

<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>ULR:TC568819400000153F</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	166108047	Seite 1 von 12 <i>Page 1 of 12</i>	
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	410949	<b>Auftragsdatum:</b> <i>Order date:</i>	08/02/2019		
<b>Auftraggeber:</b> <i>Client:</i>	Renewsys India Pvt Ltd.Division: Hyderabad,Fab City (SEZ), Plot No.6,Survey #114/P, Srinagar Village, Maheswaram, R.R District Hyderabad -501359. India				
<b>Prüfgegenstand:</b> <i>Test item:</i>	Photovoltaic (PV) modules				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	DESERV MGALACTIC xxx and DESERV SGALACTIC xxx				
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Testing against PID resistivity				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	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				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	08/02/2019	Detaillierte Fotodokumentation siehe Anlage zu diesem Bericht  Detailed photo documentation see appendix to this report			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	Refer list of test samples				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	21/02/2019 – 08/03/2019				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Bangalore				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TUV Rheinland(India) Pvt. Ltd.,Bangalore,India				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass				
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>			
08/04/2019	K.Ganesh Kamath/Manager-PV Products	08/04/2019	Kamalaksha CS/AGM -PV Products		
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	
				<b>Unterschrift</b> <i>Signature</i>	
<b>Sonstiges / Other:</b>	Discipline : Electronics Group: Miscellaneous				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet	5 = mangelhaft
Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested	5 = poor
<b>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.</b> <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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Prüfbericht-Nr.: ULR:TC56881940000153F  
Test Report No.:

Seite 3 von 12  
Page 3 of 12

**Produktbeschreibung**  
**Product description**

**1 Produktdetails**  
*Product details*

DESERV MGALACTIC xxx(xxx = 285-350 in steps of 1, 72 Poly cells)  
DESERV SGALACTIC xxx(xxx = 320-390 in steps of 1, 72 Mono 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 –

- Positive potential of the specified maximum system voltage between the shorted output terminals and the frame(ground), + 1000V 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**

**Prüfbericht-Nr.: ULR:TC568819400000153F**  
*Test Report No.:*

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

—	<b>Test specification</b>	
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	—

—	<b>Marking</b>	
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

-	<b>List of test samples</b>		
Sample No.	Sample S/N	Type/Model	Remarks/constructional characteristics (e.g. cell, back sheet, frame type)
A000876127-017	R1000002192103332	DESERV MGALACTIC 330	Cell: Renewsys- RESERV 625 -5bb Multi crystalline
A000876127-018	R1000002192103333	DESERV MGALACTIC 330	Back Sheet: Renewsys - Preserve -150WD EVA: RenewSys-CONSERV A 360.2 14FC
A000876127-019	R1000002192103330	DESERV MGALACTIC 330	Glass: CSG AR coated 3.2mm JB: DhaSh - DSJB03
A000876127-020	R1000002192103339	DESERV SMGALACTIC 370	Cell: URE - NP6WL -5bb mono crystalline Back Sheet: Renewsys - Preserve -150WD
A000876127-021	R1000002192103336	DESERV SGALACTIC 370	EVA: RenewSys-CONSERV A 360.2 14FC
A000876127-022	R1000002192103335	DESERV SGALACTIC 370	Glass: CSG AR coated 3.2mm JB: DhaSh - DSJB03

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 5 von 12  
*Test Report No.:* Page 5 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

**10.1 Visual inspection (Initial)**

Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
21/02/2019	A000876127-017	No Major visual defects found	P
21/02/2019	A000876127-018	No Major visual defects found	P
21/02/2019	A000876127-019	No Major visual defects found	P
21/02/2019	A000876127-020	No Major visual defects found	P
21/02/2019	A000876127-021	No Major visual defects found	P
21/02/2019	A000876127-022	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 <sub>max</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]	FF [%]	
21/02/2019	A000876127-017	319.6	38.01	8.41	45.52	8.97	78.3	-
21/02/2019	A000876127-018	321.1	37.79	8.50	45.51	8.99	78.5	-
21/02/2019	A000876127-019	320.9	38.16	8.41	45.51	8.97	78.6	-
21/02/2019	A000876127-020	356.4	39.39	9.05	47.65	9.55	78.3	
21/02/2019	A000876127-021	357.5	39.43	9.07	47.67	9.52	78.8	
21/02/2019	A000876127-022	354.2	39.32	9.01	47.56	9.45	78.8	

Supplementary information: - None

**10.3 Insulation test (Initial)**

Maximum system voltage [V <sub>DC</sub> ]		1000						-
High voltage applied [V <sub>DC</sub> ]		6000						
Insulation resistance measured at [V <sub>DC</sub> ]		1000						
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-	
		[GΩ]	[m²]	[GΩ × m²]	Yes (description)	No		
21/02/2019	A000876127-017	45.30	1.97	89.24	--	No	P	
21/02/2019	A000876127-018	48.10	1.97	94.75	--	No	P	
21/02/2019	A000876127-019	49.70	1.97	97.90	--	No	P	
21/02/2019	A000876127-020	45.50	1.97	96.33	--	No	P	

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 6 von 12  
*Test Report No.:* Page 6 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

21/02/2019	A000876127-021	40.70	1.97	80.17	--	No	P
21/02/2019	A000876127-022	48.90	1.97	96.33	--	No	P

\*Minimum requirement acc. to the standard is 0.04 GΩ × m².

Supplementary information: - None

**10.15 Wet leakage current test (Initial)**

Insulation resistance measured at [V <sub>DC</sub> ]		1000			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured [MΩ]	Area [m²]	Result* [MΩ × m²]	
21/02/2019	A000876127-017	2300.0	1.97	4531.0	P
21/02/2019	A000876127-018	2600.0	1.97	5122.0	P
21/02/2019	A000876127-019	3100.0	1.97	6107.0	P
21/02/2019	A000876127-020	2100.0	1.97	4137.0	P
21/02/2019	A000876127-021	1800.0	1.97	3546.0	P
21/02/2019	A000876127-022	1900.0	1.97	3743.0	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]		
21/02/2019	A000876127-017	205.6	5.48	P	
21/02/2019	A000876127-018	215.6	5.75	P	
21/02/2019	A000876127-019	213.7	5.69	P	
21/02/2019	A000876127-020	227.1	6.05	P	
21/02/2019	A000876127-021	214.5	5.72	P	
21/02/2019	A000876127-022	208.1	5.54	P	

Supplementary information: - None

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 7 von 12  
*Test Report No.:* Page 7 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Performance of PID Test -1 <sup>st</sup> 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]	
21/02/2019 to 26/02/2019	A000876127-018	-1000	96	P
	A000876127-019	-1000	96	P
21/02/2019 to 26/02/2019	A000876127-021	-1000	96	P
	A000876127-022	-1000	96	P
Supplementary information: - None				

10.1 Visual inspection after 1 <sup>st</sup> PID Cycle			
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings	-
26/02/2019	A000876127-018	No Major visual defects found	P
26/02/2019	A000876127-019	No Major visual defects found	P
26/02/2019	A000876127-021	No Major visual defects found	P
26/02/2019	A000876127-022	No Major visual defects found	P
Supplementary information: - None			

10.2 Maximum power determination - after 1 <sup>st</sup> PID Cycle									
Module temperature [°C]	corrected to 25								-
Irradiance [W/m <sup>2</sup> ]	1000								
Test date [DD/MM/YYYY]	Sample No.	P <sub>max</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]	FF [%]	Degradation [%]	
26/02/2019	A000876127-018	314.2	37.76	8.32	45.46	8.96	77.1	-2.1	P
26/02/2019	A000876127-019	319.2	38.23	8.35	45.56	8.95	78.2	-0.5	P
26/02/2019	A000876127-021	355.5	39.54	8.99	47.76	9.50	78.4	-0.6	P
26/02/2019	A000876127-022	352.4	38.98	9.04	47.64	9.46	78.2	-0.5	P
Supplementary information: - Initial measurements were considered for calculating degradation									

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 8 von 12  
*Test Report No.:* Page 8 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

**10.3 Insulation test after 1<sup>st</sup> PID Cycle**

Maximum system voltage [V <sub>DC</sub> ]		1000					
High voltage applied [V <sub>DC</sub> ]		6000					
Insulation resistance measured at [V <sub>DC</sub> ]		1000					
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m <sup>2</sup> ]	[GΩ × m <sup>2</sup> ]	Yes (description)	No	
26/02/2019	A000876127-018	38.70	1.97	76.23	--	No	P
26/02/2019	A000876127-019	44.50	1.97	87.66	--	No	P
26/02/2019	A000876127-021	40.90	1.97	80.57	--	No	P
26/02/2019	A000876127-022	48.70	1.97	95.90	--	No	P

\*Minimum requirement acc. to the standard is 0.04 GΩ × m<sup>2</sup>.

Supplementary information: - None

**10.15 Wet leakage current test after 1<sup>st</sup> PID Cycle**

Insulation resistance measured at [V <sub>DC</sub> ]		1000				-
Solution resistivity [Ω cm]		< 3,500				P
Solution temperature [°C]		22 ± 3				P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*		
		[MΩ]	[m <sup>2</sup> ]	[MΩ × m <sup>2</sup> ]	-	
26/02/2019	A000876127-018	4100.0	1.97	8077.0	P	
26/02/2019	A000876127-019	3300.0	1.97	6501.0	P	
26/02/2019	A000876127-021	1700.0	1.97	3349.0	P	
26/02/2019	A000876127-022	2300.0	1.97	4531.0	P	

\* Minimum requirement acc. to the standard is 40 MΩ × m<sup>2</sup>.

Supplementary information: - None



**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 9 von 12  
*Test Report No.:* Page 9 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Performance of PID Test – II <sup>nd</sup> 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.]	
26/02/2019 to 03/03/2019	A000876127-018	-1000	96	P
	A000876127-019	-1000	96	P
26/02/2019 to 03/03/2019	A000876127-021	-1000	96	P
	A000876127-022	-1000	96	P
Supplementary information: - None				

10.1	Visual inspection after II <sup>nd</sup> PID Cycle			
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings		-
03/03/2019	A000876127-018	No Major visual defects found		P
03/03/2019	A000876127-019	No Major visual defects found		P
03/03/2019	A000876127-021	No Major visual defects found		P
03/03/2019	A000876127-022	No Major visual defects found		P
Supplementary information: - None				

10.2	Maximum power determination - after II <sup>nd</sup> PID Cycle								
Module temperature [°C]	corrected to 25								
Irradiance [W/m <sup>2</sup> ]	1000								
Test date [DD/MM/YYYY]	Sample No.	P <sub>max</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]	FF [%]	Degradation [%]	
03/03/2019	A000876127-018	314.4	37.68	8.34	45.37	8.92	77.7	-2.1	P
03/03/2019	A000876127-019	317.7	37.95	8.37	45.53	8.92	78.3	-1.0	P
03/03/2019	A000876127-021	354.7	39.64	8.95	47.72	9.46	78.6	-0.8	P
03/03/2019	A000876127-022	353.7	39.45	8.97	47.71	9.42	78.7	-0.1	P
Supplementary information: - Initial measurements were considered for calculating degradation									

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 10 von 12  
*Test Report No.:* Page 10 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

10.3 Insulation test after II <sup>nd</sup> PID cycle							
Maximum system voltage [V <sub>DC</sub> ]			1000				
High voltage applied [V <sub>DC</sub> ]			6000				
Insulation resistance measured at [V <sub>DC</sub> ]			1000				
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m <sup>2</sup> ]	[GΩ × m <sup>2</sup> ]	Yes (description)	No	
03/03/2019	A000876127-018	40.50	1.97	79.78	--	No	P
03/03/2019	A000876127-019	38.70	1.97	76.23	--	No	P
03/03/2019	A000876127-021	43.20	1.97	85.10	--	No	P
03/03/2019	A000876127-022	37.50	1.97	73.87	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m <sup>2</sup> .							
Supplementary information: - None							

10.15 Wet leakage current after II <sup>nd</sup> PID Cycle							
Insulation resistance measured at [V <sub>DC</sub> ]			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]	[m <sup>2</sup> ]	[MΩ × m <sup>2</sup> ]			
03/03/2019	A000876127-018	4200.0	1.97	8274.0			P
03/03/2019	A000876127-019	3700.0	1.97	7289.0			P
03/03/2019	A000876127-021	3300.0	1.97	6501.0			P
03/03/2019	A000876127-022	3700.0	1.97	7289.0			P
* Minimum requirement acc. to the standard is 40 MΩ × m <sup>2</sup> .							
Supplementary information: - None							

<b>Prüfbericht-Nr.: ULR:TC568819400000153F</b>			Seite 11 von 12
Test Report No.:			Page 11 of 12
Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Performance of PID Test – III <sup>rd</sup> 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.]	
03/03/2019 to 08/03/2019	A000876127-018	+1500	96	P
	A000876127-019	+1500	96	P
03/03/2019 to 08/03/2019	A000876127-021	-1000	96	P
	A000876127-022	-1000	96	P
Supplementary information: - None				

10.1	Visual inspection after III <sup>rd</sup> PID Cycle			
Test date [DD/MM/YYYY]	Sample No.	Nature and position of initial findings		-
08/03/2019	A000876127-018	No Major visual defects found		P
08/03/2019	A000876127-019	No Major visual defects found		P
08/03/2019	A000876127-021	No Major visual defects found		P
08/03/2019	A000876127-022	No Major visual defects found		P
Supplementary information: - None				

