

(Number of pages in test report: Page no.1 to77)

**TEST FORMAT AS PER IS 14286 : 2010**

<b>1. Name of manufacturer:</b>	Icon Solar- En Power Technologies Private Limited
<b>2. Product:</b>	Photovoltaic (PV) Modules
<b>3. Models:</b>	<p>ISEN320 (Representative model)</p> <p>ISEN350, ISEN345, ISEN340, ISEN335, ISEN330, ISEN325, ISEN315, ISEN310, ISEN305, ISEN300, ISEN250, ISEN250X, ISEN200, ISEN150 (72 cell series)</p> <p>ISEN335X, ISEN330X, ISEN325X, ISEN320X, ISEN300X, ISEN250X, ISEN225X, ISEN220X, ISEN200X (144 cell series)</p> <p>ISEN300N, ISEN295, ISEN290, ISEN285, ISEN280 (66 cell series)</p> <p>ISEN275, ISEN270, ISEN265, ISEN260, ISEN255, ISEN250(60 cell series)</p> <p>ISEN250Y(120 cell series)</p> <p>ISEN250N, ISEN245, ISEN240, ISEN235, ISEN230, ISEN225(54 cell series)</p> <p>ISEN220, ISEN215, ISEN210, ISEN205, ISEN200 (48 cell series)</p> <p>ISEN200N, ISEN195, ISEN190 (44 cell series)</p> <p>ISEN185, ISEN180, ISEN175, ISEN170 (40 cell series)</p> <p>ISEN165, ISEN160, ISEN155, ISEN150, ISEN135, ISEN130, ISEN125, ISEN110, ISEN100, ISEN80, ISEN75, ISEN60, ISEN50, ISEN40, ISEN20, ISEN10(36 cell series)</p> <p>ISEN5, ISEN3 (18 cell series)</p>
<b>4. Model differences provided</b>	YES
<b>5. Model differences verified as per MNRE Guidelines for series formulation</b>	YES

**6. Test Results:**

SL	TEST REQUIREMENTS	CLAUSE	VERDICT
1	Marking	4	P
2	Visual Inspection	10.1	P
3	Maximum Power Determination	10.2	P



**SUMMARY OF TEST REPORTS NO 4788560221-BIS-S1 DATED(mm/dd/yyyy): 12/27/2018**  
**ULR No : TC61681800000231F**

4	Insulation Test	10.3	P
5	Measurement of Temperature Coefficients.	10.4	P
6	Measurement of NOCT	10.5	P
7	Performance at STC and NOCT	10.6	P
8	Performance at low irradiance.	10.7	P
9	Outdoor exposure test	10.8	P
10	Hot-spot endurance test	10.9	P
11	UV preconditioning	10.10	P
12	Thermal cycling test	10.11	P
13	Humidity freeze test	10.12	P
14	Damp heat test	10.13	P
15	Robustness of termination test	10.14	P
16	Wet leakage current test	10.15	P
17	Mechanical load test	10.16	P
18	Hail test	10.17	P
19	Bypass diode thermal test	10.18	P

**General Information:**


1. The conformity certificates of critical components are verified to ensure complete testing of apparatus under test and details regarding harmonized IEC/UL standards (where IS standards are not available) are also provided in the list of critical component.

**CONCLUSION:**

- 1) Sample meets all relevant requirements of IS 14286:2010.
- 2) ~~Sample fails to meet the following test requirements:~~

I, hereby, undertake that the verdict stated in the test reports for all the tests matches with the test results. The sample meets all relevant requirements of IS 14286:2010 /~~does not meet the requirements stated above at 2) of conclusion. If any deviation is found, suitable punitive action may be taken by BIS.~~

Date: 12/27/2018

  
 (Signature of Authorized person with stamp)





<b>TEST REPORT</b>	
<b>IS 14286: 2010 First Revision Crystalline Silicon Terrestrial Photovoltaic (PV) Modules -Design Qualification and Type Approval</b>	
<b>Report Reference No</b> ..... :	4788560221-BIS-S1
<b>ULR No</b> ..... :	TC616818000000231F
<b>Date of issue</b> ..... (mm/dd/yyyy):	12/27/2018
<b>Total number of pages</b> .....	77
<b>Testing Laboratory</b> .....	UL India Pvt. Ltd.
<b>Address</b> .....	Laboratory Building, Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India.
<b>Applicant's name</b> .....	Icon Solar- En Power Technologies Private Limited
<b>Address</b> .....	319-320, 3rd floor, Offizo , Magneto Mall, G.E. Road., Raipur-492001
<b>Test specification</b> .....	
<b>Standard</b> .....	IS 14286: 2010
<b>Test procedure</b> ..... :	IS 14286: 2010
<b>Non-standard test method</b> .....	N/A
<b>Test Report Form No.</b> .....	TRF No.IS 14286_V1.0
<b>Test Report Form Originator</b> ..... :	BIS
<b>Master TRF</b> .....	Dated: 19.02.2018
<b>Test item description</b> .....	Photovoltaic (PV) Module(s)
<b>Trade Mark</b> ..... :	



Manufacturer.....:	Icon Solar- En Power Technologies Private Limited
Factory.....:	319-320, 3rd floor, Offizo , Magneto Mall, G.E. Road., Raipur-492001
Model/Type reference.....:	ISEN350, ISEN345, ISEN340, ISEN335, ISEN330, ISEN325, ISEN320, ISEN315, ISEN310, ISEN305, ISEN300, ISEN250, ISEN250X, ISEN200, ISEN150 ISEN335X, ISEN330X, ISEN325X, ISEN320X, ISEN300X ISEN250X, ISEN225X, ISEN220X, ISEN200X ISEN300N, ISEN295, ISEN290, ISEN285, ISEN280 ISEN275, ISEN270, ISEN265, ISEN260, ISEN255, ISEN250 ISEN250Y ISEN250N, ISEN245, ISEN240, ISEN235, ISEN230, ISEN225 ISEN220, ISEN215, ISEN210, ISEN205, ISEN200 ISEN200N, ISEN195, ISEN190 ISEN185, ISEN180, ISEN175, ISEN170 ISEN165, ISEN160, ISEN155, ISEN150, ISEN135, ISEN130, ISEN125, ISEN110, ISEN100, ISEN80, ISEN75, ISEN60, ISEN50, ISEN40, ISEN20, ISEN10 ISEN5, ISEN3
Ratings.....:	72, 144, 66, 60, 120, 54, 48, 44 Cell Series Maximum System Voltage: 1500V Maximum over current protection rating: 15A  40, 36 Cell Series Maximum System Voltage: 1000V Maximum over current protection rating: 15A  36 Cell Series Maximum System Voltage: 600V Maximum over current protection rating: 10A  18 cell series Maximum System Voltage: 48V Maximum over current protection rating: 5A  See specific model rating in General Product information



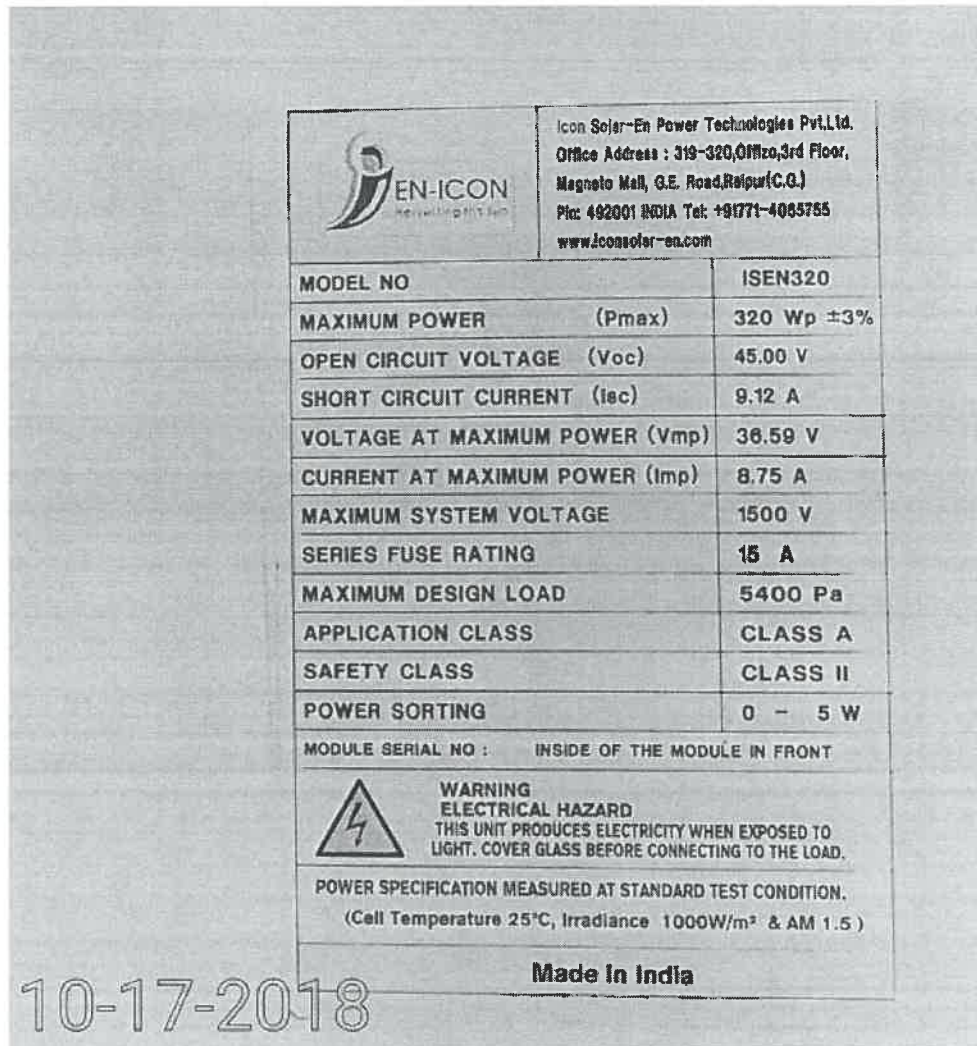
Testing procedure and testing location:	
<input checked="" type="checkbox"/> <b>Testing Laboratory:</b>	UL India Pvt. Ltd.
Testing location/ address .....	Laboratory Building, Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India
Tested by (name + signature).....:	Jyothi Swaroop <i>Jyothi Swaroop 12/27/18</i>
Approved by (name + signature).:	Sriparn Saurabh <i>Sriparn Saurabh 12/27/18</i>



<b>Summary of testing:</b>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>All tests required are listed in table 1 of IS 14286.</p> <p>Model ISEN320 from poly cell families were used for test purposes and all models are same in construction except number of cell, overall dimension, no of bypass diode and output power”.</p>	<p><b>Testing location:</b></p> <p>UL India Pvt. Ltd. Laboratory Building, Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India</p>
10.1 Visual Inspection	<p>UL India Pvt. Ltd. Laboratory Building, Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India</p>
10.2 Maximum Power Determination	
10.3 Insulation Test	
10.4 Measurement of Temperature Coefficients.	
10.5 Measurement of NOCT	
10.6 Performance at STC and NOCT	
10.7 Performance at low irradiance.	
10.8 Outdoor exposure test	
10.9 Hot-spot endurance test	
10.10 UV preconditioning	
10.1 Visual Inspection	
10.11 Thermal cycling test	
10.12 Humidity freeze test	
10.13 Damp heat test	
10.14 Robustness of termination test	
10.15 Wet leakage current test	
10.16 Mechanical load test	
10.17 Hail test	



10.18 Bypass diode thermal test

**Copy of marking plate:****Date format for above picture mm/dd/yyyy**

The marking plate above represents all models covered by this report except for difference in electrical ratings and model designation. See "General product information" for electrical ratings for all models.



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

GENERAL INFORMATION	
<b>Test item particulars:</b>	
Accessories and detachable parts included in the evaluation:	Grounding Method1: Long frame rails are equipped with pre-drilled grounding holes in their centre. Stainless steel grounding bolts or grounding lugs
Options included .....	Mounting: 1. Installation using the frame mounting holes using 4 pre-drilled mounting holes of Dia 10mm. M8 stainless steel hardware, spring washers, flat washer with torque 10Nm. 2. Using Pressure clamp: • Fixing on the long side: The clamps must be mounted along the frame at the position of the mounting hole, with a tolerance of 10% of the module total length to the edge of the frame. • Fixing on the short side: The clamps must be mounted along the frame at the edges of the module, with a tolerance of 25% of the module total width to the middle of the frame.
Possible test case verdicts:	
Abbreviations used in the report:	
HF – Humidity Freeze	TC – Temperature Cycling
DH – Damp Heat	Vmp – Maximum power voltage
Imp – Maximum power current	Voc – Open circuit voltage
Isc - Short circuit current	FF – Fill Factor
Pmp – Maximum power	$\alpha$ – Current temperature coefficient
NOCT – Nominal Operating Cell Temperature	$\beta$ – Voltage temperature coefficient
STC – Standard Test Conditions	$\delta$ – power temperature coefficient
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object .....	N/A
- test object does meet the requirement.....	Pass (P)
- test object does not meet the requirement.....	Fail (F)
<b>Testing</b> .....	Refer individual test date
<b>Date of receipt of test item</b> ..... (mm-dd-yyyy):	08/02/2018
<b>Date (s) of performance of tests</b> ..... (mm-dd-yyyy):	10/12/2018 to 12/19/2018
<b>General remarks:</b> The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a point is used as the decimal separator.	





IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

General product information:			
PV module type reference.....		ISEN350	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax).....		350.23 W	
Nominal open circuit voltage at (Voc).....		45.78 V	
Nominal short circuit current at (Isc).....		9.69 A	
Nominal maximum power voltage (Vpm) .....		37.14 V	
Nominal maximum power current (Ipm) .....		9.43 A	
PV module type reference.....		ISEN345	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax).....		345.21 W	
Nominal open circuit voltage at (Voc).....		45.66 V	
Nominal short circuit current at (Isc).....		9.59 A	
Nominal maximum power voltage (Vpm) .....		37.04 V	
Nominal maximum power current (Ipm) .....		9.32 A	
PV module type reference.....		ISEN340	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax).....		340.12 W	
Nominal open circuit voltage at (Voc).....		45.52 V	
Nominal short circuit current at (Isc).....		9.50 A	
Nominal maximum power voltage (Vpm) .....		36.97 V	
Nominal maximum power current (Ipm) .....		9.20 A	
PV module type reference.....		ISEN335	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax).....		335.15 W	
Nominal open circuit voltage at (Voc).....		45.40 V	
Nominal short circuit current at (Isc).....		9.41 A	
Nominal maximum power voltage (Vpm) .....		36.87 V	
Nominal maximum power current (Ipm) .....		9.09 A	
PV module type reference.....		ISEN330	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax).....		330.10 W	
Nominal open circuit voltage at (Voc).....		45.25 V	
Nominal short circuit current at (Isc).....		9.31 A	
Nominal maximum power voltage (Vpm) .....		36.80 V	
Nominal maximum power current (Ipm) .....		8.97 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	PV module type reference..... :	ISEN325	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax)..... :	325.07 W	
	Nominal open circuit voltage at (Voc)..... :	45.14 V	
	Nominal short circuit current at (Isc)..... :	9.23 A	
	Nominal maximum power voltage (Vpm)..... :	36.69 V	
	Nominal maximum power current (Ipm)..... :	8.86 A	
	PV module type reference..... :	ISEN320	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax)..... :	320.16 W	
	Nominal open circuit voltage at (Voc)..... :	45.00 V	
	Nominal short circuit current at (Isc)..... :	9.12 A	
	Nominal maximum power voltage (Vpm)..... :	36.59 V	
	Nominal maximum power current (Ipm)..... :	8.75 A	
	PV module type reference..... :	ISEN315	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax)..... :	315.17 W	
	Nominal open circuit voltage at (Voc)..... :	44.85 V	
	Nominal short circuit current at (Isc)..... :	9.02 A	
	Nominal maximum power voltage (Vpm)..... :	36.52 V	
	Nominal maximum power current (Ipm)..... :	8.63 A	
	PV module type reference..... :	ISEN310	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax)..... :	310.02 W	
	Nominal open circuit voltage at (Voc)..... :	44.70 V	
	Nominal short circuit current at (Isc)..... :	8.93 A	
	Nominal maximum power voltage (Vpm)..... :	36.43 V	
	Nominal maximum power current (Ipm)..... :	8.51 A	
	PV module type reference..... :	ISEN305	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax)..... :	305.17 W	
	Nominal open circuit voltage at (Voc)..... :	44.59 V	
	Nominal short circuit current at (Isc)..... :	8.83 A	
	Nominal maximum power voltage (Vpm)..... :	36.33 V	
	Nominal maximum power current (Ipm)..... :	8.40 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN300	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		300.29 W	
Nominal open circuit voltage at (Voc) .....		44.45 V	
Nominal short circuit current at (Isc) .....		8.75 A	
Nominal maximum power voltage (Vpm).....		36.18 V	
Nominal maximum power current (Ipm).....		8.30 A	
PV module type reference .....		ISEN250	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		250.37 W	
Nominal open circuit voltage at (Voc) .....		44.46 V	
Nominal short circuit current at (Isc) .....		7.28 A	
Nominal maximum power voltage (Vpm).....		36.18 V	
Nominal maximum power current (Ipm).....		6.92 A	
PV module type reference .....		ISEN250X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		250.37 W	
Nominal open circuit voltage at (Voc) .....		44.46 V	
Nominal short circuit current at (Isc) .....		7.28 A	
Nominal maximum power voltage (Vpm).....		36.18 V	
Nominal maximum power current (Ipm).....		6.92 A	
PV module type reference .....		ISEN200	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		201.16 W	
Nominal open circuit voltage at (Voc) .....		44.41 V	
Nominal short circuit current at (Isc) .....		5.86 A	
Nominal maximum power voltage (Vpm).....		36.18 V	
Nominal maximum power current (Ipm).....		5.56 A	
PV module type reference .....		ISEN150	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		150.31 W	
Nominal open circuit voltage at (Voc) .....		44.46 V	
Nominal short circuit current at (Isc) .....		4.37 A	
Nominal maximum power voltage (Vpm).....		36.22 V	
Nominal maximum power current (Ipm).....		4.15 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN335X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		335.1 W	
Nominal open circuit voltage at (Voc) .....		45.4 V	
Nominal short circuit current at (Isc) .....		9.41 A	
Nominal maximum power voltage (Vpm) .....		36.87 V	
Nominal maximum power current (Ipm) .....		9.09 A	
PV module type reference .....		ISEN330X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		330.1 W	
Nominal open circuit voltage at (Voc) .....		45.25 V	
Nominal short circuit current at (Isc) .....		9.31 A	
Nominal maximum power voltage (Vpm) .....		36.8 V	
Nominal maximum power current (Ipm) .....		8.97 A	
PV module type reference .....		ISEN325X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		325.1 W	
Nominal open circuit voltage at (Voc) .....		45.14 V	
Nominal short circuit current at (Isc) .....		9.23 A	
Nominal maximum power voltage (Vpm) .....		36.69 V	
Nominal maximum power current (Ipm) .....		8.86 A	
PV module type reference .....		ISEN320X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		320.2 W	
Nominal open circuit voltage at (Voc) .....		45.00 V	
Nominal short circuit current at (Isc) .....		9.12 A	
Nominal maximum power voltage (Vpm) .....		36.59 V	
Nominal maximum power current (Ipm) .....		8.75 A	
PV module type reference .....		ISEN300X	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		300.3 W	
Nominal open circuit voltage at (Voc) .....		88.90 V	
Nominal short circuit current at (Isc) .....		4.38 A	
Nominal maximum power voltage (Vpm) .....		72.36 V	
Nominal maximum power current (Ipm) .....		4.15 A	



