



TEST REPORT

SGS-CSTC
Standards Technical Services
(Shanghai) Co., Ltd.

No.588 West Jindu Road,
Songjiang District,
Shanghai, China

Report reference no.: SHES120700182801

Date of issue: Aug. 7, 2012

Total number of pages.....: 11

Testing laboratory: SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Address: No.588 West Jindu Road, Songjiang District, Shanghai, China

Applicant's name.....: Chinaland Solar Energy Co., Ltd.

Address: Feidong New City Development Zone, Hefei, Anhui Province, P.R.China

Test specification: Clause 10.1, 10.2, 10.3, 10.4 of IEC 61215:2005
Electroluminescence test (EL), Potential Induced Degradation test (PID),

Test item description.....: Photovoltaic (PV) module(s)

Trade mark.....: N/A

Manufacturer: Same as applicant

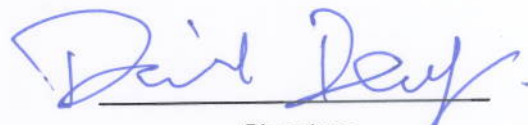
Model/Type reference.....: CHN260-72P

Ratings.....: Refer to page 3



Signature

Tested by: Erin Lin



Signature

Approved by: Daniel Deng

Summary of testing

The submitted samples are tested according to clause 10.1, 10.2, 10.3, 10.4 of IEC 61215:2005 in this test report.

The samples have been tested and found to comply with the above-mentioned standards' requirements.

And the samples have been tested according to protocol testing methods of EL test, PID test by client's requirements.

The samples have been tested and found to comply with the client's requirement.

Tests performed (name of test and test clause):

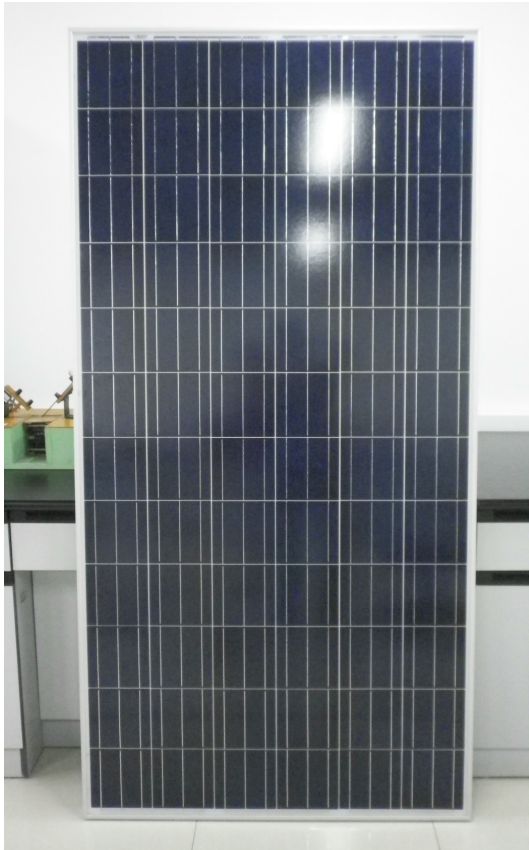
- IEC 61215:2005
- 10.1 Visual inspection
- 10.2 Maximum power determination
- 10.3 Insulation test
- 10.4 Measurement of temperature coefficients
- Other tests:
- EL test
- PID test

Testing location:

Shanghai Institute of Quality Inspection and Technical Research
No.900 Jianguyue Road, Shanghai, China

Copy of marking plate / device under test:





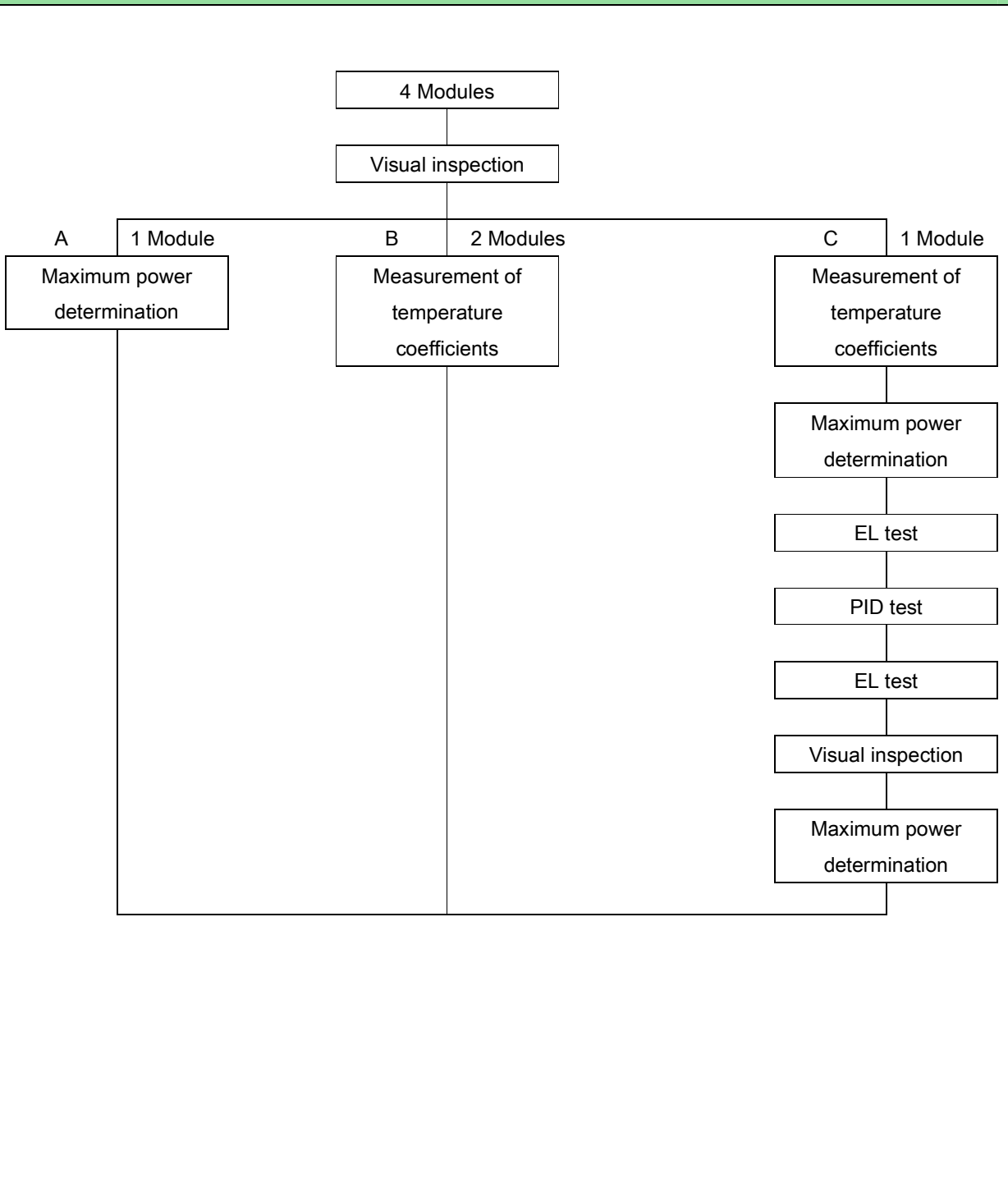
Front view of sample



Rear view of sample

Possible test case verdicts	
- 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)
General remarks	
<p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p> <p>List of test equipment must be kept on file and available for review.</p> <p>This document is issued by the company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.</p> <p>Unless otherwise stated: (a) the results shown in this document refer only to the sample(s) tested and (b) such sample(s) are retained for 3 months. This document cannot be reproduced except in full, without prior approval of the company.</p>	
General product information	
<p>The product is photovoltaic (PV) module.</p> <p>All samples are polycrystalline silicon modules with 72 pieces of 156mm-side-length cell.</p>	