10.2	Maximum power determination - after III <sup>rd</sup> Cycle								
Module temperature [°C]	corrected to 25								-
Irradiance [W/m <sup>2</sup> ]	1000								
Test date [DD/MM/YYYY]	Sample No.	P <sub>max</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]	FF [%]	Degradation [%]	
08/03/2019	A000876127-018	314.7	37.67	8.35	45.39	8.89	78.0	-2.0	P
08/03/2019	A000876127-019	316.8	38.14	8.31	45.43	8.90	78.4	-1.2	P
08/03/2019	A000876127-021	353.9	39.19	9.03	47.63	9.44	78.8	-1.0	P
08/03/2019	A000876127-022	351.9	40.00	8.80	47.63	9.40	78.6	-0.6	P
Supplementary information: - Initial measurements were considered for calculating degradation									

**Prüfbericht-Nr.: ULR:TC568819400000153F** Seite 12 von 12  
*Test Report No.:* Page 12 of 12

Absatz	<b>Solar Photovoltaic Modules</b>	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / <i>Requirements - Tests</i>	<i>Measuring results - Remarks</i>	<i>Evaluation</i>

**10.3 Insulation test after III<sup>rd</sup> Cycle**

Maximum system voltage [V <sub>DC</sub> ]		1000					
High voltage applied [V <sub>DC</sub> ]		6000					
Insulation resistance measured at [V <sub>DC</sub> ]		1000					
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	Dielectric breakdown		-
		[GΩ]	[m <sup>2</sup> ]	[GΩ × m <sup>2</sup> ]	Yes (description)	No	
08/03/2019	A000876127-018	37.30	1.97	73.48	--	No	P
08/03/2019	A000876127-019	39.50	1.97	77.81	--	No	P
08/03/2019	A000876127-021	31.80	1.97	62.64	--	No	P
08/03/2019	A000876127-022	37.50	1.97	73.87	--	No	P
*Minimum requirement acc. to the standard is 0.04 GΩ × m <sup>2</sup> .							
Supplementary information: - None							

**10.15 Wet leakage current after III<sup>rd</sup> PID Cycle**

Insulation resistance measured at [V <sub>DC</sub> ]		1000			-
Solution resistivity [Ω cm]		< 3,500			P
Solution temperature [°C]		22 ± 3			P
Test date [DD/MM/YYYY]	Sample No.	Measured	Area	Result*	-
		[MΩ]	[m <sup>2</sup> ]	[MΩ × m <sup>2</sup> ]	
08/03/2019	A000876127-018	3300.0	1.97	6501.0	P
08/03/2019	A000876127-019	2800.0	1.97	3516.0	P
08/03/2019	A000876127-021	1800.0	1.97	3546.0	P
08/03/2019	A000876127-022	2600.0	1.97	5122.0	P
* Minimum requirement acc. to the standard is 40 MΩ × m <sup>2</sup> .					
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.



**ANLAGE zum Prüfbericht-Nr.:**  
*APPENDIX to Test Report No.:* ULR:TC568819400000153F

Seite 2 von 31  
Page 2 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

**Statement of the estimated uncertainty of the test verdicts**

The Laboratory apply decision rule for giving verdict, considering measurement of Un-Certainty at 95% confident level

- 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: 2.49% with a coverage factor k=2
  - Current measurement: 2.28% with a coverage factor k=2
  - Voltage measurement: 2.08% 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  $\pm 1$  %.

ZUSATZ-DOKUMENTATION  
ADDITIONAL DOCUMENTATION

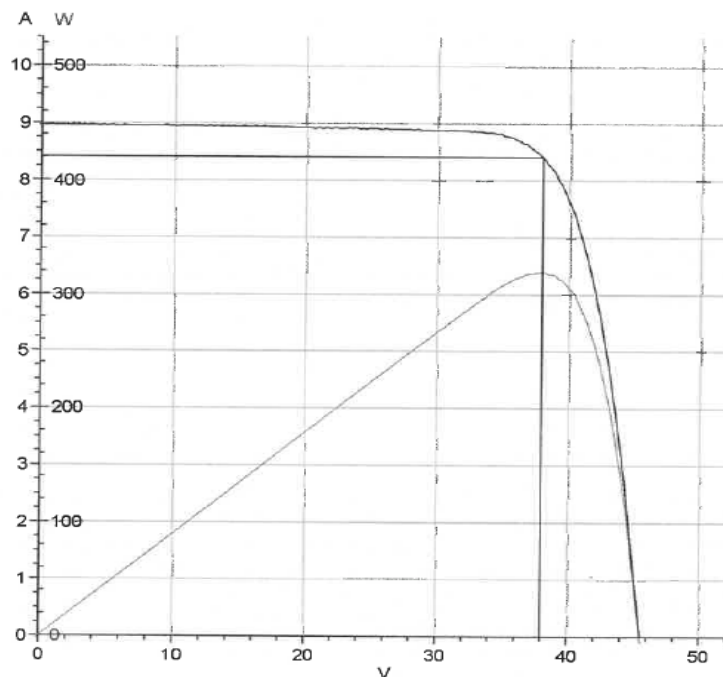
Measurement reports: Initial



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:44



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-017 initi
Module ID Code	R1000002192103332	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.4 °C	Mon. Cell Temp.	25.4 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.97 A	Voc	45.52 V
Imp	8.41 A	Vmp	38.01 V
Pmax	319.59 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	78.3 %
Cell Efficiency	18.1 %	Module Efficiency	16.2 %
Shunt res.	568.438 Ohm	Series res.	0.465 Ohm

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21-02-19

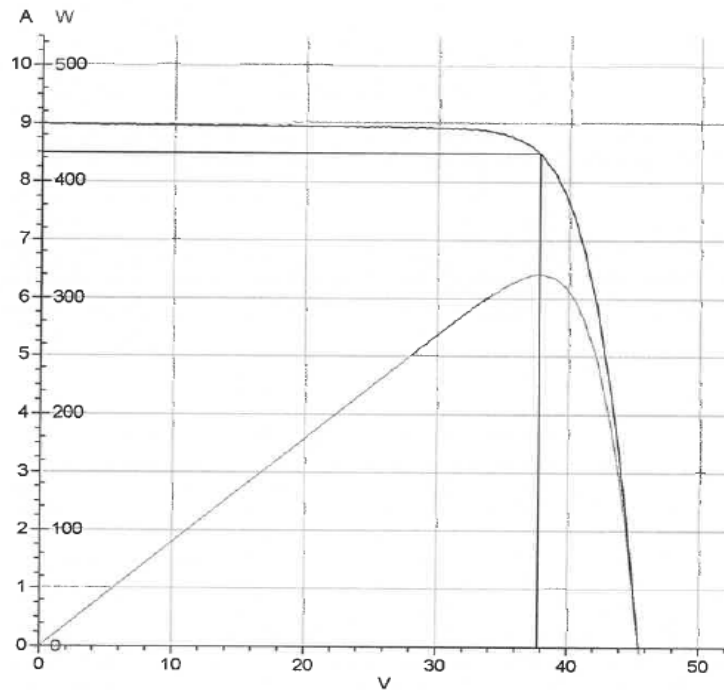
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:07



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-018 initi
Module ID Code	R1000002192103333	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.2 °C	Mon. Cell Temp.	25.2 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.99 A	Voc	45.51 V
Imp	8.50 A	Vmp	37.79 V
Pmax	321.08 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	78.5 %
Cell Efficiency	18.2 %	Module Efficiency	16.3 %
Shunt res.	731.398 Ohm	Serie res.	0.465 Ohm

*S. V. 2012  
8/11/02/19*



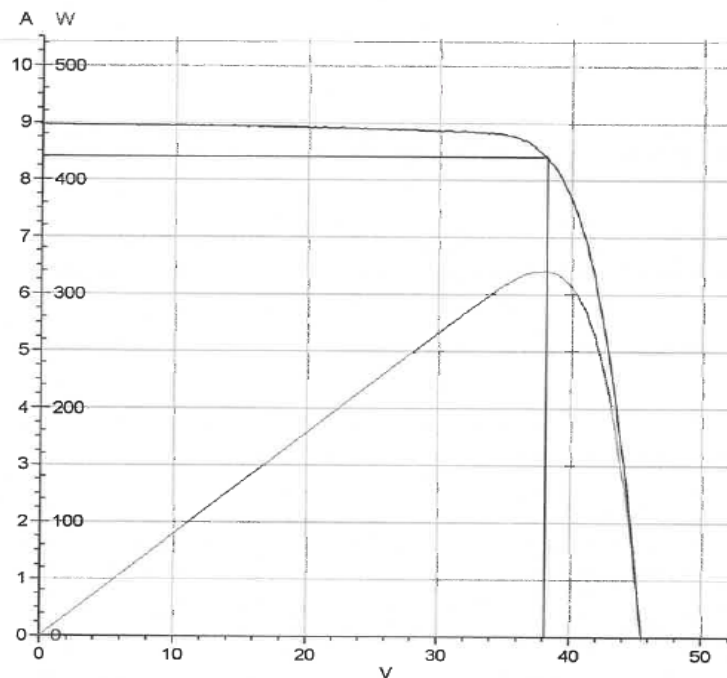
ZUSATZ-DOKUMENTATION  
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:04



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-019 initi
Module ID Code	R1000002192103330	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.1 °C	Mon. Cell Temp.	25.1 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.97 A	Voc	45.51 V
Imp	8.41 A	Vmp	38.16 V
Pmax	320.88 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	78.6 %
Cell Efficiency	18.1 %	Module Efficiency	16.3 %
Shunt res.	527.230 Ohm	Serie res.	0.459 Ohm

*S. V. 2019  
21/02/19*

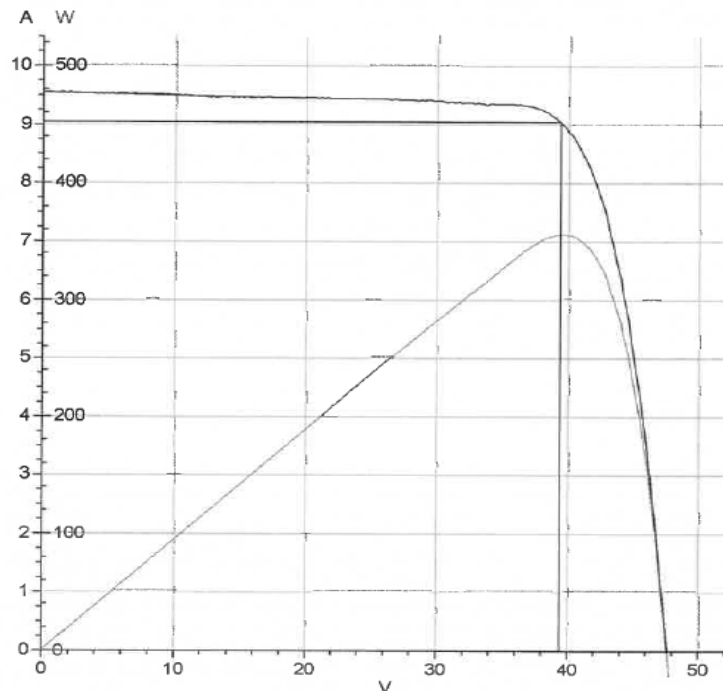
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:53

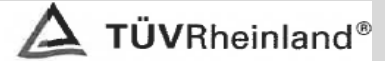


Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-020 initi
Module ID Code	R1000002192103339	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.6 °C	Mon. Cell Temp.	25.6 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.55 A	Voc	47.65 V
Imp	9.05 A	Vmp	39.39 V
Pmax	356.38 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	78.3 %
Cell Efficiency	20.3 %	Module Efficiency	18.1 %
Shunt res.	187.872 Ohm	Serie res.	0.458 Ohm

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21-02-19

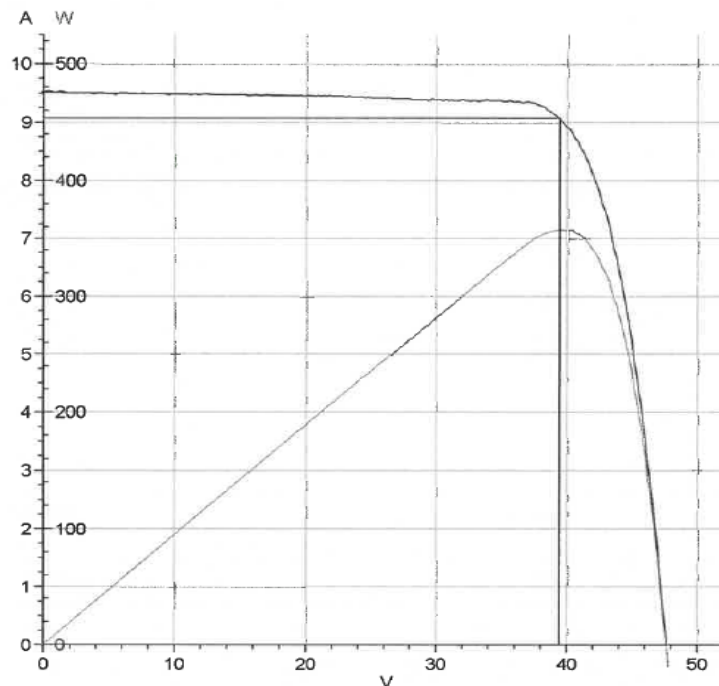
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:10



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-021 initi
Module ID Code	R1000002192103336	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.5 °C	Mon. Cell Temp.	25.5 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.52 A	Voc	47.67 V
Imp	9.07 A	Vmp	39.43 V
Pmax	357.55 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	78.8 %
Cell Efficiency	20.3 %	Module Efficiency	18.1 %
Shunt res.	335.913 Ohm	Serie res.	0.450 Ohm