<b>IS 14286:2010</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	PV module type reference .....	ISEN250X	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	250.3 W	
	Nominal open circuit voltage at (Voc) .....	89.19 V	
	Nominal short circuit current at (Isc) .....	3.63 A	
	Nominal maximum power voltage (Vpm).....	72.56 V	
	Nominal maximum power current (Ipm).....	3.45 A	
	PV module type reference .....	ISEN225X	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	225.2 W	
	Nominal open circuit voltage at (Voc) .....	91.09 V	
	Nominal short circuit current at (Isc) .....	3.16 A	
	Nominal maximum power voltage (Vpm).....	73.61 V	
	Nominal maximum power current (Ipm).....	3.06 A	
	PV module type reference .....	ISEN220X	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	220.0 W	
	Nominal open circuit voltage at (Voc) .....	90.6 V	
	Nominal short circuit current at (Isc) .....	3.11 A	
	Nominal maximum power voltage (Vpm).....	73.32 V	
	Nominal maximum power current (Ipm).....	3.00 A	
	PV module type reference .....	ISEN200X	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	200.4 W	
	Nominal open circuit voltage at (Voc) .....	88.89 V	
	Nominal short circuit current at (Isc) .....	2.92 A	
	Nominal maximum power voltage (Vpm).....	72.36 V	
	Nominal maximum power current (Ipm).....	2.77 A	
	PV module type reference .....	ISEN300N	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	300.3 W	
	Nominal open circuit voltage at (Voc) .....	41.43 V	
	Nominal short circuit current at (Isc) .....	9.26 A	
	Nominal maximum power voltage (Vpm).....	33.67 V	
	Nominal maximum power current (Ipm).....	8.92 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN295	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		295.1 W	
Nominal open circuit voltage at (Voc) .....		41.30 V	
Nominal short circuit current at (Isc) .....		9.16 A	
Nominal maximum power voltage (Vpm).....		33.57 V	
Nominal maximum power current (Ipm).....		8.79 A	
PV module type reference .....		ISEN290	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		290.3 W	
Nominal open circuit voltage at (Voc) .....		41.16 V	
Nominal short circuit current at (Isc) .....		9.06 A	
Nominal maximum power voltage (Vpm).....		33.48 V	
Nominal maximum power current (Ipm).....		8.67 A	
PV module type reference .....		ISEN285	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		285.2 W	
Nominal open circuit voltage at (Voc) .....		41.05 V	
Nominal short circuit current at (Isc) .....		8.97 A	
Nominal maximum power voltage (Vpm).....		33.36 V	
Nominal maximum power current (Ipm).....		8.55 A	
PV module type reference .....		ISEN280	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		280.0 W	
Nominal open circuit voltage at (Voc) .....		40.93 V	
Nominal short circuit current at (Isc) .....		8.85 A	
Nominal maximum power voltage (Vpm).....		33.26 V	
Nominal maximum power current (Ipm).....		8.42 A	
PV module type reference .....		ISEN275	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		275.0 W	
Nominal open circuit voltage at (Voc) .....		37.71 V	
Nominal short circuit current at (Isc) .....		9.31 A	
Nominal maximum power voltage (Vpm).....		30.62 V	
Nominal maximum power current (Ipm).....		8.98 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN270	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		270.2 W	
Nominal open circuit voltage at (Voc) .....		37.58 V	
Nominal short circuit current at (Isc) .....		9.19 A	
Nominal maximum power voltage (Vpm).....		30.56 V	
Nominal maximum power current (Ipm).....		8.84 A	
PV module type reference .....		ISEN265	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		265.3 W	
Nominal open circuit voltage at (Voc) .....		37.46 V	
Nominal short circuit current at (Isc) .....		9.09 A	
Nominal maximum power voltage (Vpm).....		30.46 V	
Nominal maximum power current (Ipm).....		8.71 A	
PV module type reference .....		ISEN260	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		260.2 W	
Nominal open circuit voltage at (Voc) .....		37.30 V	
Nominal short circuit current at (Isc) .....		9.01 A	
Nominal maximum power voltage (Vpm).....		30.36 V	
Nominal maximum power current (Ipm).....		8.57 A	
PV module type reference .....		ISEN255	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		255.2 W	
Nominal open circuit voltage at (Voc) .....		37.18 V	
Nominal short circuit current at (Isc) .....		8.84 A	
Nominal maximum power voltage (Vpm).....		30.27 V	
Nominal maximum power current (Ipm).....		8.43 A	
PV module type reference .....		ISEN250	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		250.3 W	
Nominal open circuit voltage at (Voc) .....		37.05 V	
Nominal short circuit current at (Isc) .....		8.75 A	
Nominal maximum power voltage (Vpm).....		30.12 V	
Nominal maximum power current (Ipm).....		8.31 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN250Y	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		250.3 W	
Nominal open circuit voltage at (Voc) .....		74.10 V	
Nominal short circuit current at (Isc) .....		4.38 A	
Nominal maximum power voltage (Vpm) .....		60.24 V	
Nominal maximum power current (Ipm) .....		4.16 A	
PV module type reference .....		ISEN250N	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		250.2 W	
Nominal open circuit voltage at (Voc) .....		34.01 V	
Nominal short circuit current at (Isc) .....		9.38 A	
Nominal maximum power voltage (Vpm) .....		27.62 V	
Nominal maximum power current (Ipm) .....		9.06 A	
PV module type reference .....		ISEN245	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		245.2 W	
Nominal open circuit voltage at (Voc) .....		33.89 V	
Nominal short circuit current at (Isc) .....		9.24 A	
Nominal maximum power voltage (Vpm) .....		27.52 V	
Nominal maximum power current (Ipm) .....		8.91 A	
PV module type reference .....		ISEN240	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		240.1 W	
Nominal open circuit voltage at (Voc) .....		33.75 V	
Nominal short circuit current at (Isc) .....		9.12 A	
Nominal maximum power voltage (Vpm) .....		27.44 V	
Nominal maximum power current (Ipm) .....		8.75 A	
PV module type reference .....		ISEN235	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		235.1 W	
Nominal open circuit voltage at (Voc) .....		33.61 V	
Nominal short circuit current at (Isc) .....		8.98 A	
Nominal maximum power voltage (Vpm) .....		27.31 V	
Nominal maximum power current (Ipm) .....		8.61 A	





IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
PV module type reference .....		ISEN230	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		230.3 W	
Nominal open circuit voltage at (Voc) .....		33.49 V	
Nominal short circuit current at (Isc) .....		8.89 A	
Nominal maximum power voltage (Vpm).....		27.22 V	
Nominal maximum power current (Ipm).....		8.46 A	
PV module type reference .....		ISEN225	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		225.2 W	
Nominal open circuit voltage at (Voc) .....		33.33 V	
Nominal short circuit current at (Isc) .....		8.75 A	
Nominal maximum power voltage (Vpm).....		27.13 V	
Nominal maximum power current (Ipm).....		8.3 A	
PV module type reference .....		ISEN220	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		220.1 W	
Nominal open circuit voltage at (Voc) .....		30.18 V	
Nominal short circuit current at (Isc) .....		9.31 A	
Nominal maximum power voltage (Vpm).....		24.51 V	
Nominal maximum power current (Ipm).....		8.98 A	
PV module type reference .....		ISEN215	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		215.1 W	
Nominal open circuit voltage at (Voc) .....		30.06 V	
Nominal short circuit current at (Isc) .....		9.17 A	
Nominal maximum power voltage (Vpm).....		24.42 V	
Nominal maximum power current (Ipm).....		8.81 A	
PV module type reference .....		ISEN210	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		210.1 W	
Nominal open circuit voltage at (Voc) .....		29.9 V	
Nominal short circuit current at (Isc) .....		9.04 A	
Nominal maximum power voltage (Vpm).....		24.32 V	
Nominal maximum power current (Ipm).....		8.64 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN205	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		205.0 W	
Nominal open circuit voltage at (Voc) .....		29.76 V	
Nominal short circuit current at (Isc) .....		8.89 A	
Nominal maximum power voltage (Vpm).....		24.23 V	
Nominal maximum power current (Ipm).....		8.46 A	
PV module type reference .....		ISEN200	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		200.6 W	
Nominal open circuit voltage at (Voc) .....		29.64 V	
Nominal short circuit current at (Isc) .....		8.74 A	
Nominal maximum power voltage (Vpm).....		24.14 V	
Nominal maximum power current (Ipm).....		8.31 A	
PV module type reference .....		ISEN200N	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		200.3 W	
Nominal open circuit voltage at (Voc) .....		27.62 V	
Nominal short circuit current at (Isc) .....		9.27 A	
Nominal maximum power voltage (Vpm).....		22.43 V	
Nominal maximum power current (Ipm).....		8.93 A	
PV module type reference .....		ISEN195	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		195.2 W	
Nominal open circuit voltage at (Voc) .....		27.49 V	
Nominal short circuit current at (Isc) .....		9.07 A	
Nominal maximum power voltage (Vpm).....		22.33 V	
Nominal maximum power current (Ipm).....		8.74 A	
PV module type reference .....		ISEN190	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		190.2 W	
Nominal open circuit voltage at (Voc) .....		27.36 V	
Nominal short circuit current at (Isc) .....		8.96 A	
Nominal maximum power voltage (Vpm).....		22.25 V	
Nominal maximum power current (Ipm).....		8.55 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
PV module type reference .....		ISEN185	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		185.0 W	
Nominal open circuit voltage at (Voc) .....		25.21 V	
Nominal short circuit current at (Isc) .....		9.37 A	
Nominal maximum power voltage (Vpm).....		20.44 V	
Nominal maximum power current (Ipm).....		9.05 A	
PV module type reference .....		ISEN180	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		180.1 W	
Nominal open circuit voltage at (Voc) .....		25.06 V	
Nominal short circuit current at (Isc) .....		9.22 A	
Nominal maximum power voltage (Vpm).....		20.37 V	
Nominal maximum power current (Ipm).....		8.84 A	
PV module type reference .....		ISEN175	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		175.0 W	
Nominal open circuit voltage at (Voc) .....		24.89 V	
Nominal short circuit current at (Isc) .....		9.01 A	
Nominal maximum power voltage (Vpm).....		20.23 V	
Nominal maximum power current (Ipm).....		8.65 A	
PV module type reference .....		ISEN170	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		170.2 W	
Nominal open circuit voltage at (Voc) .....		24.81 V	
Nominal short circuit current at (Isc) .....		8.89 A	
Nominal maximum power voltage (Vpm).....		20.17 V	
Nominal maximum power current (Ipm).....		8.44 A	
PV module type reference .....		ISEN165	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		165.4 W	
Nominal open circuit voltage at (Voc) .....		22.65 V	
Nominal short circuit current at (Isc) .....		9.33 A	
Nominal maximum power voltage (Vpm).....		18.4 V	
Nominal maximum power current (Ipm).....		8.99 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

PV module type reference .....		ISEN160	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		160.0 W	
Nominal open circuit voltage at (Voc) .....		22.5 V	
Nominal short circuit current at (Isc) .....		9.12 A	
Nominal maximum power voltage (Vpm).....		18.29 V	
Nominal maximum power current (Ipm).....		8.75 A	
PV module type reference .....		ISEN155	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		155.5 W	
Nominal open circuit voltage at (Voc) .....		22.37 V	
Nominal short circuit current at (Isc) .....		8.95 A	
Nominal maximum power voltage (Vpm).....		18.21 V	
Nominal maximum power current (Ipm).....		8.54 A	
PV module type reference .....		ISEN150	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		150.5 W	
Nominal open circuit voltage at (Voc) .....		22.23 V	
Nominal short circuit current at (Isc) .....		8.74 A	
Nominal maximum power voltage (Vpm).....		18.11 V	
Nominal maximum power current (Ipm).....		8.31 A	
PV module type reference .....		ISEN135	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		135.1 W	
Nominal open circuit voltage at (Voc) .....		22.58 V	
Nominal short circuit current at (Isc) .....		7.67 A	
Nominal maximum power voltage (Vpm).....		18.33 V	
Nominal maximum power current (Ipm).....		7.37 A	
PV module type reference .....		ISEN130	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		130.4 W	
Nominal open circuit voltage at (Voc) .....		22.2 V	
Nominal short circuit current at (Isc) .....		7.59 A	
Nominal maximum power voltage (Vpm).....		18.09 V	
Nominal maximum power current (Ipm).....		7.21 A	



<b>IS 14286:2010</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	PV module type reference .....	ISEN125	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	125.5 W	
	Nominal open circuit voltage at (Voc) .....	22.2 V	
	Nominal short circuit current at (Isc) .....	7.31 A	
	Nominal maximum power voltage (Vpm).....	18.09 V	
	Nominal maximum power current (Ipm).....	6.94 A	
	PV module type reference .....	ISEN110	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	110.3 W	
	Nominal open circuit voltage at (Voc) .....	22.42 V	
	Nominal short circuit current at (Isc) .....	6.33 A	
	Nominal maximum power voltage (Vpm).....	18.23 V	
	Nominal maximum power current (Ipm).....	6.05 A	
	PV module type reference .....	ISEN100	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	100.6 W	
	Nominal open circuit voltage at (Voc) .....	22.2 V	
	Nominal short circuit current at (Isc) .....	5.86 A	
	Nominal maximum power voltage (Vpm).....	18.09 V	
	Nominal maximum power current (Ipm).....	5.56 A	
	PV module type reference .....	ISEN80	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	80.5 W	
	Nominal open circuit voltage at (Voc) .....	22.1 V	
	Nominal short circuit current at (Isc) .....	4.73 A	
	Nominal maximum power voltage (Vpm).....	18.02 V	
	Nominal maximum power current (Ipm).....	4.47 A	
	PV module type reference .....	ISEN75	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	75.2 W	
	Nominal open circuit voltage at (Voc) .....	22.18 V	
	Nominal short circuit current at (Isc) .....	4.34 A	
	Nominal maximum power voltage (Vpm).....	18.07 V	
	Nominal maximum power current (Ipm).....	4.16 A	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
PV module type reference .....		ISEN60	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		60.3 W	
Nominal open circuit voltage at (Voc) .....		22.13 V	
Nominal short circuit current at (Isc) .....		3.53 A	
Nominal maximum power voltage (Vpm).....		18.04 V	
Nominal maximum power current (Ipm).....		3.34 A	
PV module type reference .....		ISEN50	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		50.1 W	
Nominal open circuit voltage at (Voc) .....		22.2 V	
Nominal short circuit current at (Isc) .....		2.9 A	
Nominal maximum power voltage (Vpm).....		18.09 V	
Nominal maximum power current (Ipm).....		2.77 A	
PV module type reference .....		ISEN40	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		40.4 W	
Nominal open circuit voltage at (Voc) .....		22.18 V	
Nominal short circuit current at (Isc) .....		2.36 A	
Nominal maximum power voltage (Vpm).....		18.02 V	
Nominal maximum power current (Ipm).....		2.24 A	
PV module type reference .....		ISEN20	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		20.5 W	
Nominal open circuit voltage at (Voc) .....		22.08 V	
Nominal short circuit current at (Isc) .....		1.2 A	
Nominal maximum power voltage (Vpm).....		18 V	
Nominal maximum power current (Ipm).....		1.14 A	
PV module type reference .....		ISEN10	
<u>Product Electrical Ratings at STC</u>			
Nominal maximum power (Pmax) .....		10.6 W	
Nominal open circuit voltage at (Voc) .....		22 V	
Nominal short circuit current at (Isc) .....		0.64 A	
Nominal maximum power voltage (Vpm).....		18 V	
Nominal maximum power current (Ipm).....		0.59 A	



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Clause	Requirement + Test	Result - Remark	Verdict
	PV module type reference .....	ISEN5	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	5.5 W	
	Nominal open circuit voltage at (Voc) .....	11.06 V	
	Nominal short circuit current at (Isc) .....	0.64 A	
	Nominal maximum power voltage (Vpm).....	9.02 V	
	Nominal maximum power current (Ipm).....	0.61 A	
	PV module type reference .....	ISEN3	
	<u>Product Electrical Ratings at STC</u>		
	Nominal maximum power (Pmax) .....	3.3 W	
	Nominal open circuit voltage at (Voc).....	11.06 V	
	Nominal short circuit current at (Isc) .....	0.39 A	
	Nominal maximum power voltage (Vpm).....	9.02 V	
	Nominal maximum power current (Ipm).....	0.37 A	
	<u>Product Safety Ratings</u>	For 72, 144 , 66, 60,120, 54, 48, 44 cell modules	
	Maximum systems operating voltage.....	1500 V	
	Maximum over-current protection rating .....	15 A	
	Safety application class .....	Class A	
	Safety class in accordance with IEC 61140 .....	Class II	
	Fire safety class.....	Class C	
	Recommended maximum series/parallel module configurations .....	26 modules in series for 72 cell modules 27 modules in series for 144 cell modules 30 modules in series for 66 cell modules 32 modules in series for 60 cell modules 16 modules in series for 120 cell modules 35 modules in series for 54 cell modules 40 modules in series for 48 cell modules 47 modules I in series for 44 cell modules	
	<u>Product Safety Ratings</u>	For 40,36 cell modules	
	Maximum systems operating voltage.....	1000 V	
	Maximum over-current protection rating .....	15 A	
	Safety application class .....	Class A	
	Safety class in accordance with IEC 61140 .....	Class II	
	Fire safety class.....	Class C	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Recommended maximum series/parallel module configurations .....	32 modules in series for 40 cell modules 36 modules in series for 36 cell modules
Product Safety Ratings	For 36, 18 cell modules
Maximum systems operating voltage.....	600 V
Maximum over-current protection rating .....	10/5 A
Safety application class .....	Class A
Safety class in accordance with IEC 61140 .....	Class II
Fire safety class.....	Class C
Recommended maximum series/parallel module configurations .....	22 modules in series for 36 cell modules 3 modules in series for 18 cell modules





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Clause	Requirement + Test	Result - Remark	Verdict

Description of module construction: (Manufactories and part numbers, unless otherwise specified)	
Sample.....:	Random sampling from production <input checked="" type="checkbox"/> Prototype submitted by client <input type="checkbox"/>
<b>Module</b>	ISEN350, ISEN345, ISEN340, ISEN335, ISEN330, ISEN325, ISEN320, ISEN315, ISEN310, ISEN305, ISEN300, ISEN250, ISEN250X, ISEN200, ISEN150  ISEN335X, ISEN330X, ISEN325X, ISEN320X, ISEN300X ISEN250X, ISEN225X, ISEN220X, ISEN200X ISEN300N, ISEN295, ISEN290, ISEN285, ISEN280 ISEN275, ISEN270, ISEN265, ISEN260, ISEN255, ISEN250 ISEN250Y ISEN250N, ISEN245, ISEN240, ISEN235, ISEN230, ISEN225 ISEN220, ISEN215, ISEN210, ISEN205, ISEN200 ISEN200N, ISEN195, ISEN190 ISEN185, ISEN180, ISEN175, ISEN170 ISEN165, ISEN160, ISEN155, ISEN150, ISEN135, ISEN130, ISEN125, ISEN110, ISEN100, ISEN80, ISEN75, ISEN60, ISEN50, ISEN40, ISEN20, ISEN10 ISEN5, ISEN3
Front Cover.....:	Manufactured by Gujarat Borosil LTD , Toughened glass, 3.2 mm ±0.2mm thick.
Rear Cover.....:	Manufactured by Renewsys India Private LTD, Model: "Preserv A 275WN/Preserv A 125WN1 Rated RTI= 120°C, overall thickness is 0.30mm
Encapsulation material.....:	Ethyl-Vinyl-acetate (EVA), Manufactured by Renewsys India Private LTD, Type: Conserv P 360-14FC, thickness 0.45±5%.
Frame.....:	Extruded aluminum frame, Manufactured by Alom Extrusions Ltd Aluminium Technology Co., Ltd(Haida Group), Type: 6063-T6
Dimensions (l x w x h) [mm].....:	ISEN350 to ISEN300: 1964 x 986 x 35 ISEN250: 1524 x 986 x 35 ISEN250X: 1650 x986 x35 ISEN200:1336 x 986 x 35 ISEN150: 1486 x 666 x35 ISEN335X to ISEN300X: 1964 x 986 x 35 ISEN225X to ISEN200X: 1336 x 986 x 35 ISEN300N to ISEN280: 1806 x 986 x 35 ISEN275 to ISEN250:1650 x 986 x 35 ISEN250Y:1650 x 986 x 35 ISEN250N to ISEN225: 1486 x 986 x 35 ISEN220 to ISEN200: 1336 x 986 x 35