Test Procedures



1. Test samples

Sample #	Model	Sample S/N
01	CHN260-72P	CHN1207450002
02	CHN260-72P	CHN1207450681
03	CHN260-72P	CHN1207450679
04	CHN260-72P	CHN1207450179


2. Test specification and test result

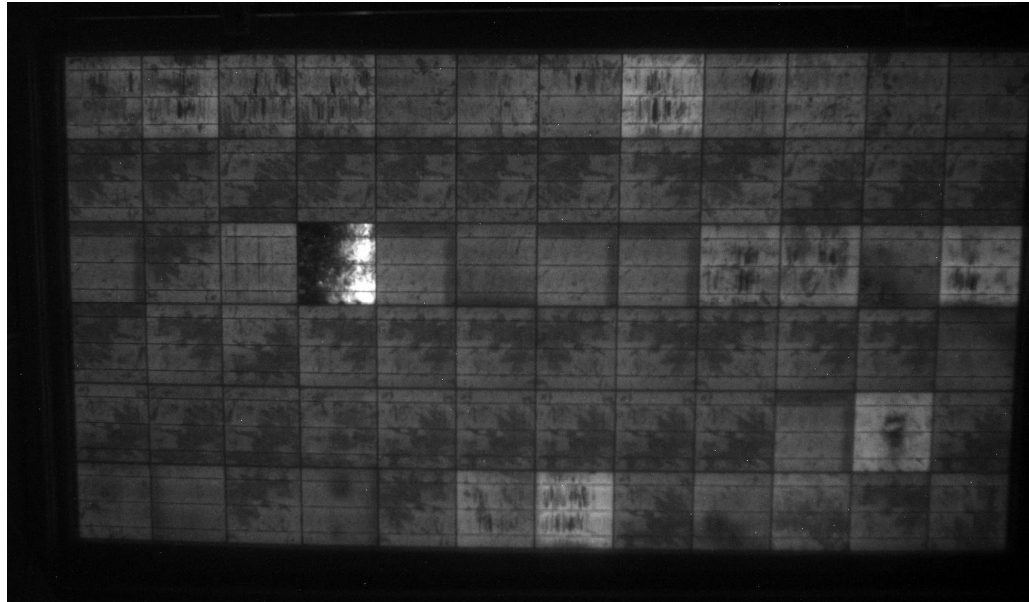
Group A						
10.1	TABLE: Visual inspection					—
Test Date [MM/DD/YYYY]		08/02/2012			—	
Sample #	Nature and position of initial findings – comments or attach photos				Verdict	
01	No visual defects				P	
Supplementary information:						
10.2	TABLE: Maximum power determination					—
Test Date [MM/DD/YYYY]		08/02/2012			—	
Radiant source		<input checked="" type="checkbox"/> Solar simulator, <input type="checkbox"/> Natural sunlight			—	
Module temperature [°C]		25			—	
Irradiance [W/m ²]		1000			—	
Sample #	Voc [V]	Isc [A]	Vmp [V]	Imp [A]	Pmp [W]	FF [%]
01	42.735	8.293	33.801	7.823	264.427	74.6
Supplementary information:						

Group B						
10.1	TABLE: Visual inspection					—
Test Date [MM/DD/YYYY]		08/02/2012			—	
Sample #	Nature and position of initial findings – comments or attach photos				Verdict	
02	No visual defects				P	
03	No visual defects				P	
10.4	TABLE: Measurement of temperature coefficients					—
Test Date [MM/DD/YYYY]		08/02/2012				
Ambient air temperature [°C]		25				
Irradiance [W/m ²] high/low		1000				
Module temperature [°C] high/low		25.5/64.1, 25.2/64.4				

Sample #	Parameter	Calculated Value	—
02	α [%/°C] :	0.067	—
	β [%/°C] :	-0.292	—
	δ [%/°C] :	-0.441	—
03	α [%/°C] :	0.063	—
	β [%/°C] :	-0.322	—
	δ [%/°C] :	-0.416	—
Supplementary information: Procedure with a solar simulator			