*S. W. 2019  
8-11/08/19*

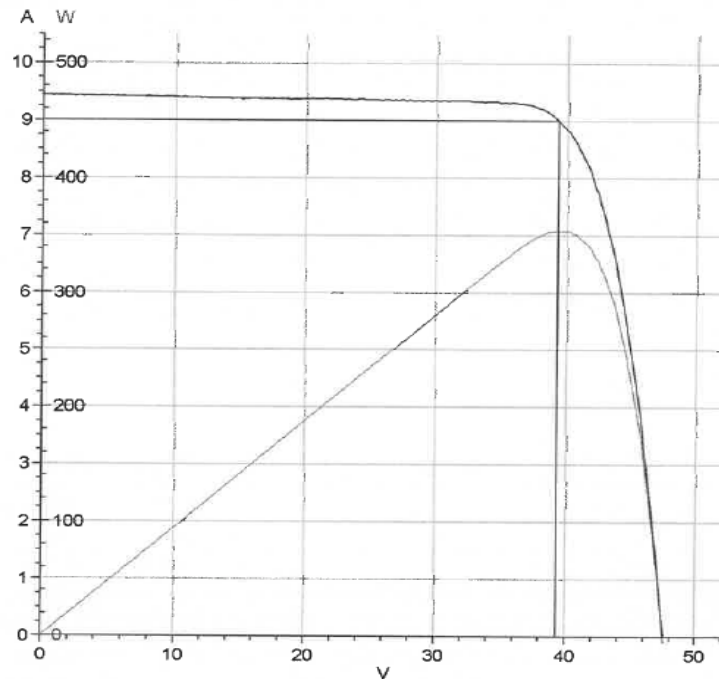
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

21-02-19 16:00



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-022 initi
Module ID Code	R1000002192103335	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.2 °C	Mon. Cell Temp.	25.2 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.45 A	Voc	47.56 V
Imp	9.01 A	Vmp	39.32 V
Pmax	354.17 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	78.8 %
Cell Efficiency	20.1 %	Module Efficiency	18.0 %
Shunt res.	268.779 Ohm	Serie res.	0.467 Ohm

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21/02/19

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

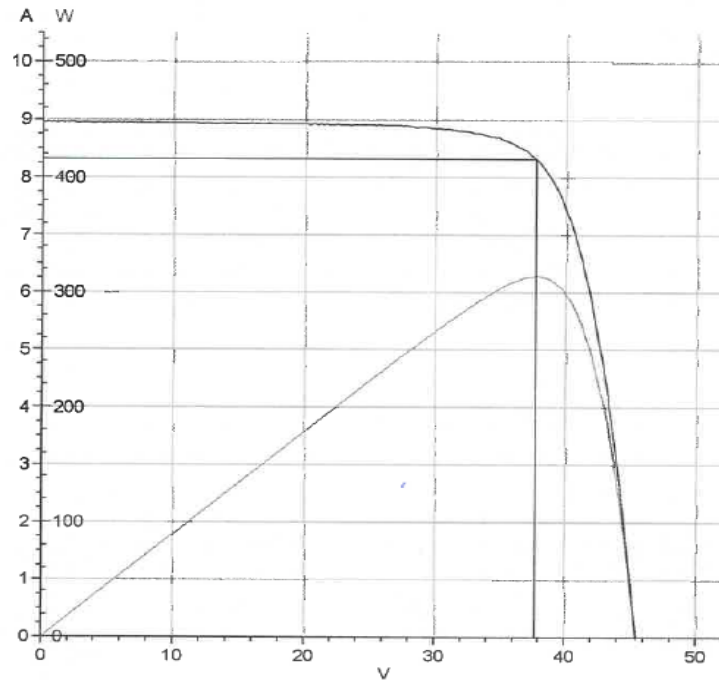
Measurement Reports after 1<sup>st</sup> PID Cycle:



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

26-02-19 15:41



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-018 af pi
Module ID Code	R1000002192103333	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.8 °C	Mon. Cell Temp.	25.8 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.96 A	Voc	45.46 V
Imp	8.32 A	Vmp	37.76 V
Pmax	314.18 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	15.9 %
Shunt res.	537.500 Ohm	Serie res.	0.488 Ohm

*8.400 W  
26/02/19*

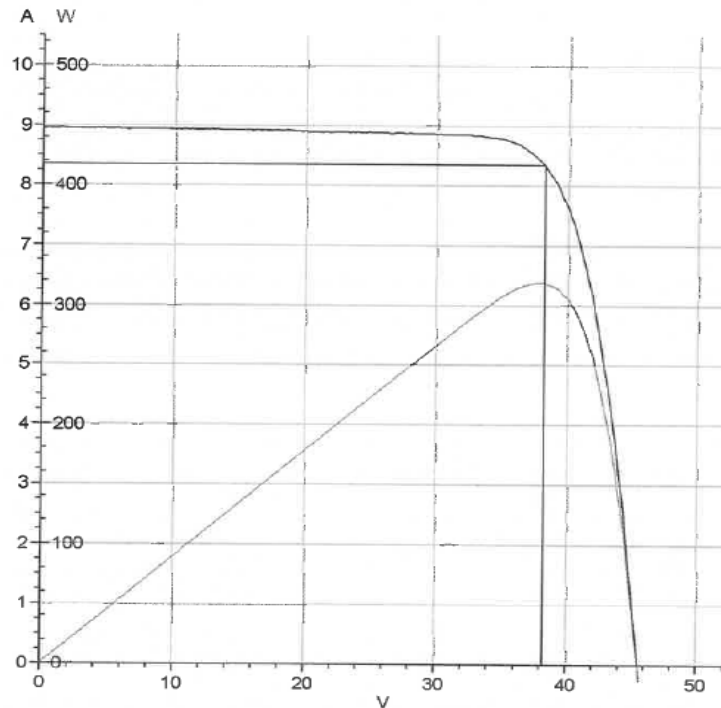
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

26-02-19 15:47



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-019 af pi
Module ID Code	R1000002192103330	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.0 °C	Mon. Cell Temp.	26.0 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.95 A	Voc	45.56 V
Imp	8.35 A	Vmp	38.23 V
Pmax	319.18 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	78.2 %
Cell Efficiency	18.0 %	Module Efficiency	16.2 %
Shunt res.	514.123 Ohm	Serie res.	0.470 Ohm

*S. V. ...*  
*26/02/19*

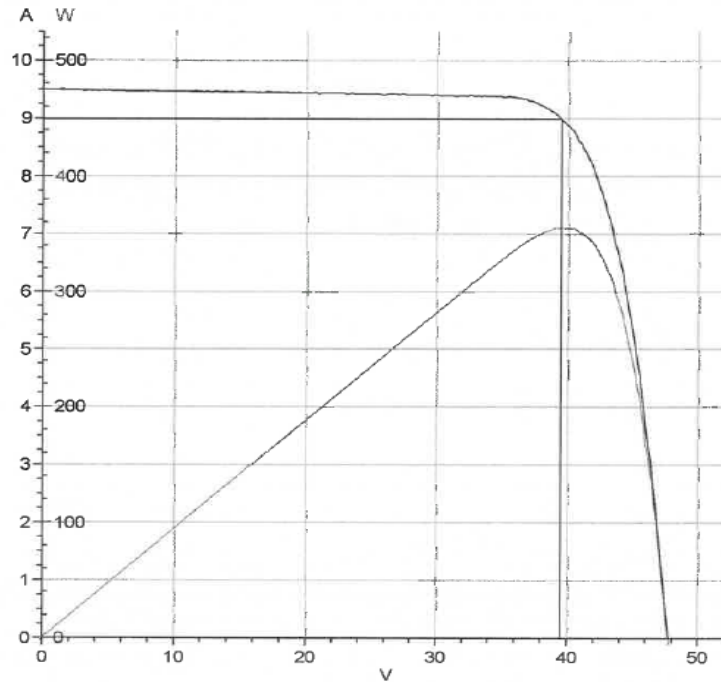
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

26-02-19 15:51



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-021 af pi
Module ID Code	R1000002192103336	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.5 °C	Mon. Cell Temp.	26.5 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.50 A	Voc	47.76 V
Imp	8.99 A	Vmp	39.54 V
Pmax	355.50 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	78.4 %
Cell Efficiency	20.2 %	Module Efficiency	18.0 %
Shunt res.	321.427 Ohm	Serie res.	0.459 Ohm

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S. 40225  
21/02/19

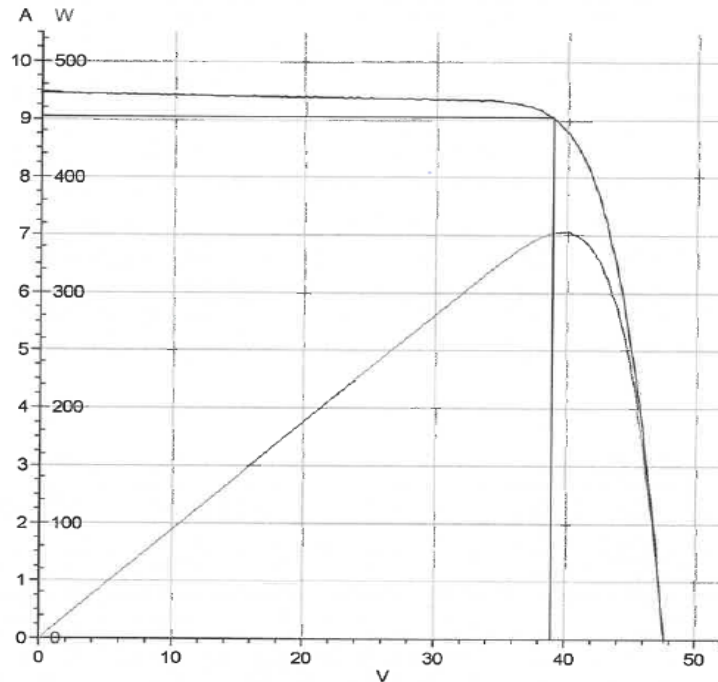
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

26-02-19 16:18



Measurement Data (Temp. compensated results)

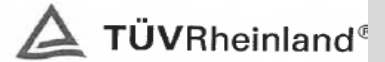
PASAN Tester version	2.4.4	Operator	A000876127-022 af pi
Module ID Code	R1000002192103335	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	25.5 °C	Mon. Cell Temp.	25.5 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.46 A	Voc	47.64 V
Imp	9.04 A	Vmp	38.98 V
Pmax	352.42 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	78.2 %
Cell Efficiency	20.0 %	Module Efficiency	17.9 %
Shunt res.	260.231 Ohm	Serie res.	0.468 Ohm

*S. Y. Y. Y.*  
*26/02/19*



ZUSATZ-DOKUMENTATION  
ADDITIONAL DOCUMENTATION

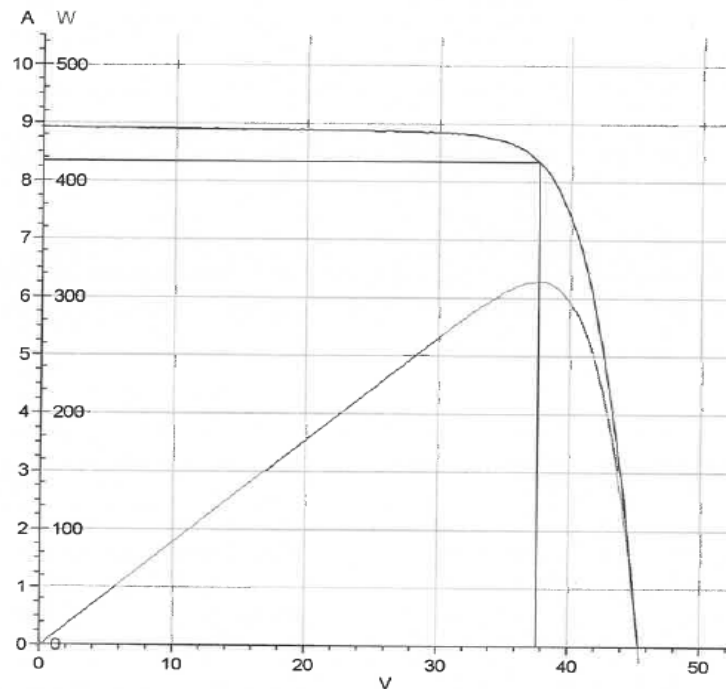
Measurement Reports after IInd PID Cycle:



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

03-03-19 16:35



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-018 AF PI
Module ID Code	R1000002192103333	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.6 °C	Mon. Cell Temp.	26.6 °C
Mask	1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.92 A	Voc	45.37 V
Imp	8.34 A	Vmp	37.68 V
Pmax	314.42 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	77.7 %
Cell Efficiency	17.8 %	Module Efficiency	15.9 %
Shunt res.	574.869 Ohm	Serie res.	0.466 Ohm

*S. W. 03/03/19*

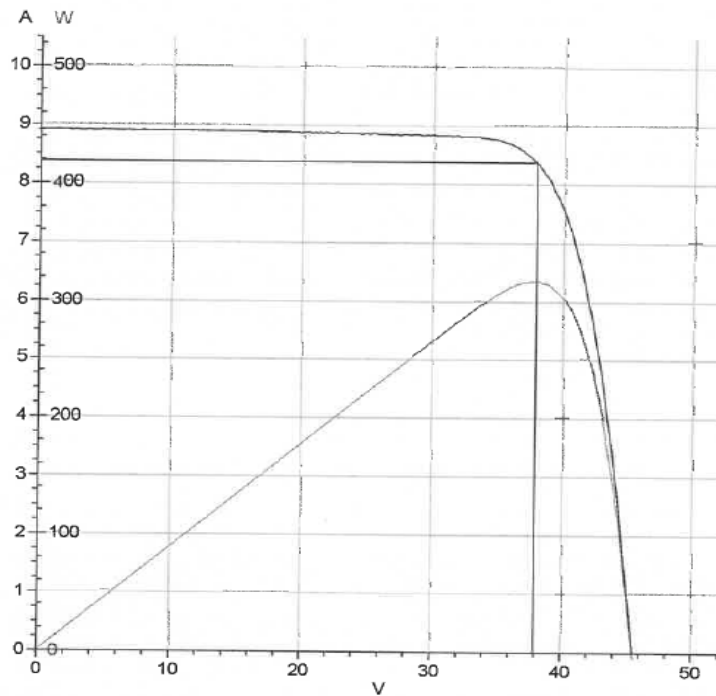
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

