1.

Customer Details :-	Testing Laboratory Details :-
Neosol Technologies Pvt.Ltd Plot No.173,Sec-6,IMT Manesar,Gurgaon -122051 (Haryana)	SMSW LAB & RESEARCH CENTRE LLP Plot No :- 90 ,Sector :- 5 IMT Manesar , Gurgaon , Haryana – 122052 Tel :- +91-124-4642736

2.

Test Report No :- SMSW LAB/ 2019 ~ 2020/ 40
Dated :-22.01.2020, Rev No :- 00,
Lab Project No :- 1920/40

Photovoltaic (PV) Module Potential – Induced Degradation Test Report

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

3.	Discipline :- Electronics	3.1	Group :- Miscellaneous Products

4.

General Details of Sample / Project					
Customer Name and Address	Neosol Technologies Pvt.Ltd Plot No.173,Sec-6,IMT Manesar,Gurgaon -122051 (Haryana)				
Test Lab Location	SMSW LAB & RESEARCH LLP (For Details Address please refer the Page No 1)				
Device Under Test (DUT)	Solar Photovoltaic (PV) Module				
PV Module Manufacturer	Neosol Technologies Pvt.Ltd Plot No.173,Sec-6,IMT Manesar,Gurgaon -122051 (Haryana)				
Manufacturer Sr No (If Any)	Refer the Test Result Table				
Sample Receipt Date	06.01.2020				
Test Lab Sample Identification	Refer The Test Result Table				
No of Sample	5Nos (325 Wp) – 1[Set]				
DUT Condition on Receipt	Good				
Applicable Test Standard	IEC TS 62804-1 , IEC 61215:2005, IEC 61730-2:2004,MNRE Guideline				
Customer Requirement if any	Yes 1- Temperature Spec 85°C ,Humidity Spec 85 % RH and Pass Fail criteria as per MNRE office Memorandum 41/06/2015-16/PVSE 2- Test Cycle 1 (96 Hrs)				
Sample forwarding letter/ PO/Gate Pass No. & Date:	Gate pass No :-14 dated 06 Jan 2020 , Request Letter No :- NESOL/SMSW/04 date 06.01.2020				
Buyer Name & Address	Mr.Abhinav (Neosol Technologies PVT.LTD.)				
Test Start Date	10.01.2020	Test End Date	18.01.2020	Report Date	22.01.2020
SMSW Lab Ambient Temp Condition	Temperature in ° C :- 25 ± 3° C Relative Humidity in % :- <70 % RH				

Test In-Charge Bharat Uppin (Technical Manager)	Authorized Signatory		
	Amresh Mahajan (Head of Laboratory)	Or	Gaurav Kumar (Quality Manager)

Note :- SMSW Lab hasn't participated in the sample selection .The Applicable Standard and raw data of test report are available with SMSW Lab

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

5.

Summary of Test Result (Project)

Test No	Test Name	Test Standard and Clause No	Test Lab Sample Identification	No of Sample Tested	Result
01	Potential – Induced Degradation Test (PID)	IEC TS 62804-1	Refer The Test Result Table	05 Nos (1 Set)	Pass

Abbreations:-

Pass	:	Sample Meet the Standard Requirement
Fail	:	Sample doesn't Meet the Standard Requirement
NA	:	Not Applicable
Isc	:	Short Circuit Current
Voc	:	Open Circuit Voltage
Imp /Ipm:		Current at Pmax
Vmp/Vpm :		Volatge at Pmax
FF	:	Fill Factor
Temp	:	Temperature
PID	:	Potential – Induced Degradation
SOP	:	Standard Operating Procedure (Work Instruction)
Pmax/Pmp:		Maximum Power
N/A	:	Not Applicable
Spec	:	Specification
OEM	:	Original Equipment Manufacturer

6.

Equipment Details which was used for Testing

Sr. No	SMSW Test Equipment	Make & Model	SMSW Lab Equipment ID	Calibration Status (Valid Up To & Calibrated By)
01	Visual Inspection Table	NA	SMSW/VI/01	NA
02	Lux Meter	M/s Lutron & LX-101 A	SMSW/LM/01	01 Jan 2021 M/s S.M. Engineers
03	Camera	Sony ILCE-5000 L/B AP2	NA	NA
04	Measuring Tape	Freemans	SMSW/MT/01	27 Dec 2020 Vaishno Calibration Services
05	Hygrometer	HTC	SMSW/HM/01	09.01.2021 Quality Service & Laboratories
06	Sun Simulator	Spire 5100 Blue	SMSW/SS/01	Temp Sensor :- 27.12.2020 Micro Calibration Lab DAQ Board :- 30 Oct 2020 Eternalsun spire(OEM)
07	Reference Module	GCL-P6/72H330 GCL	SMSW/RM/04	23 Oct 2020 TUV Rehinland
08	Safety Table	NA	SMSW/ ST/01	NA
09	Ground Bond Tester	M/s Associate Research 03240 - HYAMP 4th Gen	SMSW/GBT/01	10 Jun 2020 ANSHAANKank India Pvt Ltd
10	Hi-Pot Tester	Associated Research 7850	SMSW/HP/01	27 Dec 2020 Micro Calibration Lab
11	Resistivity Meter along with reference chemical	M/s HANNA H198195 , HI8030L & 31L	SMSW/RSM/01	Nov 2023 Hanna Instrument(OEM)
12	Temperature Idicator-2	Mextech PM10	SMSW/TI/02	27 Dec 2020 Micro Calibration Lab
13	Wet Leakage Tub	NA	SMSW/WBT/01	NA
14	EL Tester	M/s G SOLA GEL-M10	SMSW/EL/01	27 Dec 2020 Micro Calibration Lab
15	Out Door Fixture	NA	SMSW/ODSU/01~03	NA
16	WMS Set Up with Payranometer & Data Logger	Met One Kippa & Zonen	SMSW/WSU/01 WSU/PM/01	03 Sep 2021 Kippa Zonen (OEM)
17	Environment Chamber with Monitoring, Data Logging and module holding	M/s Ballice system & Controls pvt. Ltd. BSCPL/2000	SMSW/EC/01	03 Jun 2020 Micro Calibration Lab
18	PID Test Power Supply	M/s Super Control & Automation PID-2000-04 PV	SMSW/PID/01	10 Jun 2020 Micro Calibration Lab

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

7.0	Test No -1 Potential – Induced Degradation Test (PID)

Type of Test Method Used :-

Standard Test Method	X	Non Standard Test Method	V	Laboratory Developed Test Method	X

Test Standard and Clause No:- IEC TS 62804-1

Test Procedure :- As per IEC TS 62804-1 with Stress Method "A" Testing in Damp Heat using Environment Chamber and and Lab SOP No :- SOP/LAB/20 Rev No :- 01 ,Dated :- 01.03.2019

Purpose of Test:-

The purpose to check the Power Degradation during Potential – Induced Degradation Test (PID).

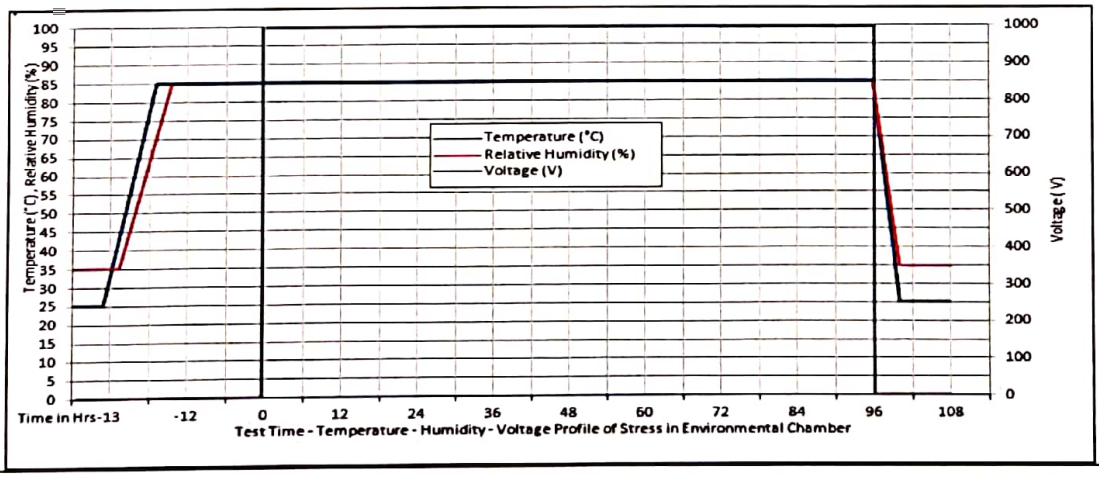
Test Sample:- Total 05 Nos PV Module was tested for – Induced Degradation Test (PID).

1- Test Set Up (Configuration) :- As per IEC TS 62804—1 PID test conducted as per Steps defined in below

A) Pre Conditioning of 5.0~5.5 kWh/m^2 as per IEC 61215:2005 clause no 5 with real Sun Light done on all 5 sample.
B) Visual Inspection as per IEC 61215:2005 Clause No 10.1 on all 5 sample.
C) Maximum Power Determination @ STC conditions as per IEC 61215:2005 clause No 10.2 on all 5 sample.
D) Performance at Low Irradiance as per IEC 61215:2005 clause No 10.7 on all 5 sample.
E) Wet Leakage Current Test as per IEC 61215:2005 clause No 10.15 on all 5 sample.
F) Electroluminescence Test @ Isc and 0.1% of Isc on all 5 samples.
G) Ground Continuity Test as per IEC 61730-2:2004 MST 13 on all 5 samples.
H) PID Stress Test as per method using "A" with 1000 V on 4 Sample (2 Sample with Positive Voltage, 2 Sample with negative Voltage & 1 sample store in dark room as a control module.)
I) After PID Test ...Maximum Power Determination, Performance of Low Irradiance, Wet Leakage Current, Electroluminescence Test @ Isc and 0.1% of Isc and Visual Test conducted.

2- PID Stress Test Details & Graph

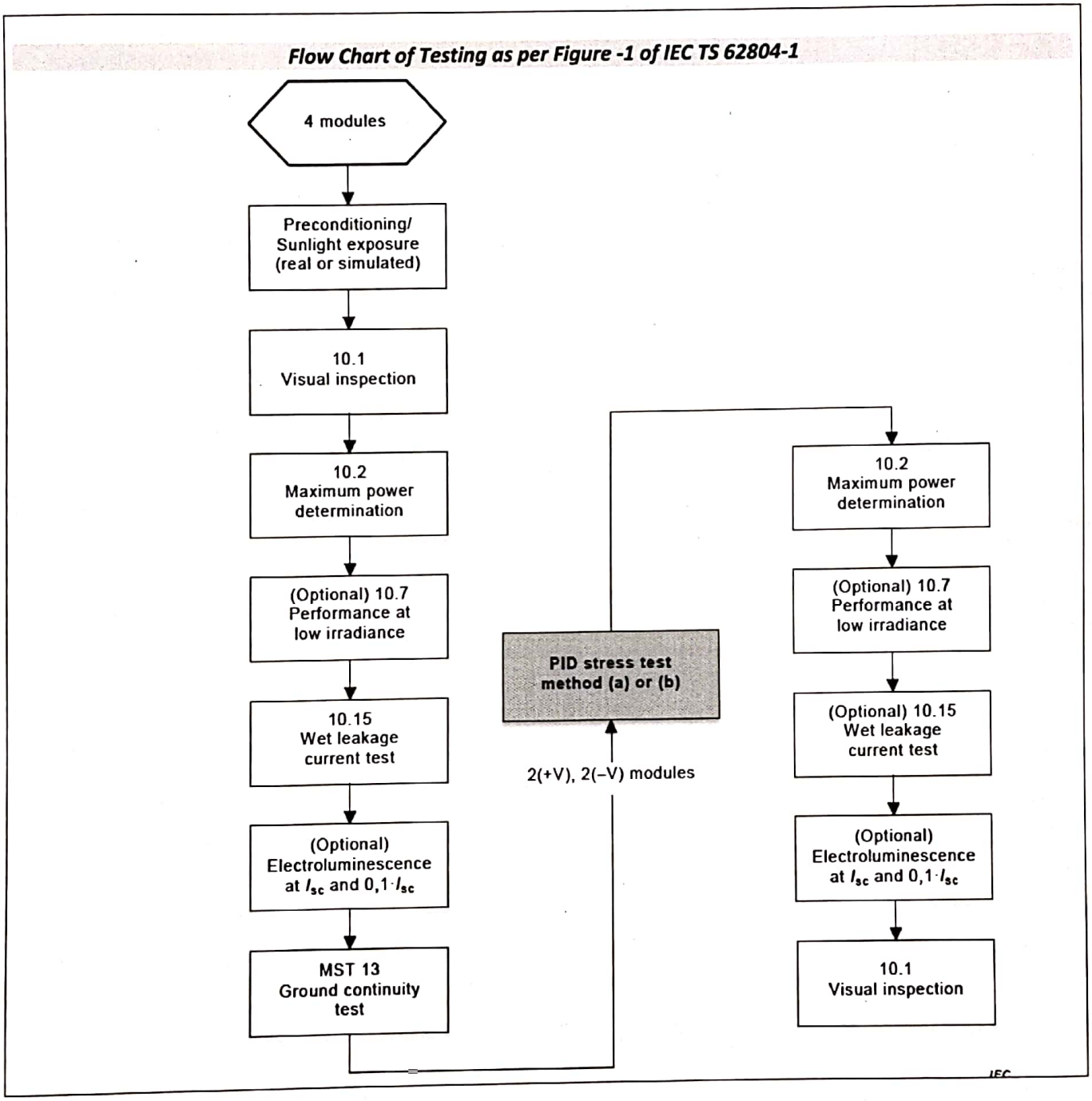
Temperature :- 85±2°C , Relative Humidity :- 85±3% RH, Voltage :- 1000±0.5% V, Dwell Time :- 96 Hrs
Total Time :-120 Hrs (12 + 96+12Hrs)



Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

Flow Chart of Testing as per Figure -1 of IEC TS 62804-1



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Clause	Requirements+ Test	Result- Remark	Verdict
7.1	Visual Inspection as per IEC 61215:2005 Clause No:10.1 (Initial)		
Test Date [DD/MM/YYYY].....:	13th Jan 2020		-----
Lux Value	1000 Lux Minimum	1108 Lux	Pass

