuse Radiance	2025-08-26
Stablization 1	199233	Datalogger	2023-06-07
Stablization 1	175795	Fixture, For Testing, Metal Plate	NA
Stablization 1	175615	Load, Resistive, Variable	NA
Stablization 2	54584	Apparatus, Pyranometer, Solar Diffuse Radiance	2025-08-26
Stablization 2	199233	Datalogger	2023-06-07
Stablization 2	175795	Fixture, For Testing, Metal Plate	NA
Stablization 2	175615	Load, Resistive, Variable	NA

**Test methodology adopted: As per test Procedure Clause 4.2.3 of IEC 61215-2:2016.**



**Test Observation (If any)**

**Test Table: Visual inspection**

10.2 Initial	TABLE: Visual inspection	P
Test Date [YYYY-MM-DD] .....	: 2023-01-20	—
Sample #	Nature and position of initial findings – comments or attach photos	Result
5622388	No visual defects found	P
Supplementary information: N/A		

**Test Table: Stabilization**

<b>MQT 19.1: Initial stabilization</b>							
MQT 06.1: Performance at STC before initial stabilization							P
Test Date [YYYY-MM-DD].....:				2023-01-20			—
Test method.....:				<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight			—
Sample #	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmax [W]	FF [%]	Result
5622388	13.49	49.85	12.85	42.14	541.64	81.00	P



TABLE 02.2: MQT 19.1: Initial Stabilization procedure							P
Light exposure method <input type="checkbox"/> Simulator <input checked="" type="checkbox"/> Natural sunlight							
Abbreviation: Regarding light source "S" for Solar simulator and "N" for Natural sunlight							
Stabilization criterion x per IEC 61215-1-x : IEC 61215-1-1					(0.01)/ 1%		
Sample #	5622388	Test Date (YYYY-MM-DD) start/end			2023-01-21/ 2023-01-25		
Test cycle	Integrated irradiation (kWh/m <sup>2</sup> )	Irradiance (W/m <sup>2</sup> )	Module temperature (°C)	Resistive load	Pmax (W) at the end of cycle	(Pmax – Pmin) / Paverage (%)	Stable (Yes/No)
Initial	—	—	—	—	541.64	—	—
1	5.02	844.7	51.7	4	540.21	—	—
2	5.03	702.2	50.0	4	539.71	0.4	Yes
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—



**Test Table: Maximum power determination**

<b>10.4</b>	<b>TABLE: Maximum power determination</b>						<b>P</b>
Test Date [YYYY-MM-DD].....:	2023-01-25						—
Irradiance (W/m <sup>2</sup> )	1000						—
Module temperature (°C)	25						—
Test method.....:	<input checked="" type="checkbox"/> Simulator <input type="checkbox"/> Natural sunlight						—
<b>Sample #</b>	<b>Voc [V]</b>	<b>Vmp [V]</b>	<b>Isc [A]</b>	<b>Imp [A]</b>	<b>Pmax [W]</b>	<b>FF [%]</b>	—
5622388	49.87	41.89	13.46	12.88	539.71	80.00	—
5622388	49.89	42.00	13.46	12.84	539.31	80.00	—
5622388	49.91	41.82	13.46	12.90	539.50	80.00	—
<b>Average</b>	<b>49.89</b>	<b>41.90</b>	<b>13.46</b>	<b>12.87</b>	<b>539.50</b>	<b>80.00</b>	—
Supplementary information: NA							

**Statement of the estimated uncertainty of the test results**

- 1) The Uncertainty of Voc is ±1.30%
- 2) The Uncertainty of Isc is ±1.60%
- 3) The Uncertainty of Pmp is ±1.70%