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
		ISEN200N to ISEN190: 1806 x 666 x 35 ISEN185 to ISEN170: 1650 x 666 x 35 ISEN 165 to ISEN150: 1486 x 666 x 35 ISEN135 to ISEN125 : 1250 x 666 x 35 ISEN110: 1036 x 666 x 35 ISEN100: 980 x 666 x 35 ISEN80 to ISEN75: 800 x 666 x35 ISEN60: 610 x 666 x22 ISEN50: 548 x 666 x 22 ISEN40: 428 x 666 x 22 ISEN20: 432 x 356 x 22 ISEN10: 450 x 196 x22 ISEN5: 256 x 196 x 22 ISEN3: 242 x 142 x 22	
	Module area [m <sup>2</sup> ].....:	ISEN350 to ISEN300: 1964 x 986 x 35 = 1.93 ISEN250: 1524 x 986 x 35 =1.50 ISEN250X: 1650 x986 x35 = 1.63 ISEN200:1336 x 986 x 35 = 1.31 ISEN150: 1486 x 666 x35= 0.98 ISEN335X to ISEN300X: 1964 x 986 x 35 = 1.93 ISEN225X to ISEN200X: 1336 x 986 x 35= 1.31 ISEN300N to ISEN280: 1806 x 986 x 35 =1.78 ISEN275 to ISEN250:1650 x 986 x 35 = 1.63 ISEN250Y:1650 x 986 x 35 =1.63 ISEN250N to ISEN225: 1486 x 986 x 35= 0.98 ISEN220 to ISEN200: 1336 x 986 x 35 =1.31 ISEN200N to ISEN190: 1806 x 666 x 35 =1.78 ISEN185 to ISEN170: 1650 x 666 x 35= 1.09 ISEN 165 to ISEN150: 1486 x 666 x 35= 0.98 ISEN135 to ISEN125 : 1250 x 666 x 35 = 0.83 ISEN110: 1036 x 666 x 35 = 0.68 ISEN100: 980 x 666 x 35 = 0.65 ISEN80 to ISEN75: 800 x 666 x35 = 0.53 ISEN60: 610 x 666 x22 =0.40 ISEN50: 548 x 666 x 22 = 0.36 ISEN40: 428 x 666 x 22 = 0.28 ISEN20: 432 x 356 x 22 = 0.15 ISEN10: 450 x 196 x22 = 0.08 ISEN5: 256 x 196 x 22 = 0.05 ISEN3: 242 x 142 x 22 = 0.03	



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Minimum distance between current-carrying parts and module edge [mm]	13.56 mm		
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Soldering material.....:	Manufactured by Kester, Type: 952-S
Fluxing agent .....	Manufactured by Kester, Type: 952-S

<b>Cell</b>	
Cell (include type).....:	Polycrystalline solar cell, type 5BB manufactured by Sichuan Yingfa Solar Energy Technology Co., Ltd
Cells (l x w) [mm].....:	156.75 X 156.75±0.25mm
Cell thickness [µm].....:	200µm ± 20µm
Cell area [cm <sup>2</sup> ].....:	245.70
Number of cells.....:	ISEN350 to ISEN150: 72 ISEN335X to ISEN200X: 144 ISEN300N to ISEN280: 66 ISEN275 to ISEN250: 60 ISEN250Y:120 ISEN250N to ISEN225: 54 ISEN220 to ISEN200: 48 ISEN200N to ISEN190: 44 ISEN185 to ISEN170: 40 ISEN 165 to ISEN10: 36 ISEN5 to ISEN 3: 18



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

<b>Components and other</b>	
Cells per bypass diode .....	ISEN350 to ISEN150: 24 ISEN335X to ISEN320X: 24 ISEN300X:48 ISEN300N to ISEN280: 22 ISEN275 to ISEN250: 20 ISEN250Y:40 ISEN250N to ISEN225: 18 ISEN220 to ISEN200: 16 ISEN200N to ISEN190: 22 ISEN185 to ISEN170: 20 ISEN 165 to ISEN10: 18 ISEN5 to ISEN 3: N/A
Type of bypass diode.....	Manufactured by Yangzhou Yangjie Electronic Technology Co., Ltd Type 30SQ045, rated 30A, 45V and Type 20SQ045, rated 20A, 45V
No. of bypass diodes .....	ISEN350 to ISEN150: 3 ISEN335X to ISEN320X: 3 ISEN300X: 3 ISEN300N to ISEN280: 3 ISEN275 to ISEN250: 3 ISEN250Y: 3 ISEN250N to ISEN225: 3 ISEN220 to ISEN200: 3 ISEN200N to ISEN190: 3 ISEN185 to ISEN170: 2 ISEN 165 to ISEN10: 2 ISEN5 to ISEN 3: 1
Cell- and string connectors.....	Make: Xi'an Telison Electronic New Materials Co. Ltd Solder tin plated copper ribbons, Sn/Pb of 60%/40% composition
Junction box.....	Manufactured by Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd. Type PV-CY802-D, Rated 1500 Vdc, 13.5A max, IP68 Manufactured by QC Solar( Suzhou) Corporation. Type QC102032, Rated 1000 Vdc, 14A max, IP68

Cable.....	Make: Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd Type PV wire, Rated Sunlight resistant, 120°C wet or dry, 1500 V, H1Z2Z2-K, 1 x 4.0mm <sup>2</sup>
Connectors .....	Make: Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd Type PV-CY30L Connectors, rated for 1500Vdc and 30A max
Adhesives (frame).....	Type " HT906Z", manufactured by Shanghai Huitian New Material Co. Ltd. rated RTI=105°C, HAI=0, HWI=1, White color, minimum 3mm thickness, flame class is V-0.
Adhesives (junction box).....	Type " HT906Z", manufactured by Shanghai Huitian New Material Co. Ltd. rated RTI=105°C, HAI=0, HWI=1, White color, minimum 3mm thickness, flame class is V-0.
Potting material (junction box).....	NA



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Clause	Requirement + Test	Result - Remark	Verdict

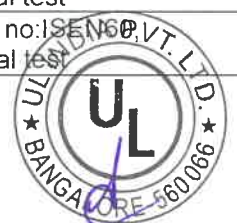
Others .....	NA
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**Testing procedure**

- New module type
- Modifications (if yes, please choose the applicable modification according to the Retesting Guideline)
- Change in cell technology
  - Modification to encapsulation system
  - Modification to superstrate
  - Increase in module size
  - Modification to back sheet/ substrate
  - Modification to frame and/ or mounting structure
  - Modification to junction box/ electrical termination
  - Change in cell interconnect materials or technique
  - Change in electrical circuit of an identical package
  - Higher or lower power output (by 10%) in the identical package including size and using the identical cell process
  - Qualification of a frameless module after the design has received certification as a framed module
  - Change in bypass diode or number of diodes

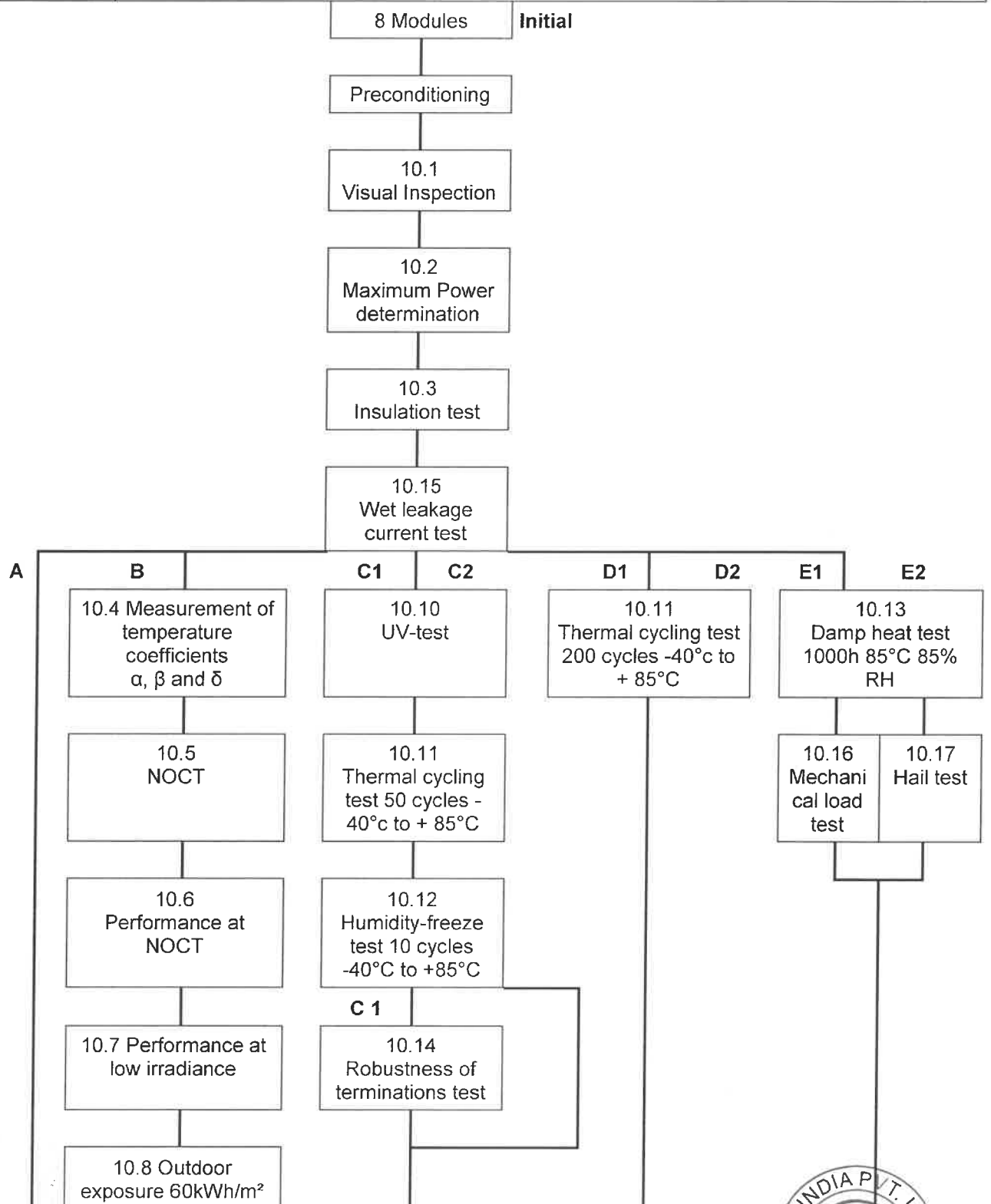
**Module group assignment:**

Sample #	Sample Group ID	Sample No. & S/N
1838821	A	Icon Solar-En Power Technologies Pvt Ltd Model no:ISEN320, S.N: ICON32036A0407211017(Control module)
1838822	B	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211009 For Full investigation
1838823	C1	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211022 For Full investigation
1838824	C	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211006 For Full investigation
1838825	E1	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211019 For Full investigation
1838826	E2	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211023 For Full investigation
1838827	D	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211024 For Full investigation
1838828	D	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN320, S.N: ICON32036A0407211025 For Full investigation
1778119	C	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN150, S.N: ICON15018S0407232004 For HF10, TC50
1836636	C1	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN150, S.N: ICON15018S0407232005 For HF10, TC50, Robutness
1836637	E2	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN150, S.N: ICON15018S0407232001For Hail Test
1836639	E1	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN150, S.N: ICON15018S0407232003 For PIV, Mechanical test
1778120	E1	Icon Solar-En Power Technologies Pvt Ltd , Model no:ISEN60, S.N: ICON06018R0407272001 For PIV, Mechanical test




IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

<b>10</b>	<p><b>TEST PROCEDURES (if it is not a full test, strikethrough non-performed test)</b></p> <p>Note: Deviations from test sequence are possible but must be documented.</p>
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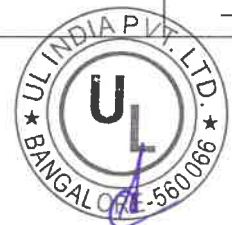
IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">10.18 Bypass-diode test</div> <div style="border: 1px solid black; padding: 5px;">10.9 Hot-spot endurance test</div>		
	10.15 Wet leakage current test	<b>Final</b>	

4	MARKING		P
	Name, monogram or symbol of manufacturer..... :		P
	Type or model number..... :	Provided	P
	Serial number..... :	Provided	P
	Polarity of terminals or leads..... :	"+" and "-" provided on connector & Junction Box	P
	Maximum system voltage..... :	1500 Vdc – For 72, 144 , 66, 60,120, 54, 48, 44 cell modules 1000Vdc- For 40, 36 cell modules 600Vdc For 36 and 18 cell modules	P
	The date and place of manufacture..... :	provided	P

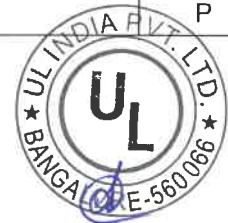
	<b>Initial examination</b>	All modules	—
10	Preconditioning..... :	5.0 kWh/m <sup>2</sup>	
10.1	Visual inspection..... :	See table 10.1 Int	P
10.2	Maximum power determination..... :	See table 10.2 Int	P
10.3	Insulation test..... :	See table 10.3 Int	P
10.15	Wet leakage current test	See table 10.15 Int	P

<b>Group A</b>	Control Module	Sample Group ID A	—
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<b>Group B</b>	1 Module	Sample Group ID B	—
10.4	Measurement of temperature coefficients	See table 10.4 B	—



IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
10.5	Measurement of Nominal Operating Cell Temperature [NOCT, °C] .....	See table 10.5 B	—
10.6	Performance at STC and NOCT .....	See table 10.6 B	—
10.7	Performance at low irradiance .....	See table 10.7 B	—
10.8	Outdoor exposure test	See table 10.8 B	P
10.18	Bypass diode thermal test	See table 10.18 B	P
	Maximum allowed junction temperature .....	200 °C	—
	Measured junction temperature .....	142.97°C	P
10.9	Hot spot endurance test .....	See table 10.9 B	P
<b>Group C</b>	2 Modules	Sample Group ID C1, C2	P
10.10	UV test .....	15 kWh/m <sup>2</sup>	P
	Final measurements	See table 10.10 C	P
10.11	Thermal cycling test (50 cycles) .....	50	P
	Final measurements	See appended table 10.11 C	P
10.12	Humidity freeze (10 cycles) .....	10	P
	Final measurements	See table 10.12 C	P
<b>Group C1</b>	1 Module	Sample Group ID C1	P
10.14	Robustness of terminations test .....	Type A	P
	Final measurements	See table 10.14 C1	P
<b>Group D</b>	2 Modules	Sample Group ID D1, D2	P
10.11	Thermal cycling test (200 cycles) .....	200	P
	Final measurements	See table 10.11 D	P
<b>Group E</b>	2 Modules	Sample Group ID E1, E2	P
10.13	Damp heat test .....	1000h	P
	Final measurements	See table 10.13 E	P



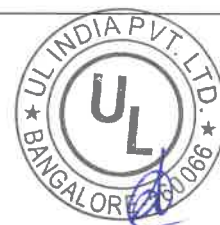


IS 14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
<b>Group E1</b>	1 Module	Sample Group ID E1	P
10.16	Mechanical load test .....	5400Pa	P
10.16.4	-No open-circuits or ground faults detected	Yes	P
	Final measurements	See table 10.16 E1	P
<b>Group E2</b>	1 Module	Sample Group ID E2	P
10.17	Hail test	25 mm	P
	Number of points impacted .....	11	P
	Final measurements	See table 10.17 E2	P
	<b>Final measurement</b>	All modules	P
10.15	Wet leakage current test	See table 10.15 F	P



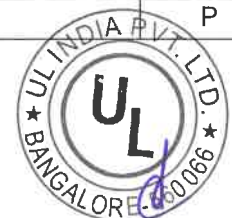
IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
<b>10.1 Initial</b>	<b>TABLE: Visual inspection (Initial)</b>		P
Test Date [MM/DD/YYYY] .....	10/12/2018		—
Sample #	Nature and position of initial findings – comments or attach photos		—
1838821	No visual defects		P
1838822	No visual defects		P
1838823	No visual defects		P
1838824	No visual defects		P
1838825	No visual defects		P
1838826	No visual defects		P
1838827	No visual defects		P
1838828	No visual defects		P
1778119	No visual defects		P
1836636	No visual defects		P
1836637	No visual defects		P
1836639	No visual defects		P
1778120			
Supplementary information: N/A			

<b>10.2 Initial</b>	<b>TABLE: Maximum power determination (Initial)</b>						P
Test Date [MM/DD/YYYY] .....	10/16/2018						—
Module temperature [°C] .....	25						—
Irradiance [W/m <sup>2</sup> ] .....	1000						—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	
1838821	45.87	37.59	9.03	8.54	321.16	78.00	
1838822	45.93	37.68	9.06	8.58	323.14	78.00	
1838823	45.90	37.57	9.03	8.58	322.35	78.00	
1838824	45.92	37.46	9.04	8.61	322.37	78.00	
1838825	45.87	37.50	9.06	8.60	322.51	78.00	
1838826	45.90	37.52	9.07	8.60	322.78	78.00	
1838827	45.88	37.54	9.04	8.59	322.40	78.00	
1838828	45.91	37.45	9.03	8.60	321.94	78.00	
1778119	22.97	18.60	8.95	8.55	159.06	77.00	
1836636	22.98	18.62	8.98	8.56	159.43	77.00	
1836637	22.97	18.65	9.03	8.58	160.07	77.00	
1836639	23.00	18.64	9.02	8.59	160.06	77.00	
Supplementary information: N/A							



IS14286:2010					
Clause	Requirement + Test		Result - Remark		Verdict
<b>10.3 Initial</b>	<b>Table: Insulation test (initial)</b>				P
Test Date [MM/DD/YYYY].....:			10/16/2018		—
Test Voltage applied [V] .....			1500/4000 (for sample 1838821 to 1838828), 1000/3000( for sample 1778119 to 1836639) ,600/2200(for sample 1778120)		—
Sample #	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes (description) / No	-	
1838821	7.11	20.62	No	-	P
1838822	6.54	20.62	No	-	P
1838823	5.89	20.62	No	-	P
1838824	4.85	20.62	No	-	P
1838825	4.65	20.62	No	-	P
1838826	5.75	20.62	No	-	P
1838827	6.00	20.62	No	-	P
1838828	3.68	20.62	No	-	P
1778119	4.64	40.40	No	-	P
1836636	5.10	40.40	No	-	P
1836637	5.32	40.40	No	-	P
1836639	4.37	40.40	No	-	P
1778120	11.05	93.02	No	-	P
Supplementary information: Size of module: For samples 1838821 to 1838828 : 1.94 [m <sup>2</sup> ] For samples 1778119 to 1836639: 0.99 [m <sup>2</sup> ] , 1778120 : 0.43 [m <sup>2</sup> ]					

<b>10.15 Initial</b>	<b>TABLE: Wet leakage current test (Initial)</b>			P
Test Date [MM/DD/YYYY].....:		10/16/2018		—
Test Voltage applied [V] .....		1500/4000 (for sample 1838821 to 1838828), 1000/3000( for sample 1778119 to 1836639) 600/2200(for sample 1778120)		—
Solution resistivity [Ω cm) .....		< 3,500 Ω cm at 22 ± 3°C	2017	—
Surface tension [Nm <sup>-2</sup> ) .....		< 0.03 Nm <sup>-2</sup> at 22 ± 3°C	—	—
Solution temperature [°C] .....		22.9		—
Sample #	Measured [GΩ]	Limit [MΩ]		Result
1838821	2.81	20.62		P
1838822	3.01	20.62		P
1838823	2.97	20.62		P
1838824	2.38	20.62		P
1838825	2.98	20.62		P
1838826	4.02	20.62		P
1838827	3.94	20.62		P
1838828	2.02	20.62		P



