

Prüfbericht-Nr.: Test Report No.:	19630765.005	Auftrags-Nr.: Order No.:	1803364607	Seite 1 von 11 Page 1 of 11
Kunden-Referenz-Nr.: Client Reference No.:	410949	Auftragsdatum: Order date:	29/10/2018	
Auftraggeber: Client:	Renewsys India Pvt Ltd.Division: Hyderabad,Fab City (SEZ), Plot No.6,Survey #114/P, Srinagar Village, Maheswaram, R.R District Hyderabad -501359. India			
Prüfgegenstand: Test item:	Photovoltaic (PV) modules			
Bezeichnung / Typ-Nr.: Identification / Type No.:	DESERV 3M6H 315			
Auftrags-Inhalt: Order content:	Testing against PID resistivity			
Prüfgrundlage: Test specification:	Solar Photovoltaic Modules IEC TS 62804 – 1 :Test methods for the detection of potential-induced degradation – Part 1: Crystalline silicon with following severities - Climatic conditions: 85°C and 85% RH - Duration: 288 hours- 3 cycles of 96 hours each			
Wareneingangsdatum: Date of receipt:	03/12/2018	Detaillierte Fotodokumentation siehe Anlage zu diesem Bericht Detailed photo documentation see appendix to this report		
Prüfmuster-Nr.: Test sample No.:	Refer list of test samples			
Prüfzeitraum: Testing period:	29/12/2018 – 13/01/2019			
Ort der Prüfung: Place of testing:	Bangalore			
Prüflaboratorium: Testing laboratory:	TUV Rheinland(India) Pvt. Ltd.,Bangalore,India			
Prüfergebnis*: Test result*:	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
23/01/2019	K.Ganesh Kamath/Manager-PV Products	23/01/2019	Kamalaksha CS/AGM -PV Products	
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung Name / Position
				Unterschrift Signature
Sonstiges / Other:		none		
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Produktbeschreibung
Product description

1 Produktdetails
Product details

DESERV-3M6H-xxx(xxx = 295-345 in steps of 1, 72 Poly cells)
xxx represents output power in Wp

2 Verwendete Materialien
Used materials

Refer constructional characteristics in the "List of test samples"

3 Adresse(n) der Fertigungsstätte(n)
Address(es) of the manufacturing site(s)

Renewsys India Pvt Ltd.Division: Hyderabad,Fab City (SEZ), Plot No.6,Survey #114/P, Srinagar Village, Maheswaram, R.R District Hyderabad -501359. India

4 Zusammenfassung der Prüfergebnisse
Summary of test results

"According to the enquiry of the manufacturer for a testing against PID resistivity shall be performed according to IEC TS 62804 with following severities –

- Negative potential of the specified maximum system voltage between the shorted output terminals and the frame(ground), - 1500V DC
- Climatic conditions: 85°C and 85% RH
- Duration: 288 hours (3 cycles of 96 hours each)

Before and after the PID test, Visual inspection, maximum power determination, Ground continuity and documentation by electroluminescence imaging shall be performed.

In line with the international standard for PV module type approval testing EN IEC 61215, two modules will be tested. One additional module will be used as a reference sample.

Pass Criteria:

A module design shall be judged to have passed the PID test , if each test sample meets all the following criteria:

- The degradation of maximum output power does not exceed 5%.
- No evidence of a major visual defect (as defined in IEC 61215:2005)

All presented results are only valid for the exact tested module type and design (cell type, encapsulation material, glass type

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Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

—	Test specification		
Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation - Part 1: Crystalline silicon		IEC TS 62804-1:2015-08, Edition 1.0	—

—	Marking		
Name, monogram or symbol of manufacturer		On Type label and on module front	P
Type or model number		On Type label	P
Serial number		On laminate from front side	P
Polarity of terminals or leads		On JB and cable	P
Maximum system voltage		On Type label	P
Date and place of manufacture		Date traceable from serial number and Manufacturing address mentioned on type label	P

-	List of test samples		
Sample No.	Sample S/N	Type/Model	Remarks/constructional characteristics (e.g. cell, back sheet, frame type)
A000846996-001	R1000047182010072	DESERV-3M6H-315	Cell: Renewsys-RESERV 625 -5bb Poly crystalline Back Sheet: Renewsys - PRESERV 1-150WD EVA: RenewSys-CONSERV A 360.2 14FC Glass: CSG AR coated 3.2mm JB: DHASH - DSJB03
A000846996-002	R1000047182010068	DESERV-3M6H-315	
A000846996-003	R1000047182010073	DESERV-3M6H-315	

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10.1	Visual inspection (Initial)		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
29/12/2018	A000846996-001	No Major visual defects found	P
29/12/2018	A000846996-002	No Major visual defects found	P
29/12/2018	A000846996-003	No Major visual defects found	P
Supplementary information: - None			

10.2	Maximum power determination (Initial)							
Module temperature [°C]		corrected to 25						-
Irradiance [W/m²]		1000						
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	
29/12/2018	A000846996-001	312.5	37.20	8.40	45.38	8.94	77.0	-
29/12/2018	A000846996-002	314.1	37.19	8.44	45.36	8.98	77.1	-
29/12/2018	A000846996-003	314.5	37.01	8.50	45.40	8.96	77.3	-
Supplementary information: - None								

10.3	Insulation test (Initial)						
Maximum system voltage [V _{DC}]			1500				
High voltage applied [V _{DC}]			8000				
Insulation resistance measured at [V _{DC}]			1500				
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
29/12/2018	A000846996-001	56.80	1.93	109.62	--	No	P
29/12/2018	A000846996-002	58.20	1.93	112.32	--	No	P
29/12/2018	A000846996-003	55.40	1.93	106.92	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

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10.15	Wet leakage current test (Initial)				
Insulation resistance measured at [V _{DC}]		1500			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[MΩ]	[m²]	[MΩ × m²]	
29/12/2018	A000846996-001	54500.0	1.93	105185.0	P
29/12/2018	A000846996-002	53000.0	1.93	102290.0	P
29/12/2018	A000846996-003	48000.0	1.93	92640.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m².					
Supplementary information: - None					

10.4	Ground continuity (Initial) - MST 13			
Maximum over-current protection rating [A]		15		-
Current applied [A]		37.5		
Location of designated grounding point		Right side Longer frame		
Location of second contacting point		Opposite frame		
Test date [DD/MM/YYYY]	Sample No.	Voltage [mV]	Resistance [mΩ]	
29/12/2018	A000846996-001	240.2	6.40	P
29/12/2018	A000846996-002	148.0	3.94	P
29/12/2018	A000846996-003	173.6	4.62	P
Supplementary information: - None				

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	Performance of PID Test -1 st Cycle				
Test Method		Chamber		—	
Module Temperature [°C]		85			
Relative Humidity [%]		85			
Grounding polarity		+ve			
Test date [DD/MM/YYYY]	Sample No.		Applied Voltage [V]	Duration[Hrs]	
29/12/2018 to 03/01/2019	A000846996-002		-1500	96	P
	A000846996-003		-1500	96	P
Supplementary information: - None					

10.1	Visual inspection after 1st PID Cycle		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
03/01/2019	A000846996-002	No Major visual defects found	P
03/01/2019	A000846996-003	No Major visual defects found	P
Supplementary information: - None			