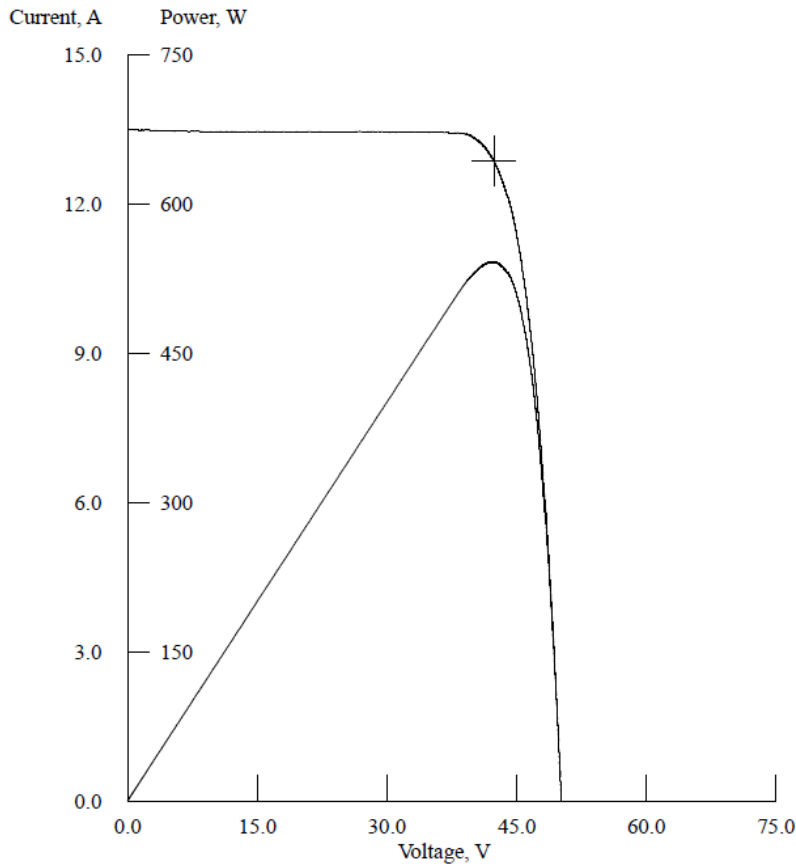
The expanded measurement uncertainty resulting from the standard measurement uncertainty multiplied with a factor k=2 is specified, denoting the deviations of the measurement value within a probability of 95%.





## Appendix

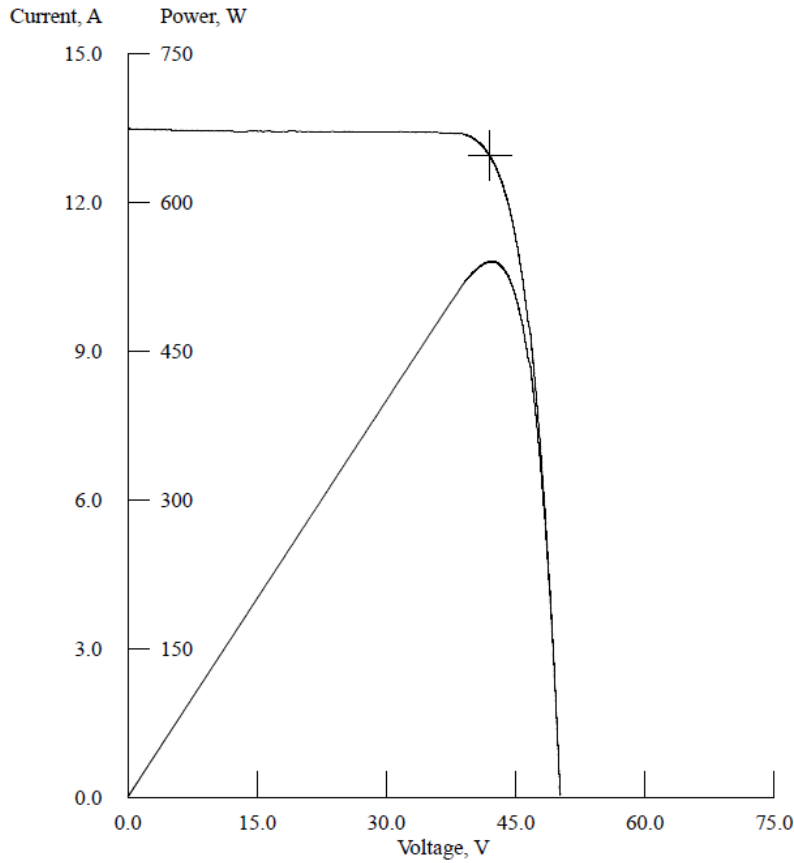
### PIV Graphs: SMF72HM10-545 (5622388)