03-03-19 16:24



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-019-initi <i>AF PID</i>
Module ID Code	R1000002192103330	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.7 °C	Mon. Cell Temp.	26.7 °C
Mask	1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.92 A	Voc	45.53 V
Imp	8.37 A	Vmp	37.95 V
Pmax	317.75 W	Reference vit 1	0.00 V
Reference vit 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	78.3 %
Cell Efficiency	18.0 %	Module Efficiency	16.1 %
Shunt res.	548.498 Ohm	Serie res.	0.479 Ohm

*S. V. P. 03/03/19*

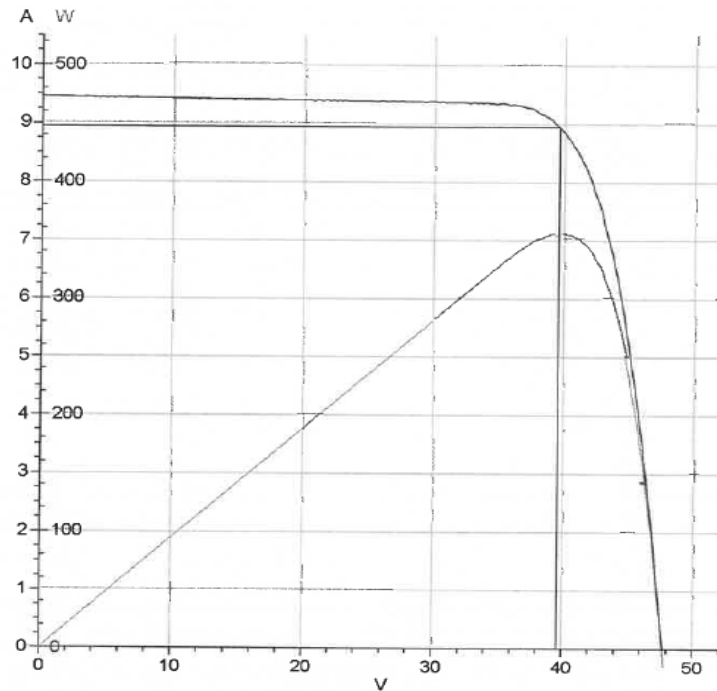
ZUSATZ-DOKUMENTATION  
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

03-03-19 16:19

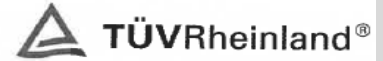


Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-021 initi <i>AF PID</i>
Module ID Code	R1000002192103336	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	27.0 °C	Mon. Cell Temp.	27.0 °C
Mask	1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.46 A	Voc	47.72 V
Imp	8.95 A	Vmp	39.64 V
Pmax	354.72 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	78.6 %
Cell Efficiency	20.2 %	Module Efficiency	18.0 %
Shunt res.	368.407 Ohm	Serie res.	0.454 Ohm

*2.4.4.4  
03/03/19*

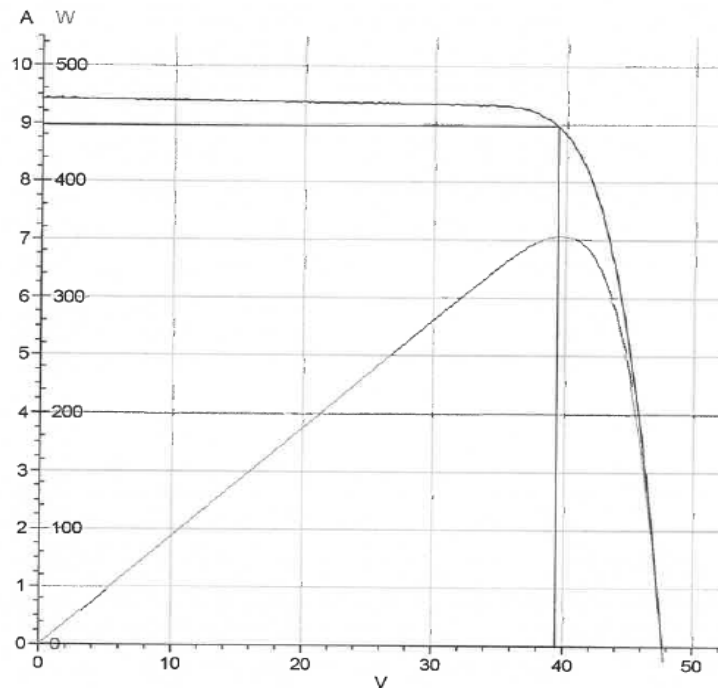
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

03-03-19 16:30



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-022 AF PI
Module ID Code	R1000002192103335	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.8 °C	Mon. Cell Temp.	26.8 °C
Mask	1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.42 A	Voc	47.71 V
Imp	8.97 A	Vmp	39.45 V
Pmax	353.69 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	78.7 %
Cell Efficiency	20.1 %	Module Efficiency	17.9 %
Shunt res.	364.968 Ohm	Serie res.	0.458 Ohm

*S. V. Paetz*  
03/03/19

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

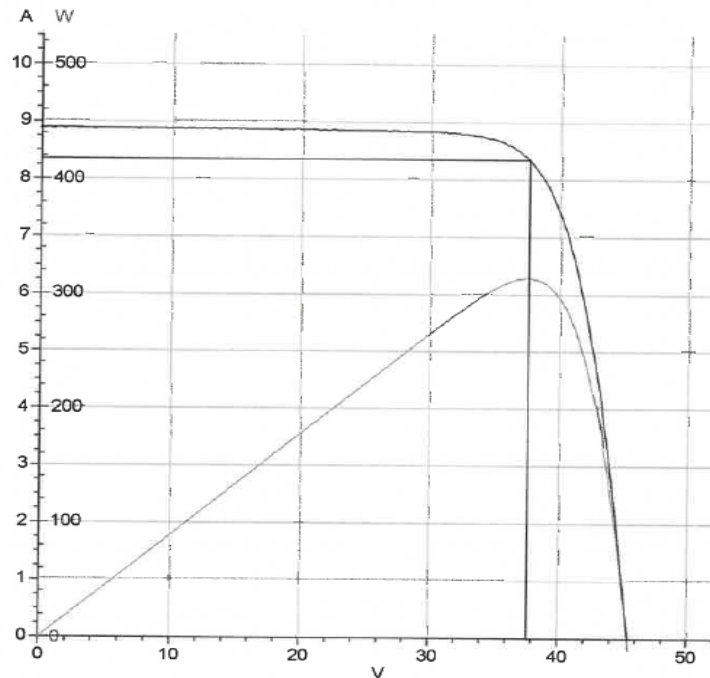
Measurement Reports after Illrd PID Cycle:



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

08-03-19 10:51



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-018 AF PI
Module ID Code	R1000002192103333	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.6 °C	Mon. Cell Temp.	26.6 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.89 A	Voc	45.39 V
Imp	8.35 A	Vmp	37.67 V
Pmax	314.66 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	78.0 %
Cell Efficiency	17.8 %	Module Efficiency	16.0 %
Shunt res.	1002.248 Ohm	Serie res.	0.487 Ohm

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08/03/19

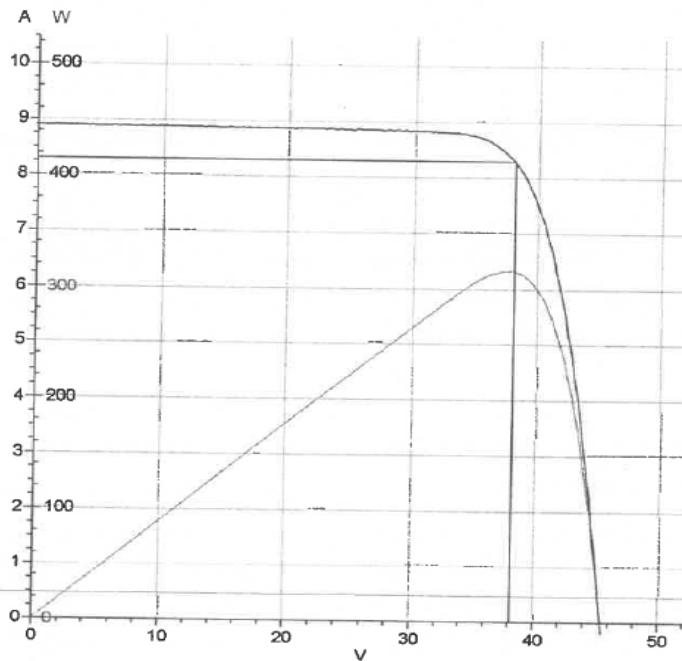
**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

08-03-19 10:15



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-019 af pi
Module ID Code	R1000002192103330	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	26.8 °C	Mon. Cell Temp.	26.8 °C
Mask	NO-MASK 1.000 -	Cell Area	122.84 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	8.90 A	Voc	45.43 V
Imp	8.31 A	Vmp	38.14 V
Pmax	316.84 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	78.4 %
Cell Efficiency	17.9 %	Module Efficiency	16.1 %
Shunt res.	641.838 Ohm	Serie res.	0.478 Ohm

*S. V. V. V. V. V.*  
*08/03/19*

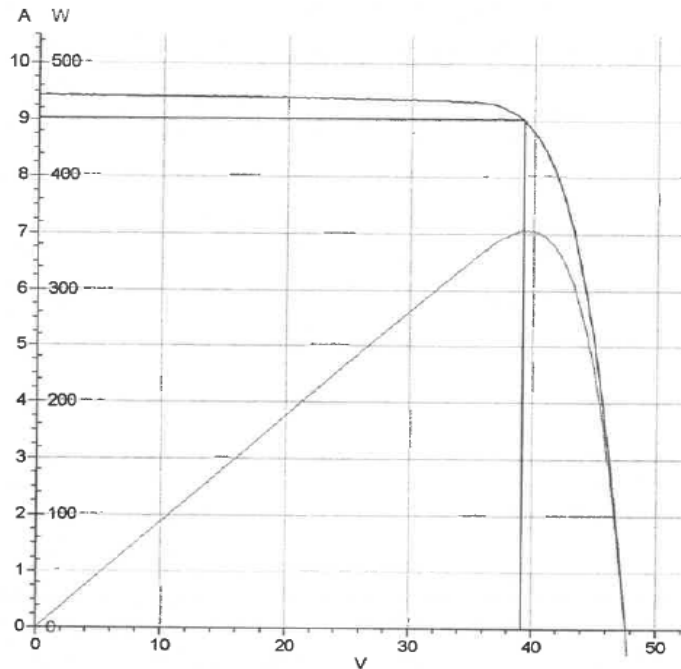
ZUSATZ-DOKUMENTATION  
ADDITIONAL DOCUMENTATION



Performance measurement

PASAN SLAB Tester - STC + SM V2.4.4

08-03-19 10:22



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-021 AF PI
Module ID Code	R1000002192103336	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	27.1 °C	Mon. Cell Temp.	27.1 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.44 A	Voc	47.63 V
Imp	9.03 A	Vmp	39.19 V
Pmax	353.98 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	78.8 %
Cell Efficiency	20.1 %	Module Efficiency	18.0 %
Shunt res.	576.949 Ohm	Serie res.	0.455 Ohm

*8-40-19*  
*08/03/19*

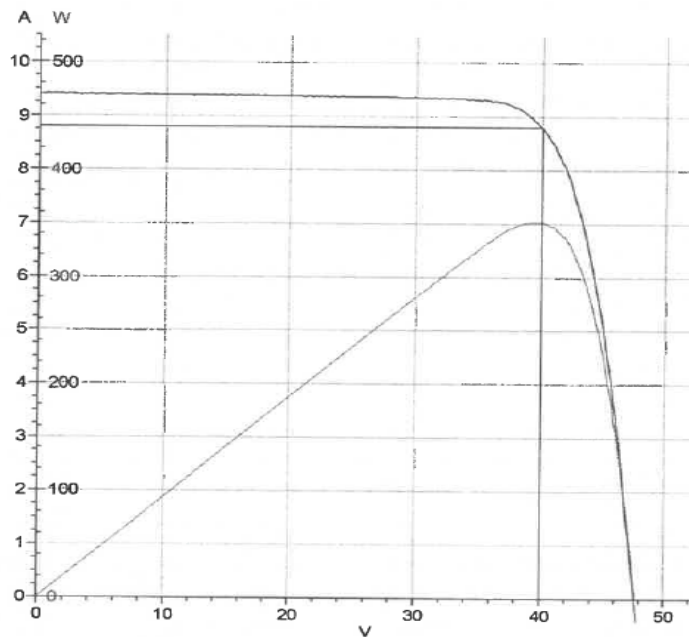
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**ADDITIONAL DOCUMENTATION**



**Performance measurement**

PASAN SLAB Tester - STC + SM V2.4.4

08-03-19 10:20



Measurement Data (Temp. compensated results)

