



BID SPECIFICATION FOR SOLAR LANTERN



ANNEXURE – I

SECTION – 2A

Technical Specification for CFL based Solar Lantern

1.0 DEFINITION

A Solar Photovoltaic Lantern is a lighting system consisting of a lamp, battery and electronics, all placed in a suitable housing, made of metal, plastic or fiberglass, and a PV module. The battery is charged by electricity generated through the PV module. The lantern is basically a portable lighting device suitable for either indoor or outdoor lighting, covering a full range of 360 degrees. A lighting device, which provides only unidirectional lighting, will not be classified as a solar lantern in the present context.

2.0 SCOPE OF WORK

The scope of work includes:

Manufacture, shop testing, packing & forwarding, transportation & supply of CFL based solar lantern system complete in all respect along with one set of operation instruction-cum- maintenance manual in Hindi for each set and delivery on F.O.R destination/site (door delivery) basis across the state of Jharkhand including, demonstration of performance and training at all sites located within the state of Jharkhand as per direction of JREDA.

3.0 TECHNICAL SPECIFICATION

The CFL based solar lantern shall be Indigenous make should conform to the following model:

MODEL	LAMP	BATTERY CAPACITY AT C/20 RATE	PV MODULE RATING
MODEL II A	CFL 7W	12V, 7AH	10 to 11.9 Wp.

3.1 DUTY CYCLE

The Solar lantern should provide a minimum of 3/4 hours of lighting per day under average daily solar radiation conditions of 5 kWh/sq.m. on a horizontal surface. The actual duration of lighting may vary depending on the location, season etc.

3.2 LAMPS

- The lamp will be compact fluorescent (CFL) type with a rating of 7W.
- For 4-Pin type CFLs, a suitable pre-heating circuit must be provided.
- The lamp should be preferably mounted in a base up configuration.
- The light output should be $370 \pm 5\%$ lumen for 7W lamp. No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON / OFF cycles (two minutes ON and four minutes OFF is one cycle).

3.3 BATTERY

- The battery shall be sealed maintenance free lead acid type.
- The capacity of the battery will be a minimum of 7.0AH at 12V at C/20 discharge rate at 27°C.

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- (c) 80% of the rated battery capacity (~ 5.6AH at 12V, 27°C) should be between the low voltage and high voltage cut-off points specified in the performance requirements of the electronics used in the solar lantern.

3.4 ELECTRONICS

- (a) The inverter will be of quasi sine wave/sine wave type with a crest factor less than 1.7 and the frequency in the range of 20-35 KHz Half-wave operation is not acceptable.
- (b) The overall efficiency of the control electronics should be more than 80%.
- (c) The idle current (i.e. the current consumed when the lamp is switched OFF and no charging is in progress) should not be more than 1 mA.
- (d) The PCB containing the electronics should be capable of solder free installation and placement.
- (e) The voltage drop from module terminals to the battery terminal should not exceed 0.5 volts including drop across the diode and the cable.
- (f) The low voltage cut off set point will not be lower than 11V and the high voltage cut off should be below 14.3V at 27°C.
- (g) The electronics circuit shall be designed to ensure full charging of the battery under different ambient temperatures (0 – 45°C). Further the electronics circuit should have adequate temperature compensation for proper charging of the battery through out year.

3.5 PV MODULE (S)

- a) The SPV module to be used with solar lantern must have a minimum of 10 Wp (atleast 610mA Load when measured at 16.40 ± 0.2 Volts load condition) under standard test conditions (STC) of measurement.
- b) The module should preferably have an arrangement (stand) for mounting at the optimum angle in the direction facing the sun.
- c) In case of thin film solar cell modules, the specified values refer to the stabilized power output after the initial degradation.
- d) The terminal box on the module should have a provision for opening it for replacing the cables, if required.
- e) A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side.
- Name of the Manufacturer or distinctive logo.
 - Model or Type No.
 - Serial No.
 - Year of make
- f) Models of reputed make shall be offered

JREDA SPECIFICATION

- (a) Monogram of JREDA along with following details translated into Hindi language shall be laminated in Devnagari script on the left hand top corner in the front of each PV module.
- ❖ SPV Programme 2007-08
 - ❖ Not for sale or transfer
 - ❖ Statutory action would be taken by JREDA, if it found sold or transferred under different sections of IPC
- (b) Frame of PV module shall be painted golden yellow.