Lab ID	Serial No	Requirements + Test	Result- Remark Nature and position of initial findings	Verdict
SMSW-1920-1617	72NSMJAN325000585	As per Clause no 7 of IEC 61215:2005	No visual Defect observed	Pass
SMSW-1920-1618	72NSMJAN325000797		No visual Defect observed	Pass
SMSW-1920-1619	72NSMJAN325000501		No visual Defect observed	Pass
SMSW-1920-1620	72NSMJAN325000688		No visual Defect observed	Pass
SMSW-1920-1621	72NSMJAN325000742		No visual Defect observed	Pass

Supplementary Information :- NA

Acceptance Criteria :- As per Clause no 7 of IEC 61215:2005

Clause	Requirements+ Test	Result- Remark	Verdict
7.2	Maximum Power Determination as per IEC 61215:2005 Clause No:10.2 (Initial)		
Test Date [DD/MM/YYYY].....:	13th Jan 2020		—
Module Temperature [°C]..... :	25°C (Corrected)		—
Irradiance (W/m2)..... :	1000 W/m2 (Corrected)		—

Lab ID	Serial No	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
SMSW-1920-1617	72NSMJAN325000585	46.008	38.559	8.993	8.478	326.913	0.790
SMSW-1920-1618	72NSMJAN325000797	46.059	38.531	8.983	8.479	326.706	0.790
SMSW-1920-1619	72NSMJAN325000501	46.087	38.526	8.968	8.499	327.436	0.792
SMSW-1920-1620	72NSMJAN325000688	46.234	38.672	9.030	8.492	328.404	0.787
SMSW-1920-1621	72NSMJAN325000742	46.027	38.451	8.959	8.476	325.928	0.790

Supplementary Information :- Module with Lab ID SMSW-1920-1621and Serial No 72NSMJAN325000742 use as control module

Acceptance Criteria:- N/A

IV Curve

Lab ID :- SMSW-1920-1617, Module Sr No :- 72NSMJAN325000585

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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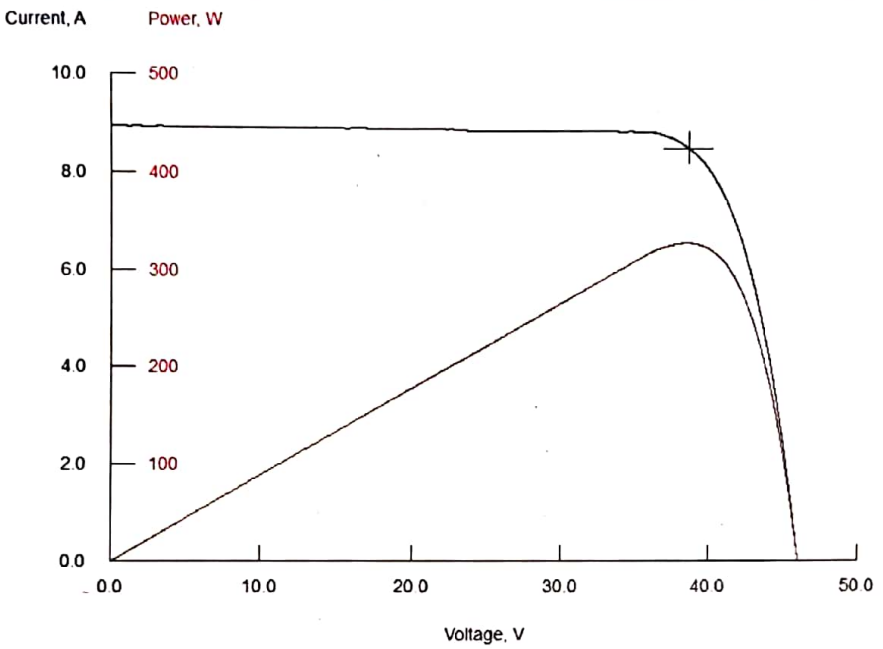
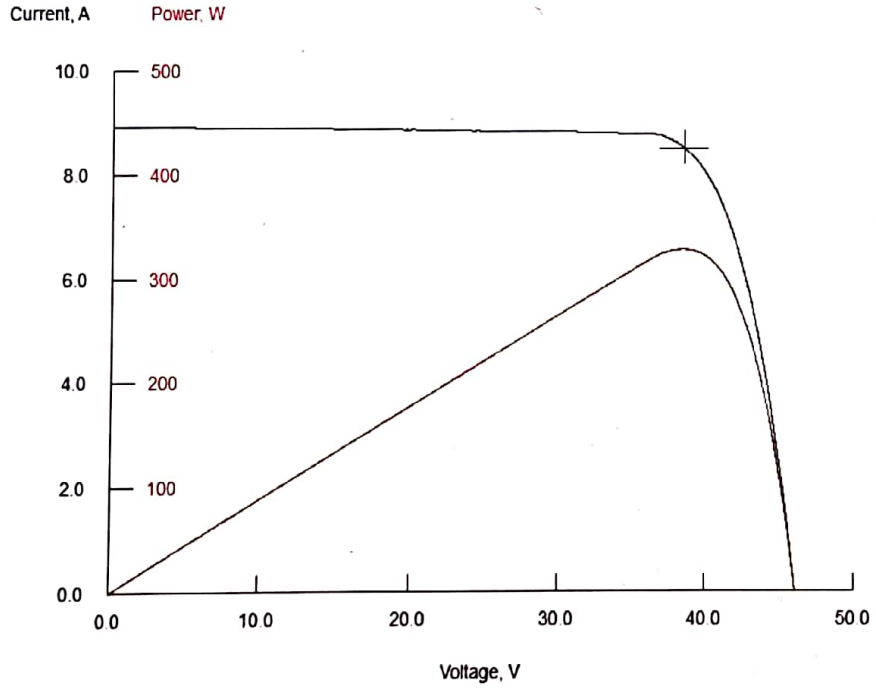


Project No:-40
Neosol 325 WP (PID Test -- Initial)
Operator: Admin
ID: 72NSJAN3252000585
Module Type: ModuleType1
16:55:40 13-01-2020
Measured Temp: 25.5 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.6mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	46.008V
Isc:	8.993A
Pmax:	326.913W
Vpm:	38.559V
Ipm:	8.478A
FF:	0.790
Eff,c:	18.480%
Eff,m:	16.848%
Rs:	0.405 Ohm
Rsh:	649.622 Ohm
MCCC1:	1.115
Intensity V:	6.741V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3354

Lab ID :- SMSW-1920-1618, Module Sr No :- 72NSMJAN325000797



Project No:-40
Neosol 325 WP (PID Test – Initial)
Operator: Admin
ID: 72NSJAN3252000797
Module Type: ModuleType1
17:21:18 13-01-2020
Measured Temp: 24.9 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.6mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	46.059V
Isc:	8.983A
Pmax:	326.706W
Vpm:	38.531V
Ipm:	8.479A
FF:	0.790
Eff,c:	18.468%
Eff,m:	16.837%
Rs:	0.417 Ohm
Rsh:	217.883 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3410

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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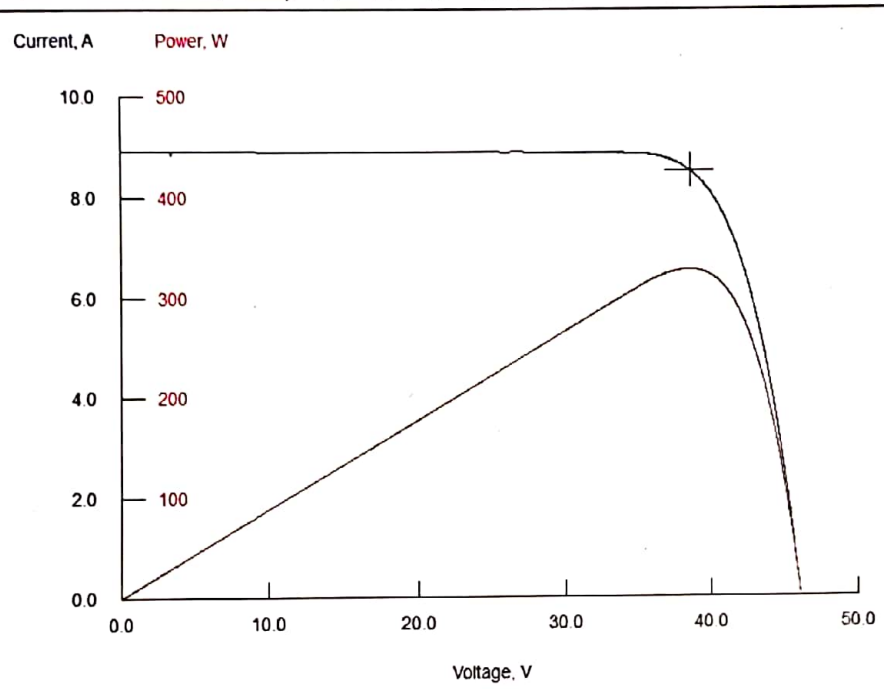
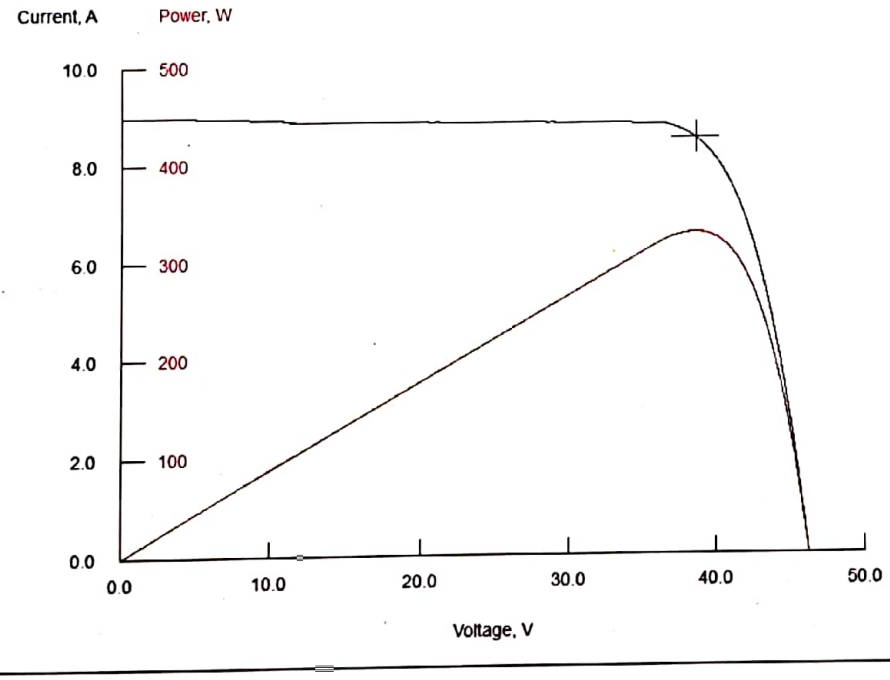
Lab ID :- SMSW-1920-1619, Module Sr No :- 72NSMJAN325000501



Project No:-40
Neosol 325 WP (PID Test – Initial)
Operator: Admin
ID: 72NSJAN3252000501
Module Type: ModuleType1
17:17:17 13-01-2020
Measured Temp: 25.0 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.6mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	46.087V
Isc:	8.968A
Pmax:	327.436W
Vpm:	38.526V
Ipm:	8.499A
FF:	0.792
Eff,c:	18.509%
Eff,m:	16.875%
Rs:	0.405 Ohm
Rsh:	617.024 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3286

Lab ID :- SMSW-1920-1620, Module Sr No :- 72NSMJAN325000688



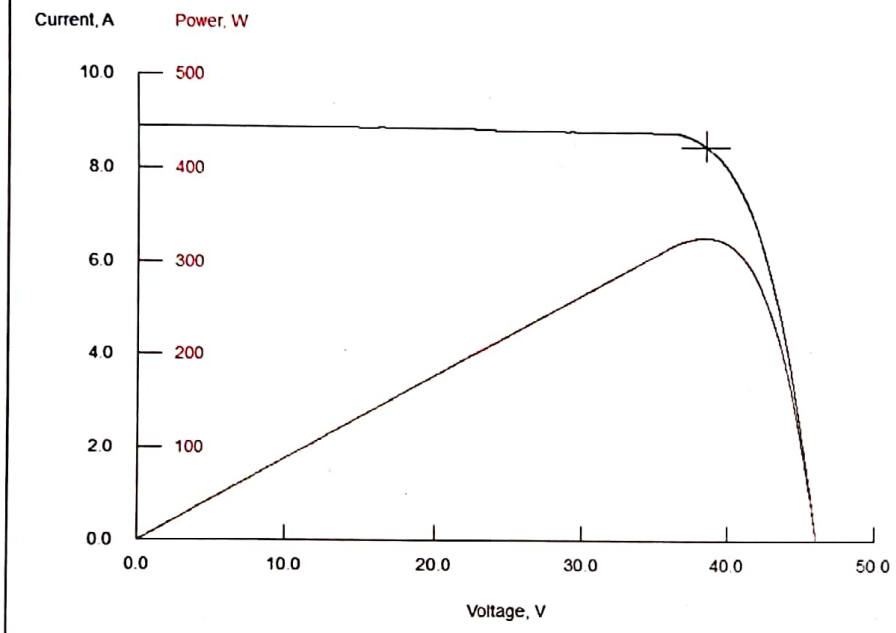
Project No:-40
Neosol 325 WP (PID Test – Initial)
Operator: Admin
ID: 72NSJAN3252000688
Module Type: ModuleType1
17:35:41 13-01-2020
Measured Temp: 25.4 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.6mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	46.234V
Isc:	9.030A
Pmax:	328.404W
Vpm:	38.672V
Ipm:	8.492A
FF:	0.787
Eff,c:	18.564%
Eff,m:	16.925%
Rs:	0.440 Ohm
Rsh:	300.743 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3477

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

Lab ID :- SMSW-1920-1621, Module Sr No :- 72NSMJAN325000742



Project No:-40
Neosol 325 WP (PID Test -- Initial)
Operator: Admin
ID: 72NSJAN3252000742
Module Type: ModuleType1
17:30:38 13-01-2020
Measured Temp: 25.0 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.6mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	46.027V
Isc:	8.959A
Pmax:	325.928W
Vpm:	38.451V
Ipm:	8.476A
FF:	0.790
Eff,c:	18.424%
Eff,m:	16.797%
Rs:	0.425 Ohm
Rsh:	591.212 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3362