10.2	Maximum power determination - after 1 st PID Cycle								
Module temperature [°C]		corrected to 25							-
Irradiance [W/m²]		1000							
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
03/01/2019	A000846996-002	312.0	36.76	8.49	45.37	8.95	76.8	-0.7	P
03/01/2019	A000846996-003	313.1	36.96	8.47	45.38	8.97	76.9	-0.4	P
Supplementary information: - Initial measurements were considered for calculating degradation									

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10.3	Insulation test after 1 st PID Cycle						
Maximum system voltage [V _{DC}]			1500				
High voltage applied [V _{DC}]			8000				
Insulation resistance measured at [V _{DC}]			1500				
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
03/01/2019	A000846996-002	54.20	1.93	104.60	--	No	P
03/01/2019	A000846996-003	52.80	1.93	101.90	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

10.15	Wet leakage current test after 1 st PID Cycle				
Insulation resistance measured at [V _{DC}]		1500			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[MΩ]	[m²]	[MΩ × m²]	
03/01/2019	A000846996-002	5800.0	1.93	11194.0	P
03/01/2019	A000846996-003	19200.0	1.93	37056.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m².					
Supplementary information: - None					

	Performance of PID Test – II nd Cycle				
Test Method		Chamber			—
Module Temperature [°C]		85			
Relative Humidity [%]		85			
Grounding polarity		+ve			
Test date [DD/MM/YYYY]	Sample No.		Applied Voltage [V]	Duration[Hrs.]	
03/01/2019 to 08/01/2019	A000846996-002		-1500	96	P
	A000846996-003		-1500	96	P
Supplementary information: - None					

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10.1	Visual inspection after IInd PID Cycle		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
08/01/2019	A000846996-002	No Major visual defects found	P
08/01/2019	A000846996-003	No Major visual defects found	P
Supplementary information: - None			

10.2	Maximum power determination - after II nd PID Cycle								
Module temperature [°C]		corrected to 25							-
Irradiance [W/m²]		1000							
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
08/01/2019	A000846996-002	310.5	37.06	8.38	45.43	8.87	77.1	-1.1	P
08/01/2019	A000846996-003	313.3	37.44	8.37	45.56	8.97	76.7	-0.4	P
Supplementary information: - Initial measurements were considered for calculating degradation									

10.3	Insulation test after II nd PID cycle						
Maximum system voltage [V _{DC}]			1500				
High voltage applied [V _{DC}]			8000				
Insulation resistance measured at [V _{DC}]			1500				
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
08/01/2019	A000846996-002	53.80	1.93	103.83	--	No	P
08/01/2019	A000846996-003	52.90	1.93	102.09	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

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10.15	Wet leakage current after IInd PID Cycle				
Insulation resistance measured at [V _{DC}]		1500			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[MΩ]	[m²]	[MΩ × m²]	
08/01/2019	A000846996-002	4860.0	1.93	9379.8	P
08/01/2019	A000846996-003	3900.0	1.93	7527.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m².					
Supplementary information: - None					

	Performance of PID Test – III rd Cycle				
Test Method		Chamber			—
Module Temperature [°C]		85			
Relative Humidity [%]		85			
Grounding polarity		+ve			
Test date [DD/MM/YYYY]	Sample No.		Applied Voltage [V]	Duration[Hrs.]	
08/01/2019 to 13/01/2019	A000846996-002		-1500	96	P
	A000846996-003		-1500	96	P
Supplementary information: - None					

10.1	Visual inspection after IIIrd PID Cycle		
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
13/01/2019	A000846996-002	No Major visual defects found	P
13/01/2019	A000846996-003	No Major visual defects found	P
Supplementary information: - None			

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10.2	Maximum power determination - after III rd Cycle								
Module temperature [°C]		corrected to 25							-
Irradiance [W/m²]		1000							
Test date [DD/MM/YYYY]	Sample No.	P _{max} [W]	V _{mpp} [V]	I _{mpp} [A]	V _{oc} [V]	I _{sc} [A]	FF [%]	Degradation [%]	
13/01/2019	A000846996-002	313.3	37.06	8.45	45.34	8.94	77.3	-0.2	P
13/01/2019	A000846996-003	313.7	37.19	8.43	45.39	8.95	77.2	-0.3	P
Supplementary information: - Initial measurements were considered for calculating degradation									

10.3	Insulation test after III rd Cycle						
Maximum system voltage [V _{DC}]			1500				
High voltage applied [V _{DC}]			8000				
Insulation resistance measured at [V _{DC}]			1500				
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No	
13/01/2019	A000846996-002	53.40	1.93	103.06	--	No	P
13/01/2019	A000846996-003	51.90	1.93	102.16	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m².							
Supplementary information: - None							

10.15	Wet leakage current after III rd PID Cycle				
Insulation resistance measured at [V _{DC}]		1500			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[MΩ]	[m²]	[MΩ × m²]	
13/01/2019	A000846996-002	28400.0	1.93	54812.0	P
13/01/2019	A000846996-003	28800.0	1.93	55584.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m².					
Supplementary information: - None					

Result:

1. The degradation of maximum output power does not exceed 5%
2. There is no evidence of a major local degradation in electroluminescence inspection.

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ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION

Statement of the estimated uncertainty of the test verdicts

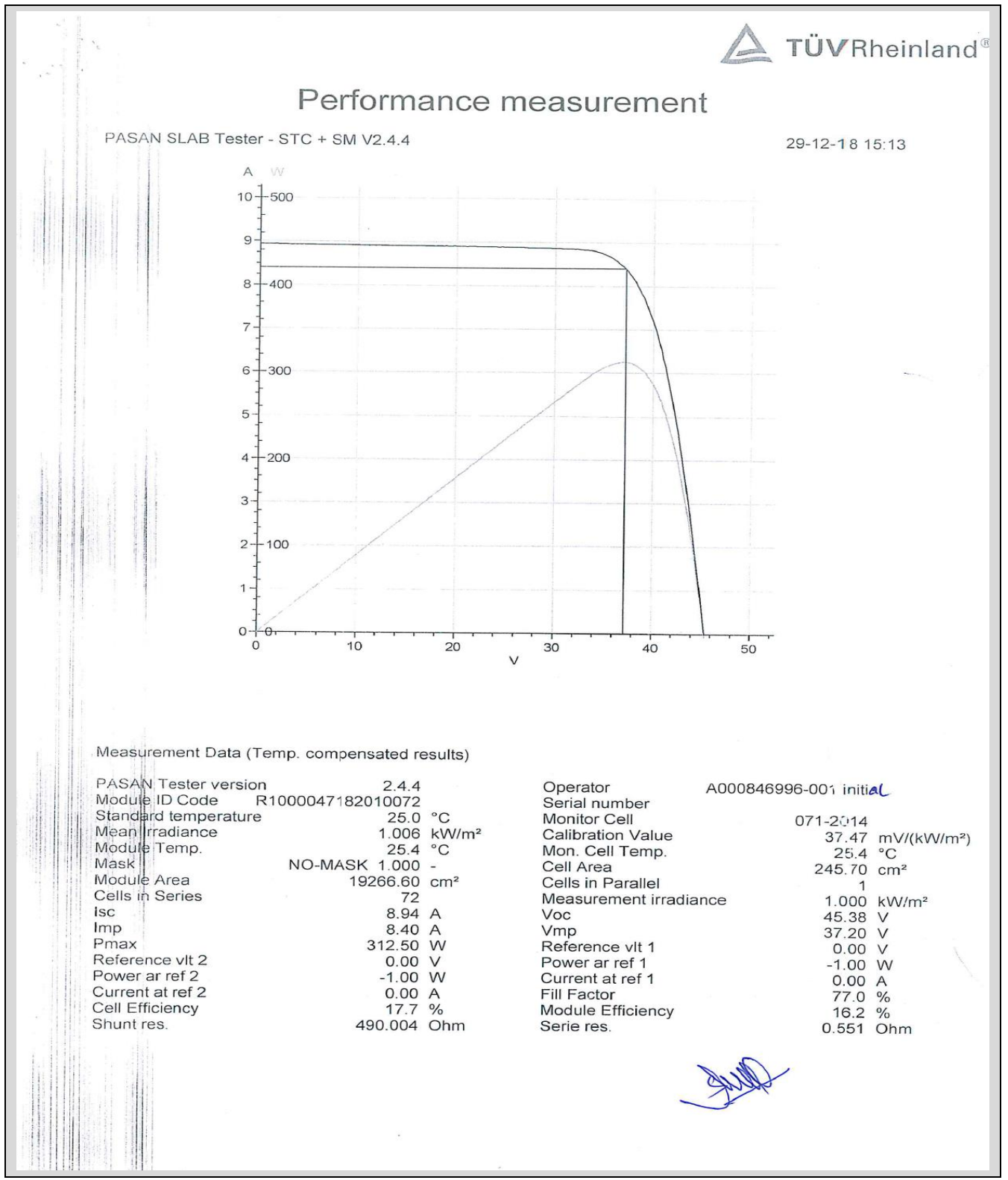
- Electrical performance rating is outside the scope of IEC 61215:2005 qualification testing. The verdicts of performance rating are only related to the test samples that were subjected to the tests. They cannot be generalised to the modules from the series production.
- The calibration to STC was performed with a class AAA solar simulator. The extended measurement uncertainty is:
- Pmax measurement: 2.12% with a coverage factor $k=2$
- Current measurement: 1.76% with a coverage factor $k=2$
- Voltage measurement: 1.57% with a coverage factor $k=2$
- Relative measurements were performed with a flash type solar simulator.
- The accuracy of measurement reproduction with the solar simulator is less than ± 1 %.

