# Directorate of Agriculture

# Department of Agriculture, Animal Husbandry & Cooperative,

# Govt of Jharkhand

## Request for Empanelment (RFE)

**For Supply, Transportation, Installation (Including Civil Works), Testing & Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 5 HP (Static) in Jharkhand State, Including Complete System Warranty and Repair & Maintenance under Kisan Samriddhi Yojana**

**RFE No.-Agri/07/2026-27**


# Directorate of Agriculture

# Department of Agriculture, Animal Husbandry and Cooperative

# Government of Jharkhand


# 1st Floor, Krishi Bhawan, Kanke Road, Ranchi – 834008

## Disclaimer

- The information contained in this Tender Document, or subsequently provided to the Bidder(s), whether verbally or in writing, by or on behalf of the Directorate of Agriculture, Department of Agriculture, Animal Husbandry & Cooperative, Government of Jharkhand, including its officers, employees, consultants, or advisors, is provided solely for the purpose of assisting Bidder(s) in preparing their bids and is subject to the terms and conditions set out in this Tender Document and such other conditions as may be prescribed by the Tendering Authority from time to time.
- This Tender Document does not constitute an agreement, nor does it amount to an offer or invitation by the Tendering Authority to any party other than the eligible and qualified Bidder(s) submitting bids in response to this Tender.
- The purpose of this Tender Document is to provide relevant information for Empanelment of eligible agencies for Supply, Transport, Installation (including civil works), Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 5 HP (Static) capacity in the State of Jharkhand, including complete system warranty and repair & maintenance, under the Kisan Samriddhi Yojana.
- This Tender Document may not include all the information that a Bidder(s) may require. Each Bidder(s) is expected to conduct its own independent assessment, investigations, and analysis of all technical, financial, commercial, legal, and regulatory aspects of the assignment and to seek professional advice wherever necessary.
- The Tendering Authority, its officers, employees, and advisors do not make any representation or warranty, express or implied, regarding the accuracy, adequacy, correctness, reliability, or completeness of the information contained in this Tender Document. The Tendering Authority shall not incur any liability under any law, statute, rule, or regulation for any loss, damage, or expense suffered by any person acting on the basis of this Tender Document.
- The Tendering Authority reserves the right, at its sole discretion and without assigning any reason, to amend, modify, update, supplement, or withdraw this Tender Document or any part thereof, at any stage of the tender process, without incurring any liability.
- In case of any discrepancy, inconsistency, or conflict between the provisions of this Tender Document and the applicable provisions of the Jharkhand Procurement of Goods & Services Manual, 2024, as amended from time to time, the provisions of the Jharkhand Procurement of Goods & Services Manual, 2024 shall prevail.

### I. Compliance with Bid Structure

Bids shall be submitted strictly in accordance with requirement of this Bid Document. Any Bid not conforming to the prescribed structure, format, or submission requirements shall be treated as non-responsive.

### II. No Deviation Condition

Bidder(s) shall quote unconditionally and strictly as per the terms, conditions, specifications, and requirements of this Bid Document. Any deviation in the make of solar panels, controllers, pumps etc. of the same specification as mentioned in the tender document, other than that mentioned in the Bid Document submitted by the Bidder shall be subject to the prior approval of the Procuring Entity.

## III. Availability & Submission of Bid Documents

Any Bidder(s) meeting the prescribed Qualifying Requirements and intending to participate in this Bid may download the complete Bid Document, along with all amendments, addenda, corrigenda, and clarifications, if any, from the **www.jharkhandtenders.gov.in/ Sameti.org**. The Bid shall be submitted electronically, complete in all respects, in accordance with the provisions of this Bid Document, on or before the stipulated due dateand time.Information related to the Bid shall be published in leading Hindi and English newspapers/dailies.

## IV. Corrigendum & Clarifications

All clarifications, amendments, corrigenda, or modifications to the Bid Document shall be hosted on the **www.jharkhandtenders.gov.in/sameti.org**and leading Hindi and English newspapers/dailies and shall form an integral part of the Bid Document.

## V. Bidder(s)'s Responsibility to Stay Updated

Bidder(s)is solely responsible for regularly monitoring the above-mentioned portals/websites/newspapers/dailies for any notices, amendments, or clarifications issued in relation to this Bid. No separate or individual communication shall be issued by the Department in this regard, and no claim on account of ignorance of such updates shall be entertained.