5600

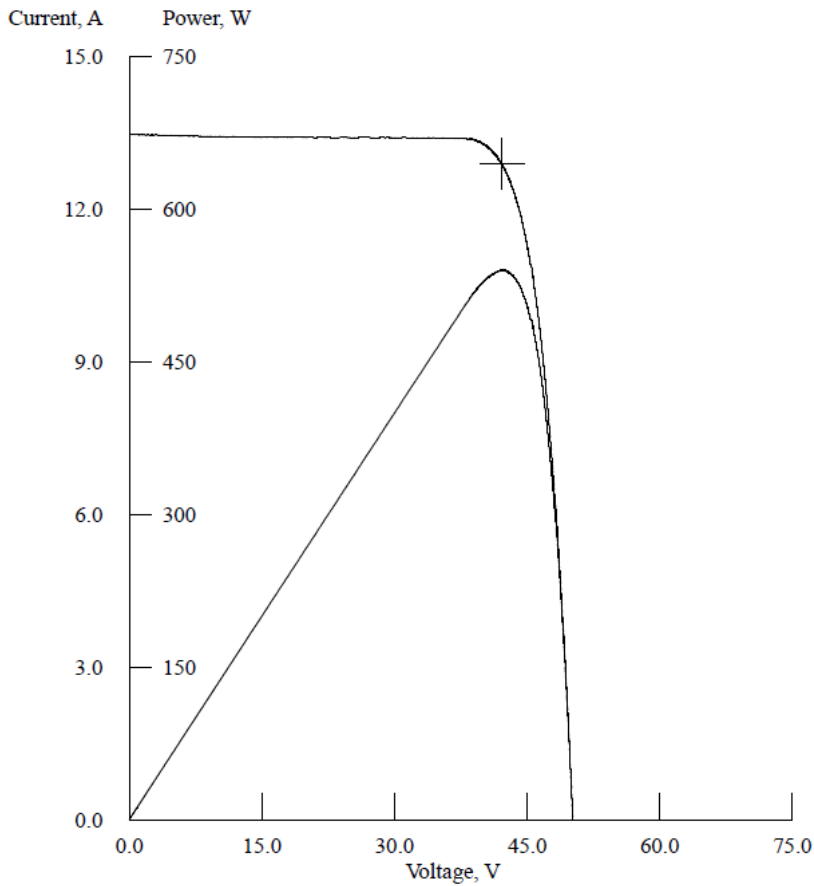
Title: SOLEX ENERGY\_4790618738  
Comment: INITIAL PIV  
Operator: Admin  
ID: 5622388 (SA22110012035)  
Module Type: ModuleType1  
17:30:01 20-01-2023  
Measured Temperature = 24.9°C  
Corrected Temperature = 25.0°C  
Irr Meas = 100.0mW/cm<sup>2</sup>  
Irr Corr = 100.0mW/cm<sup>2</sup>  
Voc = 49.85V  
Isc = 13.49A  
Pmax = 541.64W  
Vpm = 42.14V  
Ipm = 12.85A  
FF = 0.81  
Eff.m = 20.96%  
Eff.c = 22.99%  
Rs = 0.26 Ohm  
Rsh = 153.16 Ohm