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ZUSATZ-DOKUMENTATION ADDITIONAL DOCUMENTATION

Measurement reports: Initial



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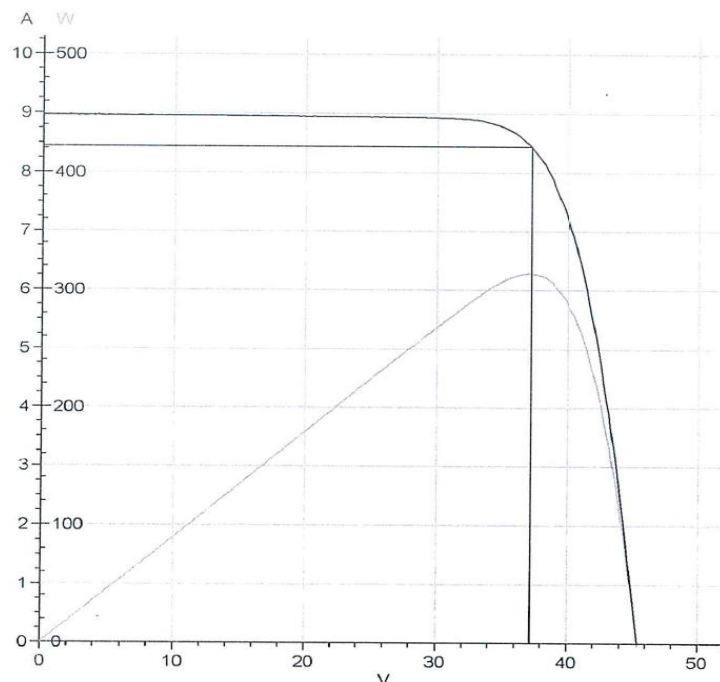
ZUSATZ-DOKUMENTATION
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Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

29-12-18 15:16



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-002 initial
Module ID Code	R1000047182010068	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean irradiance	1.006 kW/m²	Calibration Value	37.47 mV/(kW/m²)
Module Temp.	25.3 °C	Mon. Cell Temp.	25.3 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm²
Module Area	19266.60 cm²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m²
Isc	8.98 A	Voc	45.36 V
Imp	8.44 A	Vmp	37.19 V
Pmax	314.06 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.1 %
Cell Efficiency	17.8 %	Module Efficiency	16.3 %
Shunt res.	1039.972 Ohm	Serie res.	0.539 Ohm

Signature

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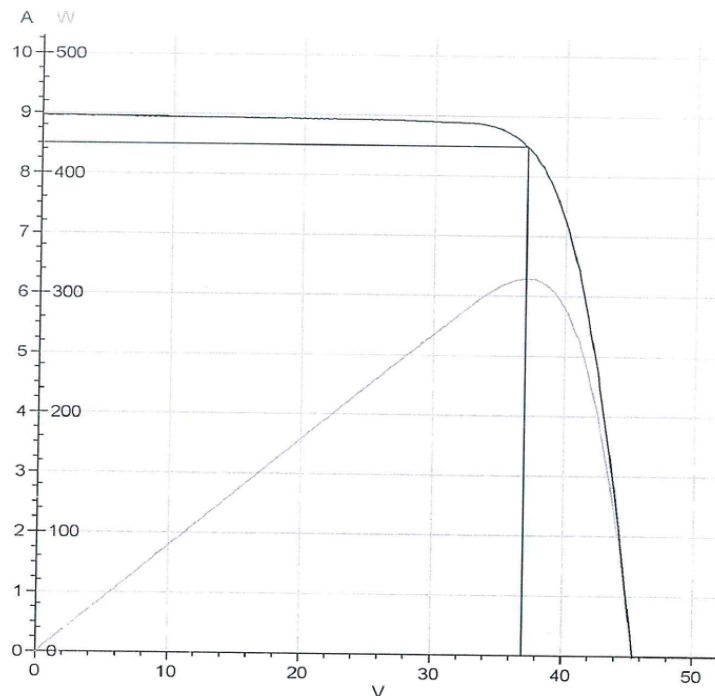
ZUSATZ-DOKUMENTATION
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Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

29-12-18 15:19



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-003 initial
Module ID Code	R1000047182010073	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	25.4 °C	Mon. Cell Temp.	25.4 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm ²
Module Area	19266.60 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	8.96 A	Voc	45.40 V
Imp	8.50 A	Vmp	37.01 V
Pmax	314.52 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power at ref 1	-1.00 W
Power at ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.3 %
Cell Efficiency	17.8 %	Module Efficiency	16.3 %
Shunt res.	911.822 Ohm	Series res.	0.540 Ohm