# Bid Information Sheet

| S No | Particulars | Details |
|---|---|---|
| 1 | Name of the Department | Directorate of Agriculture, Jharkhand, Ranchi |
| 2 | Name, address and official e-mail of Procuring Entity | Director Agriculture, Directorate of Agriculture, Jharkhand, Krishi Bhawan, Kanke Road, Ranchi – 834008. E-mail ID: directoragriculturejh@gmail.com |
| 3 | Name of Work/Brief Description | Supply, Transportation, Installation (Including Civil Works), Testing & Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 5 HP (Static) in Jharkhand State, Including Complete System Warranty and Repair & Maintenance under Kisan Samriddhi Yojana |
| 4 | RFE No. | Agri/07/2026-27 |
| 5 | Tender Value | ₹ 20 crore (approx.) |
| 6 | Type of Bidding System | Two Bid System |
| 7 | Bid validity | 180 days |
| 8 | Type pf RFE/Tender | E-Tender |
| 9 | Completion/Contract Period | As mentioned in the RFE Document |
| 10 | Bid Processing Fee | No |
| 11 | Earnest Money Deposit (EMD) | **₹ 40 Lakhs (Rupees Forty Lakhs only) (For MSEs of Jharkhand no EMD is applicable - For details please refer the Bid Document)** |
| 12 | Performance Bank Guarantee | As mentioned in the RFE Document |
| 13 | e-Reverse Auction | Applicable |
| 14 | Availability of RFE Document | www.jharkhandtenders.gov.in & sameti.org |
| 15 | Date of Issue of RFE | 19.11.2026 |
| 16 | Deadline for Submission of Pre-Bid Query | 25.11.2026 |
| 17 | Pre-Bid Meeting | 30.11.2026 |
| 18 | Last Date and Time for Submission of the Bid | 18.12.2026 6.00 PM |
| 19 | Mode of Submission of Proposal | Online at www.jharkhandtenders.gov.in |
| 20 | Duration of Contract | 2 Years |
| 21 | Contact Person | Sri Prem Bhagat, Section Officer, Directorate of Agriculture, Jharkhand, Ranchi, 1st Floor, Krishi Bhawan, Kanke Road, Ranchi – 834008. Mob. No.: 9955583222 |

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# 1.Introduction

Jharkhand has a total geographical area of 79.72 lakh hectares, of which approximately 38 lakh hectares are cultivable. The State faces acidic soils, low soil moisture, and inadequate irrigation infrastructure, with irrigation coverage limited to about 12% during Kharif and 6–8% during Rabi seasons. Although the average annual rainfall is around 1,280 mm, nearly 80% is received within a short monsoon period of about 100 days, leading to significant water stress during the rest of the year. Major crops grown in the State include paddy, maize, wheat, pulses, and vegetables, with Kharif paddy being the predominant crop under a monocropping system.

Jharkhand is predominantly rural, with nearly 70% of the population dependent on agriculture. As per the 55th Round of the National Sample Survey Organisation (NSSO), about 10.46% of households face seasonal food insecurity, while 2.5% suffer from chronic food shortages. Since the scope for expansion of cultivable land is limited, improving agricultural productivity per unit area is critical. Current productivity levels are approximately 1.4 tonnes/ha under rain-fed conditions and 1.8 tonnes/ha under irrigated conditions, highlighting the need for reliable irrigation.

In line with India's Intended Nationally Determined Contributions (INDCs) to achieve 40% of installed power capacity from non-fossil fuel sources by 2030, emphasis is being placed on decentralized renewable energy solutions alongside large-scale solar projects. Agriculture irrigation remains heavily dependent on diesel and subsidized grid electricity. Of the nearly 30 million agricultural pumps installed in India, around 10 million are diesel-operated, while grid-connected agricultural pumps consume over 17% of the country's annual electricity, placing a substantial financial burden on Distribution Companies (DISCOMs).

To address these challenges, enhance energy and water security, de-dieselize the farm sector, reduce carbon emissions, and augment farmers' income, the Government of Jharkhand has approved the Kisan Samriddhi Yojana. Under this Scheme, the Directorate of Agriculture has been designated as the Procuring Entity for undertaking a transparent and competitive bidding process for the Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 5 HP (Static) in the State, including comprehensive system warranty, repair and maintenance, and insurance for a period of five (5) years.

The Scheme aims to support individual farmers, Farmer Groups, FPOs/FPCs, Cooperatives, Water User Associations, and community-based irrigation systems, with priority to small and marginal farmers, for replacement of existing diesel irrigation pumps. Preference shall be given to beneficiaries adopting or covered under micro-irrigation systems to promote efficient water use.

The solar PV capacity corresponding to the pump capacity shall strictly conform to MNRE specifications. It shall be mandatory to use indigenously manufactured solar modules, cells, motor-pump sets, controllers, and balance of system, with Bidder(s)s required to declare any imported components used. Financial assistance of 90% of the approved unit cost shall be provided under the Scheme, with the remaining 10% to be contributed by the beneficiary farmer. The Scheme shall be implemented in non-market mode, and beneficiary details shall be provided to the selected Bidder(s) by the Directorate of Agriculture.