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
1778119	5.53	40.40	P
1836636	5.18	40.40	P
1836637	5.03	40.40	P
1836639	5.65	40.40	P
1778120	5.69	93.02	P
Supplementary information: Size of module: For samples 1838821 to 1838828 : 1.94 [m <sup>2</sup> ] For samples 1778119 to 1836639: 0.99 [m <sup>2</sup> ] , 1778120 : 0.43 [m <sup>2</sup> ]			

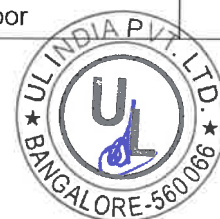
10.4 B	TABLE: Measurement of temperature coefficients		P
Test Date [MM/DD/YYYY].....	11/21/2018 & 11/22/2018		—
Ambient air temperature [°C] .....	NA		—
Irradiance [W/m <sup>2</sup> ] .....	1000		—
Module temperature [°C] high/low.....	65.90/24.70		—
Sample #	Parameter	Calculated Value	—
1838822	Short circuit current $\alpha$ [%/°C].....	0.0268	P
	Open circuit voltage $\beta$ [%/°C].....	-0.2994	P
	Peak power $\delta$ [%/°C].....	-0.3914	P

Supplementary information: NA

10.5 B	TABLE: Measurement of Nominal Operating Cell Temperature [NOCT, °C]			P
Test Date [MM/DD/YYYY].....	11/27/2018	11/28/2018	11/29/2018	—
Wind velocity [m/s]high/low .....	1.73/0.55	1.73/0.49	1.75/0.44	—
Ambient temperature [°C] high/low .....	29.99/20.34	30.80/20.41	30.54/22.74	—
Irradiance [W/m <sup>2</sup> ]high/low.....	899.0/413.80	931.00/440.30	1010.00/436.90	—
Module temperature [°C] high/low.....	64.26/20.91	67.16/22.26	62.74/39.17	—
Wind velocity [m/s](average) .....	1.095	1.110	1.071	—
Ambient temperature [°C] (average).....	26.221	27.167	26.694	—
NOCT correction factor [°C] .....	1	1	1	—
Calculated NOCT [°C] .....	52.96	52.11	46.96	—
Sample #	Average NOCT [°C]			—
1838822	50.67			—

Supplementary information: NA

10.6 B	TABLE: Performance at STC and NOCT		P
Test Date [MM/DD/YYYY].....	11/30/2018		—
Wind velocity [m/s]high/low.....	--		—
Test method.....	<input checked="" type="checkbox"/> indoor	<input type="checkbox"/> outdoor	—



IS14286:2010						
Clause	Requirement + Test			Result - Remark		Verdict
Ambient air temperature [°C] .....			25		—	
Irradiance [W/m <sup>2</sup> ] .....			1000/800		—	
Module temperature [°C] high/low.....			50.4/24.8		—	
Condition	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
STC	45.73	37.29	8.98	8.56	319.21	78.00
NOCT	41.18	32.91	7.32	6.88	226.30	75.00
Supplementary information: NA						
<b>10.7 B</b>	<b>TABLE: Performance at low irradiance</b>					P
Test Date [MM/DD/YYYY].....			11/30/2018		—	
Ambient air temperature [°C].....			---		—	
Irradiance [W/m <sup>2</sup> ](200 W/m <sup>2</sup> ).....			200		—	
Module temperature [°C] .....			24.7		—	
Test method .....			<input checked="" type="checkbox"/> Data corrected to a 25°C cell temperature and 200 W/m <sup>2</sup> irradiance <input type="checkbox"/> Directly measured			—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838822	42.40	36.04	1.82	1.71	61.59	80.00
Supplementary information: N/A						

<b>10.8 B</b>	<b>TABLE: Outdoor exposure test</b>					P
Test Date [MM/DD/YYYY] start/end .....			12/01/2018 to 12/12/2018		---	
Total irradiation dosage [kWh/m <sup>2</sup> ] .....			60		P	
Supplementary information: NA						
<b>(10.1 Visual inspection after outdoor exposure test)</b>						—
Test Date [MM/DD/YYYY] .....			12/12/2018		—	
Sample #	Nature and position of initial findings – comments or attach photos					—
1838822	No Visual defects					P
Supplementary information: NA						
<b>(10.2 Maximum power determination after outdoor exposure test)</b>						P
Test Date [MM/DD/YYYY] .....			12/12/2018		—	
Module temperature [°C].....			25		—	
Irradiance [W/m <sup>2</sup> ] .....			1000		—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838822	45.78	37.37	8.98	8.53	318.85	78.00
1838821 (control)	45.86	37.66	9.00	8.54	321.51	78.00

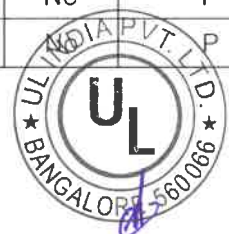


IS14286:2010					
Clause	Requirement + Test		Result - Remark		Verdict
Pmp degradation after this test [%] ≤ 5%.....:		1838822: -0.11%		P	
<b>(10.3 Insulation test after outdoor exposure test)</b>					—
Test Date [MM/DD/YYYY] :		12/12/2018		—	
Test Voltage applied [V] .....		1500/4000		—	
Sample #	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes (description)	No	
1838822	3.67	20.62	-	No	P
Supplementary information: Size of module : 1.94 [m²]					

10.18 B	TABLE: Bypass diode thermal test			P
Test Date [MM/DD/YYYY] start/end.....:	12/13/2018(1838822), 12/18/2018(1778119)			—
Module temperature [°C]..... :	75			—
Number of diodes in junction box .....	3			—
Diode manufacturer..... :	Sunter			—
Diode type designation .....	30SQ040(1838822), 20SQ045(1778119)			—
Max. permissible junction temperature T <sub>jmax</sub> [°C] (according to diode datasheet) .....	200			—
	Diode 1	Diode 2	Diode 3	Result
Current flow applied [A] .....	9.12 (1838822) 8.74 (1778119)	9.12 (1838822) 8.74 (1778119)	9.12 (1838822) - -	-
Max. diode surface temperature [°C] a or b :	136.70 (1838822) 133.20 (1778119)	133.30 (1838822) 133.70 (1778119)	139.80 (11838822) - -	-
Voltage drop [V] .....	0.35 (1838822) 0.33 (1774849)	0.35 (1838822) 0.33 (1774849)	0.35 (1838822) - -	-
Power dissipation [W] .....	3.19 (1838822) 2.89 (1774849)	3.15 (1838822) 2.90 (1774849)	3.17 (1838822) - -	-
Thermal resistance junction to leads (RTHJL)/to case (RTHJC) [K/W] (according to datasheet) :	1.00 (1838822) 2.5 (1774849)	1.00 (1838822) 2.5 (1774849)	1.00 (1838822) - -	-



IS14286:2010						
Clause	Requirement + Test			Result - Remark		Verdict
Calculated max. junction temperature $T_{jcalc}$ [°C] a or b..... :	139.89 (1838822)	136.45 (1838822)	142.97 (1838822)			-
	140.44 (1774849)	140.95 (1774849)	-			
$T_{jcalc} < T_{jmax}$ (test passed)? yes/no..... :	YES	YES	YES			P
Current flow (1.25 * Isc) [A]..... :	11.40 (1838822)	11.40 (1838822)	11.40 (1838822)			-
	10.93 (1774849)	10.93 (1774849)				
Max. diode surface temperature [°C] a or b :	146.2 (1838822)	146.2 (1838822)	155 (1838822)			-
	145.5 (1774849)	146.1 (1774849)				
Remarks: ( <sup>a</sup> measured at diode case or ambient near diode case, <sup>b</sup> measured at diode leads)						
<b>(10.1 Visual inspection after bypass diode thermal test)</b>						P
Test Date [MM/DD/YYYY] .....	12/13/2018(1838822), 12/18/2018(1778119)					—
Sample #	Nature and position of initial findings – comments or attach photos					—
1838822	No visual defects					P
1778119	No visual defects					P
Supplementary information: NA						
<b>(10.2 Maximum power determination after bypass diode thermal test)</b>						P
Test Date [MM/DD/YYYY] .....	12/13/2018(1838822), 12/19/2018(1778119)					—
Module temperature [°C].....	25					—
Irradiance [W/m <sup>2</sup> ] .....	1000					—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838822	45.83	37.33	8.96	8.50	317.25	77.00
1778119	22.86	18.51	8.95	8.46	156.62	77.00
1838821 (control)	45.89	37.68	8.97	8.51	320.69	78.00
Pmp degradation after this test [%] ≤ 5% .....			1838822: -0.50%, 1778119: -0.14%			P
Supplementary information: N/A						
<b>(10.3 Insulation test after bypass diode thermal test)</b>						P
Test Date [MM/DD/YYYY] .....	12/13/2018(1838822), 12/19/2018(1778119)					—
Test Voltage applied [V] .....	1500/4000-1838822 1000/3000-1778119					—
Sample #	Measured	Required	Dielectric breakdown		Result	
	GΩ	MΩ	Yes (description)		No	—
1838822	1.89	20.62	-		No	P
1778119	2.67	40.40	-			P



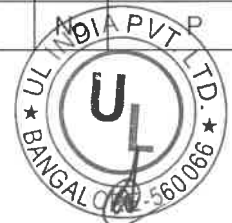
IS14286:2010							
Clause	Requirement + Test				Result - Remark	Verdict	
Supplementary information: Size of module: 1838822: 1.94 [m <sup>2</sup> ] , 1778119: 0.99 [m <sup>2</sup> ]							
<b>10.9 B</b>	<b>TABLE: Hot-spot endurance test</b>						
Test Date [MM/DD/YYYY] start/end .....	12/13/2018					P	
Cell interconnection circuit.....	<input checked="" type="checkbox"/> S <input type="checkbox"/> SP <input type="checkbox"/> SPS					—	
Module temperature at thermal equilibrium [°C] .....	41.2					—	
<b>Determination of worst case cell</b>						—	
Maximum measured cell temperature in 5 hours [°C] :	88.40					—	
Shading rate [%].....	100					—	
Supplementary information: N/A							
<b>(10.1 Visual inspection after hot-spot endurance test)</b>						P	
Test Date [MM/DD/YYYY] .....	12/13/2018					—	
Sample #	Nature and position of initial findings – comments or attach photos					—	
1838822	No visual defects					P	
Supplementary information: N/A							
<b>(10.2 Maximum power determination after hot-spot endurance test)</b>						P	
Test Date [MM/DD/YYYY] .....	12/13/2018					—	
Module temperature [°C].....	25					—	
Irradiance [W/m <sup>2</sup> ] .....	1000					—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	
1838822	45.77	37.33	8.94	8.48	316.60	77.00	
1838821 (control)	45.90	37.68	8.97	8.51	320.81	78.00	
Pmp degradation after this test [%] ≤ 5% .....	1838822: -0.20%					P	
Supplementary information: A solar simulator was used for the measurements.							
<b>(10.3 Insulation test after hot-spot endurance test)</b>						P	
Test Date [MM/DD/YYYY] .....	12/13/2018					—	
Test Voltage applied [V] .....	1500/4000					—	
Sample #	Measured	Required	Dielectric breakdown			Result	
	GΩ	MΩ	Yes (description)	No		—	
1838822	1.08	20.62	-	No		P	
Supplementary information: Size of module:1.94 [m <sup>2</sup> ]							





IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

<b>10.10 C</b>	<b>TABLE: UV preconditioning test</b>					P
Test Date [MM/DD/YYYY] start/end.....:	10/24/2018 to 11/02/2018					—
Module temperature [°C] .....	60±5°C					—
Irradiation 280 - 400 nm [kWh/ m²] UV-A .....	15.21					—
Irradiation 280 - 320 nm [kWh/ m²] UV-B.....:	0.87					—
Sample #						—
1838823	No					P
1838824	No					P
Supplementary information: N/A						
<b>(10.1 Visual inspection after UV preconditioning test)</b>						P
Test Date [MM/DD/YYYY] .....	11/02/2018					—
Sample #	Nature and position of initial findings – comments or attach photos					—
1838823	No visual defects					P
1838824	No visual defects					P
Supplementary information: N/A						
<b>(10.2 Maximum power determination after UV preconditioning test)</b>						P
Test Date [MM/DD/YYYY] .....	11/05/2018					—
Module temperature [°C].....:	25					—
Irradiance [W/m²) .....	1000					—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838823	45.89	37.55	9.04	8.58	322.11	78.00
1838824	45.91	37.41	9.05	8.60	321.85	77.00
1838821 (Control)	45.86	37.48	8.99	8.57	321.11	78.00
Pmp degradation after this test [%] ≤ 5% .....	1838823: -0.074% 1838824: -0.16%					P
Supplementary information: N/A						
<b>(10.3 Insulation test after UV preconditioning test)</b>						P
Test Date [MM/DD/YYYY] .....	11/05/2018					—
Test Voltage applied [V] .....	1500/4000					—
Sample #	Measured	Required	Dielectric breakdown			Result
	GΩ	MΩ	Yes (description)	No		
1838823	4.78	20.62	-	No	P	
1838824	4.14	20.62	-	No	P	



IS14286:2010						
Clause	Requirement + Test				Result - Remark	Verdict
Supplementary information: Size of module: 1.94 [m <sup>2</sup> ]						
<b>10.11 C</b>	<b>TABLE: Thermal cycling 50 test</b>					P
Test Date [MM/DD/YYYY] start/end .....				11/17/2018 to 11/26/2018		—
Total cycles (50) .....				50		—
Sample #	Open circuits (yes/no)				—	
1838823	No				P	
1838824	No				P	
1806636	No				P	
1778119	No				P	
Supplementary information: N/A						
<b>(10.1 Visual inspection after thermal cycling 50 test)</b>						P
Test Date [MM/DD/YYYY] .....				11/26/2018		—
Sample #	Nature and position of initial findings – comments or attach photos				—	
1838823	No visual defects				P	
1838824	No visual defects				P	
1806636	No visual defects				P	
1778119	No visual defects				P	
Supplementary information: N/A						
<b>(10.2 Maximum power determination after thermal cycling 50 test)</b>						P
Test Date [MM/DD/YYYY] .....				11/26/2018		—
Module temperature [°C].....				25		—
Irradiance [W/m <sup>2</sup> ] .....				1000		—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838823	45.78	37.36	9.04	8.57	320.24	77.00
1838824	45.79	37.29	9.05	8.57	319.67	77.00
1806636	22.88	18.46	9.04	8.60	158.73	77.00
1778119	22.86	18.51	9.04	8.55	158.29	77.00
1838821 (Control)	45.86	37.57	8.99	8.55	321.04	78.00
Pmp degradation after this test [%] ≤ 5%.....			1838823: -0.58%		1806636: -0.44%	
			1838824: -0.68%		1778119: -0.48%	
Supplementary information: N/A						



IS14286:2010					
Clause	Requirement + Test			Result - Remark	Verdict
<b>(10.3 Insulation test after thermal cycling 50 test)</b>					P
Test Date [MM/DD/YYYY] .....		11/26/2018			—
Test Voltage applied [V] .....		1500/4000, 1000/3000			—
Sample #	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes (description)	No	
1838823	3.76	20.62	-	No	P
1838824	3.67	20.62	-	No	P
1806636	4.16	40.81	-	No	P
1778119	3.87	40.81	-	No	P
Supplementary information: Size of module : For samples 1838823, 1838824: 1.94 [m <sup>2</sup> ] For samples 1806636, 1778119: 0.98 [m <sup>2</sup> ]					

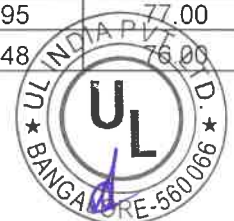
<b>10.12 C</b>	<b>TABLE: Humidity freeze 10 test</b>				P
Test Date [MM/DD/YYYY] start/end .....		11/26/2018 to 12/08/2018			—
Total cycles (10) .....		10			—
Sample #	Open circuits (yes/no)				—
1838823	No				P
1838824	No				P
1806636	No				P
1778119	No				P

Supplementary information: NA

<b>(10.1 Visual inspection after humidity freeze 10 test)</b>					P
Test Date [MM/DD/YYYY] .....		12/08/2018			—
Sample #	Nature and position of initial findings – comments or attach photos				—
1838823	No visual defects				P
1838824	No visual defects				P
1806636	No visual defects				P
1778119	No visual defects				P

Supplementary information: N/A

<b>(10.2 Maximum power determination after humidity freeze 10 test)</b>							P
Test Date [MM/DD/YYYY] .....		12/08/2018					—
Module temperature [°C].....		25					—
Irradiance [W/m <sup>2</sup> ] .....		1000					—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	
1838823	45.74	37.31	9.03	8.54	318.74	77.00	
1838824	45.71	37.18	9.02	8.53	316.95	77.00	
1806636	22.94	18.36	9.07	8.58	157.48	76.00	



IS14286:2010						
Clause	Requirement + Test			Result - Remark		Verdict
1778119	22.84	18.47	9.06	8.49	156.84	76.00
1838821 (Control)	45.86	37.58	8.99	8.54	321.10	78.00
Pmp degradation after this test [%] ≤ 5% .....			1838823: -0.47%	1806636: -0.78%		P
			1838824: -0.85%	1778119: -0.91%		
Supplementary information: A solar simulator was used for the measurements.						
<b>(10.3 Insulation test after humidity freeze 10 test)</b>						P
Test Date [MM/DD/YYYY] .....			12/08/2018			—
Test Voltage applied [V] .....			1000/3000			—
Sample #	Measured	Required	Dielectric breakdown		Result	
	GΩ	MΩ	Yes (description)	No		
1838823	2.47	20.62	-	No	P	
1838824	2.16	20.62	-	No	P	
1806636	2.15	40.81	-	No	P	
1778119	2.13	40.81	-	No	P	
Supplementary information: For samples 1838823, 1838824: 1.94 [m <sup>2</sup> ] For samples 1806636, 1778119: 0.98 [m <sup>2</sup> ]						

<b>10.14 C1</b>	<b>TABLE: Robustness of terminations test</b>				P
Test Date [MM/DD/YYYY] start/end .. :		12/10/2018			—
Types of terminations		<input checked="" type="checkbox"/> Type A: wire of flying lead <input type="checkbox"/> Type B: tags, threaded stubs, screws, etc. <input type="checkbox"/> Type C: connector			—
Applied force in all directions [N] .....		2.5			—
Sample #	Open circuits (yes/no)				—
1838823	No				P
1806636	No				P
Supplementary information: N/A					
<b>(10.1 Visual inspection after robustness of terminations test)</b>					P
Test Date [MM/DD/YYYY] .....		12/10/2018			—
Sample #	Nature and position of initial findings – comments or attach photos				—
1838823	No Visual defects				P
1806636	No Visual defects				P
Supplementary information: N/A					
<b>(10.2 Maximum power determination after robustness of terminations test)</b>					P
Test Date [MM/DD/YYYY] .....		12/10/2018			—



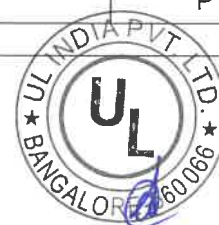
IS14286:2010						
Clause	Requirement + Test			Result - Remark		Verdict
Module temperature [°C].....:			25		—	
Irradiance [W/m <sup>2</sup> ] .....			1000		—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838823	45.79	37.12	9.03	8.56	317.82	77.00
1806636	22.91	18.34	9.06	8.53	156.44	75.00
1838821 (Control)	45.86	37.57	8.99	8.55	321.04	78.00
Pmp degradation after this test [%] ≤ 5% .....			1838823: -0.28%, 1806636: -0.66%		P	
Supplementary information: N/A						
<b>(10.3 Insulation test after robustness of terminations test)</b>						—
Test Date [MM/DD/YYYY] .....			12/10/2018		—	
Test Voltage applied [V] .....			1500/4000 (for sample 1838823) 1000/3000( for sample 1836636)		—	
Sample #	Measured	Required	Dielectric breakdown			—
	GΩ	MΩ	Yes (description)	No	—	
1838823	1.12	20.62	-	No	P	
1806636	1.78	40.81	-	No	P	
Supplementary information: Size of module : 1838823: 1.94 [m <sup>2</sup> ] , 1806636: 0.98[m <sup>2</sup> ]						