Load Voltage: 5.300 V  
IV Points: 3894



5600

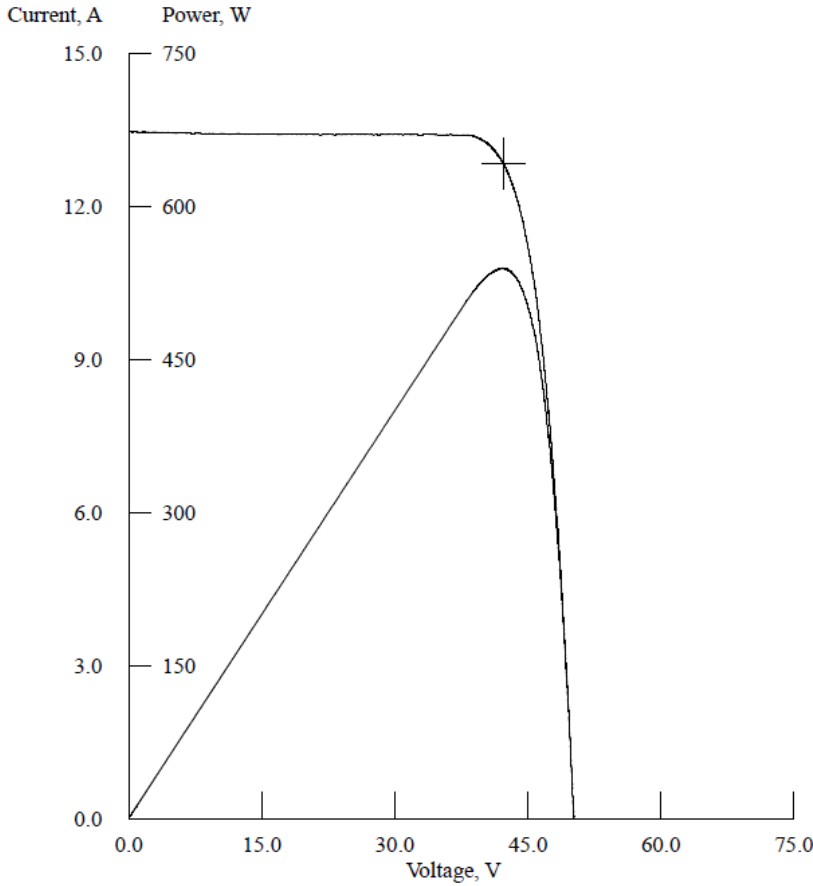
Title: SOLEX ENERGY\_4790618738  
Comment: STABILAZATION-1  
Operator: Admin  
ID: 5622388  
Module Type: ModuleType1  
09:48:35 24-01-2023  
Measured Temperature = 24.5°C  
Corrected Temperature = 25.0°C  
Irr Meas = 99.9mW/cm<sup>2</sup>  
Irr Corr = 100.0mW/cm<sup>2</sup>  
Voc = 49.86V  
Isc = 13.48A  
Pmax = 540.21W  
Vpm = 41.77V  
Ipm = 12.93A  
FF = 0.80  
Eff.m = 20.90%  
Eff.c = 22.93%  
Rs = 0.25 Ohm  
Rsh = 115.84 Ohm  
Load Voltage: 5.300 V  
IV Points: 3871



5600

Title: SOLEX ENERGY\_4790618738  
Comment: STABILAZATION-2  
Operator: Admin  
ID: 5622388  
Module Type: ModuleType1  
16:18:07 25-01-2023  
Measured Temperature = 24.6°C  
Corrected Temperature = 25.0°C  
Irr Meas = 100.0mW/cm<sup>2</sup>  
Irr Corr = 100.0mW/cm<sup>2</sup>  
Voc = 49.87V  
Isc = 13.46A  
Pmax = 539.71W  
Vpm = 41.89V  
Ipm = 12.88A  
FF = 0.80  
Eff.m = 20.88%  
Eff.c = 22.91%  
Rs = 0.25 Ohm  
Rsh = 151.71 Ohm

