PV Panel Technical Specification

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1 General

The aim of this document is to specify the minimum requirements for PV panels.

Note that power plants Solar Panels must be A Grade, N Type, TopCon, Bi facial, Half Cut, Mono crystalline panels with Maximum power (Pmax/W) at STC ≥660 W and Efficiency at STC ≥21 %. These panels must be purchased from approved vendors as declared in “Vendor List”.

Vendor List	
Item	Manufacture
1	LONGi
2	Trina Solar
3	JA Solar
4	AE Solar
5	Canadian Solar
6	Jinko Solar
7	Risen
8	Mana Energy Pak

2 Standards and Certifications

Standards	
Certification Note: the versions from 2016 onwards is accepted, if not available then the last available version is also accepted	IEC 61215 IEC 61730 UL 61730 ISO 9001 ISO 14001 ISO 45001 IEC 62941 IEC 61853 IEC 61701 IEC 62804 IEC 62892
Certification authority (for IEC standards only)	TUV

3 General Specifications

General Specifications	
Facial type	Bi facial
Cut type	Half Cut, Half Cell
Silicon type	Mono crystalline
Topcon	Mandatory
Wafer technology	N Type
No of cells	>120 and Depends on wafer size and other parameters

Wafer size	M10 or M/G12
Fire rating	UL type 1 or 2 IEC Class C
First year power degradation (%)	≤1.5
Year 2 - 25 degradation (%)	≤0.55
Total power degradation in 25th year (%)	≤19.3
Production date	2025
Number of spare panels for following PV plant capacities (in DC) Note: In calculation of spare, always round up the value. E.g. For a 3 MW plant, approximately 4,839 modules with capacity of 620 W is required, so 2% for 4,839 modules is 96.77 and therefore 97 spare panels must be purchased.	2%
Bfacilaity Factor	75 % +/- 10 %

4 Operating Parameters

Operating Parameters	
Power output warranty (year)	25
Material and process warranty (year)	≥10
Operational temperature (°C)	-40 to +85
Voc and Isc tolerance (%)	±3
Maximum system voltage	DC1500V (IEC/UL)
Maximum series fuse rating (A)	25~30

Nominal operating cell temperature (°C)	45±2 or 41 +/-5
Protection class	Class II

5 Electrical Characteristics at STC

Electrical Characteristics at STC STC: AM1.5 1000 W/m2 25°C	
Maximum power (Pmax/W)	≥660
PV Module Efficiency (%)	≥21
Power output tolerance (W)	0 to 5
Number of bus bar	At least 9

6 Temperature Rating at STC

Temperature Rating at STC STC: AM1.5 1000 W/m2 25°C	
Temp coefficient of Isc (%/°C)	To be specified
Temp coefficient of Voc (%/°C)	To be specified
Temp coefficient of Pmax (%/°C)	<=0.30

7 Mechanical Loading

Mechanical Loading	
Front side maximum mechanical loading (Pa)	≥5400
Rear side maximum mechanical loading (Pa)	≥2400
Hail stone test	Acc. to IEC 61215

8 Mechanical Parameters

Mechanical Parameters	
Junction box	IP68 3 bypass diodes
Minimum DC cable cross section (mm2)	4
Installation method	Landscape, Portrait
Junction box minimum cable Length (cm)	140 (In any Case must fullfill Leap Frog Connection of panels in strings)
Frame	Anodized aluminum alloy frame
Glass	Dual Glass, 2mm+2mm heat Strengthened Glass
Number of grounding holes	Minimum 2
DC Connector	To be specified

Note 1: Client shipping permission of solar panels will be granted upon fulfillment of following items:

a. Handover of excel file containing flash test results and other routine test results for each and every to be procured panels executed by solar panel manufacturer as per solar panel serial number.
b. Completion and approval of random flash test for selected solar panels noted in technical documents.

c. Completion and approval of TUV test for any required randomly selected solar panels noted in technical documents by named facilities.
d. Approval of third-party inspection company regarding correct and safe cargo packaging and test witness designated by client (if necessary)