<b>10.11 D</b>	<b>TABLE: Thermal cycling 200 test</b>					P
Test Date [MM/DD/YYYY] start/end .....			10/23/2018 to 12/07/2018		—	
Total cycles (200) .....			200		—	
Applied current [A] .....			8.75		—	
Sample #	Open circuits (yes/no)				—	
1838827	No				P	
1838828	No				P	
Supplementary information: NA						
<b>(10.1 Visual inspection after thermal cycling 200 test)</b>						P
Test Date [MM/DD/YYYY] .....			12/07/2018		—	
Sample #	Nature and position of initial findings – comments or attach photos					—
1838827	No Visual defects					P
1838828	No Visual defects					P
Supplementary information: N/A						
<b>(10.2 Maximum power determination after thermal cycling 200 test)</b>						P
Test Date [MM/DD/YYYY] .....			12/07/2018		—	



IS14286:2010							
Clause	Requirement + Test				Result - Remark	Verdict	
Module temperature [°C].....:		25			—		
Irradiance [W/m <sup>2</sup> ] .....		1000			—		
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]	
1838827	45.75	37.26	9.01	8.51	316.95	77.00	
1838828	45.73	37.36	8.95	8.47	316.42	77.00	
1838821 (control)	45.87	37.58	8.99	8.55	321.09	78.00	
Pmp degradation after this test [%] ≤ 5% .....			1838827: -1.69%	1838828: -1.71%	P		
Supplementary information: N/A							
<b>(10.3 Insulation test after thermal cycling 200 test)</b>						P	
Test Date [MM/DD/YYYY] .....		12/08/2018				—	
Test Voltage applied [V].....:		1500/4000				—	
Sample #	Measured	Required	Dielectric breakdown		Result		
	GΩ	MΩ	Yes (description)	No			
1838827	1.78	20.62	-	No	P		
1838828	1.67	20.62	-	No	P		
Supplementary information: Size of module:1.94 [m <sup>2</sup> ]							

<b>10.13 E</b>	<b>TABLE: Damp heat 1000 test</b>				P
Test Date [MM/DD/YYYY] start/end :		10/16/2018 to 12/03/2018			—
Total hours (1000) .....		1000			—
Sample #	Open circuits (yes/no)				—
1838825	No				P
1838826	No				P
1836639	No				P
1836637	No				P
Supplementary information: N/A					
<b>(10.1 Visual inspection after damp heat 1000 test)</b>					—
Test Date [MM/DD/YYYY] .....		12/03/2018			—
Sample #	Nature and position of initial findings – comments or attach photos				—
1806621	No Visual defects				P
1806622	No Visual defects				P
1806641	No Visual defects				P
Supplementary information: N/A					



IS14286:2010					
Clause	Requirement + Test			Result - Remark	Verdict
<b>(10.3 Insulation test after damp heat 1000 test)</b>					P
Test Date [MM/DD/YYYY] .....		12/03/2018			—
Test Voltage applied [V] .....		1500/4000 (for sample 1838825 to 1838826), 1000/3000( for sample 1836639 to 1836637)			—
Sample #	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes (description)	No	—
1838825	2.17	20.62	-	No	P
1838826	2.54	20.62	-	No	P
1836639	3.13	40.81	-	No	P
1836637	3.18	40.81	-	No	P
Supplementary information: Size of module : For sample 1838825, 1838826: 1.94 [m <sup>2</sup> ] For sample 1836639, 1836637: 0.98[m <sup>2</sup> ]					



IS14286:2010						
Clause	Requirement + Test				Result - Remark	Verdict
<b>(10.15 Wet leakage current test after damp heat 1000 test)</b>						P
Test Date [MM/DD/YYYY] .....		12/03/2018			—	
Test Voltage applied [V].....		1500/4000 (for sample 1838825 to 1838826), 1000/3000( for sample 1836639 to 1836637)			—	
Solution resistivity [ $\Omega$ cm].....		< 3,500 $\Omega$ cm at 22 $\pm$ 3°C	1856		—	
Surface tension [ $\text{Nm}^{-2}$ ].....		< 0.03 $\text{Nm}^{-2}$ at 22 $\pm$ 3°C	---		—	
Solution temperature [ $^{\circ}\text{C}$ ] .....		24.2			—	
Sample #	Measured [ $\text{G}\Omega$ ]		Limit [ $\text{M}\Omega$ ]		Result	
1838825	1.67		20.62		P	
1838826	1.78		20.62		P	
1836639	2.17		40.81		P	
1836637	2.13		40.81		P	
Supplementary information: For sample 1838825, 1838826: 1.94 [ $\text{m}^2$ ] For sample 1836639,1836637: 0.98 [ $\text{m}^2$ ]						
<b>(10.2 Maximum power determination after damp heat 1000 test)</b>						P
Test Date [MM/DD/YYYY] .....		12/03/2018			—	
Module temperature [ $^{\circ}\text{C}$ ].....		25			—	
Irradiance [ $\text{W}/\text{m}^2$ ] .....		1000			—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838825	45.74	37.26	9.03	8.55	318.68	77.00
1838826	45.78	37.27	9.04	8.56	319.09	77.00
1836639	22.94	18.53	8.98	8.52	157.90	77.00
1836637	22.94	18.51	9.00	8.53	157.90	76.00
1838821 (Control)	45.87	37.56	8.98	8.55	321.01	78.00
Pmp degradation after this test [%] $\leq$ 5% .....			1838825: -1.18%	1836639: -1.34%	P	
			1838826: -1.14%	1836637: -1.35%		
Supplementary information: N/A						



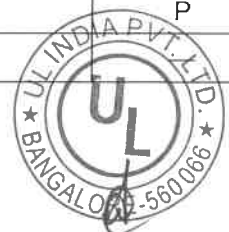


IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

10.16 E1	TABLE: Mechanical load test		P
Sample # .....	1838825, 1836639, 1778120		—
Test Date [MM/DD/YYYY].....:	12/04/2018 (1838825), 12/05/2018(1836639,1778120)		—
Mounting method .....	As per manual	As per manual	—
Load applied to.....:	front side	back side	—
Mechanical load [Pa] .....	2400	2400	—
First cycle time (start/end) :	12:00 to 13:00 (1838825, 1836639) 12:10 to 13:10 (1778120)	13:10 to 14:10 (1838825,1836639) 13:20 to 14:20 (1778120)	—
Intermittent open-circuit (yes/no) :	No	No	P
Mechanical load [Pa] :	2400	2400	—
Second cycle time (start/end) :	14:20 to 15:20 (1838825, 1836639) 14:30 to 15:30 (1778120)	15:30 to 16:30 (1838825,1836639) 15:40 to 16:40 (1778120)	—
Intermittent open-circuit (yes/no) :	No	No	P
Mechanical load [Pa] :	5400	2400	—
Third cycle time (start/end) :	16:40 to 17:40 (1838825, 1836639) 16:50 to 17:50 (1778120)	17:50 to 18:50 (1838825, 1836639) 18:00 to 19:00 (1778120)	—
Intermittent open-circuit (yes/no) :	No	No	P
Supplementary information: Such as Maximum bending at module center.			
<b>(10.1 Visual inspection after mechanical load test)</b>			P
Test Date [MM/DD/YYYY].....:	12/04/2018 (1838825), 12/05/2018(1836639,1778120)		—
Sample #	Nature and position of initial findings – comments or attach photos		—
1838825	No visual defects		P
1836639	No visual defects		P
1778120	No visual defects		P
Supplementary information: N/A			



IS14286:2010						
Clause	Requirement + Test				Result - Remark	Verdict
<b>(10.2 Maximum power determination after mechanical load test)</b>						P
Test Date [MM/DD/YYYY].....:		12/04/2018 (1838825), 12/05/2018(1836639,1778120)				—
Module temperature [°C].....:		25				—
Irradiance [W/m <sup>2</sup> ].....:		1000				—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838825	45.85	37.32	9.03	8.51	317.46	77.00
1836639	22.94	18.49	8.98	8.47	156.61	76.00
1778120	22.88	19.01	3.58	3.35	63.72	78.00
1838821 (Control)	45.86	37.52	8.99	8.56	321.11	78.00
1838821 (Control)	45.86	37.59	8.99	8.54	321.13	78.00
Pmp degradation after this test [%] ≤ 5% .....				1838825: -0.38%,1836639: -0.81 % 1778120: -1.04%		P
Supplementary information: N/A						
<b>(10.3 Insulation test after mechanical load test)</b>						P
Test Date [MM/DD/YYYY] .....		12/05/2018				—
Test Voltage applied [V] .....		1500/4000, 1000/3000,600/2200				—
Sample #	Measured	Required	Dielectric breakdown		Result	
	GΩ	MΩ	Yes (description)	No		
1838825	1.01	20.62	-	No	P	
1836639	1.15	40.81	-	No	P	
1778120	2.18	93.02	-	No	P	
Supplementary information: Size of module: 1838825: 1.94[m <sup>2</sup> ], 1836639: 0.98[m <sup>2</sup> ], 1778120: 0.43[m <sup>2</sup> ]						
<b>10.17 E2</b>	<b>TABLE: Hail impact test</b>					P
Test Date [MM/DD/YYYY] .....		12/10/2018				—
Ice ball size [mm]..... :		25				—
Ice ball weight [g] .....		7.52				—
Ice ball velocity [m/s]..... :		23				—
Number of impact locations .....		11				—
Sample #	Open circuits (yes/no)					—
1838826	No					P
1836637	No					P
Supplementary information: N/A						
<b>(10.1 Visual inspection after hail impact test)</b>						P
Test Date [MM/DD/YYYY] .....		12/10/2018				—



IS14286:2010						
Clause	Requirement + Test			Result - Remark		Verdict
Sample #	Nature and position of initial findings – comments or attach photos					—
1838826	No Visual defects					P
1836637	No Visual defects					P
Supplementary information: NA						
<b>(10.2 Maximum power determination after hail impact test)</b>						P
Test Date [MM/DD/YYYY] .....				12/10/2018		—
Module temperature [°C].....				25		—
Irradiance [W/m <sup>2</sup> ] .....				1000		—
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF [%]
1838826	45.85	37.30	9.04	8.53	318.02	77.00
1836637	22.92	18.41	9.03	8.55	157.53	76.00
1838821 (Control)	45.86	37.44	8.98	8.57	321.01	78.00
Pmp degradation after this test [%] ≤ 5% .....				1838826: -0.33%, 1836637: -0.23%		P
Supplementary information: N/A						
<b>(10.3 Insulation test after hail impact test)</b>						P
Test Date [MM/DD/YYYY] .....				12/10/2018		—
Test Voltage applied [V] .....				1500/4000, 1000/3000		—
Sample #	Measured	Required	Dielectric breakdown		Result	
	MΩ	MΩ	Yes (description)	No		
1838826	997	20.62	-	No	P	
1836637	897	40.81	-	No	P	
Supplementary information: Size of module : 1838826: 1.94[m <sup>2</sup> ] , 1836637: 0.98[m <sup>2</sup> ]						



IS14286:2010								
Clause	Requirement + Test						Result - Remark	Verdict
<b>10.2 F</b>	<b>TABLE: Maximum power determination (Final)</b>							P
Test Date [MM/DD/YYYY].....:			10/12/2018 to 12/13/2018				—	
Module temperature [°C].....:			25				—	
Irradiance [W/m <sup>2</sup> ].....:			1000				—	
Sample #	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	FF [%]	Pmp [W]	Degradation [%]	Limit [%]
1838821	45.87	37.59	9.03	8.54	78.00	321.16	-	-
1838822	45.77	37.33	8.94	8.48	77.00	316.60	-0.20	8
1838823	45.79	37.12	9.03	8.56	77.00	317.82	-1.40	8
1838824	45.71	37.18	9.02	8.53	77.00	316.95	-1.68	8
1838825	45.85	37.32	9.03	8.51	77.00	317.46	-1.56	8
1838826	45.85	37.30	9.04	8.53	77.00	318.02	-1.47	8
1838827	45.75	37.26	9.01	8.51	77.00	316.95	-1.69	8
1838828	45.73	37.36	8.95	8.47	77.00	316.42	-1.71	8
Supplementary information: N/A								



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
<b>10.15 F</b>	<b>TABLE: Wet leakage current test (Final)</b>		P
Test Date [MM/DD/YYYY].....:	12/19/2018		—
Test Voltage applied [V].....:	1500		—
Solution resistivity [ $\Omega$ cm].....:	< 3,500 $\Omega$ cm at 22 $\pm$ 3°C	2067	—
Surface tension [ $\text{Nm}^{-2}$ ].....:	< 0.03 $\text{Nm}^{-2}$ at 22 $\pm$ 3°C	--	—
Solution temperature [°C].....:	24.1		—
Sample #	Measured [ $\text{G}\Omega$ ]	Limit [ $\text{M}\Omega$ ]	Result
1806618	1.29	20.62	P
1806619	1.06	20.62	P
1806620	1.08	20.62	P
1806621	1.01	20.62	P
1806622	1.02	20.62	P
1806623	1.04	20.62	P
1806624	1.07	20.62	P
Supplementary information: Size of module: 1.94 [ $\text{m}^2$ ]			



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

**List of Annexes**

Annex 1: List of measurement equipment

Annex 2: Spectrum of the lamp used for the UV pre-screening test (Optional)

Annex 3: Statement of the estimated uncertainty of the test results

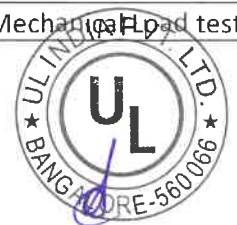
Annex 4: Enclosures



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

**Annex 1: List of measurement equipment**

Description	Identification #	Application
Datalogger	70817	Preconditioning
CONTINUOUS SIMULATOR	71790	Preconditioning
PYRANOMETER (PV LAB)	69889	Preconditioning
FLASH SOLAR SIMULATOR	70472	Initial PIV Measurement
REFERENCE MODULE (PV LAB)	170515	Initial PIV Measurement
Datalogger, RH & Temperature	65675	Initial PIV Measurement
Datalogger, RH & Temperature	70683	Initial PIV Measurement
Measuring Tool, Ruler or Tape Measure	158581	Initial PIV Measurement
Apparatus, Insulation Resistance Test	68600	Insulation Test
Datalogger, RH & Temperature	68612	Insulation Test
Apparatus, Insulation Resistance Test	68600	Wet Leakage Current Test
Datalogger, RH & Temperature	68612	Wet Leakage Current Test
Chamber, Climatic, Temp and RH	70575	Damp Heat Test
Chamber, Climatic, Temp and RH	169223	Damp Heat Test
Chamber, Climatic, Temp and RH	72836	Thermal Cycling Test-200
Datalogger	68859	Thermal Cycling Test-200
Power Supply, DC	70584	Thermal Cycling Test-200
Power Supply, DC	72838	Thermal Cycling Test-200
Shunt, Current or Voltage	76424	Thermal Cycling Test-200
Shunt, Current or Voltage	76545	Thermal Cycling Test-200
Shunt, Current or Voltage	76350	Thermal Cycling Test-200
FLASH SOLAR SIMULATOR	70472	Post Test after TC-200
REFERENCE MODULE (PV LAB)	170515	Post Test after TC-200
Datalogger, RH & Temperature	70683	Post Test after TC-200
Measuring Tool, Ruler or Tape Measure	158581	Post Test after TC-200
Apparatus, Dielectric Strength Test	68598	Post Test after TC-200
Datalogger, RH & Temperature	65675	Post Test after TC-200
Apparatus, Insulation Resistance Test	68600	Post Test after TC-200
Datalogger, RH & Temperature	68612	Post Test after TC-200
FLASH SOLAR SIMULATOR	70472	Post Test after Damp heat
REFERENCE MODULE (PV LAB)	170515	Post Test after Damp heat
Datalogger, RH & Temperature	65675	Post Test after Damp heat
Datalogger, RH & Temperature	70683	Post Test after Damp heat
Measuring Tool, Ruler or Tape Measure	158581	Post Test after Damp heat
Apparatus, Dielectric Strength Test	68598	Post Test after Damp heat
Apparatus, Insulation Resistance Test	68600	Post Test after Damp heat
Datalogger, RH & Temperature	68612	Post Test after Damp heat
MECHANICAL LOADING FIXTURE	78238	Mechanical loading
Datalogger, RH & Temperature	65675	Mechanical loading
Weighing Device, Scale or Balance, Analog or Digital	49060	Mechanical loading
Power Supply, DC	70589	Mechanical loading
FLASH SOLAR SIMULATOR	70472	Post Test after Mechanical loading test



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	REFERENCE MODULE (PV LAB)	170515	Post Test after Mechanical Load test
	Datalogger, RH & Temperature	65675	Post Test after Mechanical Load test
	Datalogger, RH & Temperature	70683	Post Test after Mechanical Load test
	Measuring Tool, Ruler or Tape Measure	158581	Post Test after Mechanical Load test
	Apparatus, Insulation Resistance Test	68600	Post Test after Mechanical Load test
	Datalogger, RH & Temperature	68612	Post Test after Mechanical Load test
	Apparatus, Impact, Drop	70574	Hail Impact Test
	Power Supply, DC	70250	Hail Impact Test
	FLASH SOLAR SIMULATOR	70472	Post test after hail test
	REFERENCE MODULE (PV LAB)	170515	Post test after hail test
	Datalogger, RH & Temperature	65675	Post test after hail test
	Datalogger, RH & Temperature	70683	Post test after hail test
	Measuring Tool, Ruler or Tape Measure	158581	Post test after hail test
	UV Lamp	79599	UV Preconditioning Test
	Chamber, Conditioning, UV	171611	UV Preconditioning Test
	Datalogger	80536	UV Preconditioning Test
	FLASH SOLAR SIMULATOR	70472	Post UV PIV
	REFERENCE MODULE (PV LAB)	170515	Post UV PIV
	Apparatus, Insulation Resistance Test	68600	Post UV Insulation Test
	Datalogger, RH & Temperature	68612	Post UV Insulation Test
	Chamber, Climatic, Temp and RH	169217	Thermal Cycling 50
	Datalogger, Temperature	84828	Thermal Cycling 50
	FLASH SOLAR SIMULATOR	70472	Post TC-50 PIV
	REFERENCE MODULE (PV LAB)	170515	Post TC-50 PIV
	Apparatus, Insulation Resistance Test	68600	Post TC-50 Insulation Test
	Datalogger, RH & Temperature	68612	Post TC-50 Insulation Test
	Chamber, Climatic, Temp and RH	71113	HF-10 Cycling
	Datalogger	71520	HF-10 Cycling
	FLASH SOLAR SIMULATOR	70472	Post HF-10 PIV
	REFERENCE MODULE (PV LAB)	170515	Post HF-10 PIV
	Force Gauge, Digital	88737	ROBUSTNESS OF TERMINATIONS TEST
	Weight	156992	ROBUSTNESS OF TERMINATIONS TEST
	Weight	156993	ROBUSTNESS OF TERMINATIONS TEST
	Measuring Tool, Micrometer or Caliper, Digital or Analog	69884	ROBUSTNESS OF TERMINATIONS TEST
	FLASH SOLAR SIMULATOR	70472	Post Tests after robustness of terminations
	REFERENCE MODULE (PV LAB)	170515	Post Tests after robustness of terminations
	Apparatus, Insulation Resistance Test	68600	Post Tests after robustness of terminations
	Datalogger, RH & Temperature	68612	Post Tests after robustness of terminations
	FLASH SOLAR SIMULATOR	70472	Measurement of Temp. Coefficient Test
	REFERENCE MODULE (PV LAB)	170515	Measurement of Temp. Coefficient Test
	Datalogger, RH & Temperature	65675	Measurement of Temp. Coefficient Test
	Thermometer, Infrared	148434	Measurement of Temp. Coefficient Test