PASAN Tester version	2.4.4	Operator	A000876127-022 AF PI
Module ID Code	R1000002192103335	Serial number	
Standard temperature	25.0 °C	Monitor Cell	TVI001/002-2012
Mean Irradiance	1.006 kW/m <sup>2</sup>	Calibration Value	35.00 mV/(kW/m <sup>2</sup> )
Module Temp.	27.1 °C	Mon. Cell Temp.	27.1 °C
Mask	NO-MASK 1.000 -	Cell Area	122.20 cm <sup>2</sup>
Module Area	19716.60 cm <sup>2</sup>	Cells in Parallel	2
Cells in Series	72	Measurement irradiance	1.000 kW/m <sup>2</sup>
Isc	9.40 A	Voc	47.63 V
Imp	8.80 A	Vmp	40.00 V
Pmax	351.92 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	78.6 %
Cell Efficiency	20.0 %	Module Efficiency	17.8 %
Shunt res.	575.070 Ohm	Serie res.	0.462 Ohm

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*08/03/19*



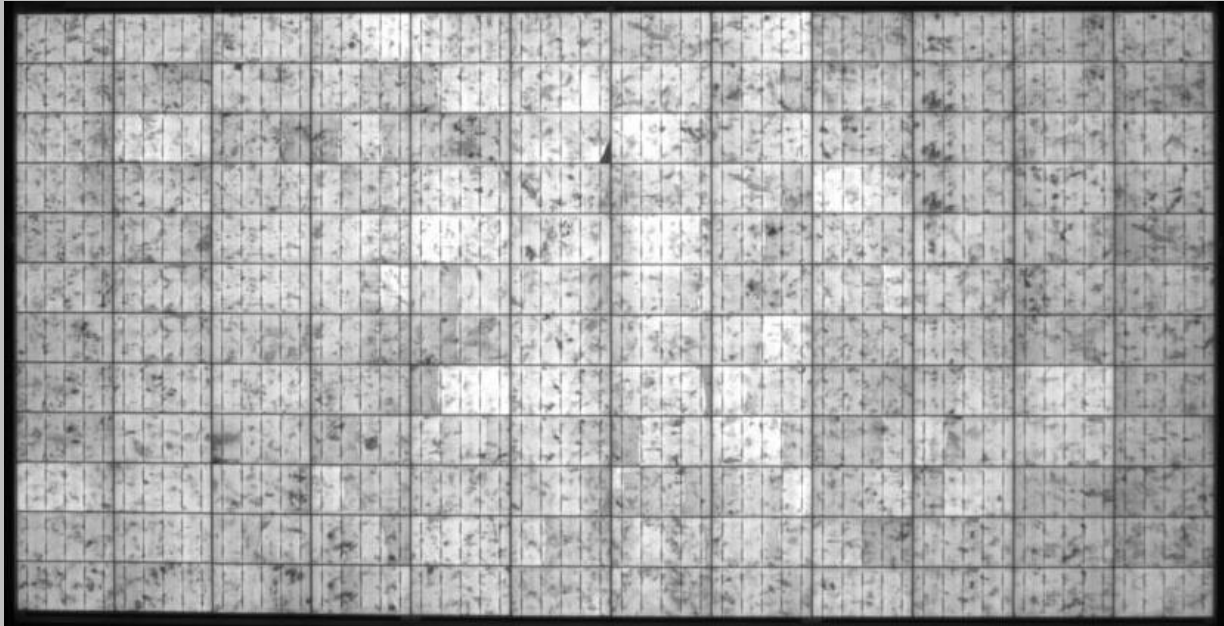
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*APPENDIX to Test Report No.:* ULR:TC568819400000153F

Seite 21 von 31  
Page 21 of 31

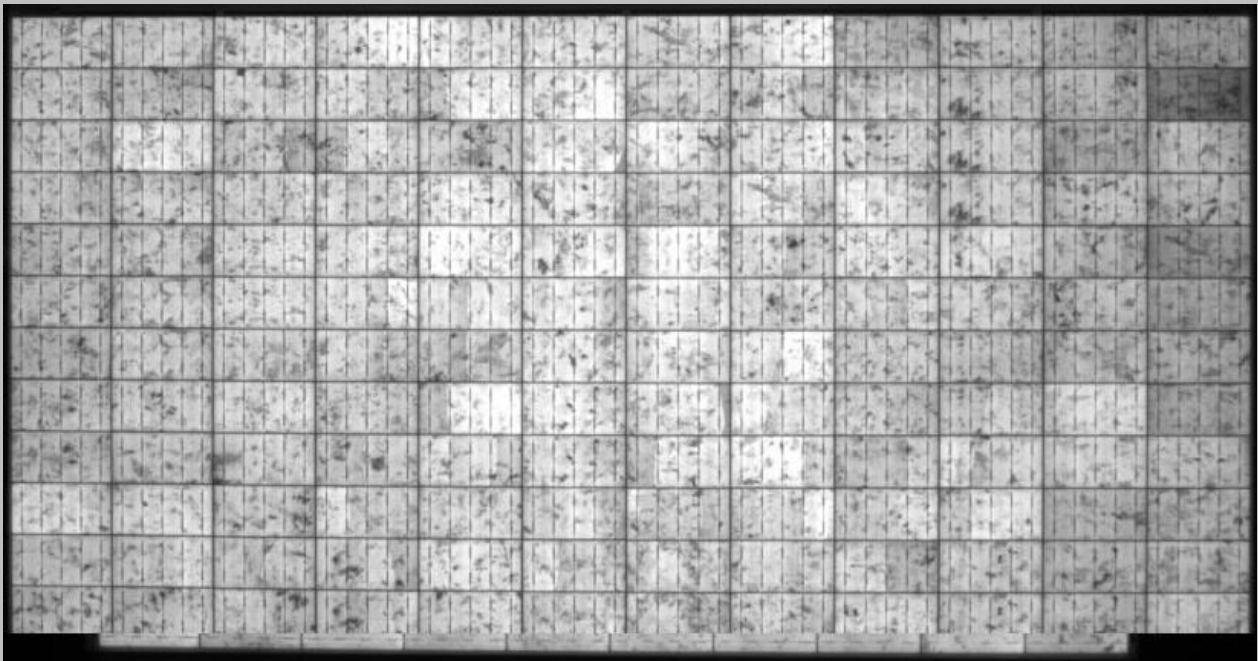
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**ADDITIONAL DOCUMENTATION**

**EL Images of Test samples :**

A000876127-018 -(Initial)



A000876127-018 (After- 1<sup>st</sup> PID Cycle)

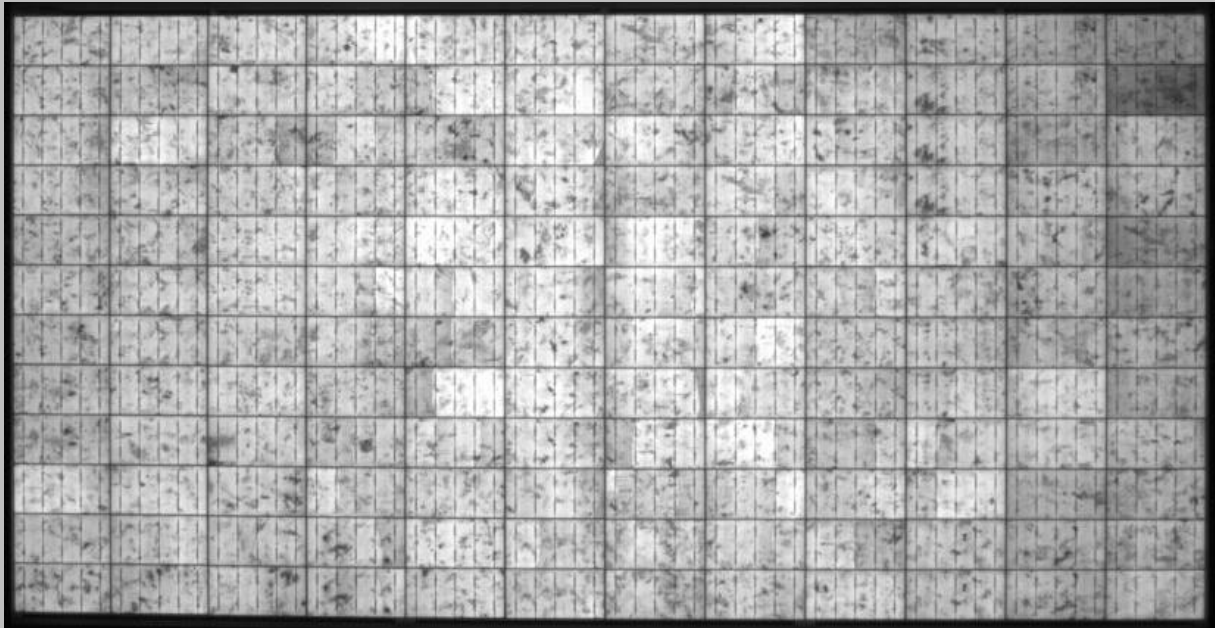


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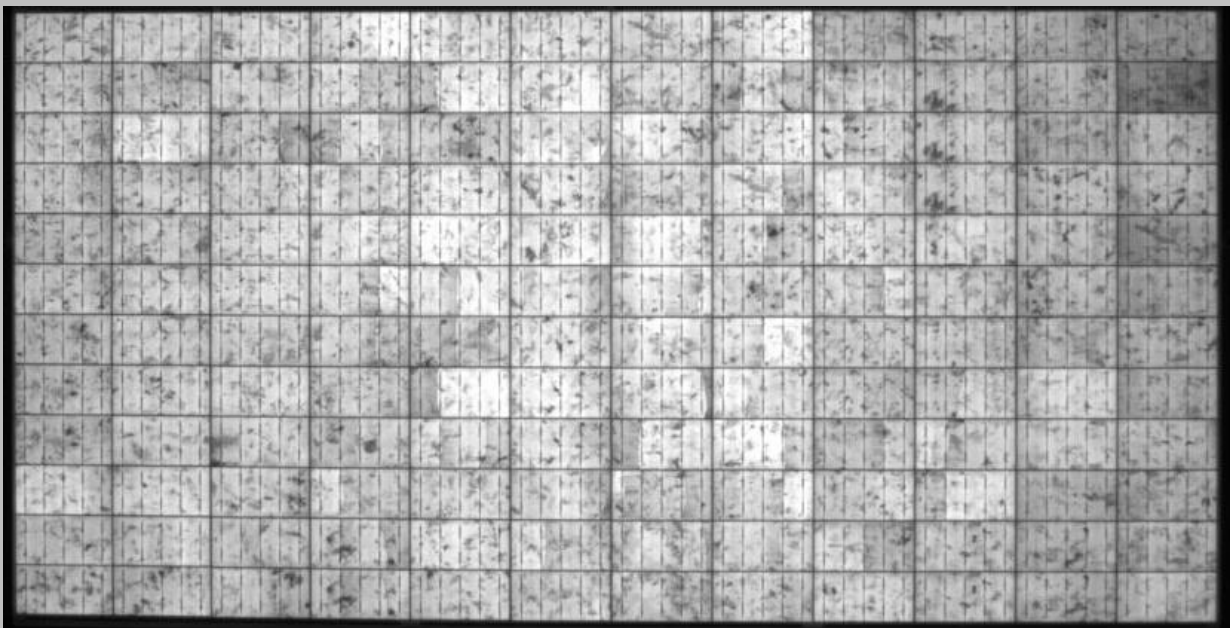
Seite 22 von 31  
Page 22 of 31

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**ADDITIONAL DOCUMENTATION**

A000876127-018 (After- IIInd PID Cycle)



A000876127-018 (After- IIIrd PID Cycle)

