

	PURCHASE SPECIFICATION	Doc. No:-	REG1920-20190741
		Rev no	00
Rudrapur	GROUP : REG (RENEWABLE ENERGY GROUP)		

**SPECIFICATIONS FOR SUPPLY OF PV MODULE WITH 05
YEARS OF WARRANTY AT VISVESVARAYA TECHNOLOGICAL
UNIVERSITY, BELAGAVI**

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1. Introduction:

This specification defines the scope of the Bidder for **Supply of Solar PV Module with 05 year Warranty and 25 Year Performance Warranty.**

2. Bidders' Scope

The Scope of bidder is as follows:

- Supply of PV module.
- Packing & Forwarding
- Freight & Transit insurance
- Loading from Manufacturer works.
- Material Warranty for 05 years
- Performance Warranty 25 Years.

3. Technical Specification

- The PV modules supplied must be made/manufactured in India only.
- The PV modules supplied must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. In addition, the modules must conform to IEC 61730 Part-2- requirements for construction & Part 2 – requirements for testing, for safety qualification or equivalent IS.
- For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701**
- The solar crystalline modules of minimum 330 Wp and above wattage. Module capacity less than 330 Wp will not be accepted.
- Protective devices against surges at the PV module shall be provided. Low voltage drops bypass diodes (3 Nos minimum) shall be provided.
- PV modules must be tested and approved by one of the IEC authorized test centers.
- The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.
- The efficiency of the PV modules should be minimum 16% and fill factor should be more than 70%.
- The Solar PV module shall be free of potential induced degradation (PID).
- Other general requirement for the PV modules and subsystems shall be the Following:
 - The rated output power of any supplied module shall have tolerance of +3%. Negative Tolerance is not accepted.

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- The peak power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
- The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
- IV curves at Standard Test Condition (STC) should be provided by bidder.

Identification and Traceability

Modules supplied must use a RF identification tag. The following information must be mentioned in the RFID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).

- a) Name of the manufacturer of the PV module
- b) Name of the manufacturer of Solar Cells.
- c) Month & year of the manufacture (separate for solar cells and modules)
- d) Country of origin (separately for solar cells and module)
- e) I-V curve for the module Wattage, I_m , V_m and FF for the module
- f) Unique Serial No and Model No of the module
- g) Date and year of obtaining IEC PV module qualification certificate.
- h) Name of the test lab issuing IEC certificate.
- i) Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

4. IEC Certification requirement:

- IEC 61215 - Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval.
- IEC 61701 - Salt mist corrosion testing of photovoltaic (PV) modules.
- IEC 61853- Part 1/ IS 16170 - Part 1 for Photovoltaic (PV) module performance testing and energy rating. Irradiance and temperature performance measurements and power rating.
- IEC 62716- Photovoltaic (PV) Modules – Ammonia (NH₃) Corrosion Testing.
- IEC 61730 Photovoltaic (PV) Module Safety Qualification –Modules must qualify to
 - Part 1: Requirements for Construction,
 - Part 2: Requirements for Testing
- IEC 62804- test methods for detection of PID (potential-induced degradation).
- IEC 60068 - Environmental testing.

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Make: ADANI/EMMVEE/HHV SOLAR/KOTAK UJRA/TATA SOLAR/ VIKRAM SOLAR/WAREE

5. Drawings & Manuals:

5.1. Document with Technical Bid

- a) Drawing of SPV modules along with the technical bids mentioning all details such as dimension, weight etc.
- b) Data Sheet of SPV Module.
- c) IEC certificate mentioned in this document

5.2. Document after award of work

Bidder shall submit following documents within 05 days after award of Purchase order for approval of document for supply of material: -

- a) Two sets of drawings and "Installation and O&M" manuals.
- b) Complete technical data sheets of Module giving details of the specifications.
- c) Material Quality Plan (MQP)
- d) General arrangement and dimensioned layout
- e) IEC /BIS certificate reports

6. Warranties:

Material Warranty:

- i. Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (05) years from the date of sale to the original customer ("Customer")
- ii. Defects and/or failures due to manufacturing
- iii. Defects and/or failures due to quality of materials.
- iv. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option.