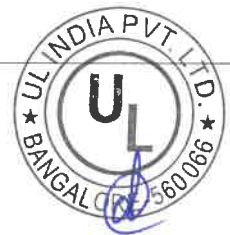
IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	Chamber, Climatic, Temp	70192	Measurement of Temp. Coefficient Test
	Measuring Tool, Ruler or Tape Measure	158581	MEASUREMENT OF NOCT
	WEATHER STATION	71858	MEASUREMENT OF NOCT
	Gauge, Inclinator, Digital or Analog	69891	MEASUREMENT OF NOCT
	Datalogger	70334	MEASUREMENT OF NOCT
	Measuring Tool, Micrometer or Caliper, Digital or Analog	69881	MEASUREMENT OF NOCT
	FLASH SOLAR SIMULATOR	70472	Performance @ STC & NOCT
	REFERENCE MODULE (PV LAB)	170515	Performance @ STC & NOCT
	Datalogger, RH & Temperature	65675	Performance @ STC & NOCT
	Datalogger, RH & Temperature	70683	Performance @ STC & NOCT
	Measuring Tool, Ruler or Tape Measure	158581	Performance @ STC & NOCT
	Chamber, Climatic, Temp	70192	Performance @ STC & NOCT
	FLASH SOLAR SIMULATOR	70472	Performance @ Low Irrandiance
	REFERENCE MODULE (PV LAB)	170515	Performance @ Low Irrandiance
	Datalogger, RH & Temperature	70683	Performance @ Low Irrandiance
	Datalogger	70334	Outdoor Exposure Test
	Component, Resistor	68247	Outdoor Exposure Test
	Datalogger	70334	Outdoor Exposure Test
	Component, Resistor	68247	Outdoor Exposure Test
	FLASH SOLAR SIMULATOR	70472	PIV @ Post Outdoor
	REFERENCE MODULE (PV LAB)	170515	PIV @ Post Outdoor
	Datalogger, RH & Temperature	65675	PIV @ Post Outdoor
	Chamber, Climatic, Temp	70192	Bypass Diode Thermal Test
	Datalogger, RH & Temperature	65675	Bypass Diode Thermal Test
	Power Supply, DC	70589	Bypass Diode Thermal Test
	FLASH SOLAR SIMULATOR	70472	Post PIV after bypass diode
	REFERENCE MODULE (PV LAB)	170515	Post PIV after bypass diode
	Datalogger, RH & Temperature	65675	Post PIV after bypass diode
	Datalogger, RH & Temperature	70683	Post PIV after bypass diode
	Measuring Tool, Ruler or Tape Measure	158581	Post PIV after bypass diode
	Chamber, Climatic, Temp	70192	Bypass Diode Thermal Test
	Datalogger, RH & Temperature	65675	Bypass Diode Thermal Test
	Power Supply, DC	70589	Bypass Diode Thermal Test
	FLASH SOLAR SIMULATOR	70472	Post PIV after bypass diode
	REFERENCE MODULE (PV LAB)	170515	Post PIV after bypass diode
	Datalogger, RH & Temperature	65675	Post PIV after bypass diode
	Datalogger, RH & Temperature	70683	Post PIV after bypass diode
	Measuring Tool, Ruler or Tape Measure	158581	Post PIV after bypass diode
	Datalogger	70817	Hotspot Test
	CONTINOUS SIMULATOR	71790	Hotspot Test
	Timer, Digital or Analog	69762	Hotspot Test
	Datalogger, RH & Temperature	65675	Hotspot Test
	PYRANOMETER (PV LAB)	69889	Hotspot Test
	FLASH SOLAR SIMULATOR	70472	Post PIV after hotspot
	REFERENCE MODULE (PV LAB)	170515	Post PIV after hotspot



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	Datalogger, RH & Temperature	65675	Post PIV after hotspot
	Datalogger, RH & Temperature	70683	Post PIV after hotspot
	Measuring Tool, Ruler or Tape Measure	158581	Post PIV after hotspot
	Chamber, Climatic, Temp	70192	Bypass Diode Test
	Datalogger, RH & Temperature	65675	Bypass Diode Test
	Power Supply, DC	70589	Bypass Diode Test
	Apparatus, Dielectric Strength Test	68598	Post test after bypass diode test
	Datalogger, RH & Temperature	65675	Post test after bypass diode test
	Apparatus, Insulation Resistance Test	68600	Post test after bypass diode test
	Datalogger, RH & Temperature	68612	Post test after bypass diode test
	Apparatus, Dielectric Strength Test	68598	Final measurements
	Datalogger, RH & Temperature	65675	Final measurements
	Apparatus, Insulation Resistance Test	68600	Final measurements
	Datalogger, RH & Temperature	68612	Final measurements
	Probe, Mechanical, Not Otherwise Specified	67371	Final measurements

**Annex 2: Spectrum of the lamp used for the UV pre-screening test (Optional)**

N/A



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

**Annex 3: Statement of the estimated uncertainty of the test results**

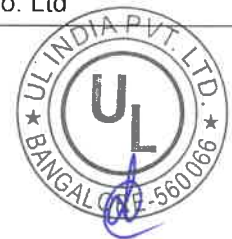
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IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

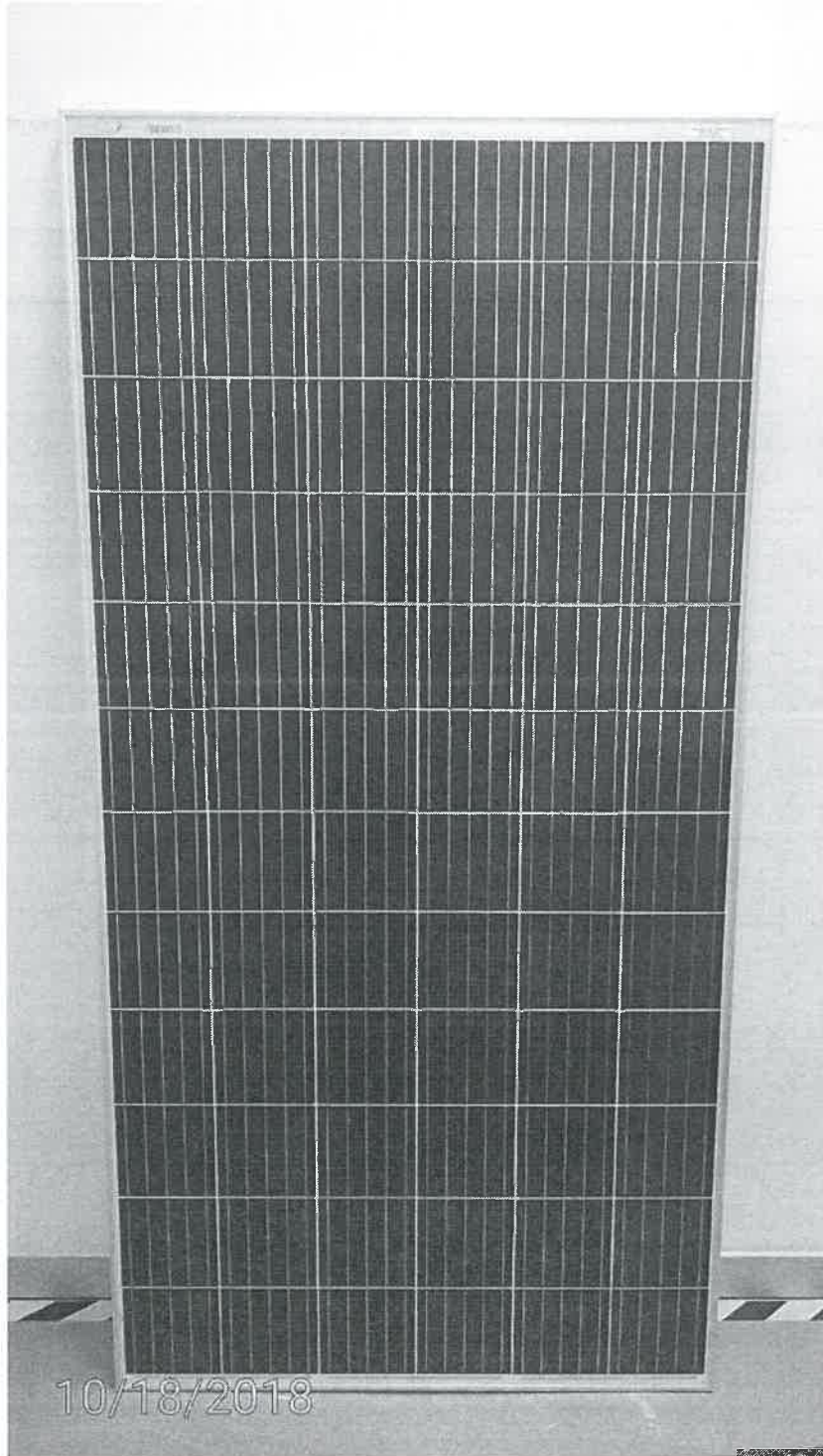
**Annex 4: Enclosures**

Type	Supplement ID	Description
Figure	1-01	Front view of model, 72 cells
Figure	1-02	Rear view of model, 72 cells
Figure	1-03	Complete view of Junction Box, Manufactured by Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd. Type PV-CY802-D
Figure	1-04	Open View of Junction Box, Manufactured by Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd. Type PV-CY802-D
Figure	1-05	Overall view of PV connector Make: Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd Type PV-CY30L Connectors
Illustration	2-01	Module overall diagram for 72 cell family
Illustration	2-02	Frame cross sectional and Corner key diagram for 72 cell family
Illustration	2-03	Cell data sheet: Polycrystalline solar cell, manufactured by Sichuan Yingfa Solar Energy Technology Co., Ltd
Illustration	2-04	Diode, manufactured by Yangzhou Yangjie Electronic Technology Co., Ltd , Type 30SQ045
Certificate	3-01	Junction Box Test Reports/ Certificates
Certificate	3-02	Used Cables Test Reports/Certificates
Certificate	3-03	Used Connector Test Reports/Certificates
Certificate	3-04	Partial Discharge test and flame spread index certificate for backsheet
Certificate	3-05	Potting material test certificate, Type " HT906Z", manufactured by Shanghai Huitian New Material Co. Ltd



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1-01

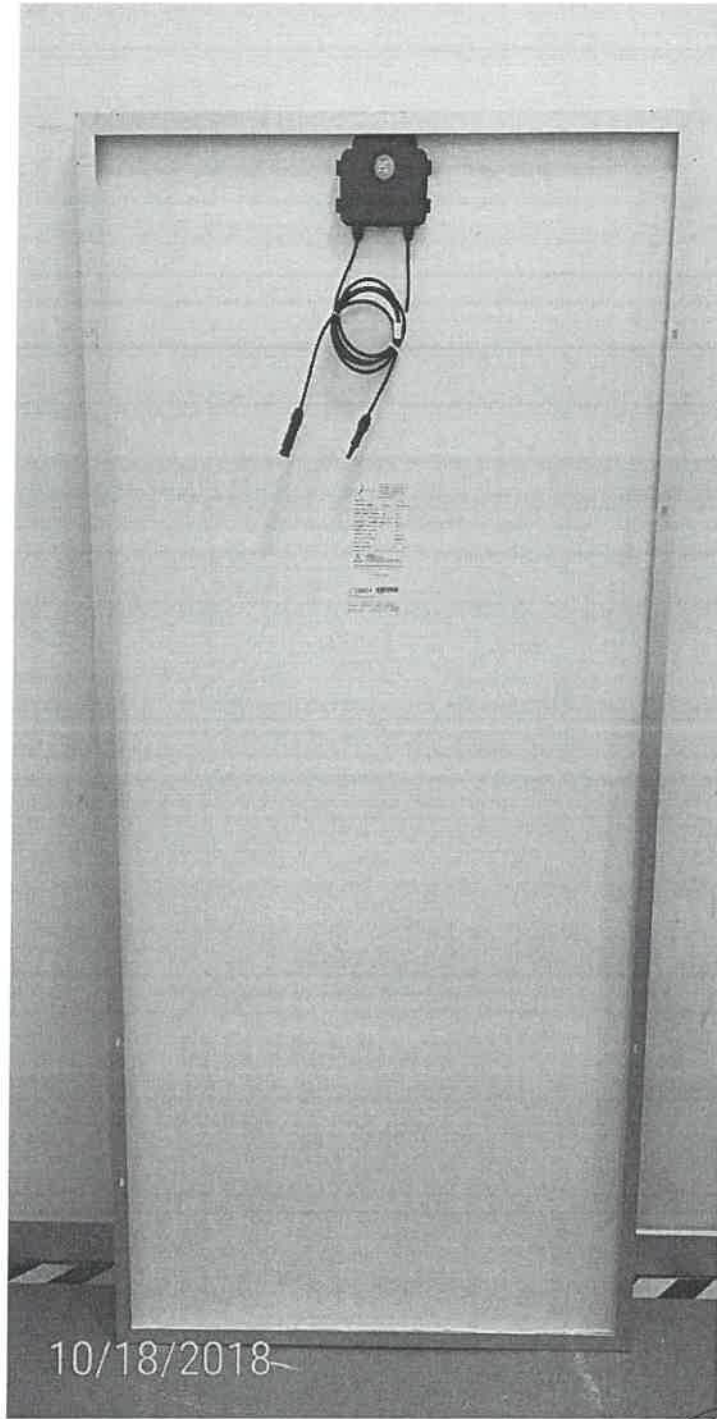


Note: All Figure Date format (mm/dd/yyyy)



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1-02

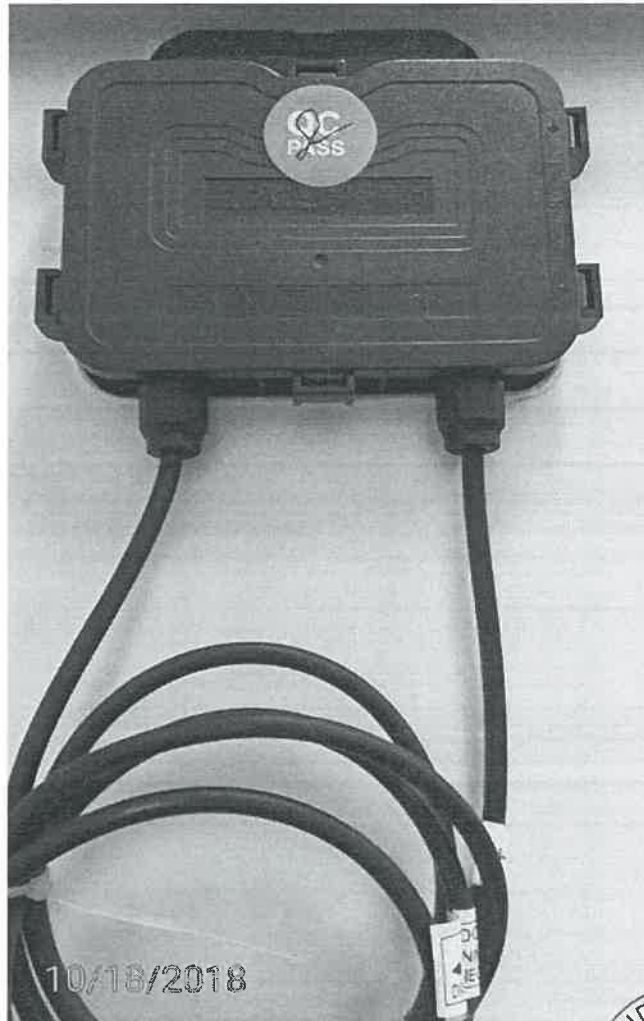


Note: All Figure Date format (mm/dd/yyyy)



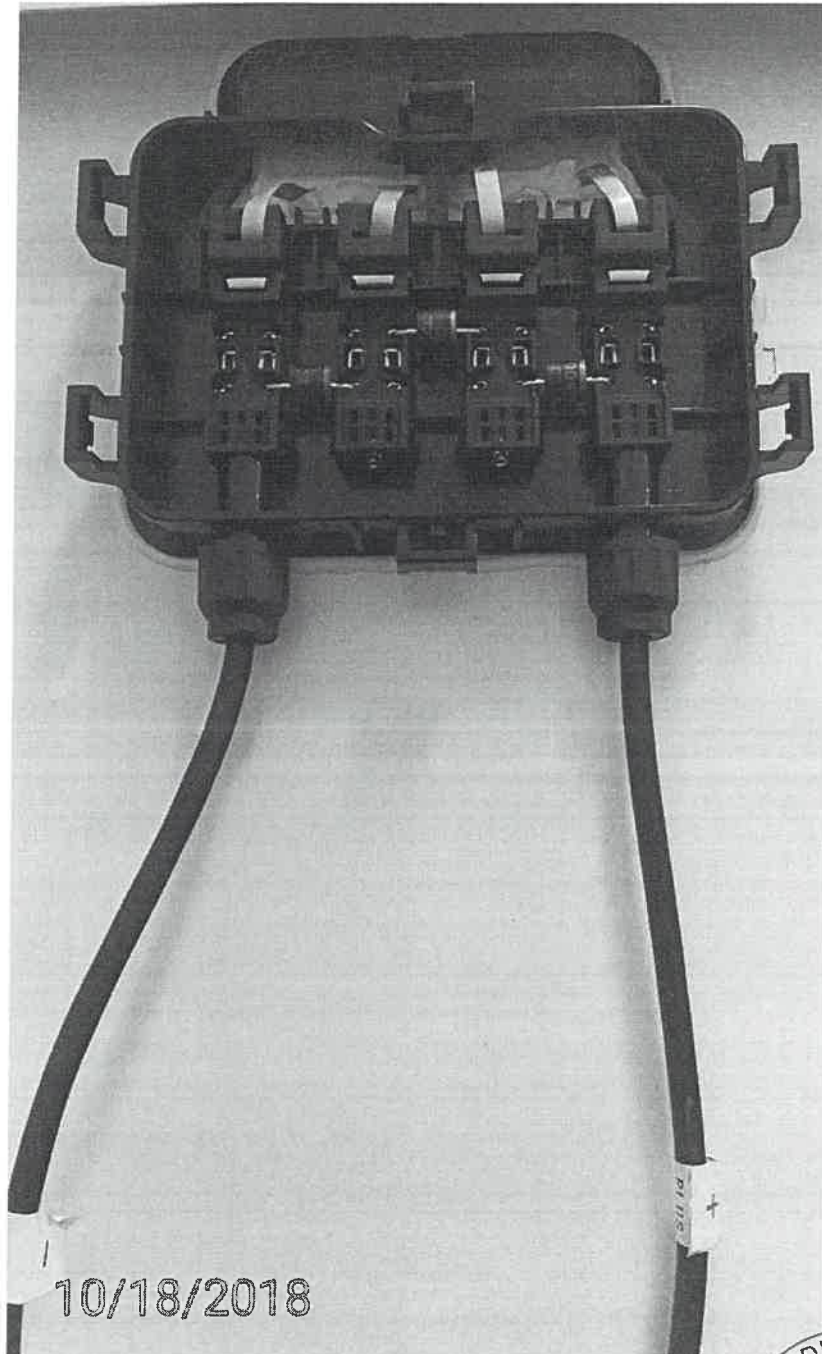
IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1-03