Clause	Requirements+ Test	Result- Remark	Verdict
7.3	Performance at Low Irradiance as per IEC 61215:2005 Clause No:10.7(Initial)		
Test Date [DD/MM/YYYY]..... :		13th Jan 2020	—
Module Temperature [°C]..... :		25°C (Corrected)	—
Irradiance (W/m2)..... :		200 W/m2 (Corrected)	—

Lab ID	Serial No	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
SMSW-1920-1617	72NSMJAN325000585	42.734	36.884	1.814	1.649	62.476	0.806
SMSW-1920-1618	72NSMJAN325000797	42.864	37.048	1.812	1.692	62.682	0.807
SMSW-1920-1619	72NSMJAN325000501	42.975	37.270	1.816	1.695	63.173	0.810
SMSW-1920-1620	72NSMJAN325000688	43.014	37.455	1.821	1.682	63.006	0.804
SMSW-1920-1621	72NSMJAN325000742	42.891	37.188	1.814	1.693	62.963	0.809

Supplementary Information :- N/A

Acceptance Criteria:- N/A

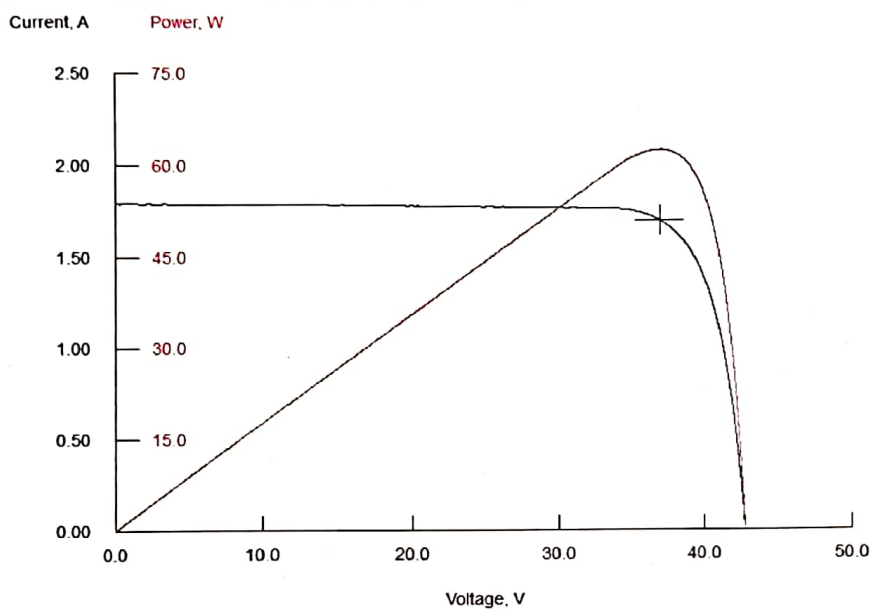
Prepared By :- Gaurav Kumar (Quality Manager)

Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

IV Curve

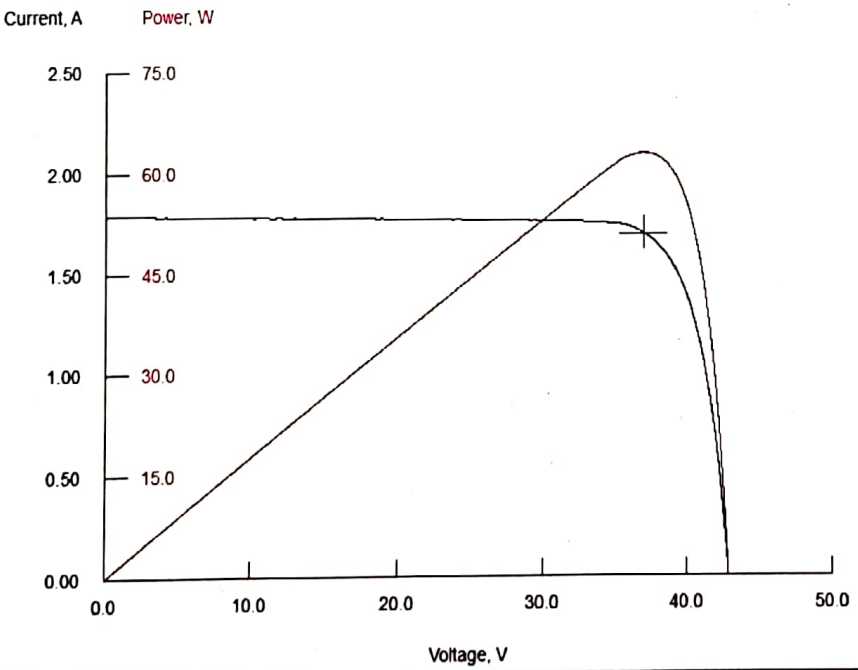
Lab ID :- SMSW-1920-1617, Module Sr No :- 72NSMJAN325000585



Project No:-40
Neosol 325 WP (PID Test -- Initial)
Operator: Admin
ID: 72NSJAN3252000585
Module Type: ModuleType1
17:11:52 13-01-2020
Measured Temp: 25.8 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.2mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.734V
Isc:	1.814A
Pmax:	62.476W
Vpm:	36.884V
Ipm:	1.694A
FF:	0.806
Eff,c:	17.658%
Eff,m:	16.099%
Rs:	1.131 Ohm
Rsh:	1740.110 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3381

Lab ID :- SMSW-1920-1618, Module Sr No :- 72NSMJAN325000797



Project No:-40
Neosol 325 WP (PID Test -- Initial)
Operator: Admin
ID: 72NSJAN3252000797
Module Type: ModuleType1
17:24:39 13-01-2020
Measured Temp: 25.0 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.3mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.864V
Isc:	1.812A
Pmax:	62.682W
Vpm:	37.048V
Ipm:	1.692A
FF:	0.807
Eff,c:	17.717%
Eff,m:	16.152%
Rs:	1.076 Ohm
Rsh:	691.912 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3362

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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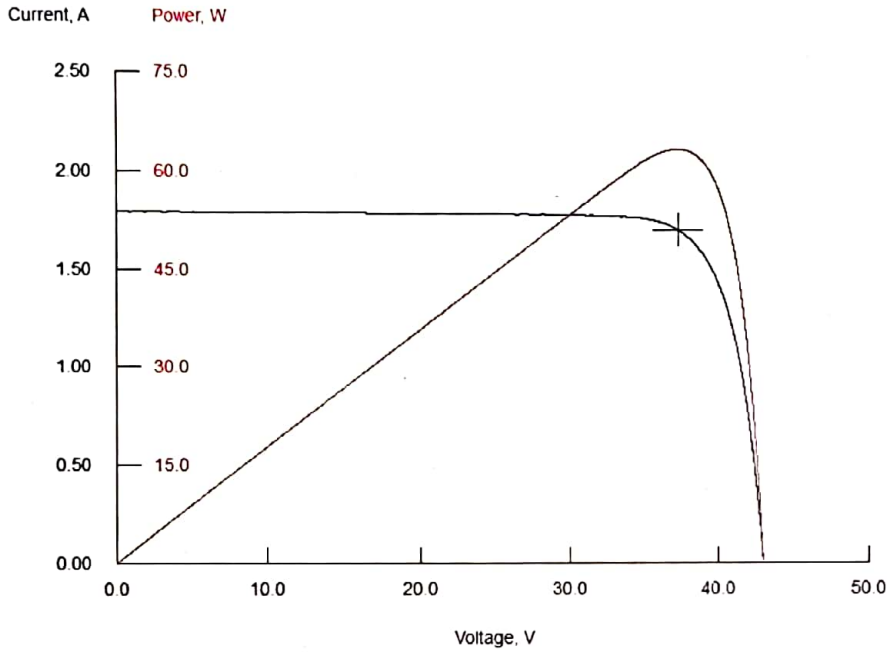
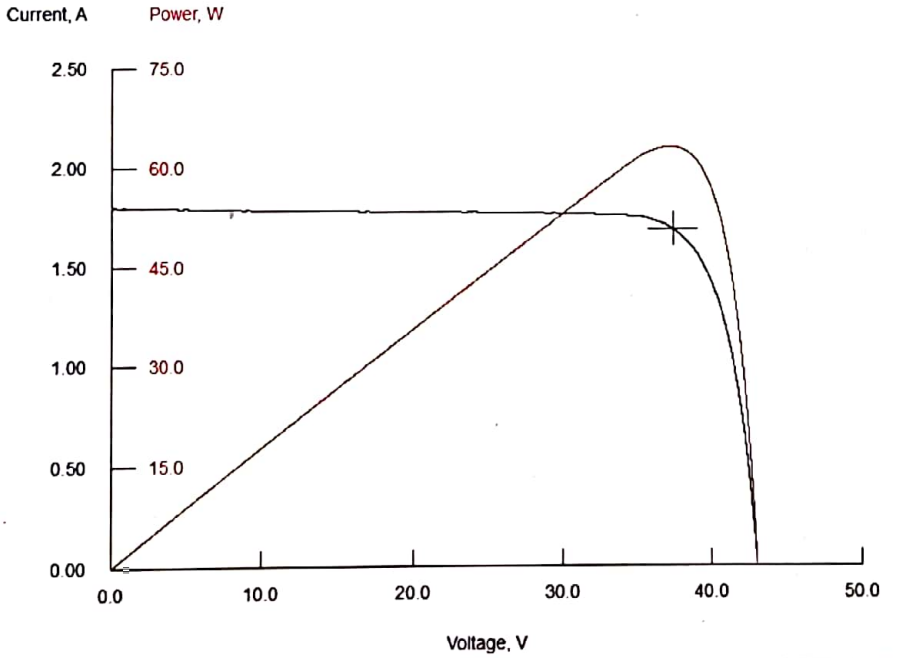
Lab ID :- SMSW-1920-1619, Module Sr No :- 72NSMJAN325000501



Project No:-40
Neosol 325 WP (PID Test – Initial)
Operator: Admin
ID: 72NSJAN3252000501
Module Type: ModuleType1
17:15:21 13-01-2020
Measured Temp: 24.9 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.2mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.975V
Isc:	1.816A
Pmax:	63.173W
Vpm:	37.270V
Ipm:	1.695A
FF:	0.810
Eff,c:	17.855%
Eff,m:	16.278%
Rs:	1.144 Ohm
Rsh:	1764.970 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3387

Lab ID :- SMSW-1920-1620, Module Sr No :- 72NSMJAN325000688



Project No:-40
Neosol 325 WP (PID Test – Initial)
Operator: Admin
ID: 72NSJAN3252000688
Module Type: ModuleType1
17:38:41 13-01-2020
Measured Temp: 25.4 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.3mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	43.014V
Isc:	1.821A
Pmax:	63.006W
Vpm:	37.455V
Ipm:	1.682A
FF:	0.804
Eff,c:	17.808%
Eff,m:	16.235%
Rs:	1.192 Ohm
Rsh:	687.964 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3433

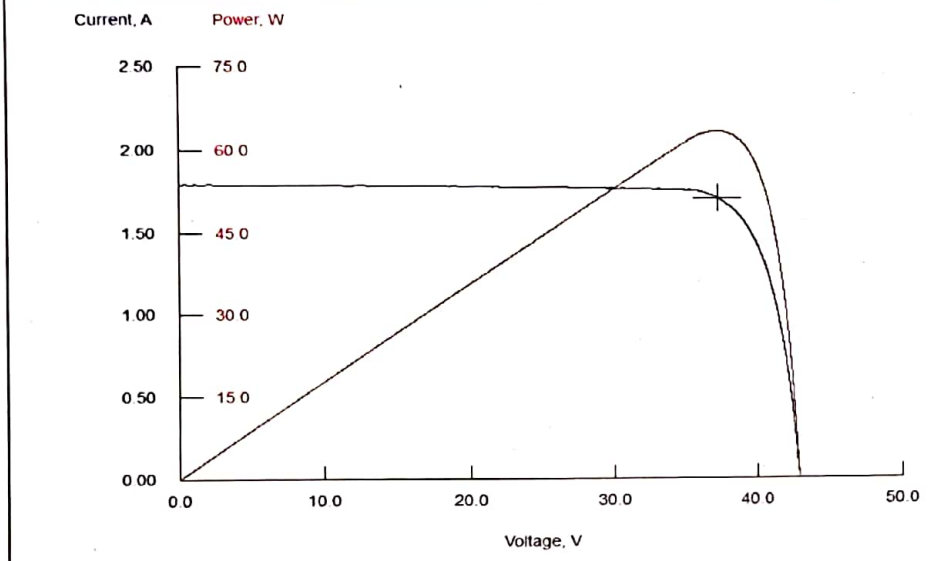
Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

SMSW LAB & RESEARCH CENTRE
TEST REPORT

Certificate No.: TC-7566
NABL Accredited Laboratory

Lab ID :- SMSW-1920-1621, Module Sr No :- 72NSMJAN325000742



Project No.-40
Neosol 325 WP (PID Test -- Initial)
Operator: Admin
ID: 72NSJAN3252000742
Module Type: ModuleType1
17:28:07 13-01-2020
Measured Temp: 24.8 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.2mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.891V
Isc:	1.814A
Pmax:	62.963W
Vpm:	37.188V
Ipm:	1.693A
FF:	0.809
Eff,c:	17.796%
Eff,m:	16.224%
Rs:	1.166 Ohm
Rsh:	1186.140 Ohm
MCCC1:	1.115
Intensity V:	6.740V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3371

clause		Requirements+ Test	Result- Remark	Verdict
7.4	Wet Leakage Current Test as per IEC6215:2005 Clause No:10.15(Initial)			
Test Date [DD/MM/YYYY].....		13th Jan 2020	—	—
Test Voltage applied [V].....		1000 [V]	1000 [V]	Pass
Solution Resistivity [Ω cm].....		< 3500 [Ω cm]	3345[Ω cm]	Pass
Solution Temperature [°C].....		22±3°C	24.7 [°C]	Pass
Lab ID	Serial No	Insulation Resistance [MΩ] Required	Insulation Resistance [MΩ] Measured	—
SMSW-1920-1617	72NSMJAN325000585	20.61	6513	Pass
SMSW-1920-1618	72NSMJAN325000797	20.61	3565	Pass
SMSW-1920-1619	72NSMJAN325000501	20.61	3905	Pass
SMSW-1920-1620	72NSMJAN325000688	20.61	3451	Pass
SMSW-1920-1621	72NSMJAN325000742	20.61	3379	Pass

Supplementary Information:- Module Size is 1.94m², Maximum System Voltage is 1000V

Acceptance Criteria:- Modules with an area larger than 0,1 m2 the measured insulation resistance times the area of the module shall be not less than 40 MΩ.m².