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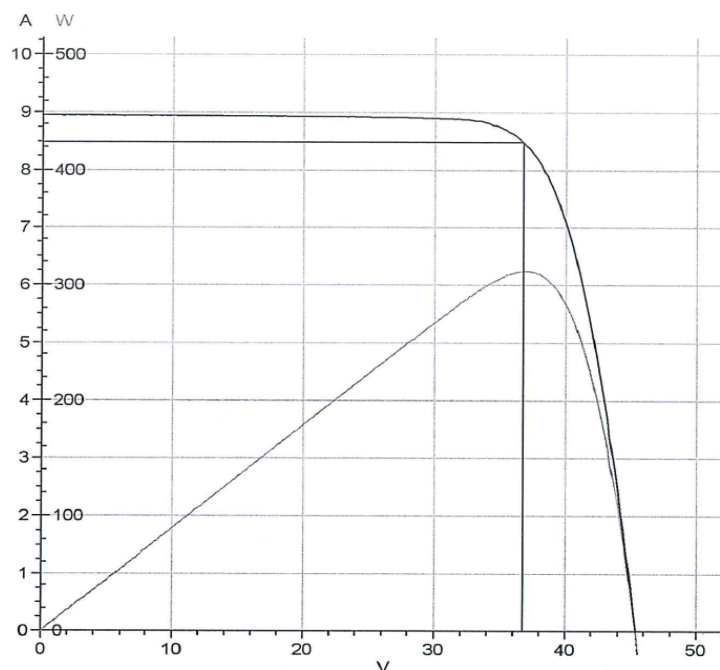
Measurement Reports after 1st PID Cycle:



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

03-01-19 15:55



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-002 AF PID 96hrs
Module ID Code	R1000047182010068	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	23.9 °C	Mon. Cell Temp.	23.9 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm ²
Module Area	19266.60 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	8.95 A	Voc	45.37 V
Imp	8.49 A	Vmp	36.76 V
Pmax	311.97 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.8 %
Cell Efficiency	17.6 %	Module Efficiency	16.2 %
Shunt res.	1170.374 Ohm	Serie res.	0.571 Ohm

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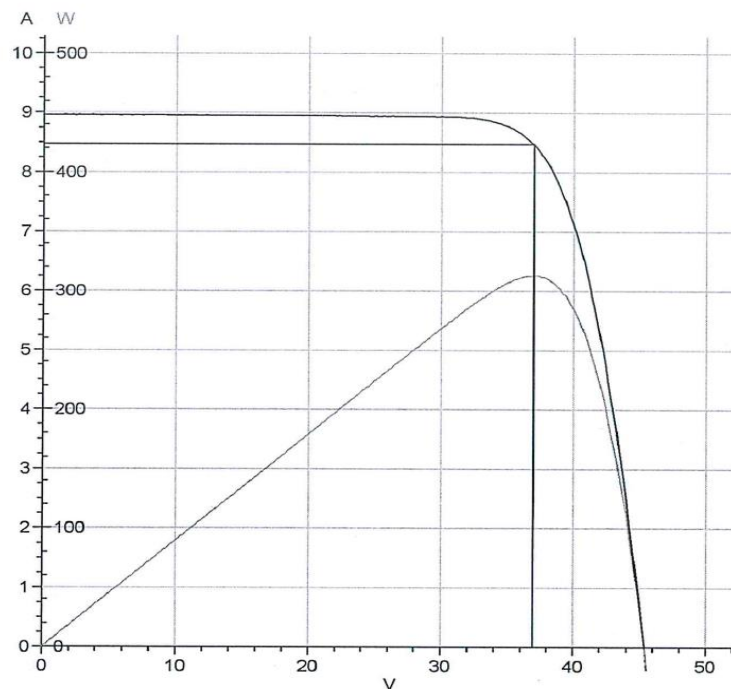
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

03-01-19 15:57



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-003 af pid 96hrs
Module ID Code	R1000047182010073	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m²	Calibration Value	37.47 mV/(kW/m²)
Module Temp.	24.0 °C	Mon. Cell Temp.	24.0 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm²
Module Area	19266.60 cm²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m²
Isc	8.97 A	Voc	45.38 V
Imp	8.47 A	Vmp	36.96 V
Pmax	313.13 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.9 %
Cell Efficiency	17.7 %	Module Efficiency	16.3 %
Shunt res.	1505.504 Ohm	Serie res.	0.571 Ohm

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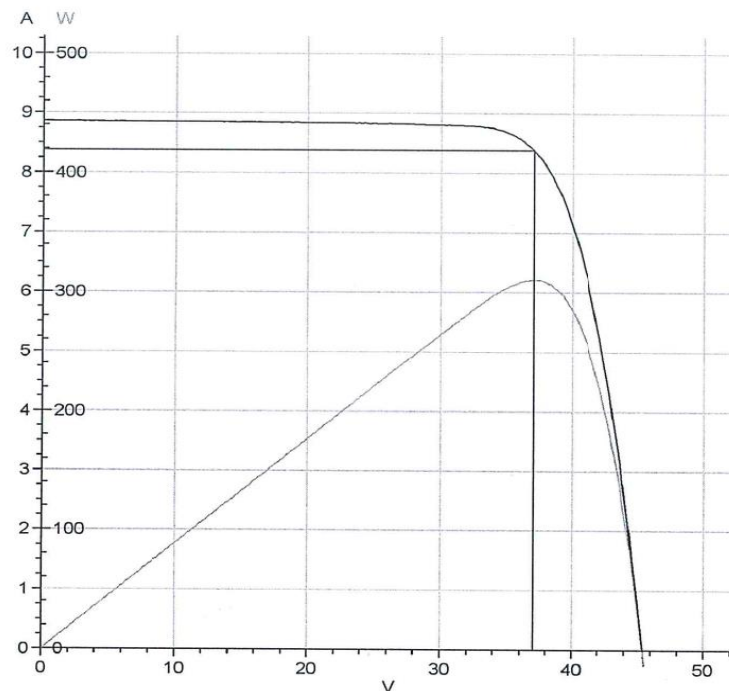
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

08-01-19 17:06



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-002 AF PID 192hrs
Module ID Code	R1000047182010068	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	26.7 °C	Mon. Cell Temp.	26.7 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm ²
Module Area	19266.60 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	8.87 A	Voc	45.43 V
Imp	8.38 A	Vmp	37.06 V
Pmax	310.48 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power at ref 1	-1.00 W
Power at ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.1 %
Cell Efficiency	17.6 %	Module Efficiency	16.1 %
Shunt res.	886.690 Ohm	Series res.	0.558 Ohm



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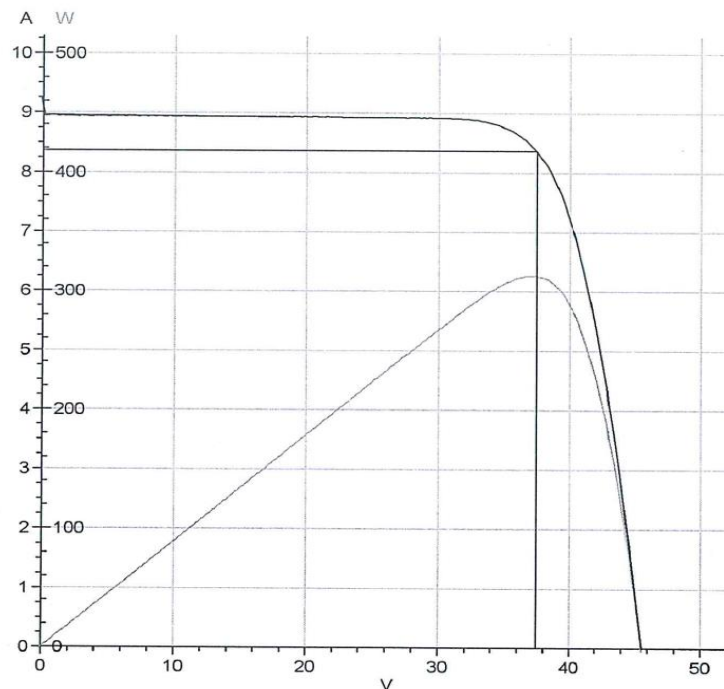
ZUSATZ-DOKUMENTATION
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