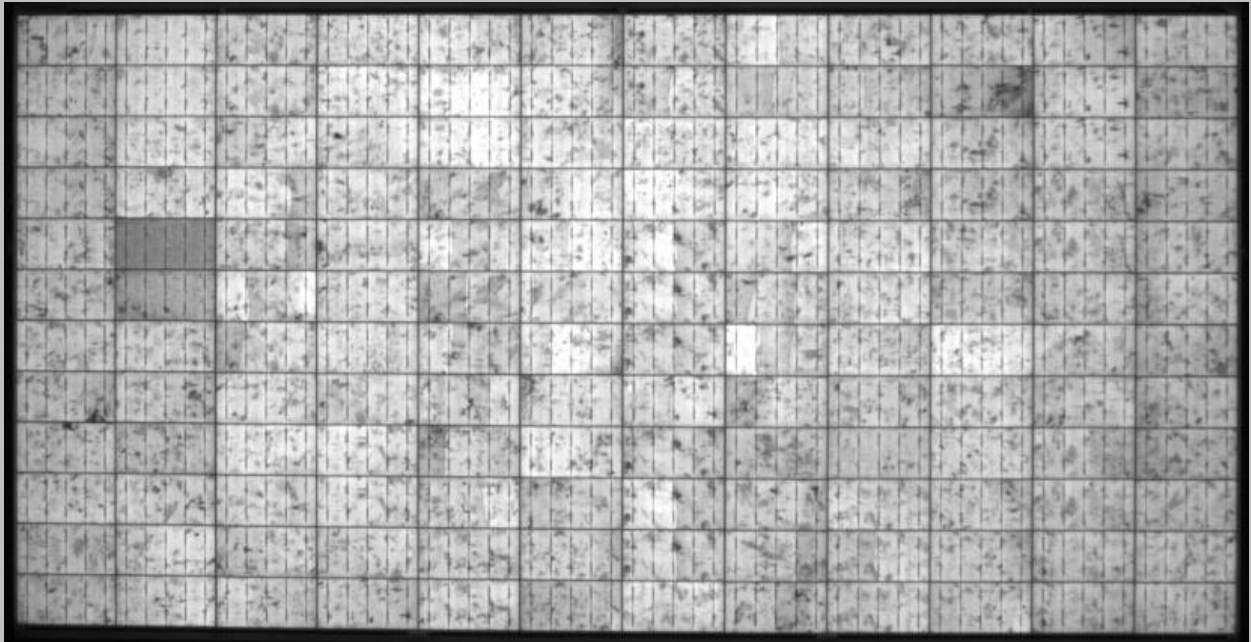


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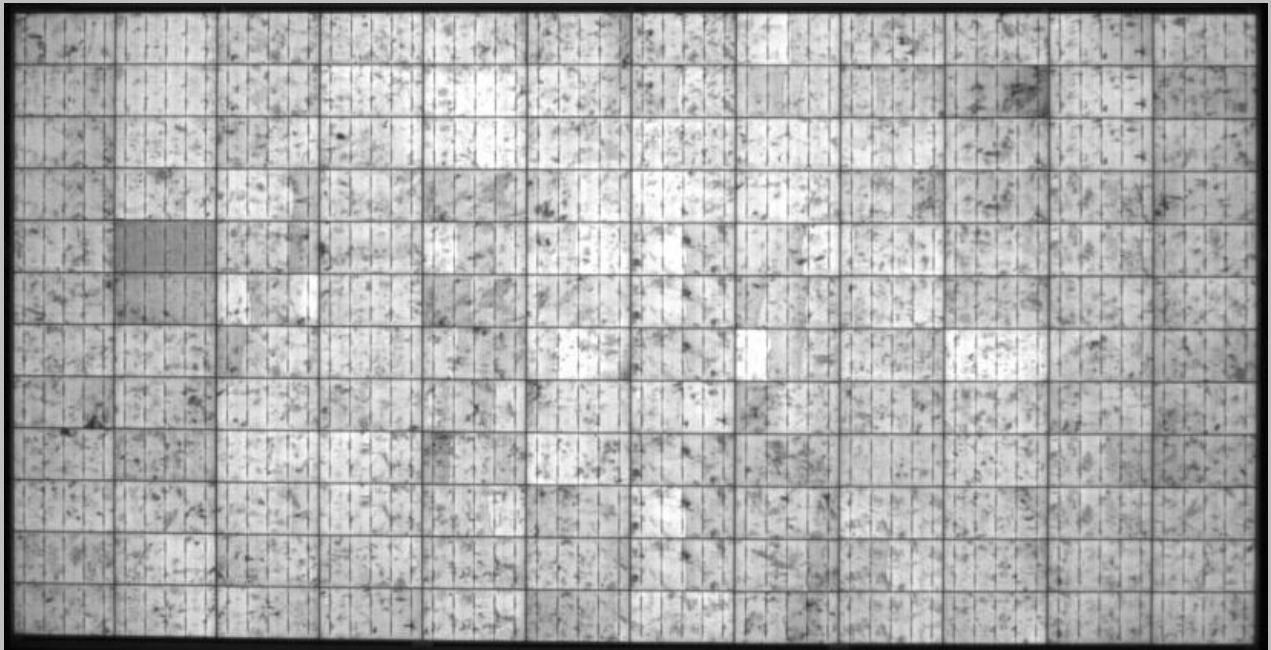
Seite 23 von 31  
Page 23 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

A000876127-019(Initial)



A000876127-019(After- 1<sup>st</sup> PID Cycle)

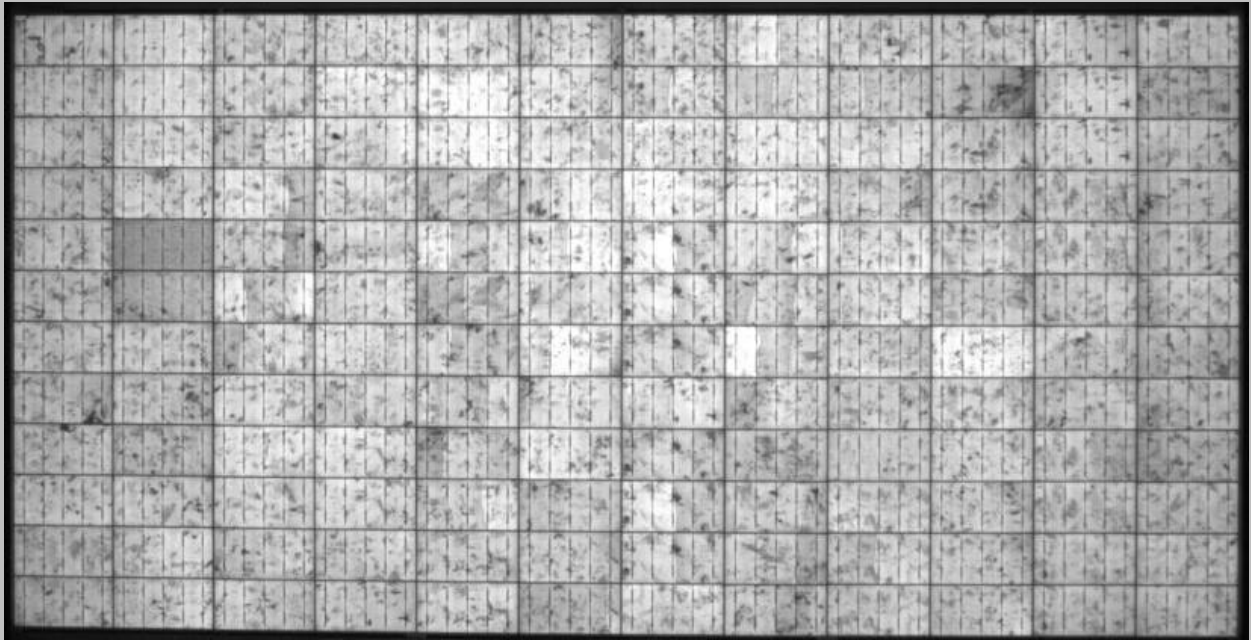


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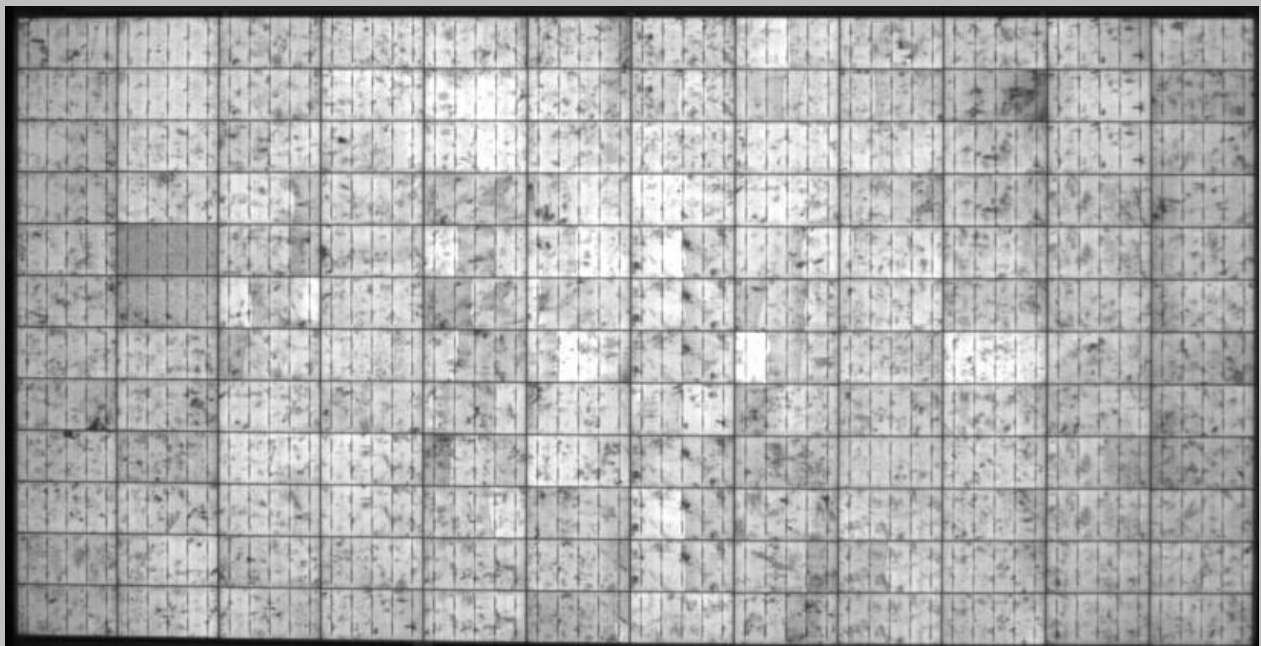
Seite 24 von 31  
Page 24 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

A000876127-019(After- IInd PID Cycle)



A000876127-019(After- IIIrd PID Cycle)

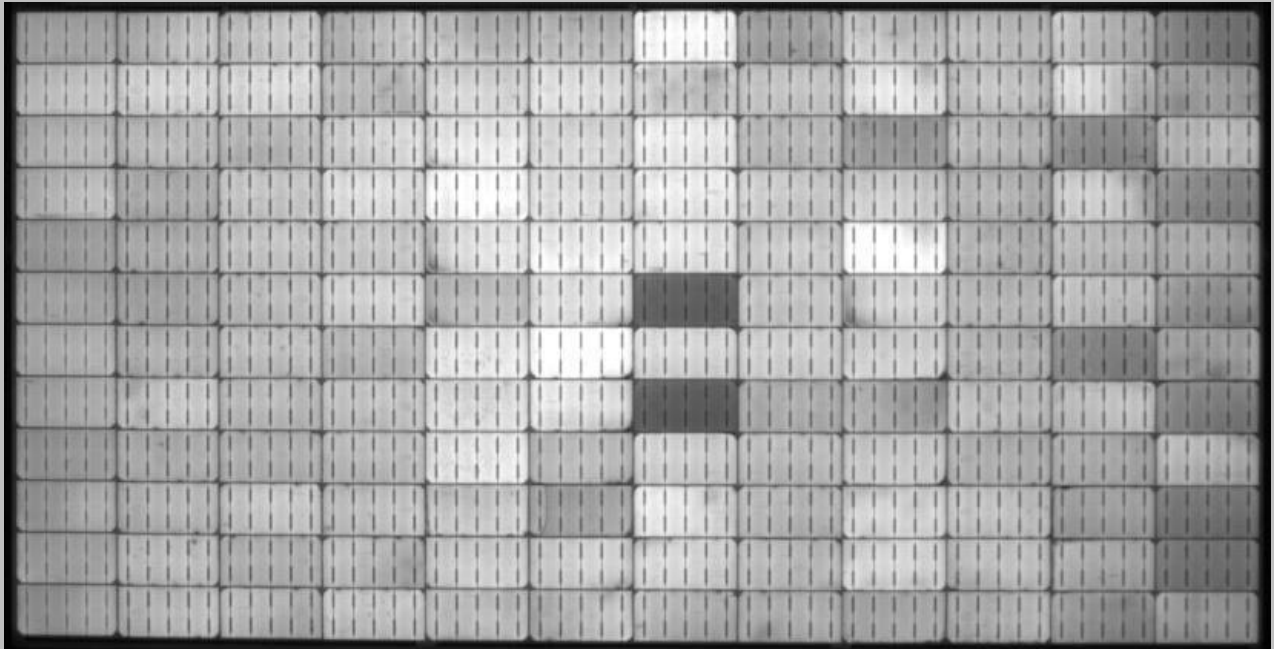


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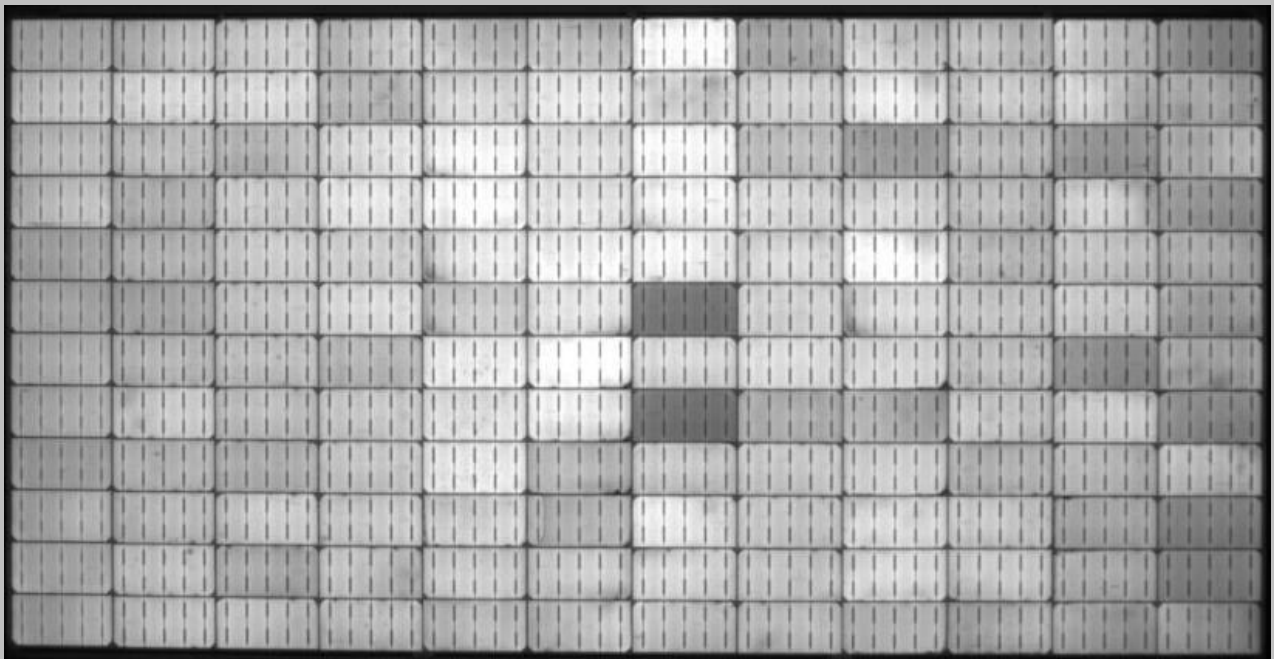
Seite 25 von 31  
Page 25 of 31