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

SMSW LAB & RESEARCH CENTRE
TEST REPORT

Certificate No.: TC-7566
NABL Accredited Laboratory

Clause	Requirements+ Test	Result- Remark	Verdict
7.5	Electroluminescence Test @ Isc(Initial)		
Test Date [DD/MM/YYYY].....	13th Jan 2020	—	—
Test Current applied [Amp].....	Isc ±0.5% [Amp]	—	—

Lab ID	Serial No	Remark (Observation)	—
SMSW-1920-1617	72NSMJAN325000585	Presence of micro-cracks	—
SMSW-1920-1618	72NSMJAN325000797	Presence of micro-cracks	—
SMSW-1920-1619	72NSMJAN325000501	Presence of micro-cracks	—
SMSW-1920-1620	72NSMJAN325000688	Presence of micro-cracks	—
SMSW-1920-1621	72NSMJAN325000742	Presence of micro-cracks	—

Supplementary Information :- N/A

Acceptance Criteria:- N/A

Lab ID:- SMSW-1920-1617 ,Module Sr No :- 72NSMJAN325000585

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

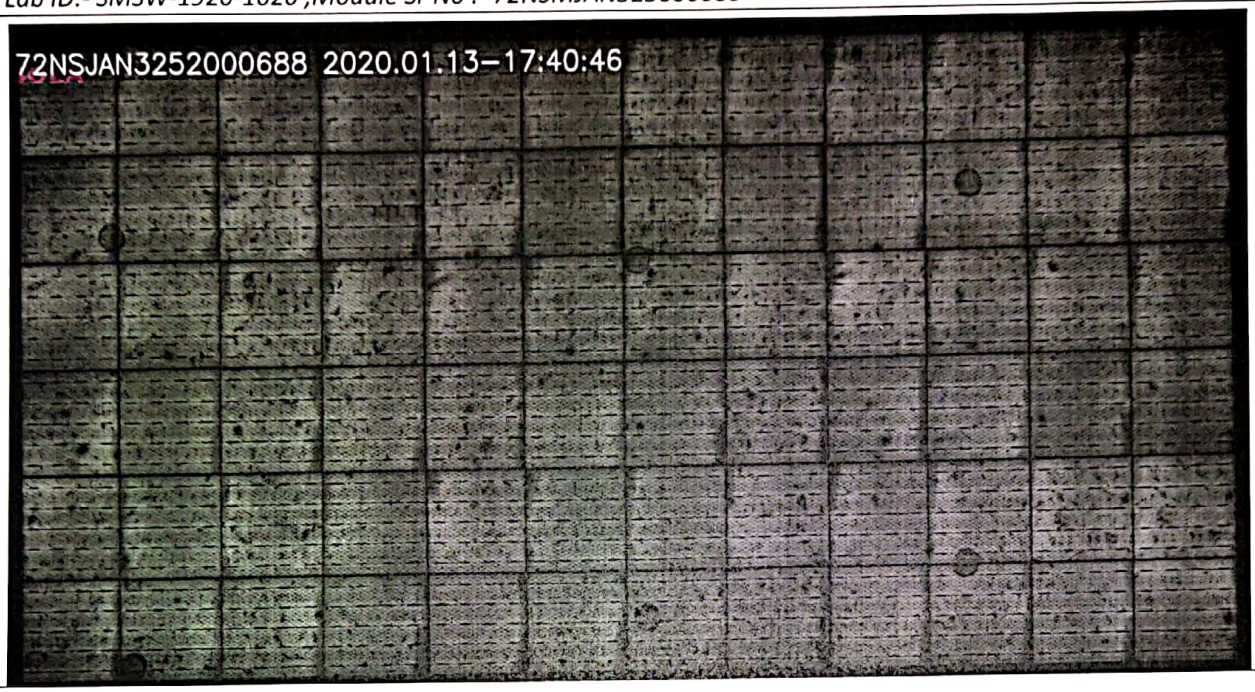
Lab ID:- SMSW-1920-1618 ,Module Sr No :- 72NSMJAN325000797

Lab ID:- SMSW-1920-1619 ,Module Sr No :- 72NSMJAN325000501

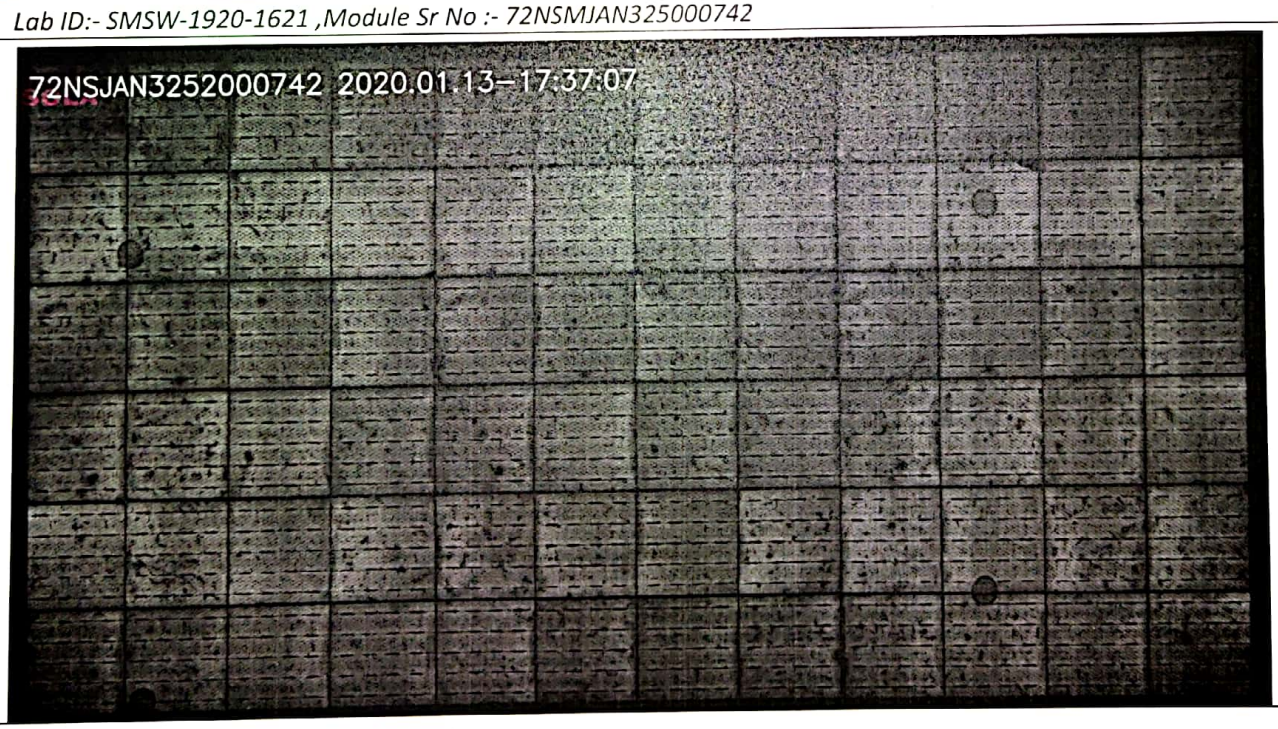
Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

Lab ID:- SMSW-1920-1620 ,Module Sr No :- 72NSMJAN325000688



Lab ID:- SMSW-1920-1621 ,Module Sr No :- 72NSMJAN325000742



Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

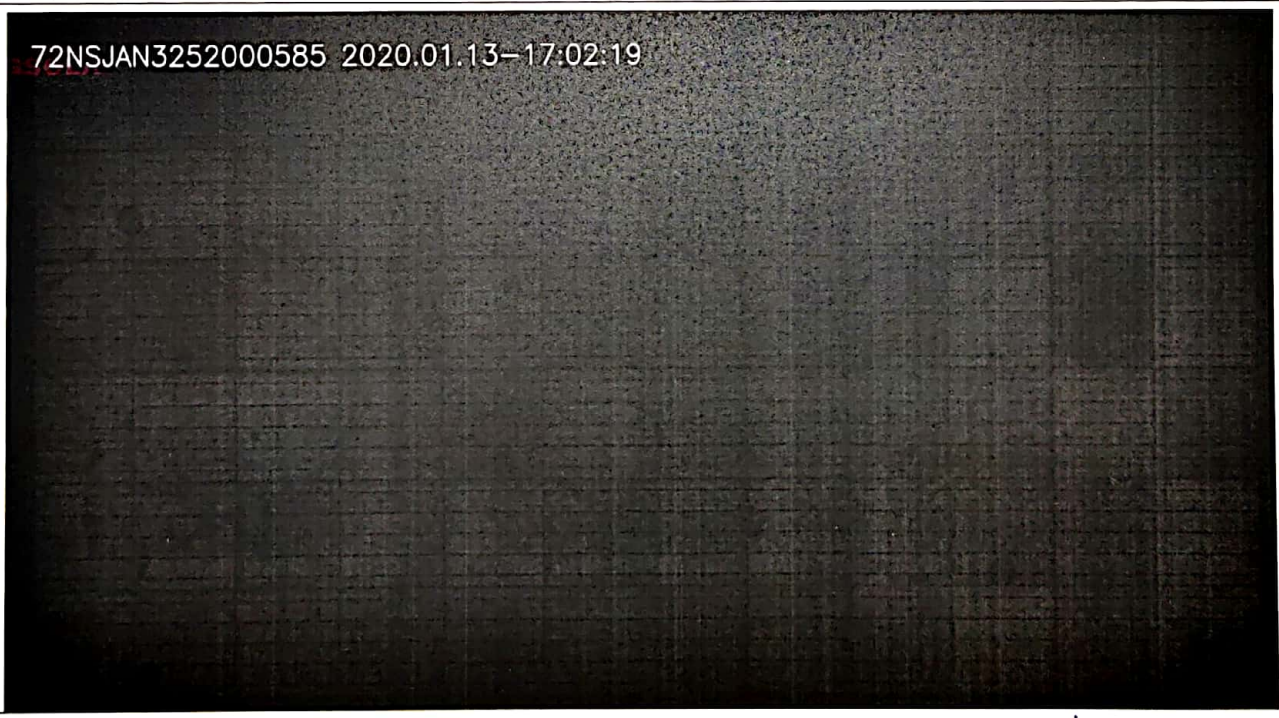
Clause	Requirements+ Test	Result- Remark	Verdict
7.6	Electroluminescence Test @ 0.1% Isc(Initial)		
Test Date [DD/MM/YYYY].....	13th Jan 2020	—	—
Test Current applied [Amp].....	Isc *0.1% [Amp]	—	—

Lab ID	Serial No	Remark (Observation)	—
SMSW-1920-1617	72NSMJAN325000585	Presence of micro-cracks	—
SMSW-1920-1618	72NSMJAN325000797	Presence of micro-cracks	—
SMSW-1920-1619	72NSMJAN325000501	Presence of micro-cracks	—
SMSW-1920-1620	72NSMJAN325000688	Presence of micro-cracks	—
SMSW-1920-1621	72NSMJAN325000742	Presence of micro-cracks	—

Supplementary Information:- N/A

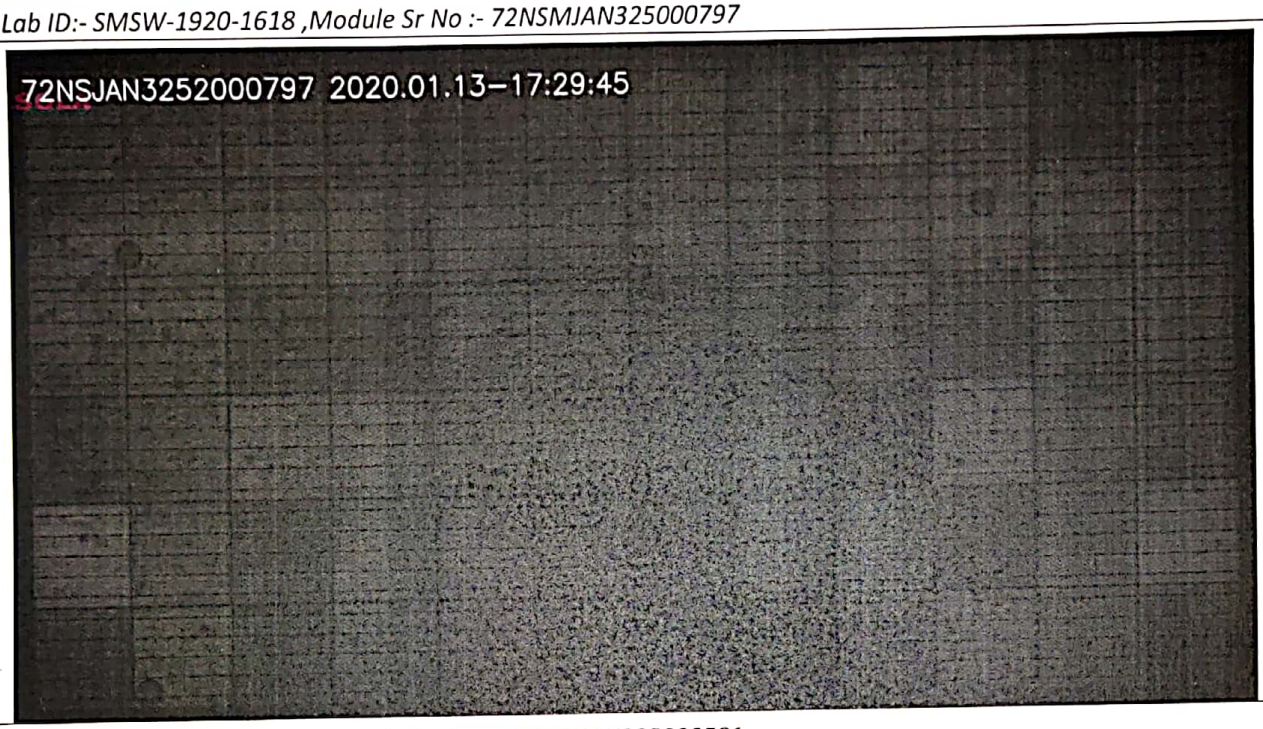
Acceptance Criteria:- N/A

Lab ID:- SMSW-1920-1617 ,Module Sr No :- 72NSMJAN325000585



Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Lab ID:- SMSW-1920-1618 ,Module Sr No :- 72NSMJAN325000797