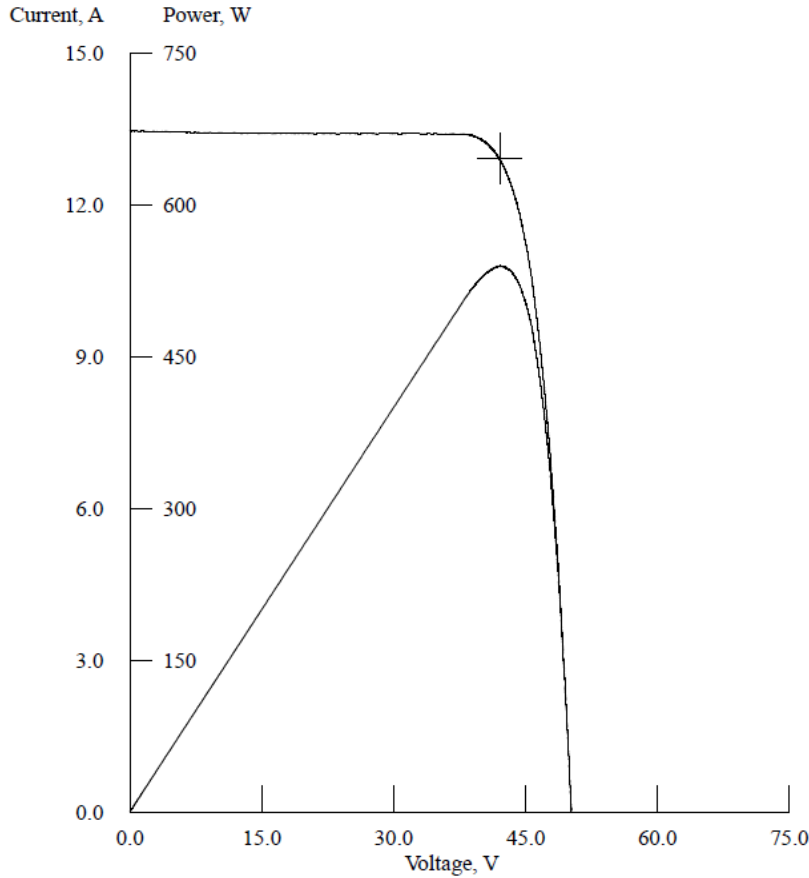
Load Voltage: 5.40 V  
IV Points: 3549



5600

Title: SOLEX ENERGY\_4790618738  
Comment: STABILAZATION-2  
Operator: Admin  
ID: 562238  
Module Type: ModuleType1  
16:21:25 25-01-2023  
Measured Temperature = 24.9°C  
Corrected Temperature = 25.0°C  
Irr Meas = 100.0mW/cm<sup>2</sup>  
Irr Corr = 100.0mW/cm<sup>2</sup>  
Voc = 49.89V  
Isc = 13.46A  
Pmax = 539.31W  
Vpm = 42.00V  
Ipm = 12.84A  
FF = 0.80  
Eff.m = 20.87%  
Eff.c = 22.89%  
Rs = 0.25 Ohm  
Rsh = 141.05 Ohm