08-01-19 17:01



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-003 AF PID 192 bsc
Module ID Code	R1000047182010073	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	30.6 °C	Mon. Cell Temp.	30.6 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm ²
Module Area	19266.60 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	8.97 A	Voc	45.56 V
Imp	8.37 A	Vmp	37.44 V
Pmax	313.30 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	76.7 %
Cell Efficiency	17.7 %	Module Efficiency	16.3 %
Shunt res.	532.968 Ohm	Serie res.	0.571 Ohm

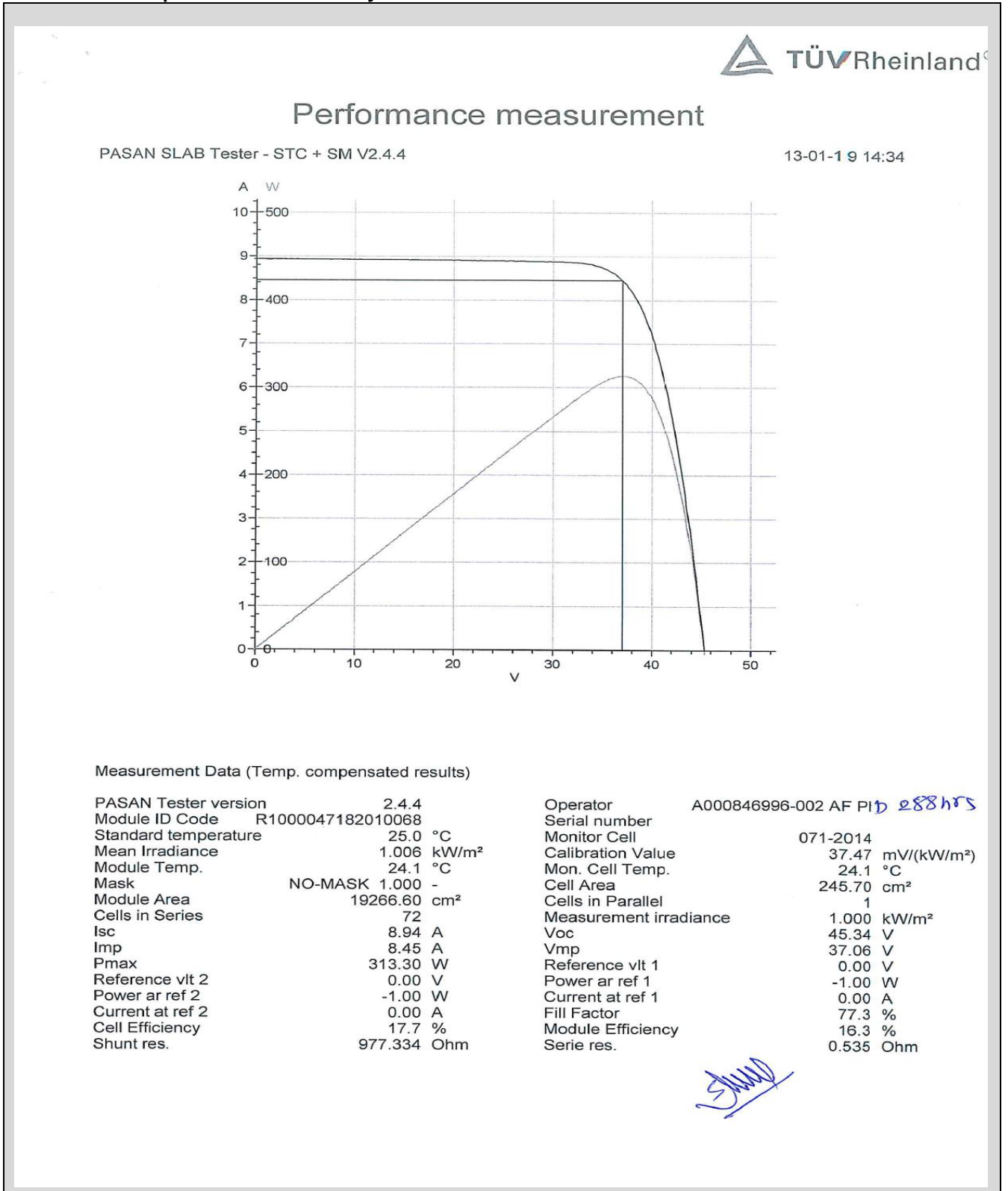
Shunt

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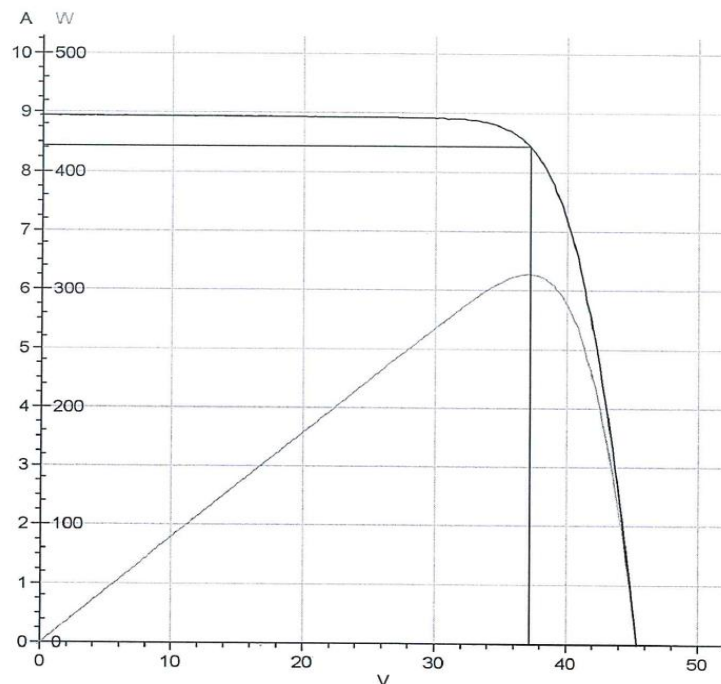
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Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

13-01-19 14:45



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000846996-003 AF PID 288 hrs
Module ID Code	R1000047182010073	Serial number	
Standard temperature	25.0 °C	Monitor Cell	071-2014
Mean Irradiance	1.006 kW/m ²	Calibration Value	37.47 mV/(kW/m ²)
Module Temp.	24.2 °C	Mon. Cell Temp.	24.2 °C
Mask	NO-MASK 1.000 -	Cell Area	245.70 cm ²
Module Area	19266.60 cm ²	Cells in Parallel	1
Cells in Series	72	Measurement irradiance	1.000 kW/m ²
Isc	8.95 A	Voc	45.39 V
Imp	8.43 A	Vmp	37.19 V
Pmax	313.69 W	Reference vlt 1	0.00 V
Reference vlt 2	0.00 V	Power ar ref 1	-1.00 W
Power ar ref 2	-1.00 W	Current at ref 1	0.00 A
Current at ref 2	0.00 A	Fill Factor	77.2 %
Cell Efficiency	17.7 %	Module Efficiency	16.3 %
Shunt res.	1327.275 Ohm	Serie res.	0.551 Ohm