Performance Warranty:

The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25-year period and not more than 10% after ten years' period of the full rated original output.

7. Testing

Factory Acceptance Tests (FAT)

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The Quality Plan/ test program for the Factory Acceptance Tests (FAT) shall be submitted to customer for approval at least 2 weeks prior commencing of tests. The test report shall be submitted prior to shipment of material.

BHEL/Customer reserves the right to visit the PV module factory at any time during manufacturing process to assess quality and production scheduling status.

Additional Independent Test

Additional independent certified Third Party testing of the PV modules is required. The bidder shall propose a list of Third Party testing laboratories for BHEL approval. The bidder shall organize and facilitate the end customer visit and/or testing in the factory or laboratory, if required.

BHEL/End customer reserves the right to select PV modules randomly for the following tests:

- Module performance tests
- Module behavior test (irradiation and temperature)
- Module electroluminescence tests

All testing must be included in the proposal and be supported by the bidder.

8. Inspection

Items shall be inspected by BHEL/Customer/Third party during manufacturing and in assembled condition prior to dispatch.

All standard tests on equipment and accessories in accordance with the Standards adopted & as per QAP/MQP shall be carried out at manufacturer's works so as to ensure efficient operation and satisfactory performance of all components / parts. The Pre dispatch will be carried out by BHEL/ Customer Rep at firm's premises.

Bidder shall bear all cost and expense incurred for inspection of all items supplied by bidder. Bidder has to provide advance notice to BHEL/BHEL's customer for inspection.

If any plant and equipment or any part of the facilities supplied by bidder fails to pass any test and/or inspection, the bidder shall either rectify or replace such items and shall repeat the test/inspection without any extra cost to BHEL.

BHEL/customer reserves the right to verify flash test reports of Solar PV modules.

9. Packing:

The following Packing and Marking clause will form part of the contract placed on successful Bidder –

- i. The Bidder shall provide packing and preservation of the equipment and spares/goods contracted so as to ensure their safety against damage in the conditions of land, sea and air transportation, transshipment, storage and weather hazards during transportation, subject to proper cargo handling. The Seller shall ensure that the stores are packed in containers, which are made sufficiently strong, and with seasoned

Signature

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wood. The packing cases should have hooks for lifting by crane/fork lift truck. Tags with proper marking shall be fastened to the special equipment, which cannot be packed.

- ii. The Bidder must ensure that sturdy packing is used to withstand rough handling during transit by rail/road. In case the contractor fails to meet the qualitative requirements for packing, he must make good all losses arising out of his failure to meet contractual obligations. The contractor will be responsible for internal damages if any, when outwardly there is no damage to the package.
- iii. One copy of the packing list/ invoice in English and pre-dispatch inspection certificate shall be inserted in each cargo package, and the full set of the packing lists shall be placed in Case No.1 painted in a yellow colour preferably.

Marking: Each package shall be marked with warning inscriptions: Top, do not turn over, category of cargo, etc.

10.Safe Disposal of Solar PV Modules

The bidder will ensure that all Solar PV modules from their plant after their end of life' (when they become defective/ non-operational/ non-repairable) are disposed in accordance with the "e-waste (Management and Handling) Rules, 2011" notified by the Government and as revised and amended from time to time.

11.Authorized Test Centers

The PV modules deployed shall have valid test certificates for their qualification as per above specified IEC/ BIS Standards by one of the NABL Accredited Test Centers in India. In case of module types/ equipment for which such Test facilities may not exist in India, test certificates from reputed ILAC Member Labs abroad will be acceptable.

12. Supply Destination & Delivery Period:

- a) **Delivery Period:** Supply shall be made within **45 days** from the date of the Purchase order.
- b) **Supply Destination:** VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI-KARNATAK

13.Bank Guarantee:

Performance Bank Guarantee(PBG) of **5% of the Purchase Order value** shall be submitted within 02 weeks from the date of release of Purchase Order date. Bank Guarantee is valid for the warranty period (i.e **5 Years** from the date of purchase order) with a further claim period of 6 months.