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**ADDITIONAL DOCUMENTATION**

A000876127-021-(Initial)



A000876127-021(After- 1<sup>st</sup> PID Cycle)

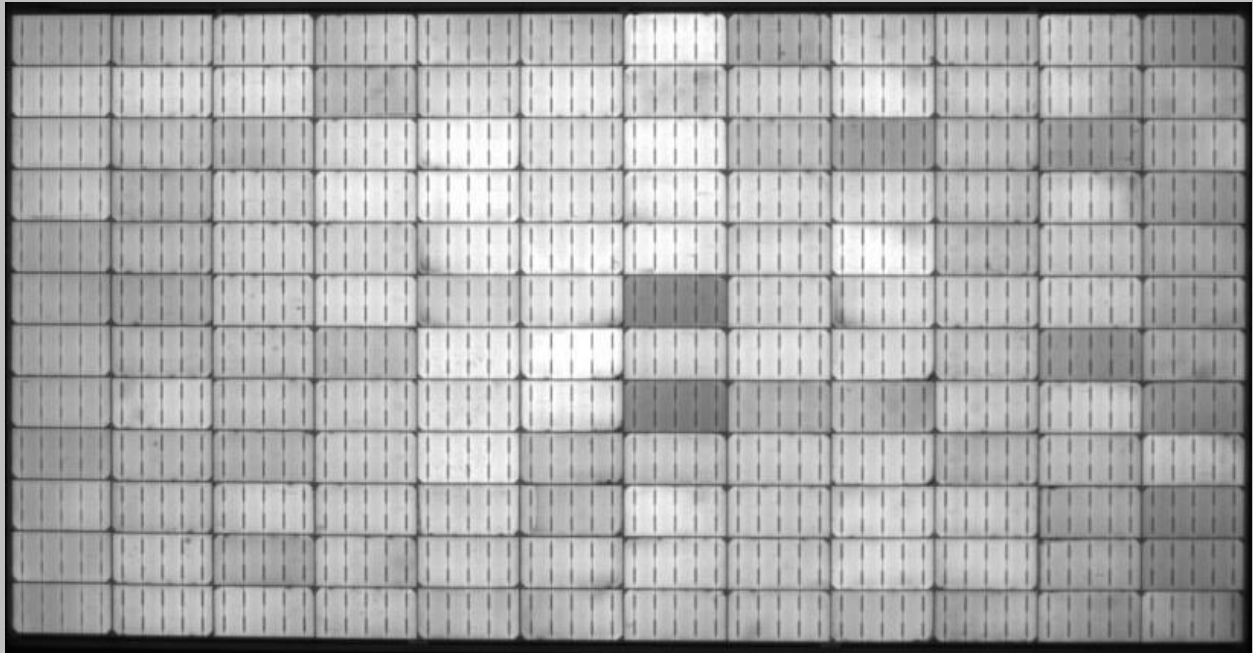


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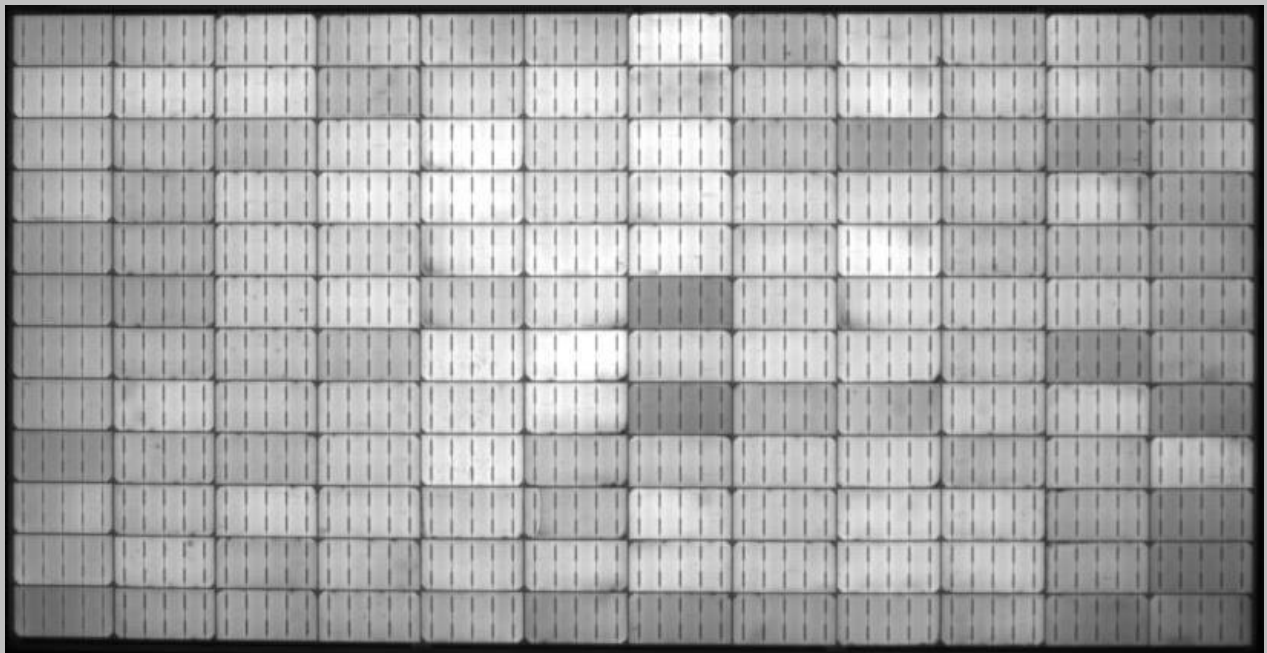
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Page 26 of 31

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**ADDITIONAL DOCUMENTATION**

A000876127-021(After- IInd PID Cycle)



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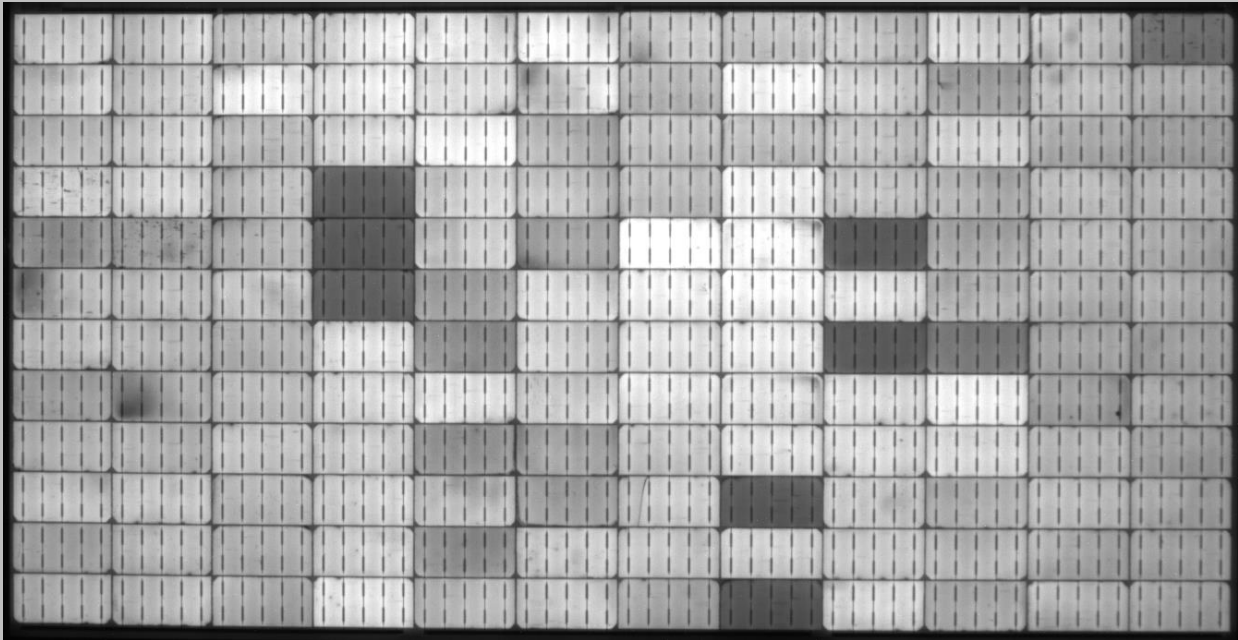


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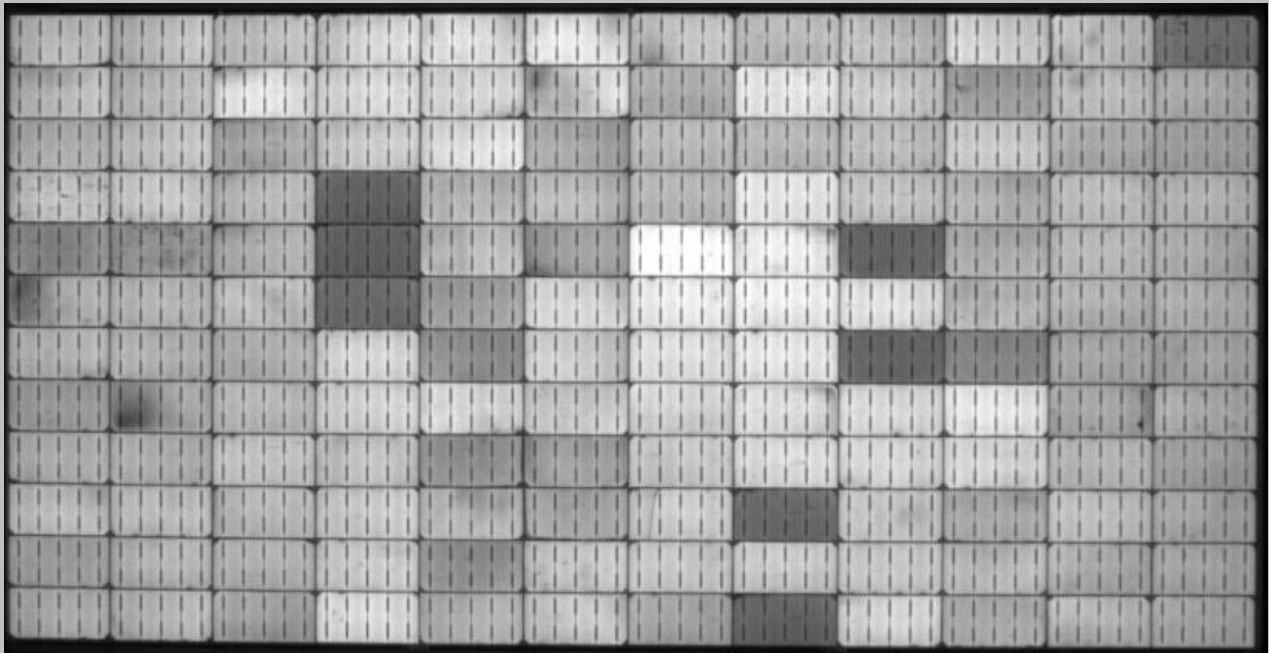
Seite 27 von 31  
Page 27 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

A000876127-022(Initial)



A000876127-022(After- 1<sup>st</sup> PID Cycle)