Load Voltage: 5.400 V  
IV Points: 3552

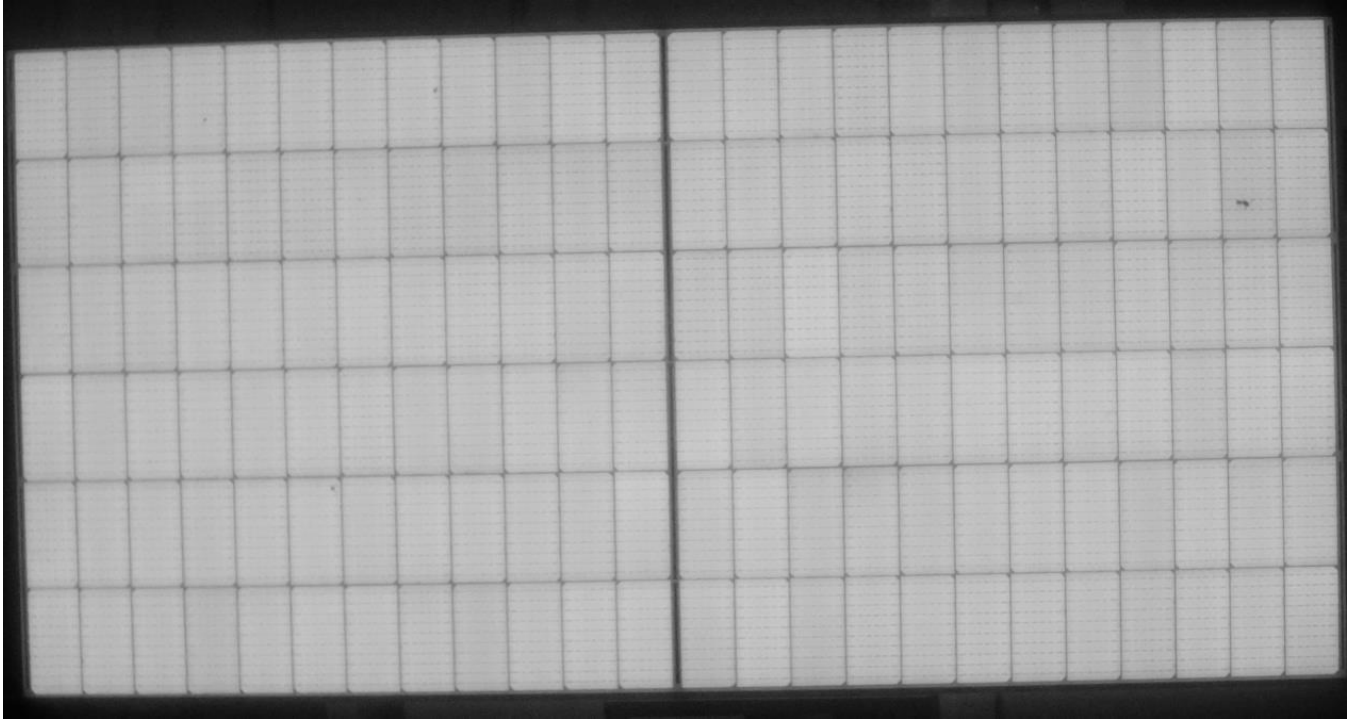


5600  
Title: SOLEX ENERGY\_4790618738  
Comment: STABILAZATION-2  
Operator: Admin  
ID: 562238  
Module Type: ModuleType1  
16:23:52 25-01-2023  
Measured Temperature = 25.1°C  
Corrected Temperature = 25.0°C  
Irr Meas = 100.0mW/cm<sup>2</sup>  
Irr Corr = 100.0mW/cm<sup>2</sup>  
Voc = 49.91V  
Isc = 13.46A  
Pmax = 539.50W  
Vpm = 41.82V  
Ipm = 12.90A  
FF = 0.80  
Eff.m = 20.88%  
Eff.c = 22.90%  
Rs = 0.25 Ohm  
Rsh = 118.97 Ohm  
Load Voltage: 5.400 V  
IV Points: 3556

UL India Private Limited  
Registered Office: Kalyani Platina - Block I, 3rd Floor  
No. 24, EPIP Zone, Phase II, Whitefield, Bangalore - 560066, India  
T: 91.80.4138.4400 / F: 91.80.2841.3759 / W: ul.com  
CIN: U74200KA1997PTC023189