# 2. Bidding Process and General Instructions

**2.1** The tender shall be processed through a **Single Stage, Two-Packet Bidding System**, as detailed in the Bid Document. The bidding process shall be conducted through competitive bidding in accordance with the applicable provisions and procedures prescribed in the Bid Document and on the www.jharkhandtenders.gov.in

**2.2** Bids shall be submitted online, complete in all respects, on or before the date and time of bid submission as specified on www.jharkhandtenders.gov.in and in the Bid Information Sheet.

**2.3** The Bidder(s) shall submit its bid along with the Earnest Money Deposit (EMD), wherever applicable, in accordance with the Bid Information Sheet. Techno-Commercial Bids shall be opened online as per the schedule notified on the portal, in the presence of authorized representatives of Bidder(s)s who choose to attend online. Bids not accompanied by the required EMD (where applicable) shall be liable to rejection. If any specified date happens to be a holiday, the next working day shall apply for the corresponding activity.

**2.4** The Bid Documents, including eligibility criteria, technical specifications, terms and conditions, and prescribed formats, shall be available for download only from www.jharkhandtenders.gov.in /Sameti.org. Any amendment, corrigendum, or clarification related to this tender shall be hosted on the same portal. Bidder(s)s is advised to regularly visit the portal for updates.

**2.5** The Directorate of Agriculture reserves the right to cancel, withdraw, or defer this tender process at any stage, without assigning any reason. No claim or compensation shall be admissible on account of such action.

# 3. Draft Terms of Contract

## 3.1 Scope of Work

The selected Bidder(s)(s) shall be responsible for the supply, transportation, installation, testing, commissioning, insurance, operation, and maintenance of stand-alone Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 5 HP DCcapacityacross Jharkhand under the Kisan Samriddhi Yojana, including comprehensive warranty and maintenance for a period of five (5) years.

### 3.1.1 Supply, Manufacture and Quality Assurance

I. The selected Bidder(s) shall supply, install (including required civil works), test, and commission 5 HP DC SPWPS and provide comprehensive repair, maintenance, and insurance coverage for five (5) years from the date of commissioning.

II. The Bidder(s) shall establish at least one authorized service centre in each operational district and operate a state-level helpline in the local language. The helpline number shall be permanently displayed on the pump/controller. A basic tool-kit shall be provided to each beneficiary.

III. Each SPWPS shall be permanently marked with a unique pump serial number and toll-free helpline number on the controller, legible for at least five (5) years. These details shall be captured in the web-based monitoring application provided by the Bidder(s).

IV. Pre-Dispatch Inspection (PDI) shall be conducted at the Bidder(s)'s warehouse by a committee constituted by the Directorate of Agriculture, in the presence of the Bidder(s), to verify compliance and quality of all major components including PV modules, pump, controller, Module Mounting Structure (MMS), lightning arrester, wiring, and accessories.

V. The Bidder(s) shall submit MNRE/BIS-compliant test reports, warranty certificates, and structure certificates for the proposed SPWPS along with the bid.

### 3.1.2 Installation and Commissioning

I. Installation and Commissioning shall be carried out strictly as per approved specifications and timelines.

II. A joint site survey shall be conducted by the Bidder(s) and the District ATMA representative. Progress reports shall be submitted fortnightly or as directed by office of the Directorate of Agriculture.

III. Work Orders shall be issued only after submission of beneficiary consent in the prescribed format.

IV. Weekly installation reports and district-wise completion reports (within one week of 100% completion) shall be submitted to the Directorate of Agriculture.

V. The entire installation and commissioning shall be completed within 45 days from the date of issuance of the Work order.

VI. Purchase Orders for major components (PV modules, pumps, controllers, etc.) shall be placed within 30 days of assigning of Notification of Award/Letter of Award (LoA). Unpriced copies of such purchase orders,shall be submitted to the Directorate of Agriculture.

VII. The Bidder(s) shall comply with all applicable statutory, regulatory, and safety requirements and obtain all necessary approvals, permits, and insurance.

VIII. GPS-tagged & time stamped photographs of each installed SPWPS (panels, pump, controller, pipeline, water discharge) shall be captured and uploaded to the MIS for monitoring and record purposes.

IX. The selected Bidder(s) shall take all necessary permits, approvals and licenses, insurance etc. provide training and such other items and services as required to complete the scope of work.

X. Time schedule includes the time required for mobilization as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of the Officer-in-Charge designated by Directorate of Agriculture.