Group C						
10.1 Int	TABLE: Visual inspection (Initial)		—			
Test Date [MM/DD/YYYY]	07/31/2012		—			
Sample #	Nature and position of initial findings – comments or attach photos		Verdict			
04	No visual defects		P			
Supplementary information:						
10.4	TABLE: Measurement of temperature coefficients					
Test Date [MM/DD/YYYY]	07/31/2012		—			
Ambient air temperature [°C]	25		—			
Irradiance [W/m ²] high/low	1000		—			
Module temperature [°C] high/low	25.5/61.0		—			
Sample #	Parameter	Calculated Value	—			
04	α [%/°C] :	0.064	—			
	β [%/°C] :	-0.370	—			
	δ [%/°C] :	-0.476	—			
Supplementary information: Procedure with a solar simulator						
10.2 Int	TABLE: Maximum power determination (Initial)		—			
Test Date [MM/DD/YYYY]	08/02/2012		—			
Radiant source	<input checked="" type="checkbox"/> Solar simulator, <input type="checkbox"/> Natural sunlight		—			
Module temperature [°C]	25		—			
Irradiance [W/m ²]	1000		—			
Radiant source	<input checked="" type="checkbox"/> Solar simulator, <input type="checkbox"/> Natural sunlight		—			
Sample #	Voc [V]	Isc [A]	Vmp [V]	Imp [A]	Pmp [W]	FF [%]
04	42.603	8.335	33.845	7.808	264.268	74.4
Supplementary information:						
	EL test (Initial)					
Test Date [MM/DD/YYYY]	07/31/2012					—

Test Current applied [A]		7		—		
						
Supplementary information: abnormal cell was detected by EL test before PID						
TABLE: PID test					—	
Test Date [MM/DD/YYYY] start/end		08/03/2012 to 08/05/2012		—		
Temperature [°C]		85		—		
Humidity [%]		85		—		
Total hours [h]		48		—		
Voltage [V]		-1000		—		
Sample #	Open circuits (yes/no)				Verdict	
04	No				P	
Supplementary information:						
(10.1 Visual inspection after PID test)					—	
Test Date [MM/DD/YYYY]		08/06/2012		—		
Sample #	Nature and position of initial findings – comments or attach photos				Verdict	
04	No visual defects				P	
Supplementary information:						
(10.2 Maximum power determination after PID test)					—	
Test Date [MM/DD/YYYY]		08/06/2012		—		
Radiant source		<input checked="" type="checkbox"/> Solar simulator, <input type="checkbox"/> Natural sunlight		—		
Module temperature [°C]		25		—		
Irradiance [W/m ²]		1000		—		
Sample #	Voc [V]	Isc [A]	Vmp [V]	Imp [A]	Pmp [W]	FF [%]

04	42.428	8.277	34.514	7.398	255.346	72.7
Pmp degradation after this test [%] ≤ 5% :			3.38%			P
Supplementary information:						
(EL test after PID test)						—
Test Date [MM/DD/YYYY]			08/06/2012		—	
Test Current applied [A]			7		—	
						
Supplementary information:						

3. List of measurement equipments

Identification#	Description
DZ-A-A2-0022	Pulse Solar Simulator
DZ-A-A1-0001-1	Standard solar cell
DZ-A-A2-0007-2	Dielectric Withstand Voltage tester
DZ-A-A1-0010	Thermal infrared imager
DZ-A-A1-50-26-0	Anemometer
DZ-A-A1-50-25-0	Pyranometer
DZ-A-A1-52-36-0	Data acquisition system
DZ-A-A3-0005	Walking-in environment chamber
DZ-A-A2-0007-1	Conductivity meter
DZ-A-A1-17-22-0	Thrust and tension meter
DZ-D-B2-0001	Solar cell infrared test equipment
DZ-A-A1-50-81-1	Analytical balance
DZ-A-A3-61-09-0	High temperature vacuum chamber

4. Statement of the estimated uncertainty of the test results

The estimated uncertainty fulfils the requirements from the CTL decision sheet DSH 251B / 2009.

----- End of Test Report -----