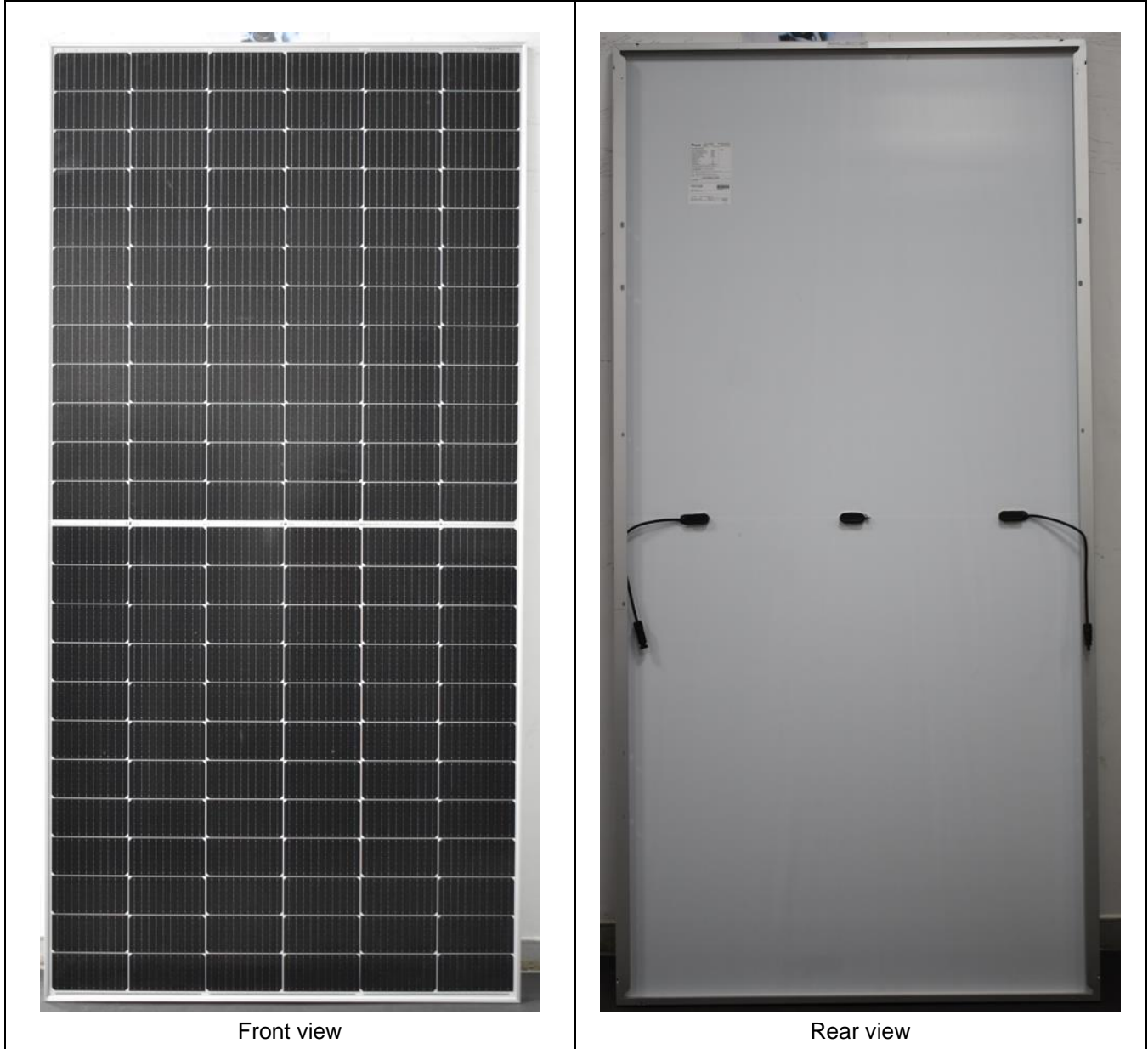
**EL Image: SMF72HM10-545 (5622388)**



\*EL image is for Only for customer reference. EL image is not covered under NABL scope



**Photographs: SMF72HM10-545 (5622388)**



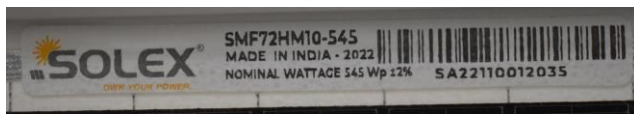


ISO 9001:2015 ISO 14001:2015 OHSAS 45001:2018 Certified Facility Made in INDIA		info@solex.in www.solex.in 1800 527 8787		<b>SOLAR PV MODULE</b> <b>SMF72HM10-54S</b> For Module Serial Number refer front side of the module	
<b>ELECTRICAL RATING</b>					
Maximum Power (Pmax) (±5%)	54S Wp				
Open Circuit Voltage (Voc) (±5%)	49.84 V				
Short Circuit Current (Isc) (±5%)	13.67 A				
Voltage at Pmax (Vmp)	41.93 V				
Current at Pmax (Imp)	13.00 A				
Maximum System Voltage	1500 VDC				
Application Class	A				
Safety Class	II				
Series Fuse Rating	25A				
Fire Class	C				
Module Weight	28 kg				
Module Dimension (L x W x H)	2278 x 1134 x 35 mm				
Measured at STC : 1000W/m <sup>2</sup> , AM1.5, 25°C Cell Temperature					
<b>WARNING! ELECTRICAL HAZARD</b>					
<ul style="list-style-type: none"> <li>Solar PV module produce DC electricity when they exposed to sunlight.</li> <li>Read and follow all safety instructions in the installation manual prior to installing, using and maintaining this product.</li> <li>Do not connect/disconnect cable-connector under load.</li> <li>Dispose-off the module as e-waste after end of its working life.</li> </ul>					
<b>SOLEX ENERGY LIMITED</b> Factory Address - Plot no.1A Block 93B, Tadkeshwar, Kim Mandvi road, Mandvi, Surat, Gujarat-394110					

Rating Label



Junction box



Serial number and Logo Inside Laminate



Connectors

\*\*\*\*\*End of Report\*\*\*\*\*