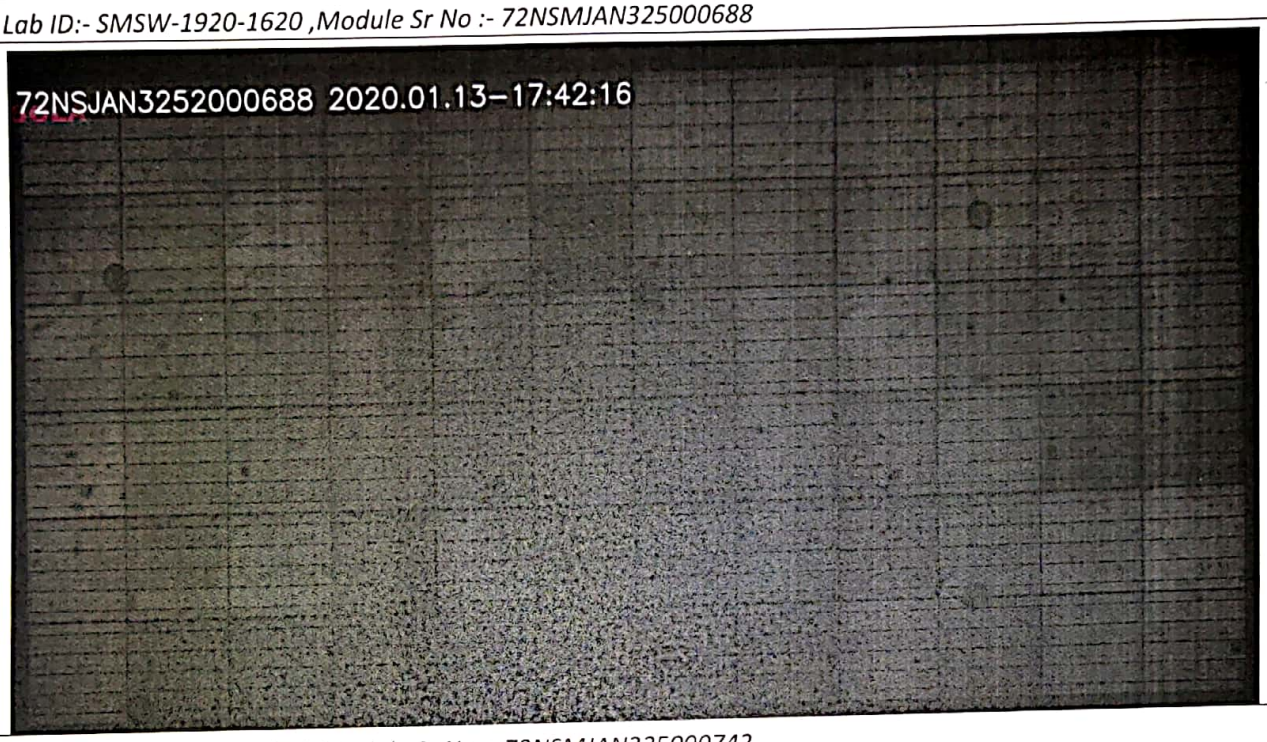


Lab ID:- SMSW-1920-1619 ,Module Sr No :- 72NSMJAN325000501

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

Lab ID:- SMSW-1920-1620 ,Module Sr No :- 72NSMJAN325000688



Lab ID:- SMSW-1920-1621 ,Module Sr No :- 72NSMJAN325000742

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

Clause	Requirements+ Test	Result- Remark	Verdict
7.7	Ground continuity test (Initial) as per IEC 61730-2:2004 MST 13 Clause no 10.4		
Test Date [DD/MM/YYYY].....	13th Jan 2020	—	—
Maximum over-current protection rating [Amp] of Module under test	15[Amp]	—	—
Current applied [Amp]	2.5 time of Maximum over-current protection rating	37.5 [Amp]	Pass
Location of designated grounding point	At the center of longer side	—	—
Location of second contacting point	1- Adjacent side with greatest distance from the grounding point; 2- At the center of another longer side 3- At the center of another shorter side	—	—

Lab ID	Serial No	Location	Voltage [V] Drop	Resistance [Ω] Required	Resistance [mΩ] Measured	—
SMSW-1920-1617	72NSMJAN32500 0585	1	0.11	0.1	3	Pass
		2	0.28	0.1	7	
		3	0.12	0.1	3	
SMSW-1920-1618	72NSMJAN32500 0797	1	0.15	0.1	4	Pass
		2	0.26	0.1	7	
		3	0.16	0.1	4	
SMSW-1920-1619	72NSMJAN32500 0501	1	0.67	0.1	18	Pass
		2	0.80	0.1	21	
		3	0.16	0.1	4	
SMSW-1920-1620	72NSMJAN32500 0688	1	0.17	0.1	4	Pass
		2	0.63	0.1	16	
		3	0.15	0.1	4	
SMSW-1920-1621	72NSMJAN32500 0742	1	0.12	0.1	3	Pass
		2	0.53	0.1	11	
		3	0.11	01	3	

Supplementary Information:- Maximum over-current protection rating [Amp] is 15 Amp

Acceptance Criteria:- The Resistance between the selected exposed conductive component and each other conductive component of the module shall be less then 0.1Ω

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Clause	Requirements+ Test	Result- Remark	Verdict
7.8	Potential Induced Degradation test as per IEC TS 62804-1 clause No 4,with PID Stress Method "A		
Test Date [DD/MM/YYYY].....	13th Jan2020 to 18th Jan 2020	—	—
Test Temperature [°C]	85±2°C	85±2°C	Pass
Test Relative Humidity [%]	85±3%	85±3%	Pass
System Voltage [V]	1000V	—	—
Test Voltage [V]	System Voltage[V] ±0.5%	—	—
Lab ID	Serial No	Voltage Applied [V]	—
SMSW-1920-1617	72NSMJAN325000585	-1000V	—
SMSW-1920-1618	72NSMJAN325000797	-1000V	—
SMSW-1920-1619	72NSMJAN325000501	1000V	—
SMSW-1920-1620	72NSMJAN325000688	1000V	—
Supplementary Information:- N/A			
Acceptance Criteria:- N/A			

Clause	Requirements+ Test	Result- Remark	Verdict
7.9	Maximum Power Determination as per IEC 61215:2005 Clause No:10.2 (After PID)		
Test Date [DD/MM/YYYY].....:	18th Jan 2020		—
Module Temperature [°C]..... :	25°C (Corrected)		—
Irradiance (W/m2)..... :	1000 W/m2 (Corrected)		—

Lab ID	Serial No	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	Degradation [%]	FF [%]	—
SMSW-1920-1617	72NSMJAN325000585	45.918	38.457	9.023	8.444	324.747	-0.66	0.784	Pass
SMSW-1920-1618	72NSMJAN325000797	45.976	38.461	8.959	8.488	326.461	-0.07	0.793	Pass
SMSW-1920-1619	72NSMJAN325000501	45.999	38.360	8.952	8.504	326.194	-0.38	0.792	Pass
SMSW-1920-1620	72NSMJAN325000688	45.949	38.324	8.951	8.514	326.299	-0.64	0.793	Pass
SMSW-1920-1621	72NSMJAN325000742	45.957	38.346	8.929	8.499	325.902	—	—	—
Supplementary Information :-N/A									
Acceptance Criteria :- Maximum allowable Pmax degradation after PID test is 5 %.									

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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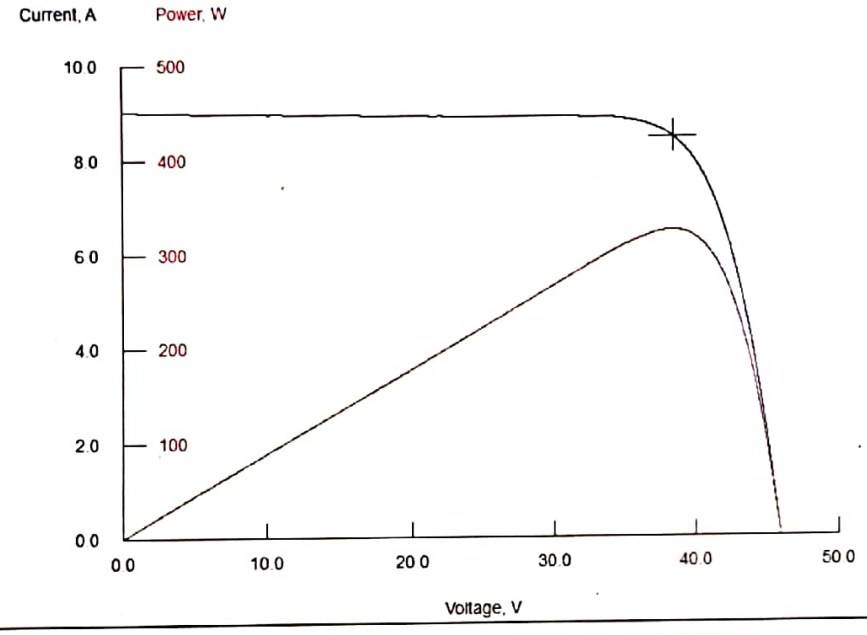
IV Curve

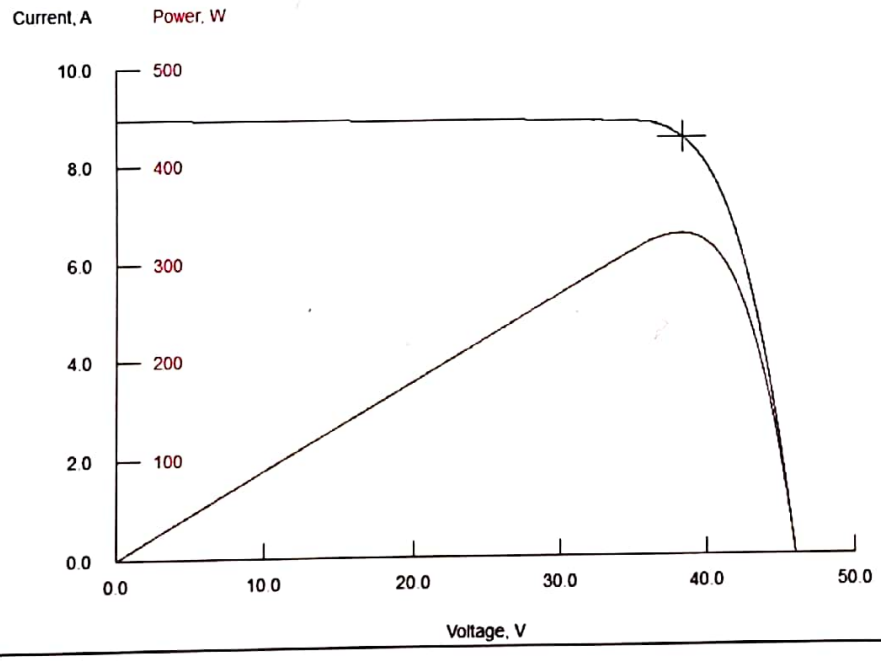
Lab ID :- SMSW-1920-1617, Module Sr No :- 72NSMJAN325000585



Project No.-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000585
Module Type: ModuleType1
23:43:03 18-01-2020
Measured Temp: 25.0 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.1mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	45.918V
Isc:	9.023A
Pmax:	324.747W
Vpm:	38.457V
Ipm:	8.444A
FF:	0.784
Eff,c:	18.357%
Eff,m:	16.736%
Rs:	0.403 Ohm
Rsh:	161.453 Ohm
MCCC1:	1.115
Intensity V	6.701V
Capacitor Voltage:	2400V
Load V	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3484

Lab ID :- SMSW-1920-1618, Module Sr No :- 72NSMJAN325000797



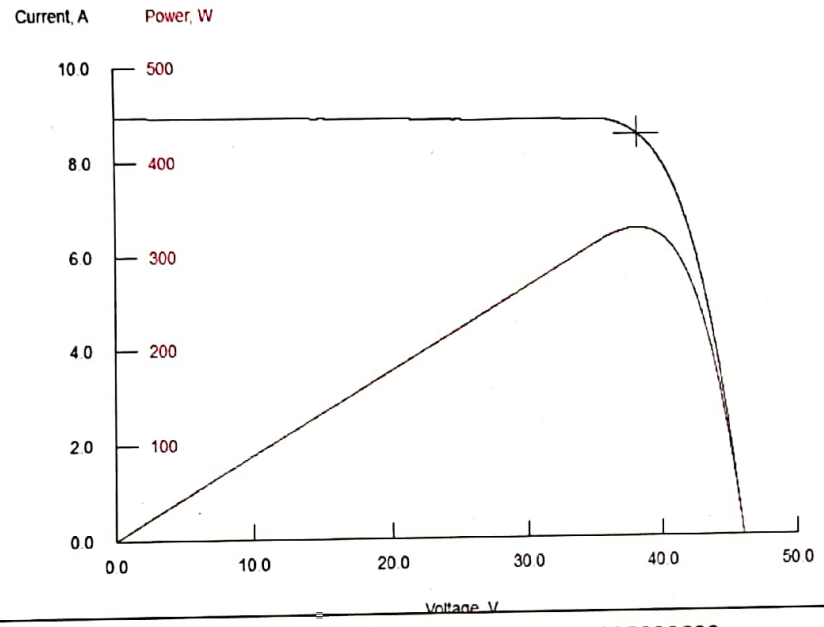
Project No:-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000797
Module Type: ModuleType1
23:27:52 18-01-2020
Measured Temp: 24.9 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.0mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	45.976V
Isc:	8.959A
Pmax:	326.461W
Vpm:	38.462V
Ipm:	8.488A
FF:	0.793
Eff,c:	18.454%
Eff,m:	16.824%
Rs:	0.433 Ohm
Rsh:	207.020 Ohm
MCCC1:	1.115
Intensity V:	6.700V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3358