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1-04



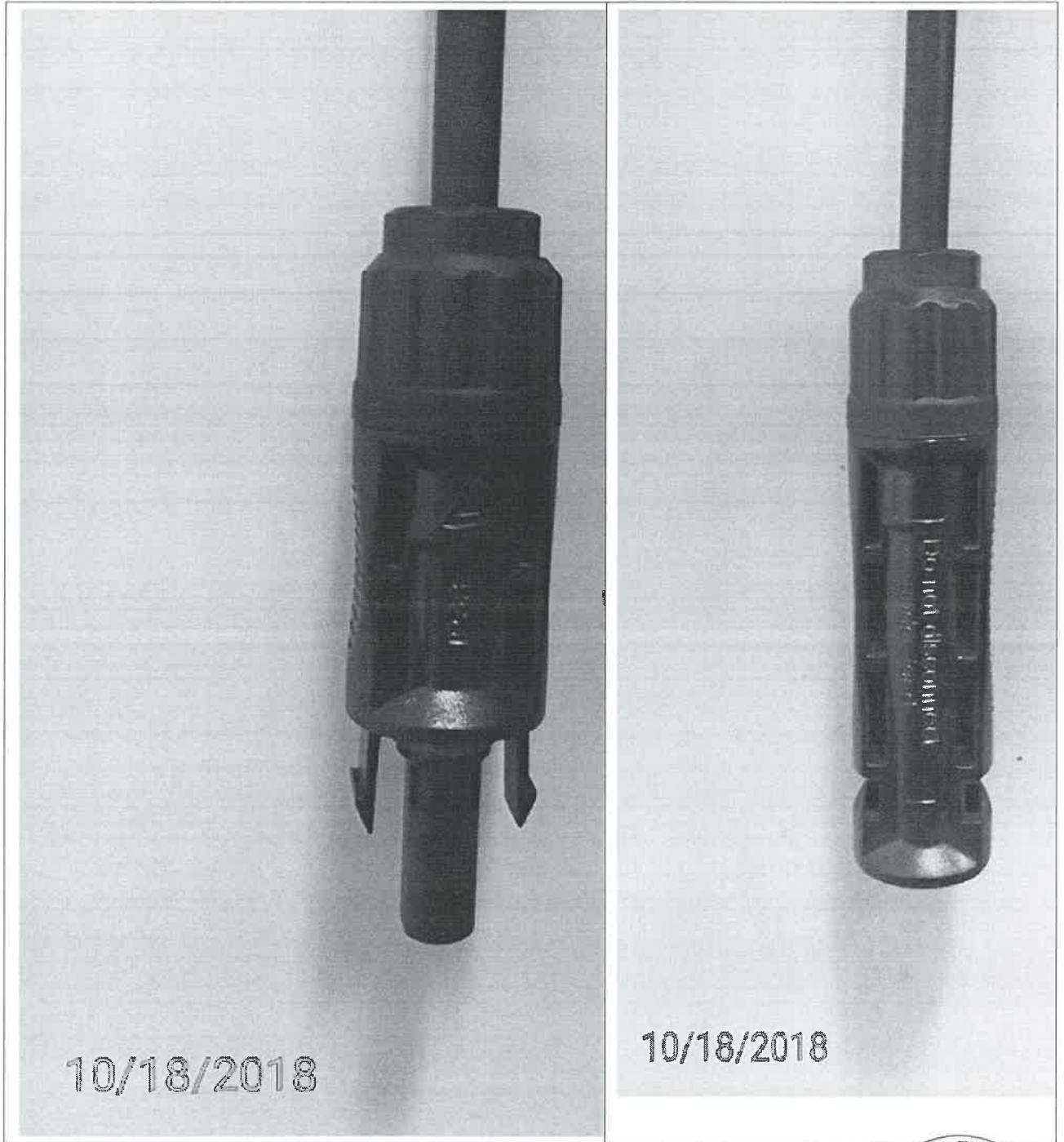
Note: All Figure Date format (mm/dd/yyyy)





IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1-05

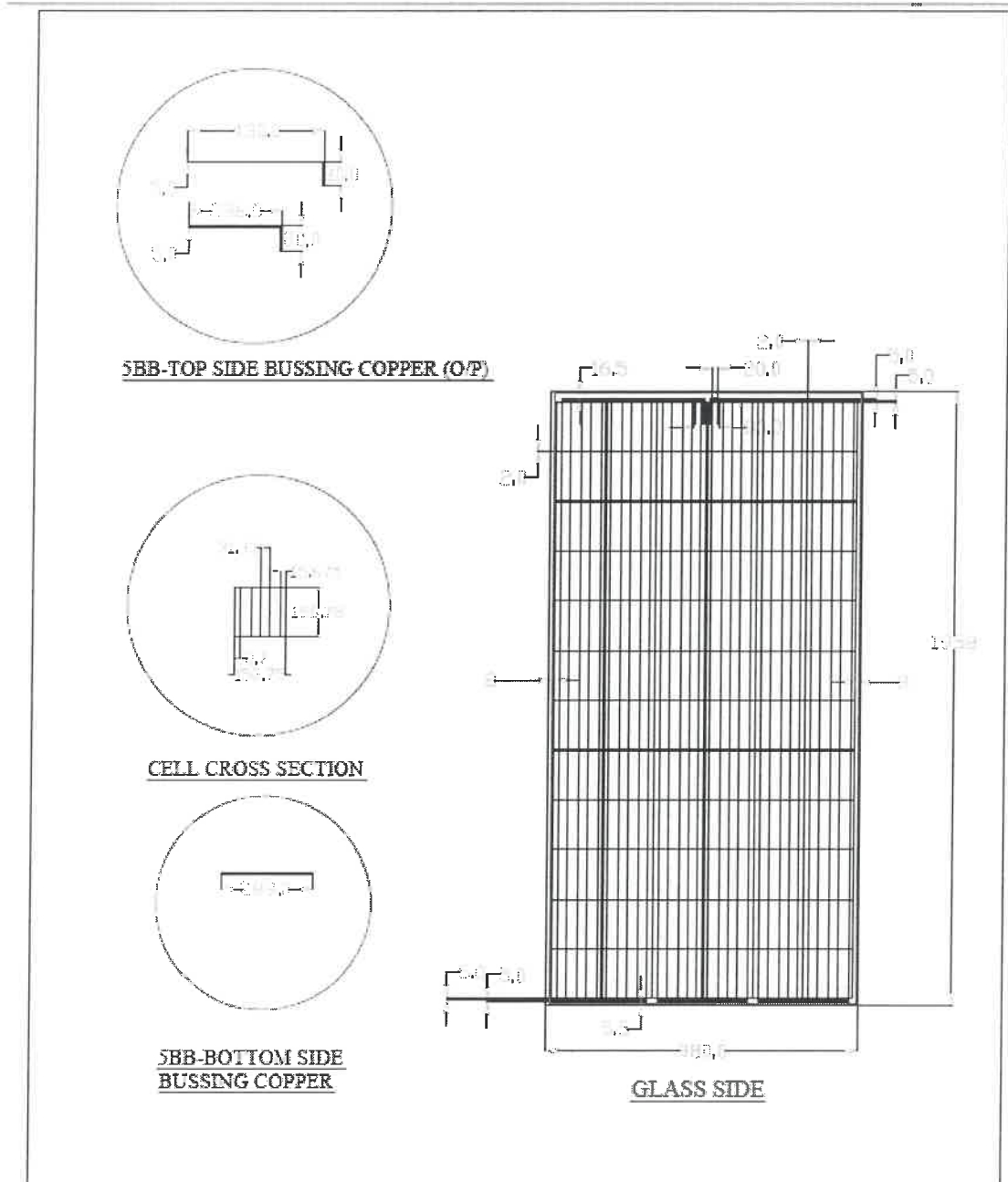



Note: All Figure Date format (mm/dd/yyyy)

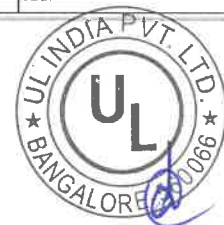


IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

**Illustration 2-01**

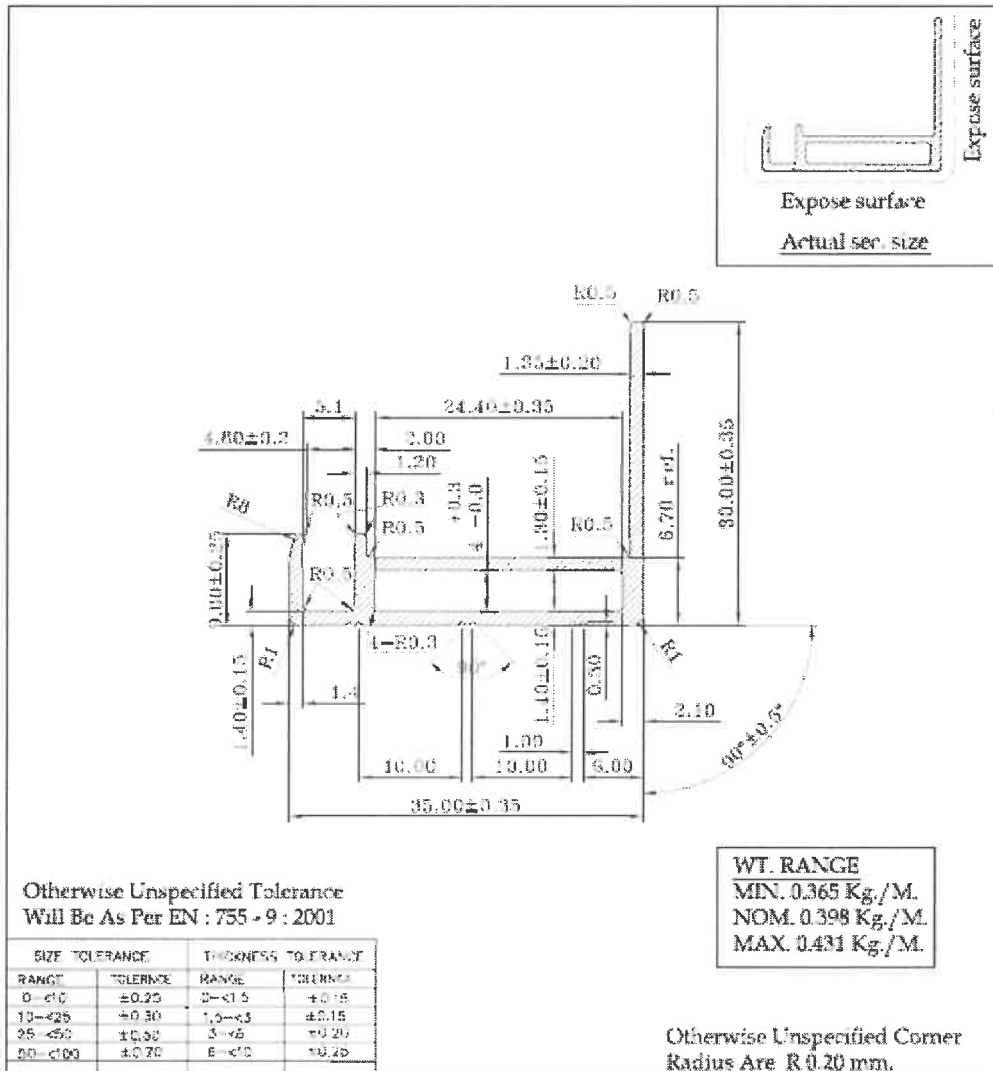


	MODEL NO-ISEN300-ISEN300 (FD)		
	DRAWING NO	IS-MP-ENG-BW	
<p>Icon Solar-En Power Technologies Private Limited</p> <p>Dighari, Arang, Raipur-493441,CG, India</p> <p>ALL DIMENSIONS ARE IN mm (±0.1mm)SCALE 1:1</p>	DRAWING NAME	LAYOUT DIAGRAM OF 300Wp-300Wp (72 FULL CELL)SBB FRAME	
	REV DATE	06/07/18	REV NO DC
	WEIGHT	23.5 KG	
	DRAWN	SANDHYA NIRMALKAR	SIGN
	CHECKED	MR. VIRESH KOSAYAN	SIGN
	APPROVED	MR. JEEKUMAR BANERJEE	SIGN



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Illustration 2-02

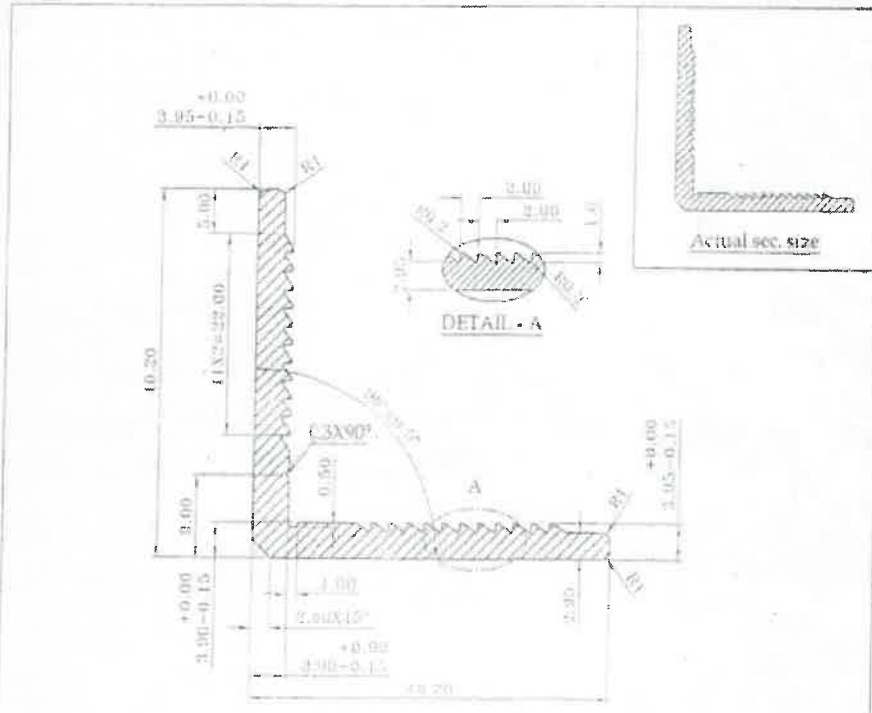


**ALOM EXTRUSIONS LIMITED.**  
 (UNIT-II)

Balasure	CUST				MKT. REF. NO./DATE	B-Mail 02-06-15	
CUST.DRG./SAMPLE	As Per Party's Drg.	AREA	145.903	mm <sup>2</sup>	DRWN./DATE	S. PATRA 16-06-15	
	SEC. TYPE	Hollow	WEIGHT	392	gm/M	CHECKED/DATE	H.L.SHARMA
	CONT. SIZE	156 (P2) mm.	WT. RANGE	1335-1580	gm/3MM	END USE	SOLAR FRAME SEC.
	No. of Imp.	02	PERIMETER	EXT. 148.075	mm.		
	EXT. RATIO	66		INT. 56.265	mm.		
REV. NO. & DATE	ALLOY/TMP.	6063 T6	C C D	46	mm.	SCALE :	1 : 1, 2 : 1
ALL DIMENSIONS ARE IN MM	BOLSTER	--	BLS.	BLS-2452M		BLS. SEC. NO.	B 8079
	INST BOLSTER	--	DWG. NO.				



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict



Otherwise Unspecified Tolerance  
Will Be As Per EN : 755 - 9 : 2001

SIZE TOLERANCE		FINISH TOLERANCE	
RANGE	TOLERANCE	RANGE	TOLERANCE
0-10	±0.15	0-0.3	±0.15
10-25	±0.20	0.3-0.4	±0.15
25-50	±0.30	0.4-0.5	±0.20
50-100	±0.40	0.5-0.6	±0.25

WT. RANGE  
MIN. 0.676 Kg/M.  
NOM. 0.694 Kg/M.  
MAX. 0.712 Kg/M.

Otherwise Unspecified Corner  
Radius Arc R 0.25 mm.

**ALOM EXTRUSIONS LIMITED.**  
(UNIT-II)

Division	QUG1	MGT. REF. NO./DATE	--
CUST. DRG./SAMPLE	--	DRWN./DATE	S. PATRA 12-08-13
SEC. TYPE	S&M	WEIGHT	712 gm/m
CONT. SIZE	156 (72) mm	WT. RANGE	2475-2605 g-1000
No. of Ang.	02	EXT. DIM.	132.54 mm
EXT. RATIO	72	INT. DIM.	-- mm
REV. NO. & DATE	ALLOT/2009/06/03/16	SCALE	1:1
ALL DIMENSIONS ARE IN MM	BOLSTER	DWG. NO.	ULS-2459



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Illustration 2-03



**YF P5 5BB 156.75×156.75**

MULTICRYSTALLINE SILICON SOLAR CELLS

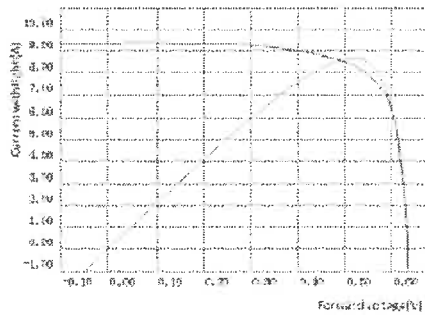
MECHANICAL DATA & DESIGN

Format 156.75mm\*156.75mm±0.25mm  
 Thickness 200µm±20µm  
 Front(-) Blue silicon nitride AR coating, 0.7mm silver bus bars  
 Back(+) 2.0mm wide soldering pads(silver) back surface(aluminum)

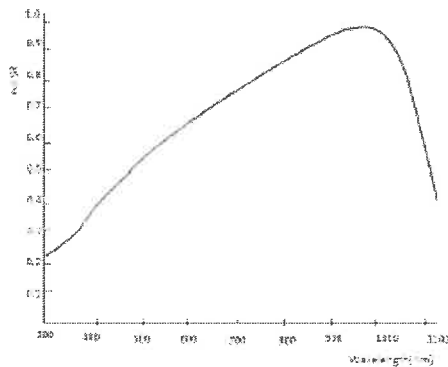


YF P5 156.75×156.75	Eta(%)	Pmp(Wp)	Imp(A)	Ump(V)	Voc(V)	Isc(A)	FF(%)
A1890	18.9	4.64	8.4381	0.5503	0.6411	8.9401	81.02
A1880	18.8	4.62	8.4351	0.5477	0.6376	8.9382	81.06
A1870	18.7	4.59	8.4172	0.5458	0.6363	8.9133	81.00
A1960	18.5	4.57	8.3858	0.5431	0.6357	8.8963	80.83
A1850	18.5	4.55	8.3707	0.543	0.6337	8.8735	80.81
A1840	18.4	4.52	8.3437	0.5418	0.6345	8.8123	80.85
A1820	18.2	4.47	8.277	0.5404	0.6306	8.7745	80.83
A1800	18.0	4.42	8.2714	0.5348	0.6269	8.7445	80.71
A1780	17.8	4.37	8.2459	0.5323	0.6227	8.7117	80.63
A1750	17.5	4.30	8.2358	0.5221	0.6205	8.6370	80.24
A1700	17.0	4.18	8.1587	0.5121	0.6054	8.6219	80.05

I-V CURVE



SPECTRAL RESPONSE



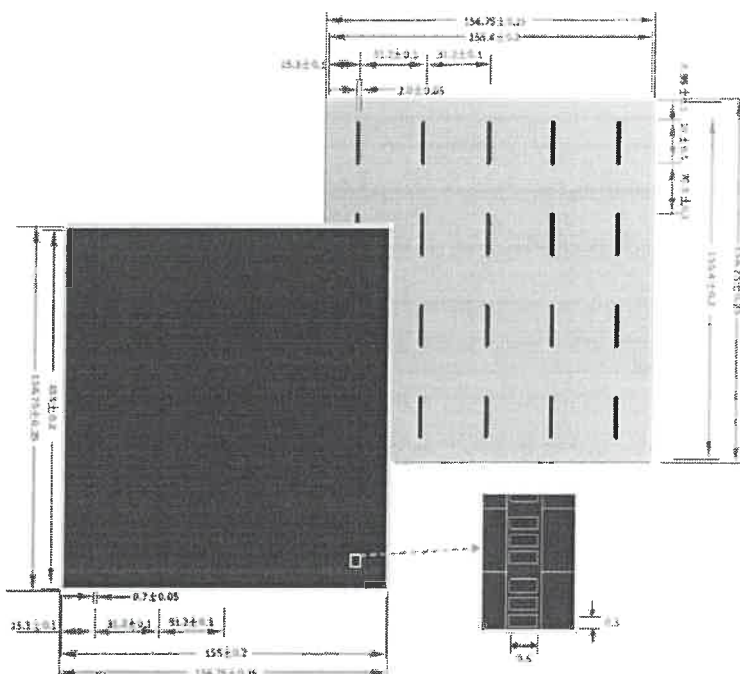
Sichuan Yingfa Solar reserves the rights of final interpretation and revision of the datasheet.