Shunt

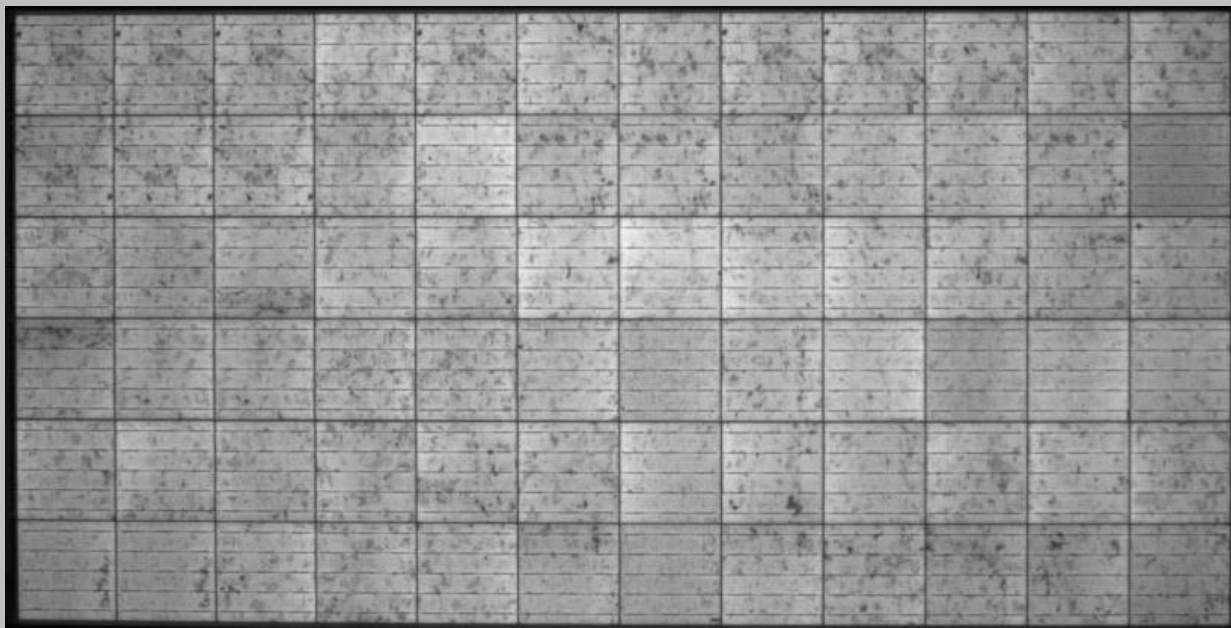
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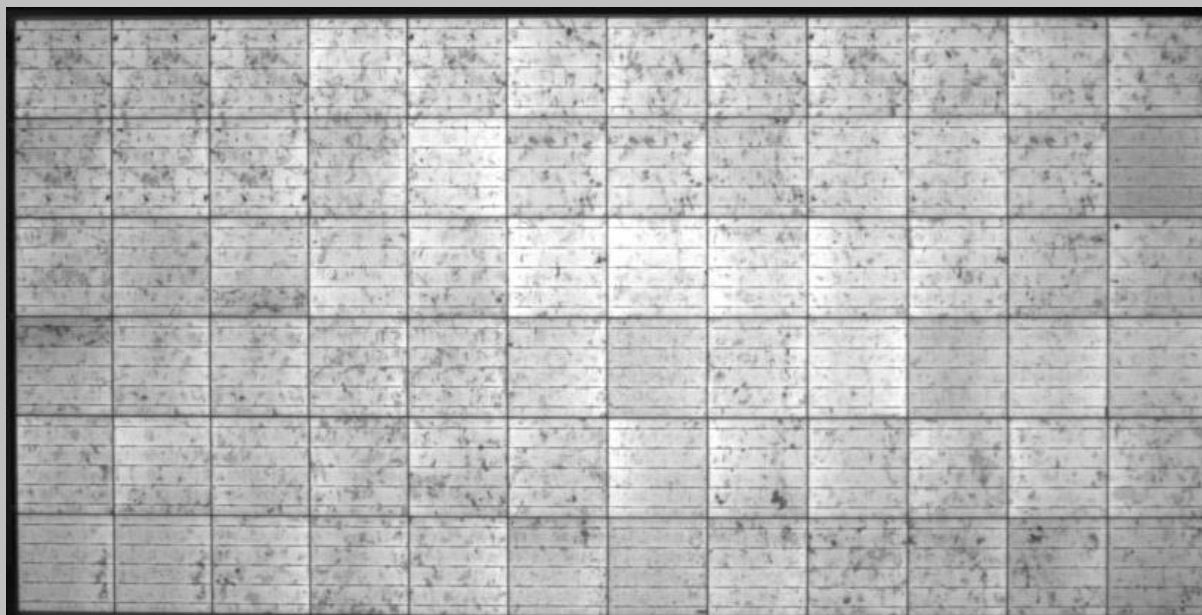
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EL Images of Test samples :

A000846996-002 (Initial)



A000846996-002(After- 1st PID Cycle)