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

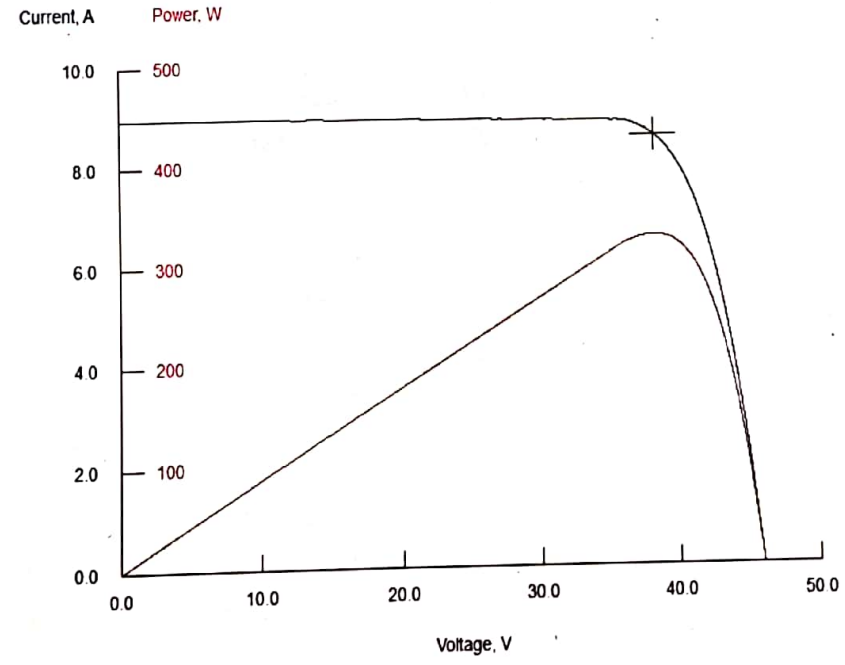
Lab ID :- SMSW-1920-1619, Module Sr No :- 72NSMJAN325000501



Project No:-40
Neosol 325 WP (PID Test -- After)
Operator: Admin
ID: 72NSJAN3252000501
Module Type: ModuleType1
23:16:55 18-01-2020
Measured Temp: 24.7 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.0mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	45.999V
Isc:	8.952A
Pmax:	326.194W
Vpm:	38.360V
Ipm:	8.504A
FF:	0.792
Eff,c:	18.439%
Eff,m:	16.811%
Rs:	0.420 Ohm
Rsh:	157.017 Ohm
MCCC1:	1.115
Intensity V:	6.699V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3339

Lab ID :- SMSW-1920-1620, Module Sr No :- 72NSMJAN325000688



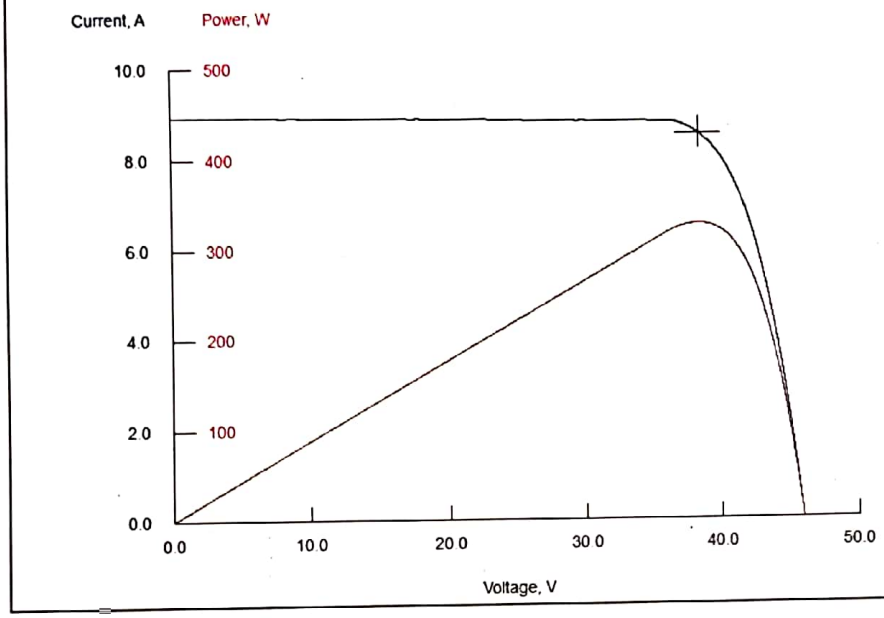
Project No:-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000688
Module Type: ModuleType1
23:53:31 18-01-2020
Measured Temp: 25.0 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.1mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	45.949V
Isc:	8.951A
Pmax:	326.299W
Vpm:	38.324V
Ipm:	8.514A
FF:	0.793
Eff,c:	18.445%
Eff,m:	16.816%
Rs:	0.412 Ohm
Rsh:	581.989 Ohm
MCCC1:	1.115
Intensity V:	6.701V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3338

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

Lab ID :- SMSW-1920-1621, Module Sr No :- 72NSMJAN325000742



Project No:-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000742
Module Type: ModuleType1
23:02:32 18-01-2020
Measured Temp: 24.8 °C
Corrected Temp: 25.0 °C

Irr Meas:	100.0mW/cm²
Irr Corr:	100.0mW/cm²
Voc:	45.957V
Isc:	8.929A
Pmax:	325.902W
Vpm:	38.346V
Ipm:	8.499A
FF:	0.794
Eff,c:	18.423%
Eff,m:	16.796%
Rs:	0.421 Ohm
Rsh:	264.915 Ohm
MCCC1:	1.115
Intensity V:	6.700V
Capacitor Voltage:	2400V
Load V:	6.580V
Sampling Frequency:	436000 Hz
Sweep Delay:	6 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3285

Clause	Requirements+ Test	Result- Remark	Verdict
7.10	Performance at Low Irradiance as per IEC 61215:2005 Clause No:10.7(After PID)		
Test Date [DD/MM/YYYY].....:		18th Jan 2020	—
Module Temperature [°C]..... :		25°C (Corrected)	—
Irradiance (W/m2)..... :		200 W/m2 (Corrected)	—

Lab ID	Serial No	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
SMSW-1920-1617	72NSMJAN325000585	42.705	36.635	1.826	1.650	60.432	0.775
SMSW-1920-1618	72NSMJAN325000797	42.769	36.965	1.809	1.696	62.697	0.810
SMSW-1920-1619	72NSMJAN325000501	42.828	37.155	1.813	1.689	62.772	0.808
SMSW-1920-1620	72NSMJAN325000688	42.766	36.914	1.813	1.699	62.720	0.908

Supplementary Information:- N/A

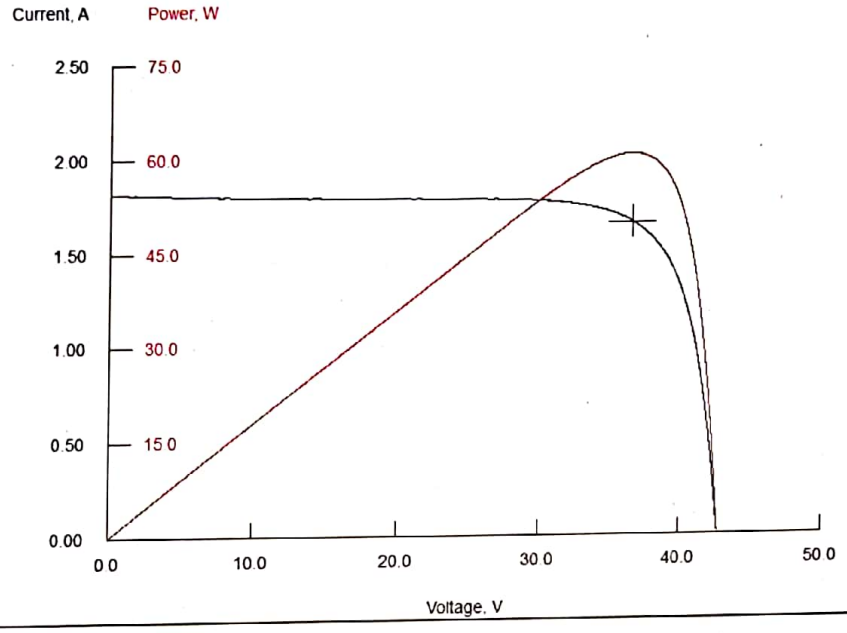
Acceptance Criteria:- N/A

IV Curve

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

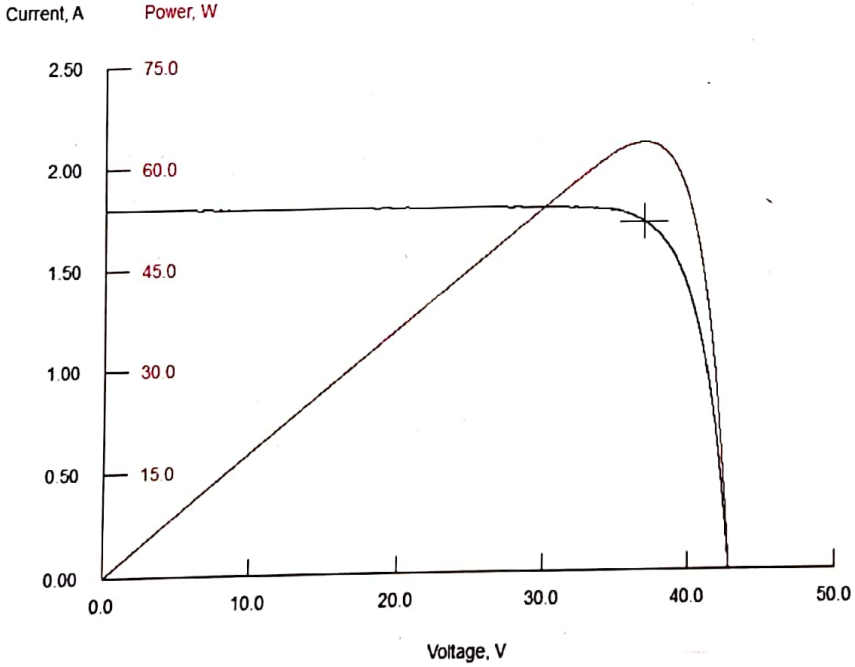
Lab ID :- SMSW-1920-1617, Module Sr No :- 72NSMJAN325000585



Project No:-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000585
Module Type: ModuleType1
23:41:15 18-01-2020
Measured Temp: 24.9 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.1mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.705V
Isc:	1.826A
Pmax:	60.432W
Vpm:	36.635V
Ipm:	1.650A
FF:	0.775
Eff,c:	17.080%
Eff,m:	15.572%
Rs:	1.137 Ohm
Rsh:	461.543 Ohm
MCCC1:	1.115
Intensity V:	6.700V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3467

Lab ID :- SMSW-1920-1618, Module Sr No :- 72NSMJAN325000797



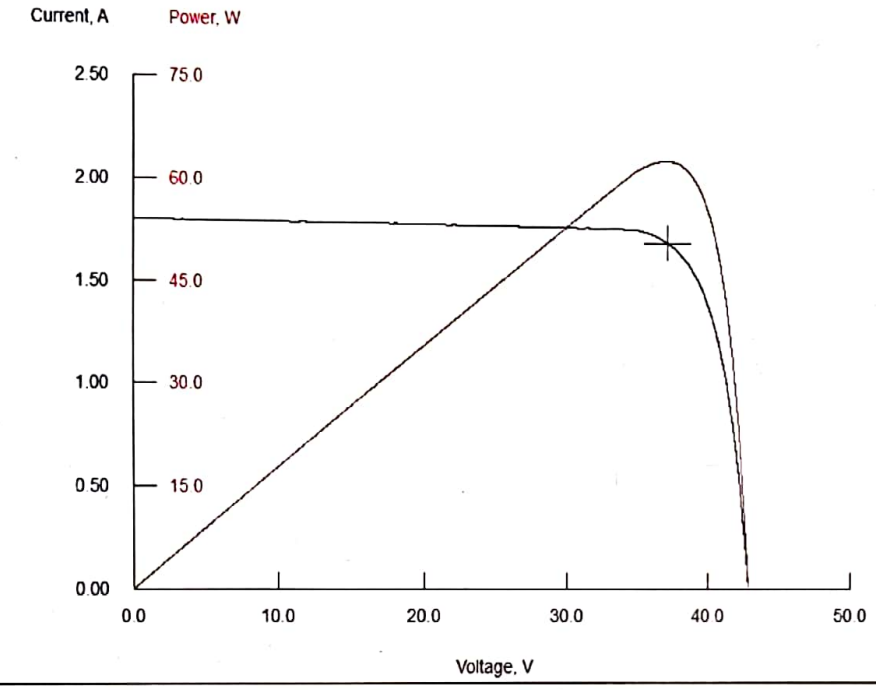
Project No:-40
Neosol 325 WP (PID Test – After)
Operator: Admin
ID: 72NSJAN3252000797
Module Type: ModuleType1
23:24:57 18-01-2020
Measured Temp: 24.5 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.1mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.769V
Isc:	1.809A
Pmax:	62.697W
Vpm:	36.965V
Ipm:	1.696A
FF:	0.810
Eff,c:	17.721%
Eff,m:	16.156%
Rs:	1.210 Ohm
Rsh:	754.150 Ohm
MCCC1:	1.115
Intensity V:	6.700V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3330

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

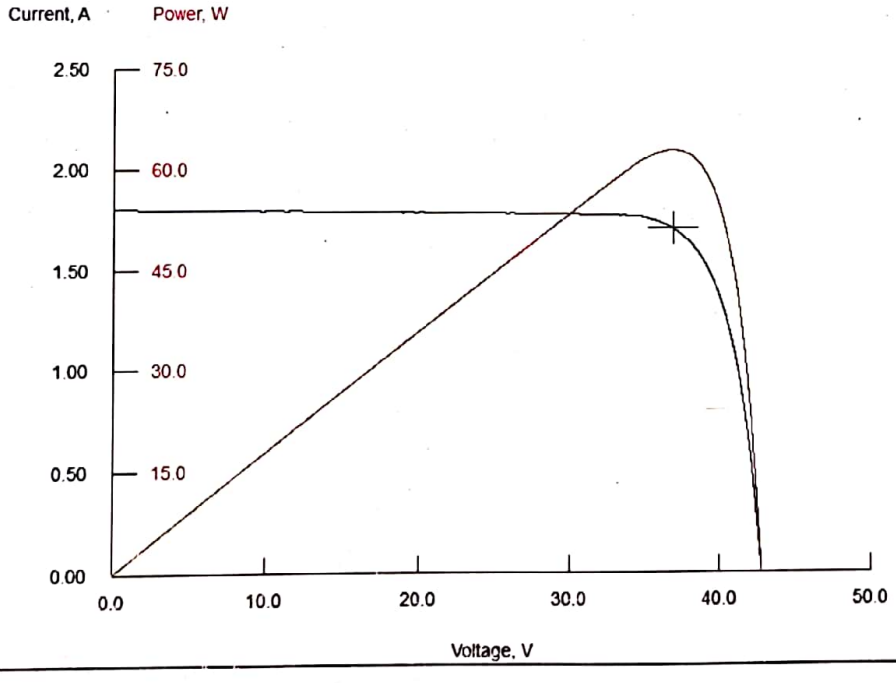
Lab ID :- SMSW-1920-1619, Module Sr No :- 72NSMJAN325000501