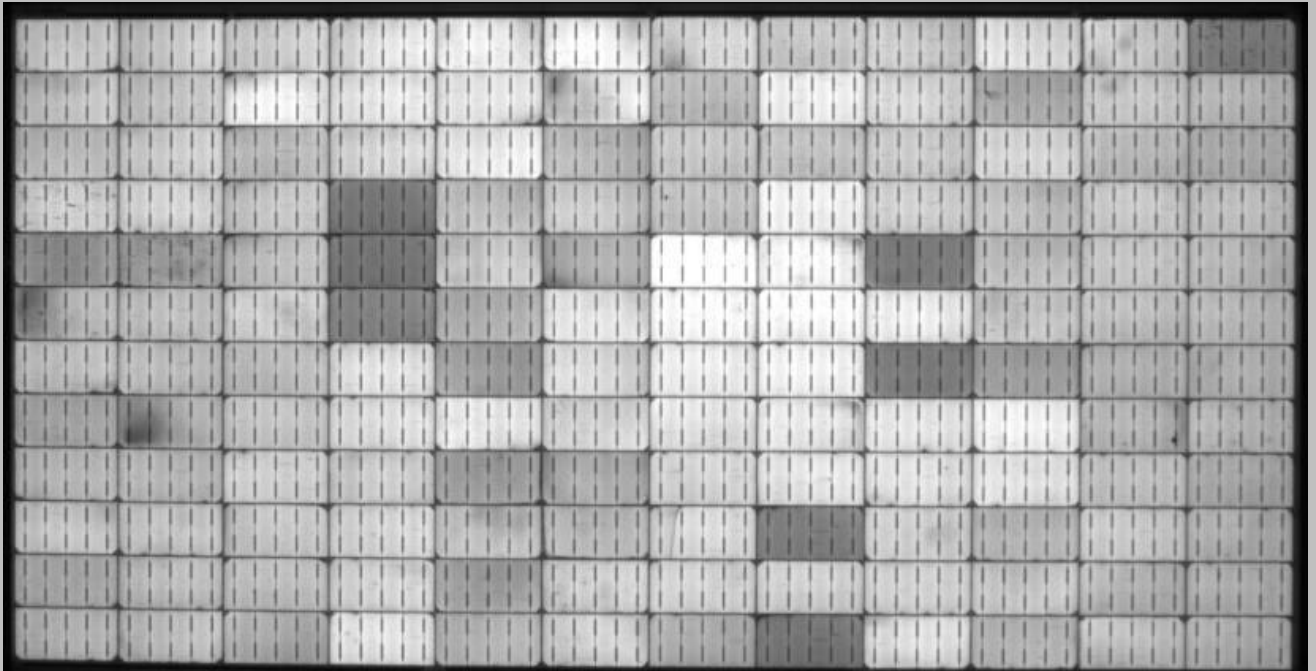


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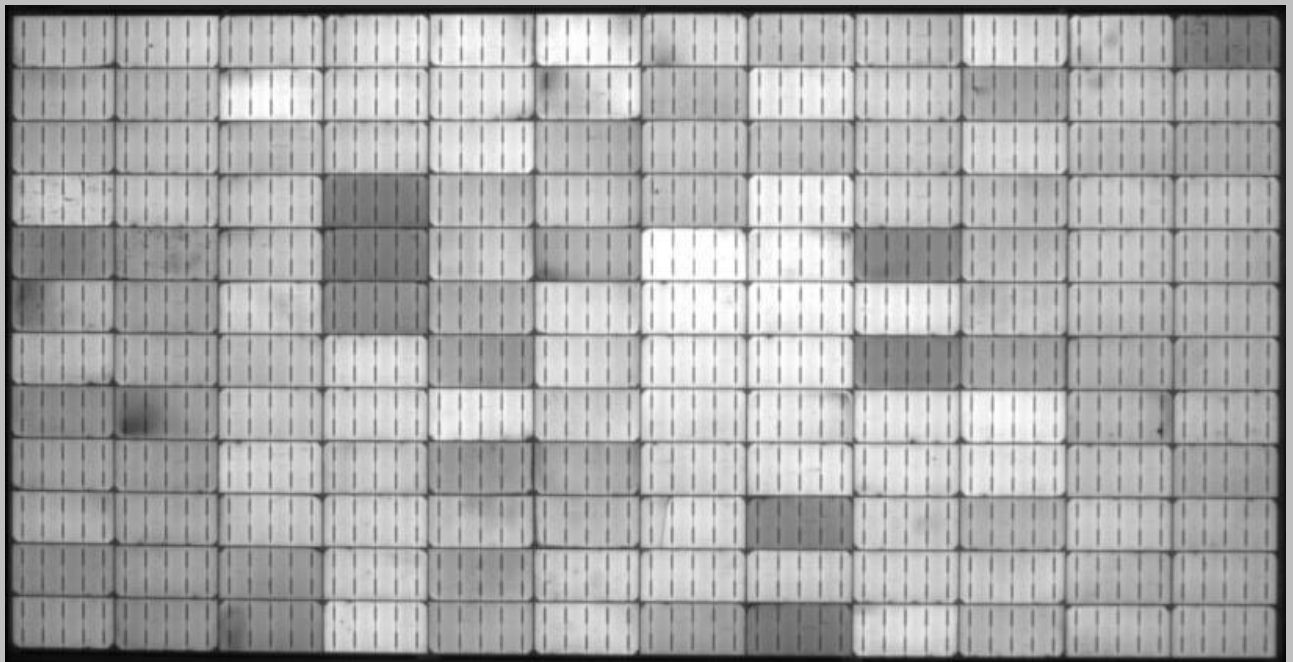
Seite 28 von 31  
Page 28 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

A000876127-022(After- IInd PID Cycle)



A000876127-022(After- IIIrd PID Cycle)



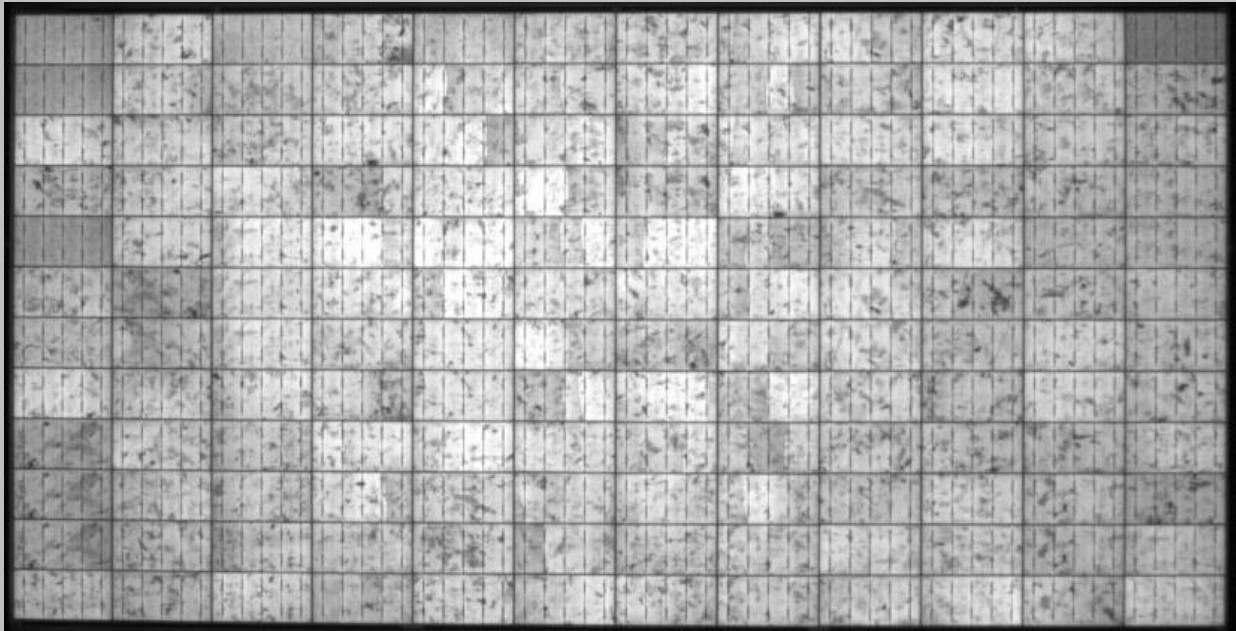


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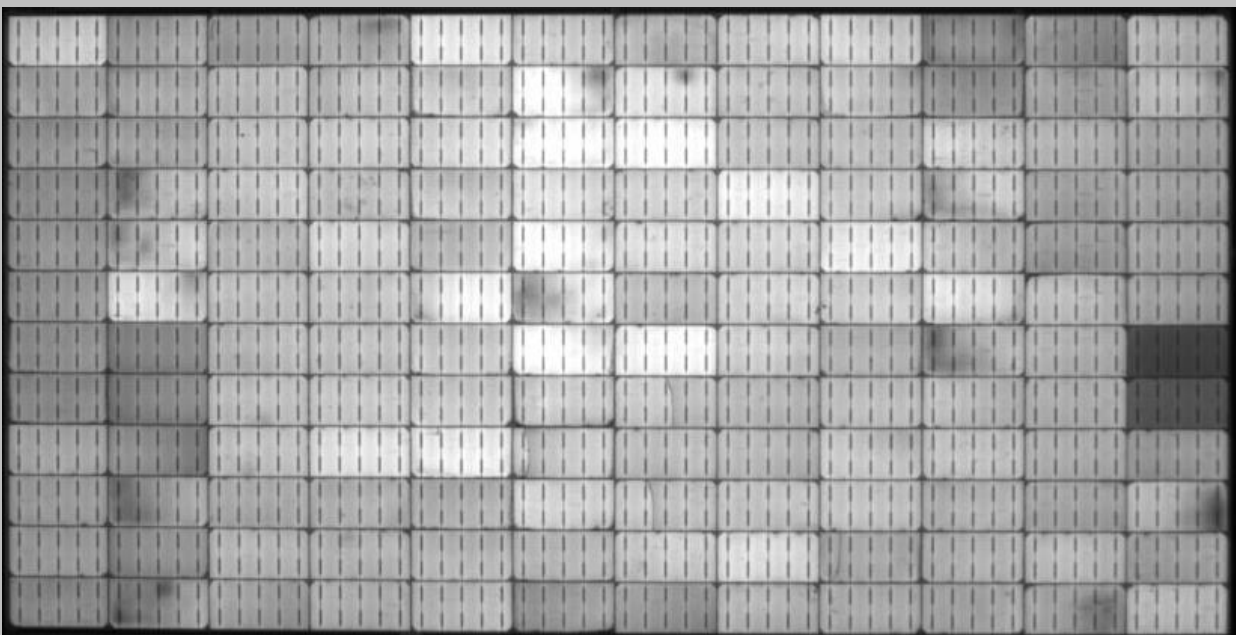
Seite 29 von 31  
Page 29 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

A000876127-017(Control module)



A000876127-020(Control module)



**ANLAGE zum Prüfbericht-Nr.:**  
*APPENDIX to Test Report No.:* ULR:TC568819400000153F

Seite 30 von 31  
Page 30 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

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**ANLAGE zum Prüfbericht-Nr.:**  
*APPENDIX to Test Report No.:* ULR:TC568819400000153F

Seite 31 von 31  
Page 31 of 31

**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

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**FOTO-DOKUMENTATION**  
**PHOTO-DOCUMENTATION**

**Pictures of Modules - DESERV MGalactic- 330**



Fig.1:Front view of the module



Fig.2:Rear view of the module

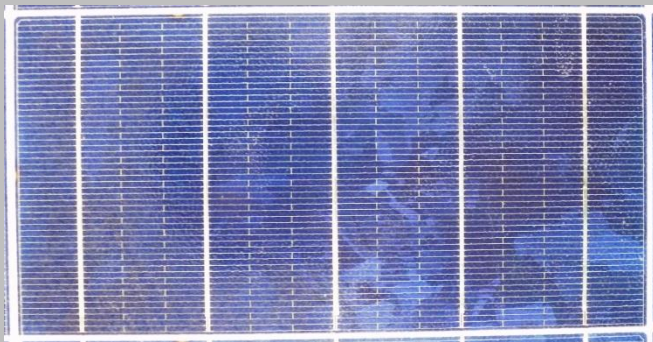


Fig.3:Detail view of the Solar cell



Fig.4: Detail view of Junction Box



Fig.5: detail view of the connector


		<b>RenewSys India Pvt Ltd</b> Sy.No. 114/P, Srinagar (V), Fabcity, Maheswaram (M), Ranga Reddy District.					
Model : DESERV MGalactic-330 High Performance Multicrystalline Modules							
Rated Power	Voc	Isc	Vmp	Imp	Max System Voltage	Binning	Weight
330Wp	46.24V	9.26A	37.67V	8.77A	1500V (EU)	0~+4.99Wp	21.5 Kgs
Series Fuse Rating : 15A			Diode Rating : 15A				
Application Class: A				Fire Hazard Rating : C			
For field connections use AWG 12 insulated cable min. of rating at least 90°C							
IEC 61215, IEC 61730 Certified							
All Technical Data at Standard Test Conditions :AMVLS, E=1000W/5q,m, T=25°C subject to measurement. Uncertainty							
CAUTION: This Unit produces electricity when exposed to light. Cover the front surface of the Module with opaque material during installation and handling.		CE, IEC 61730, IEC 61215					
WARNING: Before installing, operating and servicing this unit check installation and operating manual.DD NOT connect or disconnect when system is on load. Failure to comply can be hazardous.						Made in India 31.12.2018 www.renewsysindia.com	

Fig.6: detail view of the Type label

**FOTO-DOKUMENTATION**  
**PHOTO-DOCUMENTATION**

**Pictures of Modules - DESERV MGalactic- 330**



Fig.1:Front view of the module



Fig.2:Rear view of the module

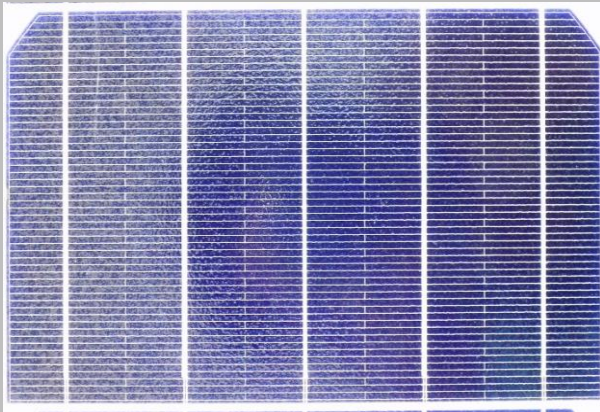


Fig.3:Detail view of the Solar cell



Fig.4: Detail view of Junction Box



Fig.5: detail view of the connector




		<b>RenewSys India Pvt Ltd</b> Sy.No. 114/P, Srinagar (V), Fabcity, Maheswaram (M), Ranga Reddy District.					
Model : DESERV SGalactic-370 High Performance Monocrystalline Modules							
Rated Power	Voc	Isc	Vmp	Imp	Max System Voltage	Binning	Weight
370Wp	49.12V	9.79A	39.94V	9.27A	1500V (EU)	0*+4.99Wp	21.5 Kgs
Series Fuse Rating : 15A				Diode Rating : 15A			
Application Class: A				Fire Hazard Rating : C			
For field connections use AWG 12 Insulated cable min. of rating at least 90°C							
IEC 61215, IEC 61730 Certified							
All Technical Data at Standard Test Conditions :AM1.5, E=1000W/Sq.m, T=25°C subject to measurement Uncertainty							
<b>CAUTION!</b> This Unit produces electricity when exposed to light. Cover the front surface of the Module with opaque material during installation and handling.		<b>WARNING!</b> Before installing, operating and servicing this unit check installation and operating manual.DO NOT connect or disconnect when system is on load. Failure to comply can be hazardous.		Made in India 31.12.2018 www.renewsysindia.com		 	

Fig.6: detail view of the Type label