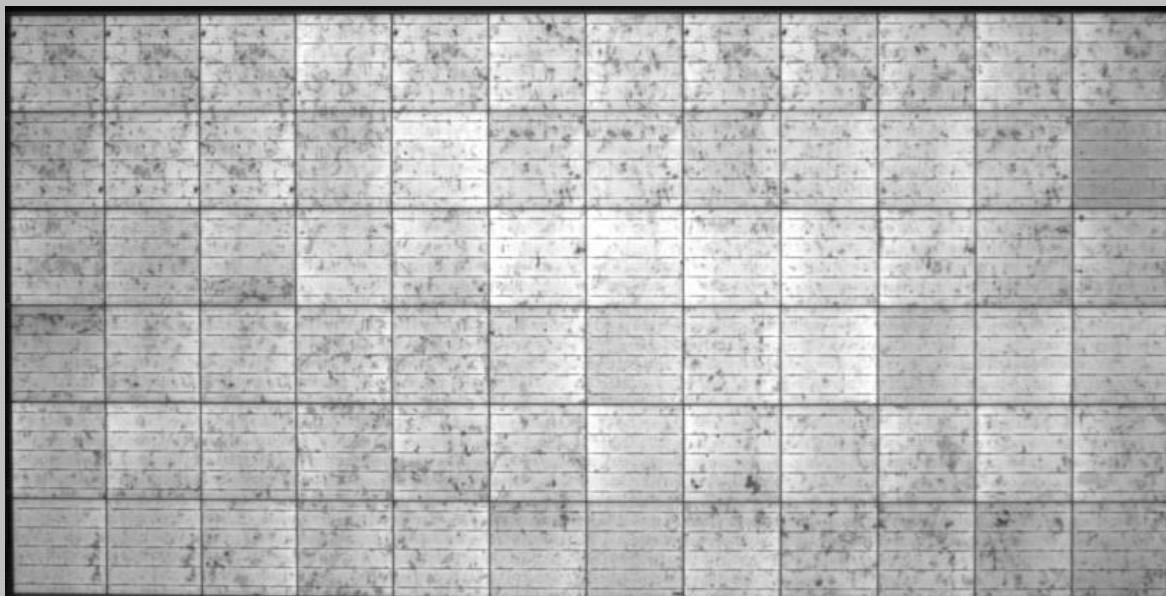


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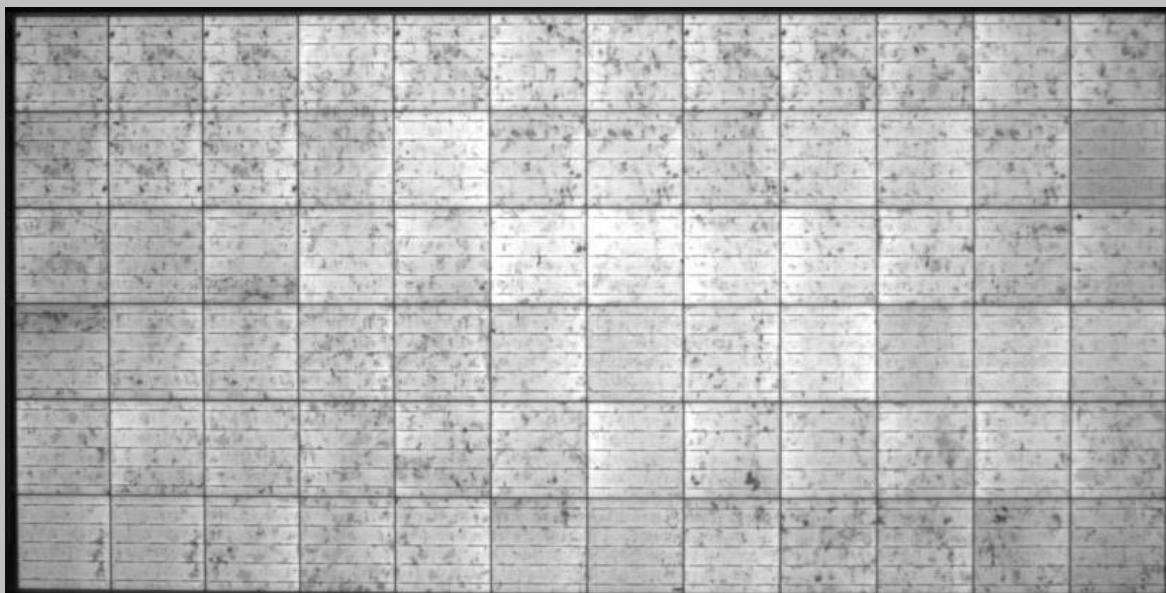
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A000846996-002(After- IIInd PID Cycle)



A000846996-002(After- IIIrd PID Cycle)

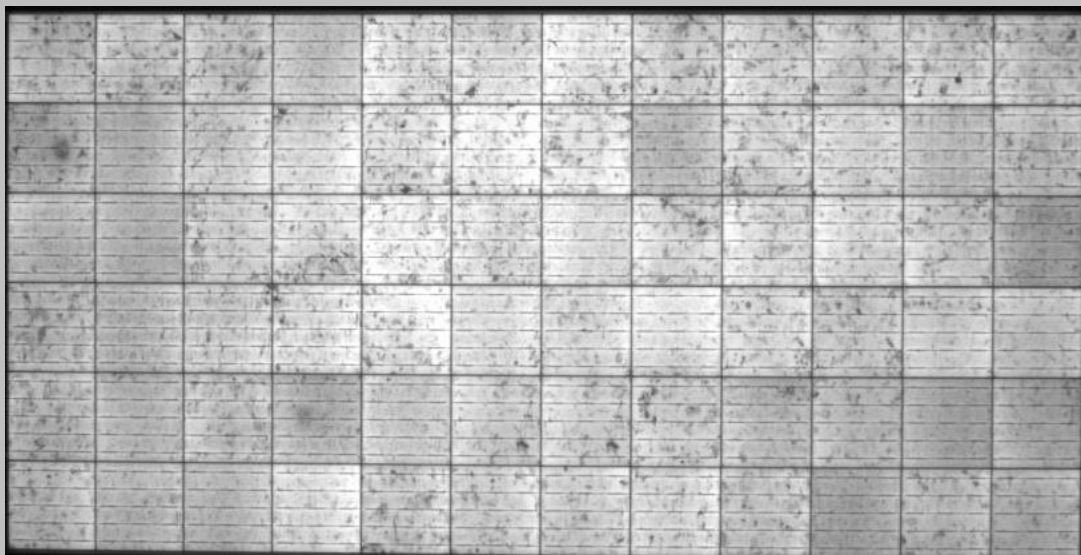


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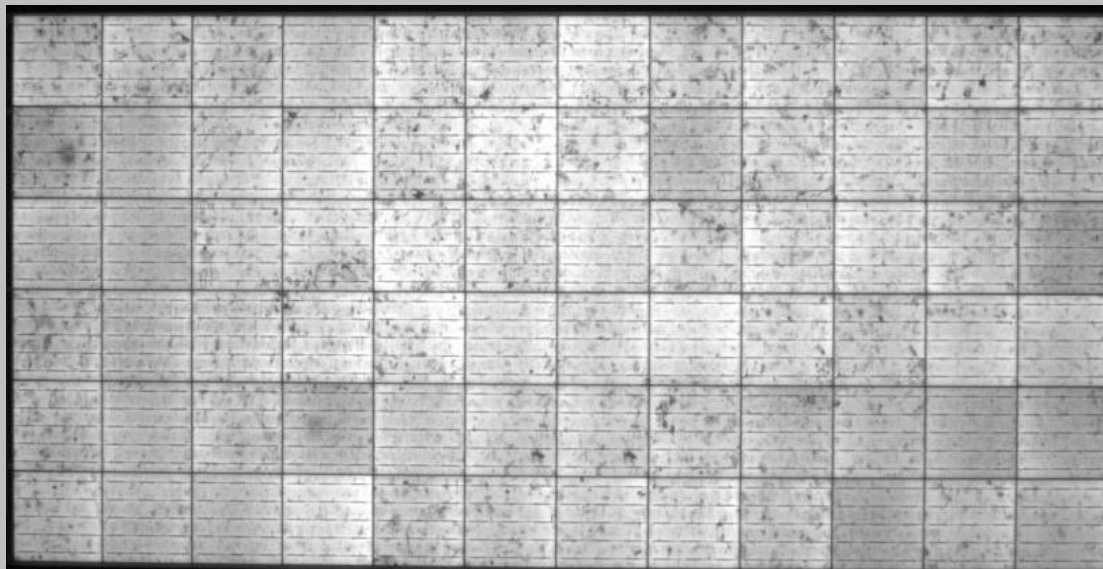
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A000846996-003(Initial)



A000846996-003(After- 1st PID Cycle)