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict



**YF P5 5BB 156.75×156.75**  
MULTICRYSTALLINE SILICON SOLAR CELLS



□ TEMPERATURE COEFFICIENTS

TkVoltage	-0.327%/°C
TkCurrent	+0.055%/°C
TkPower	-0.42%/°C

INTENSITY DEPENDENCE

Intensity[W/m <sup>2</sup> ]	Isc[mA]	Voc[mV]
1000	1.00	0.500
900	0.90	0.583
500	0.50	0.560
300	0.30	0.575
200	0.20	0.520

\*Ratio of Voc[isc] at reduced intensity to Voc[isc] at 1000W/m<sup>2</sup>

四川英发太阳能科技有限公司  
Sichuan Yingfa Solar Energy Technology Co., Ltd  
No 1, Tianwei Road, Southwest Airport Economic Development Zone, Chengdu, China 610200  
www.yingfa.com



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Illustration 2-04



30SQ045

RoHS  
COMPLIANT

Schottky Diodes



Features

- High frequency operation
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Solder dip 275 °C max. 7s, per JESD 22-B108

Typical Applications

Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection

Mechanical Data

- Package: R-6
- Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant
- Terminals: Tin plated leads, solderable per J-STD-002 and JESD22-B102
- Polarity: Color band denotes cathode end

Maximum Ratings (T<sub>a</sub>=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	30SQ045
Device Marking Code			30SQ045
Repetitive Peak Reverse Voltage	VRRM	V	45
Average Rectified Output Current @60Hz sine wave, R-load, T <sub>a</sub> =25°C	IO	A	30
Surge(Non-repetitive)Forward Current @60Hz half sine wave, 1 cycle, T <sub>a</sub> =25°C	IFSM	A	350
Current Squared Time @1ms≤t≤6.3ms T <sub>j</sub> =25°C	ft	A <sup>2</sup> s	530
Storage Temperature	Tstg	°C	-65 ~+150
Junction Temperature (IN DC Forward Mode-Forward Operations- without reverse bias, t ≤1 h (Fig. 1))	Tj	°C	-55 ~+200

NOTE

- Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test.

Electrical Characteristics (T<sub>a</sub>=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	TEST CONDITIONS	30SQ045
Maximum instantaneous forward voltage drop per diode	VFM	V	IFM=30.0A	0.53
Maximum DC reverse current at rated DC blocking voltage per diode	I <sub>RRM1</sub>	mA	V <sub>RM</sub> =VRRM T <sub>a</sub> =25°C	0.5
	I <sub>RRM2</sub>		V <sub>RM</sub> =VRRM T <sub>a</sub> =100°C	50



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict



30SQ045

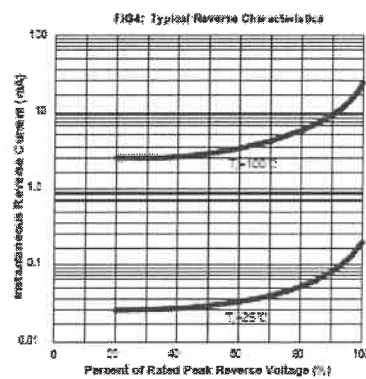
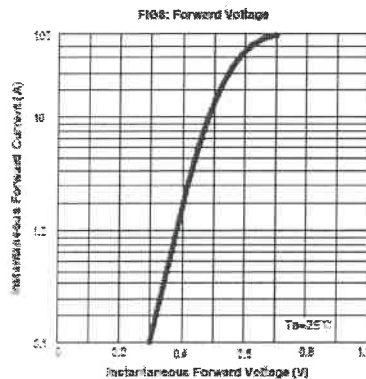
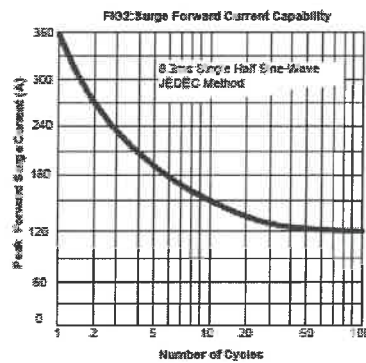
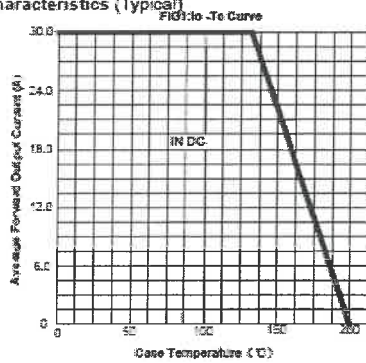
■ Thermal Characteristics (T<sub>a</sub>=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	30SQ045
Thermal Resistance	Between junction and case	R <sub>θJ-C</sub>	1.0

■ Ordering Information (Example)

PREFERRED P/N	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
30SQ045	Approximate 1.944	500	1	5000	Tape
30SQ045	Approximate 1.944	750	1	3000	Reel




■ Characteristics (Typical)





<b>IS14286:2010</b>			
Clause	Requirement + Test	Result - Remark	Verdict


**Certificate 3-01**

<b>Zertifikat</b>	<b>Certificate</b>	
Zertifikat Nr. <i>Certificate No.</i> R 50384629	Blatt <i>Sheet</i> 0001	
<b>Ihr Zeichen <i>Client Reference</i></b> H.D.J.	<b>Unser Zeichen <i>Our Reference</i></b> G1-TKQ-15105620 001	<b>Ausstellungsdatum <i>Date of Issue</i></b> 23.08.2017 <i>(day/month/yr)</i>
<b>Genehmigungsinhaber <i>License Holder</i></b> ZheJiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315336 P. R. China	<b>Fertigungsstätte <i>Manufacturing Plant</i></b> ZheJiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315336 P. R. China	
<b>Prüfzeichen <i>Test Mark</i></b> 	<b>Geprüft nach <i>Tested acc. to</i></b> IEC 62790:2014 EN 62790:2015	
<b>Zertifiziertes Produkt <i>(Geräteidentifikation)</i></b> <i>Certified Product (Product Identification)</i>	<b>Lizenzentgelte - Einheit</b> <i>License Fee - Unit</i>	
<b>PV-Anschlussdose <i>(Junction Box for PV Module)</i></b>		
Type Designation : PV-CY802X (x-Blank or -B; or -D; or -M) (ZJCY)	9	
Rated Voltage : 1500VDC for PV-CY802-D; 1000VDC for PV-CY802; PV-CY802-B and PV-CY802-M		
Rated Current : 12A for PV-CY802 and PV-CY802-B; 17,5A for PV-CY802-D and PV-CY802-M		
Reverse Current : 30A		
Application Class : Class A		
Protection Class : Class II		
Protection Degree : IP67		
Ambient Temperature : -40°C to +85°C		
<b>Remark:</b> The labelling requirements according to EU Directive 2001/95 have to be observed for distribution within the EEA.		
<b>ANLAGE <i>(Appendix)</i>: 1.0</b>		
<p><small>Dem Zertifikat liegt unsere Prüf- und Zertifizierungserklärung zugrunde und es bestätigt die Konformität der Produkte mit den oben genannten Normen und Prüfverfahren. Zusätzlich Anforderungen in Ländern, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich beachtet werden. Die Herstellung des zertifizierten Produktes wird überwacht. This certificate is based on our Testing and Certification Regulation and covers the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements in countries where the product is going to be marketed have to be considered additionally. The manufacturing of the certified product is subject to surveillance.</small></p>		
<p>TÜV Rheinland LGA Products GmbH, Thylistraße 2, 90431 Nürnberg Tel.: +49 221 806-1374 e-mail: cert-val@tuev-rl.com Fax: +49 221 806-3935 http://www.tuev-rl.com</p>		
		 Zertifizierungsstelle Dipl.-Ing. (FH) Bernd Schlegel



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

**Certificate 3-02**

<b>Zertifikat</b>		<b>Certificate</b>			
Zertifikat Nr. / Certificate No.	R 50337137	Blatt / Page	0001		
Ihr Zeichen / Client Reference	Z.J.S.	Unser Zeichen / Our Reference	01-JJK-15095493 001	Ausstellungsdatum / Date of Issue	13.07.2016 (day/month/year)
<b>Genehmigungsinhaber / License Holder</b>		<b>Fertigungsstätte / Manufacturing Plant</b>			
ZheJiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315336 P.R. China		ZheJiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315336 P.R. China			
<b>Prüfzeichen / Test Mark</b>		<b>Geprüft nach / Tested acc. to</b>	EN 50618:2014		
<b>Zertifiziertes Produkt (Geräteidentifikation)</b> Certified Product (Product Identification)		<b>Lizenzentgelte - Einheit</b> License Fee - Unit			
<b>PV-Leitungen (Electric Cables for Photovoltaic Systems)</b>					
Type Designation	: H12430-F 124.0m <sup>2</sup> Zhejiang Chuangyuan Photovoltaic Technology Co., Ltd.				5
Rated Voltage	: DC 1,5kV AC 0,0/1,0kV				
Ambient Temperature	: -40°C to +90°C				
Max. Temperature at Conductor	: 120°C				
5					
<b>ANLAGE (Appendix): 1.0</b>					
<p><small>Das Zertifikat liegt seiner Prüf- und Zertifizierungsordnung zugrunde und es beträgt die Konformität des Produktes mit dem oben genannten Standard und Programmlagen. Zusätzliche Informationen zu Location, in dem das Produkt in Verkehr gebracht werden soll, müssen zusätzlich beigefügt werden. The description of the respective products used above is not.</small></p> <p><small>The certificate is based on the Testing and Certification Regulation and states the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements or measures where the product is going to be marketed have to be certified additionally. The manufacturing of the certified product is subject to surveillance.</small></p>					
<b>TÜV Rheinland LGI Products GmbH, TIBsstraße 2, 90431 Nürnberg</b> Tel: +49 221 806-0171   e-mail: cert.validation@tue.com Fax: +49 221 806-9355   http://www.tue.com/sales				Zertifizierungsstelle  Düsseldorf, (R11) F. Ale	



IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Certificate 3-03

<b>Zertifikat</b>		<b>Certificate</b>			
Zertifikat Nr. / Certificate No.	R 50378729	Blatt / Sheet	0001		
Ihr Zeichen / Client Reference	H.D.J.	Unser Zeichen / Our Reference	01-TXQ-15104439-001	Ausstellungsdatum / Date of Issue	12.06.2017 (day/month)
<b>Genehmigungsinhaber / License Holder</b>		<b>Fertigungsstätte / Manufacturing Plant</b>			
Zhejiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315316 P. R. China		Zhejiang ChuangYuan Photovoltaic Technology Co., Ltd. No.580 Binhai 4th Road, Hangzhou-bay New Area Ningbo City, Zhejiang Province 315316 P. R. China			
<b>Prüfzeichen / Test Mark</b>		<b>Geprüft nach / Tested acc. to</b>			
		IEC 62852:2014 EN 62852:2015			
<b>Zertifiziertes Produkt (Geräteidentifikation) / Certified Product (Product Identification)</b>		<b>Lizenzart / License</b>			
<b>Steckverbinder (Connector for Photovoltaic System)</b>		Lizenzart / License: <b>Free - Use</b>			
Type Designation	: PV-CY03L ; PV-CY03L (2XCV)			7	
Rated Voltage	: 180VDC for PV-CY03L; 100VDC for PV-CY03L				
Rated Current	: 30A				
Ambient Temperature	: -40°C to +85°C				
Upper Limit Temperature	: 100°C				
Cross Section Range	: 1 x 4,2mm <sup>2</sup>				
Protection Degree	: IP68 (D, M)				
Application Class	: Class A				
Remark: The labelling requirements acc. to EU Directive 2001/95 have to be observed for distribution within the EEA.					
7					
<b>ANLAGE (Appendix): 1,0</b>					
<p><small>Dem Zertifikat liegt unter Angabe der Zertifizierungsurkunde eine Prüfung der Konformität des Produkts mit den oben genannten Normen und Prüfverfahren zugrunde. Zusätzliche Anforderungen in anderen, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich beachtet werden. Die Einhaltung der angegebenen Parameter muss sichergestellt sein. Die Einhaltung der anderen Prüfverfahren ist nicht Gegenstand der Zertifizierung. Die Einhaltung der anderen Prüfverfahren ist nicht Gegenstand der Zertifizierung. Die Einhaltung der anderen Prüfverfahren ist nicht Gegenstand der Zertifizierung. Die Einhaltung der anderen Prüfverfahren ist nicht Gegenstand der Zertifizierung.</small></p>					
TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg Tel. +49 221 806-1371 e-mail cert@tuev.com/de/en Fax +49 221 806-9933 http://www.tuev.com/de/en				Zertifizierungsstelle  Dipl.-Ing. D. Löffler	



<b>IS14286:2010</b>			
Clause	Requirement + Test	Result - Remark	Verdict

**Certificate 3-04**

Produkte  
Products



Prüfbericht-Nr.: Test Report No.:	19616627 001	Auftrags-Nr.: Order No.:	1803272369	Seite 1 von 3 Page 1 of 3
Kunden-Referenz-Nr.: Client Reference No.:	468811	Auftragsdatum: Order date:	2017-11-16	
Auftraggeber: Client:	Renewsys India Pvt. Ltd. Plot No. 21,22,23, Bommasandra Jigani Link Road, Industrial Area, Anekal Taluk Bangalore-560105, India			
Prüfgegenstand: Test item:	Backsheet			
Bezeichnung / Typ-Nr.: Identification / Type No.:	PRESERV A-275WN			
Auftragsinhalt: Order content:	Comperative tracking indices of solid insulating materials			
Prüfgrundlage: Test specification:	IEC 60112 2003+A1:2009			
Wareneingangsdatum: Date of receipt:	2017-10-28			
Prüfmuster-Nr.: Test sample No.:	1803272369 - 02			
Prüfzeitraum: Testing period:	2017-11-14			
Ort der Prüfung: Place of testing:	TÜV Rheinland (India) Pvt. Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (India) Pvt. Ltd.			
Prüfergebnis*: Test result*:	See page 2 and 3			
geprüft von / tested by:		kontrolliert von / reviewed by:		
 2017-11-23 Geethanjali A / Engineer <small>Datum Name / Stellung Unterschrift</small> <small>Date Name / Position Signature</small>		 2017-11-23 Manu Kumar B S / Senior Engineer <small>Datum Name / Stellung Unterschrift</small> <small>Date Name / Position Signature</small>		
Sonstiges/ Other Aspects:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
<p><b>Legende:</b> 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft                  (Pass) = entspricht o.g. Prüfgrundlage(n) (fail) = entspricht nicht o.g. Prüfgrundlage(n) NA = nicht anwendbar NT = nicht getestet</p> <p><b>Legend:</b> 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor                  (Pass) = passed o.g. test specification(s) (Fail) = failed o.g. test specification(s) NA = not applicable NT = not tested</p> <p>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.                  This test report only relates to the o.g. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not enable to carry any test mark.</p>				

TÜV Rheinland (India) Pvt. Ltd. - 52/A, West Wing, 3rd Main Road, - Electronic City Phase 1, - Bangalore - 560109  
 Tel.: +91 80 3689 9815 Fax: +91 80 3055 4342 Web: www.tuv.com Rev.: 1.0 2012-Kalster-Vorms 08-01 / approved: G



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Clause	Requirement + Test	Result - Remark	Verdict



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Report No. 19618627 G01

IEC 60112:2003+A1:2009			
Clause	Requirement + Test	Result - Remark	Verdict
IEC 60112 - Tracking test			
Clause	Requirement - test	Result - Remark	Verdict
9	Determination of erosion		P
	Erosion depths	See table 1	P
11	Determination of comparative tracking index (CTI)		P
11.2	Determination of the 100 drop point		N/A
	Using the basic procedure described in IEC 60112 clause 8, set the voltage at a selected level and make the test until at least 25s elapsed after the one hundredth drop has fallen or until previous failure occurs		N/A
11.3	Determination of the 50 drop point		P
	By inference from the 100 drop data, repeat the test procedure at an appropriate test voltage, using a new site/specimen and determine whether the specimen withstands the test for the period up to at least 25s after the 50th drop has fallen	CTI: 600V See table 1	P



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Clause	Requirement + Test	Result - Remark	Verdict



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Report No. 19616627 001

IEC 60112:2003+A1:2009			
Clause	Requirement + Test	Result - Remark	Verdict

Part	Material	Material thickness (mm)	Colour	Test solution A	Voltage (V)	Erosion depth (mm)	Result
Backsheet	PRESERV A - 275WN	>3mm	White	50 drops	600V	0.05	P
Backsheet	PRESERV A - 275WN	>3mm	White	50 drops	600V	0.04	P
Backsheet	PRESERV A - 275WN	>3mm	White	50 drops	600V	0.06	P
Backsheet	PRESERV A - 275WN	>3mm	White	50 drops	600V	0.03	P
Backsheet	PRESERV A - 275WN	>3mm	White	50 drops	600V	0.05	P

Remark:  
 1. Solution A : Ammonium chloride  
 2. Test samples are conditioned for 24hrs at 23°C ± 5K with (50 ± 10)%RH  
 3. 8 samples are stacked to achieve thickness > 3mm during testing  
 4. Tested on the cell side of the backsheet samples

**Test Results:**

At 600V, all 5 samples are withstood the 50drops of solution A without flaming or tracking.



\*End Report\*

IS14286:2010			
Clause	Requirement + Test	Result - Remark	Verdict

Certificate 3-05

201.0310

QMZZ.E248611 - Plastics - Component



ONLINE CERTIFICATIONS DIRECTORY

QMZZ.E248611  
Plastics - Component

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Click on a product designation for complete information.

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Plastics - Component

[See General Information for Plastics - Component](#)

SHANGHAI HUETIAN NEW MATERIAL CO LTD  
251 Wenji Rd  
Song Jiang  
201616 Shanghai, CHINA

E248611

Material Desg	Color	Thk mm	Flame Class	H N		R T I		Mech		H D	
				I	I	Imp	Str	T	S	T	C
<b>Epoxy Potting Compound (EP - Potting), furnished as one liquid component.</b>											
6312	BK	3.6	V-0	-	-	90	90	90	-	-	-
<b>Epoxy Potting Compound (EP - Potting), furnished as two liquid components.</b>											
6203A/6203B	NC	3.0	V-0	-	-	90	90	90	-	-	-
<b>Silicone "Room Temperature Vulcanizing" (RTV), furnished as Paste.</b>											
4061	NC, BK	0.4	HB	4	1	105	105	105	-	-	0
		3.0	HE	3	1	105	105	105			
<b>Silicone "Room Temperature Vulcanizing" (RTV), furnished as paste.</b>											
9061	ALL	0.4	HB	4	0	105	105	105	-	-	-
		3.0	HB	3	0	105	105	105			
916	WT	0.4	HB	4	2	105	105	105	-	-	3
		3.0	HB	3	0	105	105	105			
9661	NC, BK	0.4	HB	4	1	105	105	105	-	-	-
	ALL	1.5	HB	4	1	105	105	105			
		3.0	HB	3	0	105	105	105			
HT9062	BK, WT	3.0	V-0	1	0	105	105	105	-	-	0
<b>Silicone "Room Temperature Vulcanizing" (RTV), furnished as two liquid components.</b>											
5299A/B	BK	3.0	V-1	1	0	105	105	105	-	-	0
5299W	BK	3.0	V-0	1	0	105	105	105	-	-	0
		6.0	V-0	0	0	105	105	105			
	BK, WT	13.0	V-0	0	0	105	105	105			
	WT	3.0	V-1	1	0	105	105	105			
5299W-S	WT, BK	3.0	V-0	1	0	105	105	105	-	-	0
		6.0	V-0	0	0	105	105	105			
		13.0	V-0	0	0	105	105	105			

http://database.ul.com/cgi-bin/XYUL.asp?page=1&SEXTYFRAMEN&page=1&id=QMZZ.E248611&cat=Plastics+4+Component&cl=107

----- End of TRF No. IS 14286\_V1.0 -----