Project No -40
Neosol 325 WP (PID Test -- After)
Operator: Admin
ID: 72NSJAN3252000501
Module Type: ModuleType1
23:18:15 18-01-2020
Measured Temp: 24.7 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.1mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.828V
Isc:	1.813A
Pmax:	62.772W
Vpm:	37.155V
Ipm:	1.689A
FF:	0.808
Eff.c:	17.742%
Eff.m:	16.175%
Rs:	1.024 Ohm
Rsh:	694.215 Ohm
MCCC1:	1.115
Intensity V:	6.699V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3368

Lab ID :- SMSW-1920-1620, Module Sr No :- 72NSMJAN325000688



Project No:-40
Neosol 325 WP (PID Test -- After)
Operator: Admin
ID: 72NSJAN3252000688
Module Type: ModuleType1
23:51:05 18-01-2020
Measured Temp: 24.8 °C
Corrected Temp: 25.0 °C

Irr Meas:	20.1mW/cm²
Irr Corr:	20.0mW/cm²
Voc:	42.766V
Isc:	1.813A
Pmax:	62.720W
Vpm:	36.914V
Ipm:	1.699A
FF:	0.809
Eff.c:	17.727%
Eff.m:	16.162%
Rs:	1.119 Ohm
Rsh:	888.795 Ohm
MCCC1:	1.115
Intensity V:	6.701V
Capacitor Voltage:	1800V
Load V:	5.390V
Sampling Frequency:	427000 Hz
Sweep Delay:	7 ms
Sweep Length:	38 ms
Sweep Direction:	Isc->Voc
IV Points:	3360

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

Clause	Requirements+ Test	Result- Remark		Verdict
7.11	Wet Leakage Current Test as per IEC6215:2005 Clause No:10.15(After PID)			
		18th Jan 2020	—	—
Test Voltage applied [V].....		1000 [V]	1000 [V]	Pass
Solution Resistivity [Ω cm].....		< 3500 [Ω cm]	3334 [Ω cm]	Pass
Solution Temperature [°C].....		22±3°C	24.2 [°C]	Pass
Lab ID	Serial No	Insulation Resistance [MΩ] Required	Insulation Resistance [MΩ] Measured	—
SMSW-1920-1617	72NSMJAN325000585	20.61	2585	Pass
SMSW-1920-1618	72NSMJAN325000797	20.61	2863	Pass
SMSW-1920-1619	72NSMJAN325000501	20.61	2327	Pass
SMSW-1920-1620	72NSMJAN325000688	20.61	3523	Pass
Supplementary Information:- Module are is 1.94m^2, Maximum System voltage is 1000V				
Acceptance Criteria:- Modules with an area larger than 0,1 m^2 the measured insulation resistance times the area of the module shall be not less than 40 MΩ.m^2.				

Clause	Requirements+ Test	Result- Remark		Verdict
7.12	Electroluminescence Test @ Isc(After PID)			
Test Date [DD/MM/YYYY].....		18th Jan 2020	—	—
Test Current applied [Amp].....		Isc ±0.5% [Amp]	—	—
Lab ID	Serial No	Remark (Observation)		—
SMSW-1920-1617	72NSMJAN325000585	Presence of micro-cracks		—
SMSW-1920-1618	72NSMJAN325000797	Presence of micro-cracks		—
SMSW-1920-1619	72NSMJAN325000501	Presence of micro-cracks		—
SMSW-1920-1620	72NSMJAN325000688	Presence of micro-cracks		—
Supplementary Information:-N/A				
Acceptance Criteria:-N/A				

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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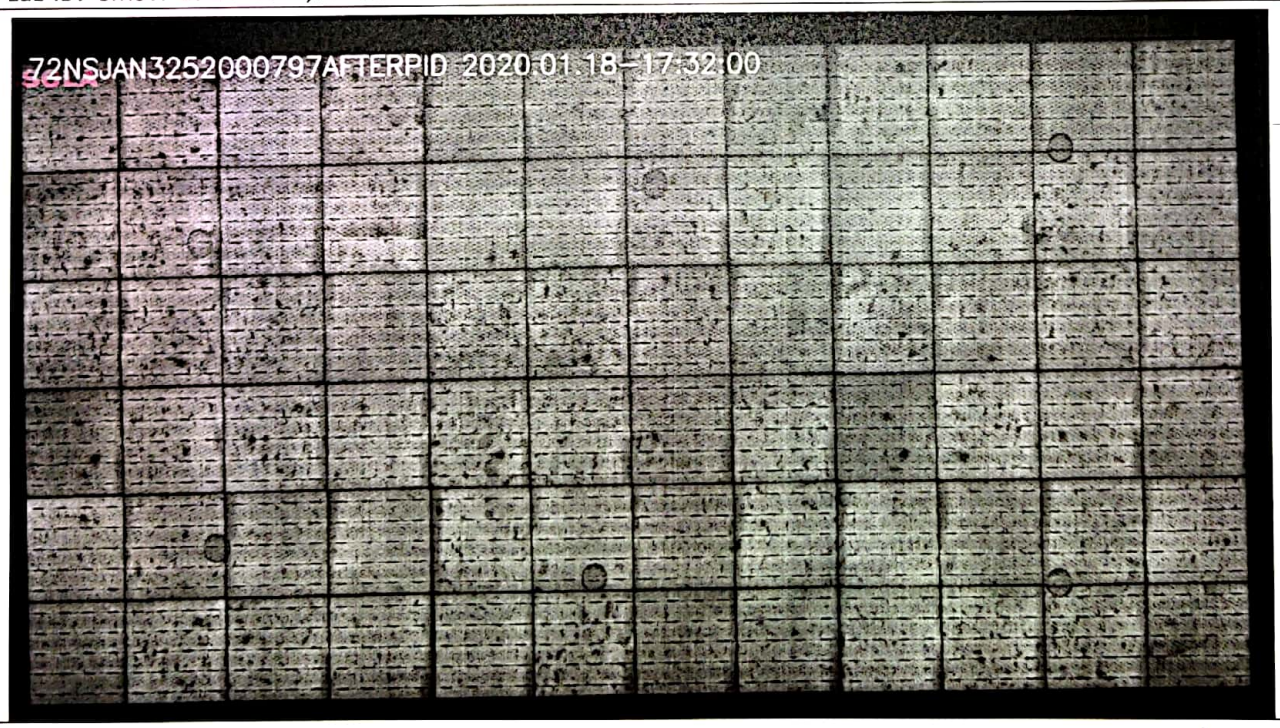
Lab ID:- SMSW-1920-1617 ,Module Sr No :- 72NSMJAN325000585

Lab ID:- SMSW-1920-1618 ,Module Sr No :- 72NSMJAN325000797



Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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Lab ID:- SMSW-1920-1619 ,Module Sr No :- 72NSMJAN325000501

Lab ID:- SMSW-1920-1620 ,Module Sr No :- 72NSMJAN325000688

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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Clause	Requirements+ Test	Result- Remark	Verdict
7.13	Electroluminescence Test @ 0.1% Isc(After PID)		
Test Date [DD/MM/YYYY].....	18th Jan 2020	—	—
Test Current applied [Amp].....	Isc *0.1% [Amp]	—	—

Lab ID	Serial No	Remark (Observation)	—
SMSW-1920-1617	72NSMJAN325000585	Presence of micro-cracks	—
SMSW-1920-1618	72NSMJAN325000797	Presence of micro-cracks	—
SMSW-1920-1619	72NSMJAN325000501	Presence of micro-cracks	—
SMSW-1920-1620	72NSMJAN325000688	Presence of micro-cracks	—

Supplementary Information:- N/A

Acceptance Criteria:- N/A

Lab ID:- SMSW-1920-1617 ,Module Sr No :- 72NSMJAN325000585

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

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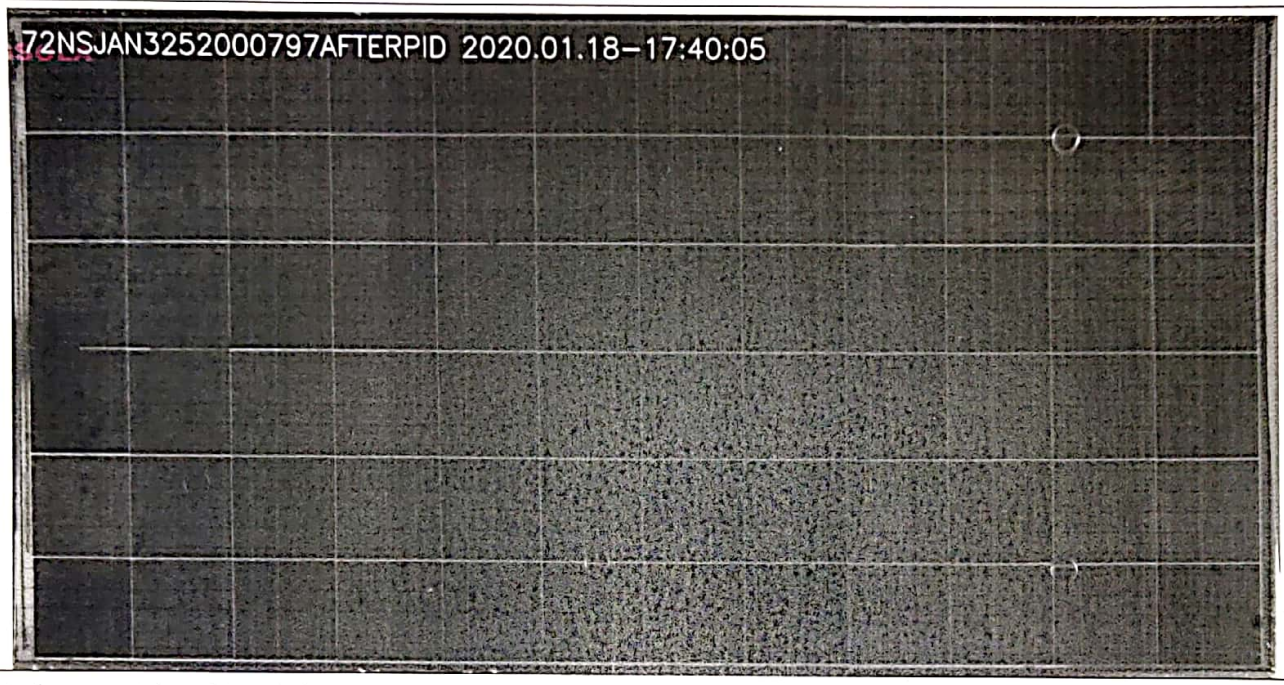
Lab ID:- SMSW-1920-1618 ,Module Sr No :- 72NSMJAN325000797

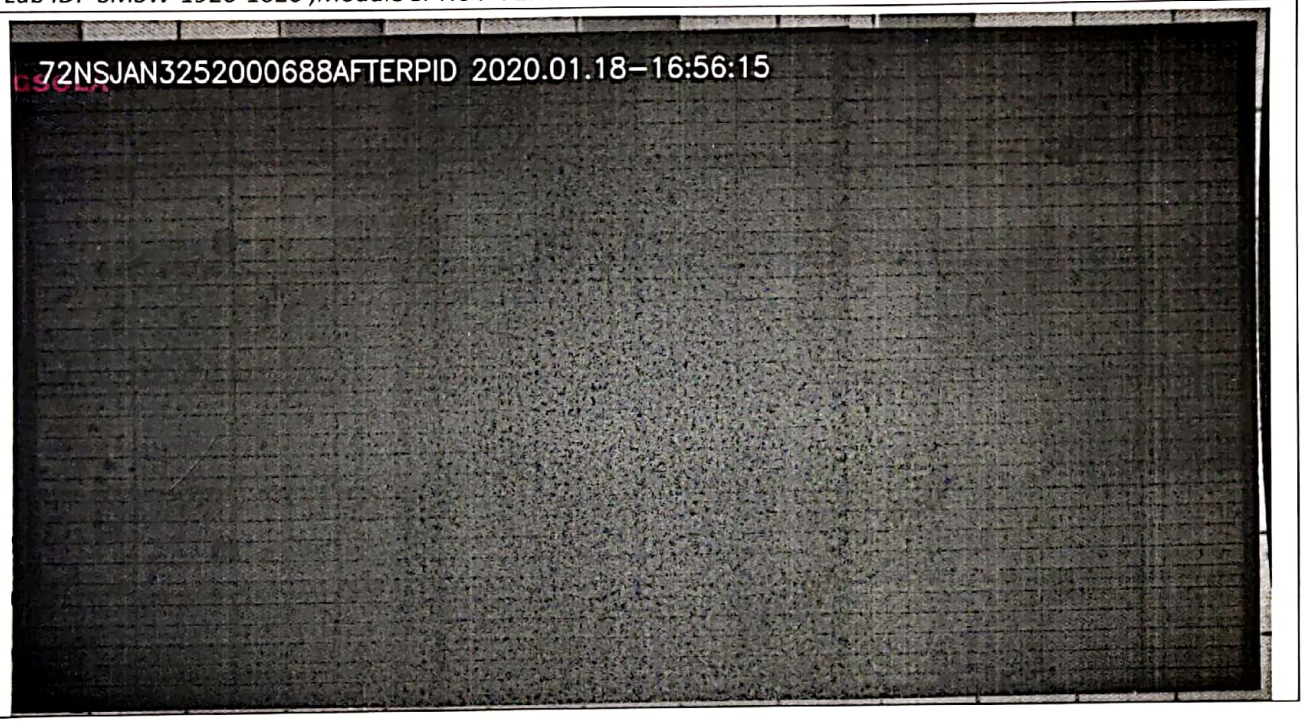


Lab ID:- SMSW-1920-1619 ,Module Sr No :- 72NSMJAN325000501

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

Lab ID:- SMSW-1920-1620 ,Module Sr No :- 72NSMJAN325000688



Clause	Requirements+ Test	Result- Remark	Verdict
7.14	Visual Inspection as per IEC 61215:2005 Clause No:10.1 (After PID)		
Test Date [DD/MM/YYYY].....:	18th Jan 2020		-----
Lux Value	1000 Lux Minimum	1112 Lux	Pass