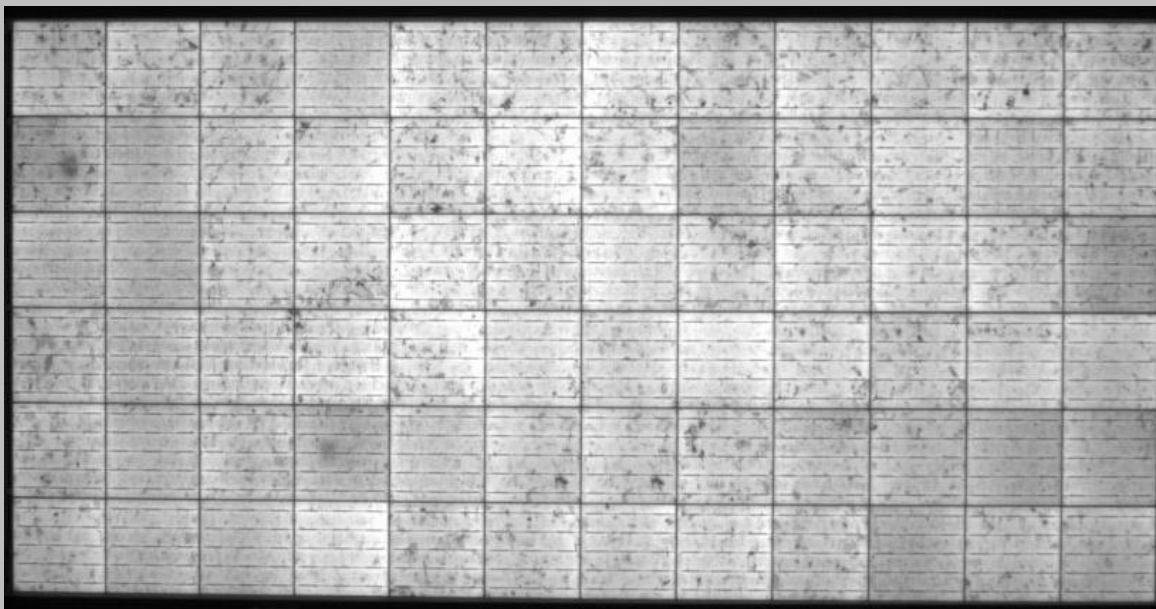


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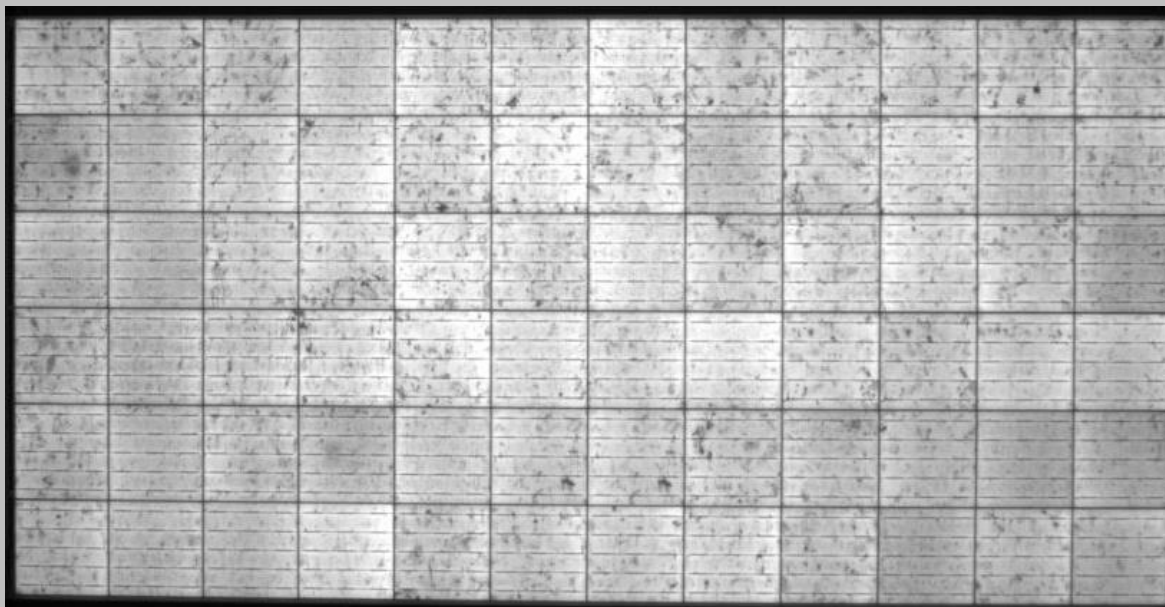
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A000846996-003(After- IInd PID Cycle)



A000846996-003(After- IIIrd PID Cycle)

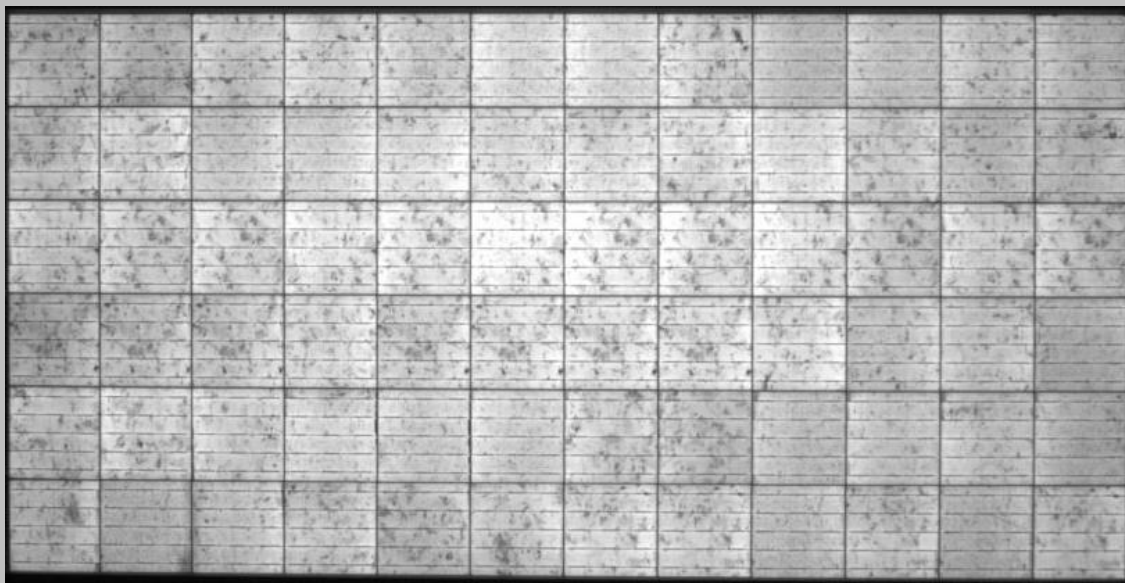


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A000846996-001(Control module)



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FOTO-DOKUMENTATION
PHOTO-DOCUMENTATION

Pictures of Modules



Fig.1:Front view of the module



Fig.2:Rear view of the module

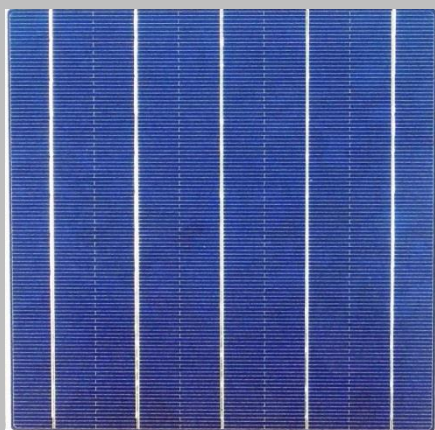


Fig.3:Detail view of the Solar cell



Fig.4: Detail view of Junction Box

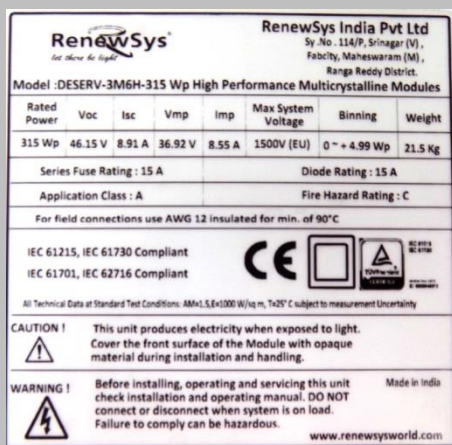


Fig.5: detail view of the Type label



Fig.6: detail view of the Serial number