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(c) A strip containing the following details should be mentioned in Hindi and pasted in permanent manner at the back of the module:

(i.) Cost of the system – Rs. 2977/- (Two Thousand Nine Hundred Seventy Seven Only)

(ii.) State subsidy to different categories viz. SC/ST/primitive

General – Rs. 2400/- (Two Thousand Four Hundred Only)

SC/ST/Primitive Tribe – 100 %

(iii) Beneficiary contribution.

General – Rs. 577/- (Rs. Five Hundred Seventy Seven Only)

3.6 ELECTRONIC PROTECTION

(a) Adequate protection is to be incorporated under no load conditions (e.g. when the lamp is removed and the lantern is switched ON).

(b) Battery cut offs & reconnects should be provided to protect it against overcharge and deep discharge condition.

(c) A fuse should be provided to protect against short circuit conditions.

(d) A blocking diode, preferably a Schottky diode, should be provided as part of the lantern electronics to prevent reverse flow of current through the PV module, if such a diode is not provided with the module itself.

(e) Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

3.7 OTHER FEATURES

(a) Two LED indicators one for a green light to indicate charging in progress, and another red LED to indicate deep discharge conditions of the battery suggesting that load should be switched off and the battery must be charged immediately should be provided on the body of the lantern. The green LED should glow only when the battery is actually being charged.

(b) The On/Off switch used in the lantern must be suitable for use in DC circuits and be reliable with long life. Use of electronic switch is allowed. A cable (2 core x 1.5 sqmm size) of suitable length (at least 5 meters) should be provided for inter-connection between the module and the lantern.

(c) The following details should be marked indelibly on the lantern:

- Name of the Manufacturer or Distinctive Logo.
- Model Number (this refers to Model (s) indicated in Clause 3.0 above)
- Serial Number.
- Make and serial number of the PV module used with the lantern.

3.8 DOCUMENTATION

An operation, Instruction Maintenance Manual in Hindi should be provided with the solar lantern. The following minimum details must be provided in the manual:

(i) About Photovoltaic

(ii) About Solar Lantern – its components and expected performance.

(iii) About PV Module.

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- (iv) About CFL
- (v) About Battery
- (vi) Clear instructions about mounting of PV module(s)
- (vii) About electronics
- (viii) About charging and significance of indicators.
- (ix) Do's and Don'ts
- (x) Clear instructions on regular maintenance and trouble shooting of solar lantern.
- (xi) Name and address of the person or service center to be contacted in case of failure or complaint
- (xii) Warranty card.

Components and parts used in solar Lantern should confirm to the latest BIS specifications, wherever such specifications are available and applicable.

3.9 WARRANTY

The PV module will be warranted for a minimum period of 10 years from the date of supply and the lantern (including the battery) will be warranted for a minimum period of 2 years from the date of supply. The warranty card to be supplied with the system must contain the detail of the system supplied. The manufacturers can also provide additional information about the system and condition of warranty as necessary.

3.10 Any minor equipment and material which may not be specifically mentioned in this specification but are required to make the system complete in every respect in accordance with technical specification and guaranteed performance of the equipment shall be deemed to have been covered under the scope of this specification and shall be provided by the tender/ supplier within the quoted price.

3.11 The equipment supplied shall be new and best of their kind and latest technology on the date. All materials and equipment shall comply with the MNES/MNRE Standard.

3.12 The equipment shall be designed to have maximum reliability and ease of operation and maintenance as primary consideration. The equipment offered shall be of a family having basic design as per which other equipment have already been supplied and which have operated efficiently and reliably elsewhere at least three years under similar climatic and operating condition. Operation feed back for such equipment already supplied shall be attached with the offer. All the equipment supplied shall be guaranteed for quality workmanship and compliance with the specified requirements for integrated performance.