Lab ID	Serial No	Requirements + Test	Result- Remark Nature and position of initial findings	Verdict
SMSW-1920-1617	72NSMJAN325000585	As per Clause no 7 of IEC 61215:2005	No visual Defect observed	Pass
SMSW-1920-1618	72NSMJAN325000797		No visual Defect observed	Pass
SMSW-1920-1619	72NSMJAN325000501		No visual Defect observed	Pass
SMSW-1920-1620	72NSMJAN325000688		No visual Defect observed	Pass

Supplementary Information :- N/A

Acceptance Criteria:- As per Clause no 7 of IEC 61215:2005

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar , Gurugram , Haryana – 122052 , INDIA ,Tel: +91-124-4642736

8.0	Bill of Material (BOM) for critical Parts and other technical details				
S.No	Parts/Component	Manufactures/ Trademark	Type/ Model	Technical Specification	Remark
01	Solar Cell	First Energy	Multi Poly Crestline	Efficiency : 18.6% Size : 156.75*156.75 Thickness : 180~220µ Busbar: 5	
1.1	Nos of Solar Cell	72 Nos			
1.2	Cell Per Bypass Diode	24 Nos			
1.3	Series/Parallel connection of cell (S,SP,SPS)	S			
2	Solar Glass	Borosil	Low Iron Tempered Textured ARC Coated Solar Glass	Thickness : 3.2mm	
3	EVA	Renewsys	Conserve P14 UC (UVT)	Thickness : 0.45mm	
4	Backsheet	Renewsys	Preserv 150 WD	Thickness : 0.295mm	
5	Solar ribbon (1.0,1.1 mm)	Sunby	Sn60 Pb40	Dimension : 1.0 * 0.18 mm	
6	Solar Ribbon (5mm)	Sunby	Sn60 Pb40	Dimension : 5.0 * 0.02 mm	
7	Soldering Flux	Cookson	PV-38 Flux	No Clean / No residue	
8	Solder Wire	Cookson	Sn60 Pb40	Dia : 0.9mm Flux : 1.1%	
9	Scotch Tape	3M	Poleyster PSA Tape	Pre Cut Type	
10	Inside Logo	Ikon Solutions	Poleyster UV Protected	Size : 20*90mm	
11	Aluminum Frames	RV Enterprises	Anodized Silver Matt Finished	Anodized Coating Thickness : >16µ	
12	Junction Box	Sinotech ST616	4 Rail 3 Diode	IP-65,IP-67,IP068 Certified	
13	Silicone Sealant	Eagle Double Head	Solar AP	Solar Grade	
14	Back Label	Ikon Solutions	Poleyster UV Protected	6*4"	
15	Rfid TAg	Alien 9640	2nd Generation UHF Tag	Wet Inlay Type	
16	Qc Pass Sticker	Avery	Paper Type	Wet Inlay Type	

Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

9.0	Product Family / Product Details

With 156.75*156.75 mm , 5Busbar Poly c-Si cells and others material as per BOM defined in clause no 8.0 of this report

NS72P6-295, NS72P6-300, NS72P6-305, NS72P6-310, NS72P6-315, NS72P6-320, NS72P6-325, NS72P6-330, NS72P6-335, NS72P6-340, NS72P6-345, NS72P6-350, NS72P6-355

Model under PID Test is NS72P6-325

10.0 Copy of Marking Plate

NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-295

Rated Maximum Power (Pmax)	295 W
Open Circuit Voltage (Voc)	44.85 V
Short Circuit Current (Isc)	8.60 A
Voltage At Pmax (Vmp)	37.02 V
Current At Pmax (Imp)	7.97 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load.

Manufacturing in Compliance with IEC 61215, IEC 61730

TOLL Free No. : 1800 - 2002 - 636
Email : info@neosoltechnologies.com
Website : www.neosoltechnologies.com
MADE IN INDIA

NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-300

Rated Maximum Power (Pmax)	300 W
Open Circuit Voltage (Voc)	44.92 V
Short Circuit Current (Isc)	8.68 A
Voltage At Pmax (Vmp)	37.22 V
Current At Pmax (Imp)	8.06 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
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Model No. : NS72P6-305

Rated Maximum Power (Pmax)	305 W
Open Circuit Voltage (Voc)	46.20 V
Short Circuit Current (Isc)	8.80 A
Voltage At Pmax (Vmp)	37.29 V
Current At Pmax (Imp)	8.18 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load.

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Model No. : NS72P6-310

Rated Maximum Power (Pmax)	310 W
Open Circuit Voltage (Voc)	46.28 V
Short Circuit Current (Isc)	8.88 A
Voltage At Pmax (Vmp)	37.38 V
Current At Pmax (Imp)	8.30 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load.

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Model No. : NS72P6-315

Rated Maximum Power (Pmax)	315 W
Open Circuit Voltage (Voc)	46.40 V
Short Circuit Current (Isc)	9.01 A
Voltage At Pmax (Vmp)	37.57 V
Current At Pmax (Imp)	8.39 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load.

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Model No. : NS72P6-320

Rated Maximum Power (Pmax)	320 W
Open Circuit Voltage (Voc)	46.52 V
Short Circuit Current (Isc)	9.16 A
Voltage At Pmax (Vmp)	38.02 V
Current At Pmax (Imp)	8.42 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load.

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Website : www.neosoltechnologies.com
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Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-325

Rated Maximum Power (Pmax)	325 W
Open Circuit Voltage (Voc)	46.63 V
Short Circuit Current (Isc)	9.20 A
Voltage At Pmax (Vmp)	38.26 V
Current At Pmax (Imp)	8.50 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material Before opening Terminal Box. Don't Disconnect the Plugs under Load

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Model No. : NS72P6-330

Rated Maximum Power (Pmax)	330 W
Open Circuit Voltage (Voc)	46.69 V
Short Circuit Current (Isc)	9.26 A
Voltage At Pmax (Vmp)	38.34 V
Current At Pmax (Imp)	8.61 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

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Model No. : NS72P6-335

Rated Maximum Power (Pmax)	335 W
Open Circuit Voltage (Voc)	46.78 V
Short Circuit Current (Isc)	9.32 A
Voltage At Pmax (Vmp)	38.52 V
Current At Pmax (Imp)	8.70 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

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NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-340

Rated Maximum Power (Pmax)	340 W
Open Circuit Voltage (Voc)	46.88 V
Short Circuit Current (Isc)	9.35 A
Voltage At Pmax (Vmp)	38.56 V
Current At Pmax (Imp)	8.82 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

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NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-345

Rated Maximum Power (Pmax)	345 W
Open Circuit Voltage (Voc)	46.98 V
Short Circuit Current (Isc)	9.40 A
Voltage At Pmax (Vmp)	38.63 V
Current At Pmax (Imp)	8.95 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

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NEOSOL TECHNOLOGIES PVT. LTD.
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Gurgaon, Haryana-122051, India

Model No. : NS72P6-350

Rated Maximum Power (Pmax)	350 W
Open Circuit Voltage (Voc)	47.10 V
Short Circuit Current (Isc)	9.48 A
Voltage At Pmax (Vmp)	38.74 V
Current At Pmax (Imp)	9.04 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

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NEOSOL TECHNOLOGIES PVT. LTD.
173/6, IMT Manesar,
Gurgaon, Haryana-122051, India

Model No. : NS72P6-355

Rated Maximum Power (Pmax)	355 W
Open Circuit Voltage (Voc)	47.16 V
Short Circuit Current (Isc)	9.51 A
Voltage At Pmax (Vmp)	39.12 V
Current At Pmax (Imp)	9.10 A
Maximum System Voltage	1000 VDC
Operating Temperature	-40°C TO 85°C
Application Class	CLASS A

All Values measured at STC: 25°C TempCell, 1000W/m², AM 1.5

WARNING - ELECTRICAL HAZARD
The Unit Produces Electricity When Exposed to Light. Cover the Glass with an Opaque Material. Before opening Terminal Box. Don't Disconnect the Plugs under Load

Manufacturing in Compliance with IEC 61215, IEC 61730

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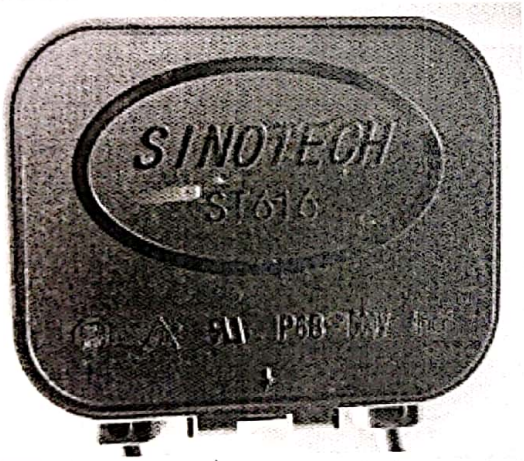
Prepared By :- Gaurav Kumar (Quality Manager)	Verified By :- Bharat Uppin (Technical Manager)

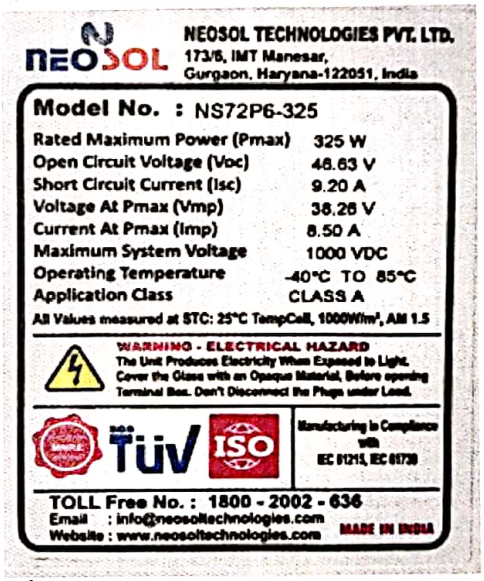
Plot No. 90, Sector-5, IMT, Manesar, Gurugram, Haryana – 122052, INDIA, Tel: +91-124-4642736

11.0	Photo Graphs of Sample and Other Details
Module Size (Length x Width) Frame Size	1960 mm x 990 mm 35 mm x 30 mm
Cell Size (Length x Width)	156.75mm x 156.75mm
Module Type/ Model No	NSP72P6-325
No of Cell	72 (12 X 6 Matrix)
Maximum System Voltage	1000V

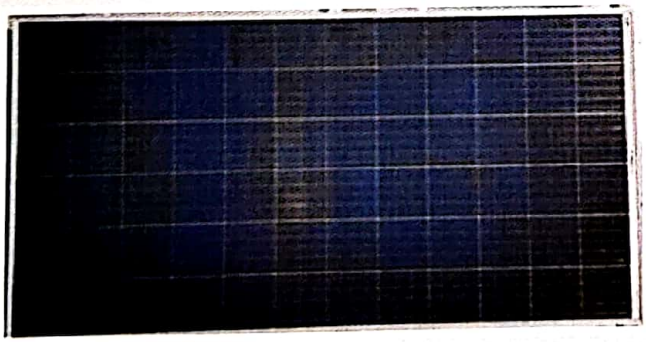
Detail view of Junction Box



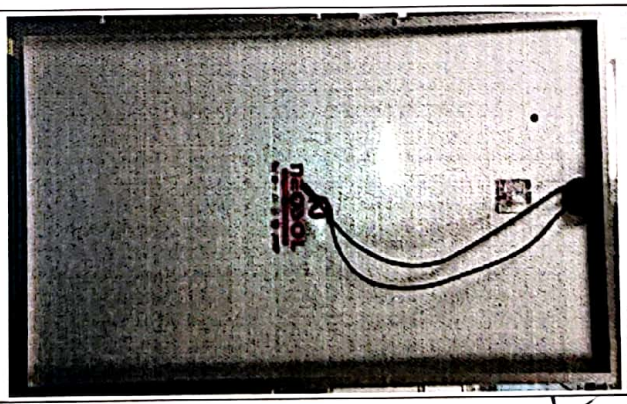
Details view of Type Label



Front view of Sample



Rear view of Sample



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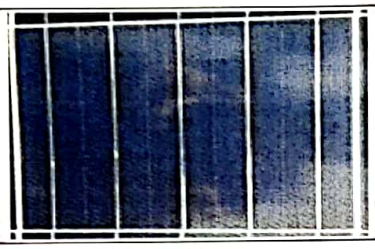
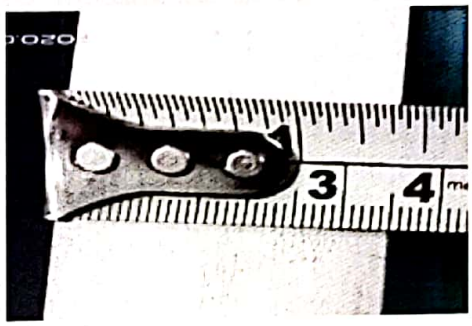
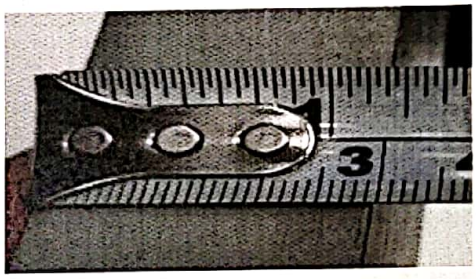
Detail view of Cell	Frame Details
	 
Detail View of RFID	
	
Detail View of Serial No/ Model	
	

12.0

Statement of the Estimated Measurement Uncertainty of Sun Simulator :-

1. *The Measurement Uncertainty of PMax Measurement is 2.47% with Coverage Factor k= 2 and Confidence Level 95%*
2. *The Measurement Uncertainty of Current Measurement is 0.23% with Coverage Factor k= 2 and Confidence Level 95%*
3. *The Measurement Uncertainty of Voltage Measurement is 0.23% with Coverage Factor k= 2 and Confidence Level 95%*

13.0

NOTE:-

1. *The Test Results relates only to the item(s) tested.*
2. *The Test Report shall not be reproduced except in full, without the written consent of Quality Manager – SMSW Lab & Research Centre*
3. *The results reported in this test report are valid at the time of and under the stipulated conditions of measurements.*

..... End of Test Report .....

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