### 3.1.3 Technical Requirements

I. The SPWPS shall conform to BIS and MNRE technical specifications as detailed in Annexure-A.

II. **Only indigenously manufactured components complying with MNRE Domestic Content Requirement (DCR) shall be permitted.**

III. Systems shall comply with MNRE OM F. No. 41/3/2018-SPV Division dated 22.03.2023, as amended from time to time.

### 3.1.4 Operation & Maintenance (O&M) and Complete Maintenance Cover (CMC)

The selected Bidder(s) shall provide **Complete Maintenance Cover (CMC)** for a period of **five (5) years** from the date of commissioning of each SPWPS. The cost of O&M and CMC shall be **fully inclusive in the system cost** and no separate payment shall be made.

I. **Scope of CMC**

The CMC shall include, but not be limited to, the following:

a. Preventive maintenance and routine inspection of the complete SPWPS;

b. Breakdown maintenance including diagnosis, repair, and replacement of defective components such as PV modules, pump, motor, controller, wiring, MMS, lightning arrester, and other required accessories;

c. Replacement of parts due to manufacturing defects, normal wear and tear, or system failure;

d. Software, firmware, and RMS-related maintenance;

e. All tools, consumables, spares, and manpower required for effective maintenance;

f. Insurance coverage against theft, fire, and natural calamities, including annual renewal.

II. **Maintenance Visits**

a. The Bidder(s) shall carry out **preventive maintenance visits at least once every quarter** for each installed SPWPSand report of the same should be communicated to the Directorate via email.

b. Additional visits shall be undertaken **as and when required**, based on complaints, RMS alerts, or directions of the Directorate of Agriculture/Director SAMETI.

III. **Complaint Redressal and Response Time**

a. A complaint registration mechanism through **toll-free helpline and RMS** shall be maintained throughout the contract period.

b. Any complaint or service call shall be attended to**within 72 hours (3 days)** from the time of receipt of complaint.

c. In case replacement of any major component is required, the same shall be carried out at the earliest, (max 15 days) without disrupting irrigation requirements.

### 3.1.5 Spare Parts Availability

a. The Bidder(s) shall maintain minimum 10% spare inventory (component-wise)for all critical components to ensure redundancy and uninterrupted event operations at each district service centre. The Directorate of Agriculture or its authorized agency may inspect the O&M activities at any time. *Unsatisfactory maintenance or non-compliance may invite action as per contract provisions.*

### 3.1.6 Training, Awareness and Beneficiary Capacity Building

The selected Bidder(s) shall provide hands-on training and awareness programmes to beneficiaries and local users at the time of installation and during O&M visits.

I. **Training shall cover**:

- Basic working principles of the SPWPS.
- Safe operation of the pump and controller.
- Daily and seasonal operation practices.
- Basic cleaning and routine checks.
- Do's and Don'ts for efficient use and safety.
- Identification of common faults and first-level troubleshooting.
- Procedure for lodging complaints and contacting service centres.

II. Training shall be conducted in the local language, using simple instructions and demonstrations. Printed O&M manuals shall be provided to each beneficiary.

III. The O&M Manual shall, be simple, user-friendly, and illustrated, enabling beneficiaries with limited technical background to operate and maintain the system safely and effectively which include the following contents:

IV. The O&M Manual shall Overview of the Solar Photovoltaic Water Pumping System (SPWPS) and its major components

- **Block diagram** and **single line diagram (SLD)** of the system
- Details of key components including make, model number, capacity, voltage rating, and country of origin

- Operating procedures for start-up, shutdown, and seasonal operation
- Explanation of controller indicators, alarms, and fault signals
- Routine maintenance activities to be carried out by the beneficiary
- Preventive maintenance schedule and basic troubleshooting guide
- Do's and Don'ts for safe and efficient operation
- Warranty coverage details and CMC scope
- Insurance coverage details
- Procedure for lodging complaints and escalation mechanism
- Name, address, and contact details of the district service centre and helpline
- Common faults and corrective actions.

V. A minimum of **ten (10) hard copies** of the O&M Manual in booklet form shall be maintained at each district service centre. Soft copies shall be made available to the Directorate of Agriculture /Director SAMETI whenever required.

V. VI. Awareness and sensitization sessions shall be conducted at least three (3) times per year, with greater emphasis during the initial months of operation, to ensure proper, efficient, and sustainable utilization of the system by beneficiaries. Photographic evidence of each awareness campaign shall be documented and submitted to the Directorate/SAMETI upon request

### 3.1.7Monitoring and Remote Monitoring System

I. The Bidder(s) shall provide and maintain a Remote Monitoring System (RMS) for each installed SPWPS in accordance with MNRE guidelines for a period of five (5) years.

The RMS shall, at a minimum, enable:

a. Assignment of a unique serial number to each controller;

b. Real-time visibility of system status (ON/OFF);

c. Monitoring and logging of key parameters including array voltage/current, power, water flow/output, and fault conditions at intervals not exceeding **10 minutes**;

d. Geo-tagging of the installed system;

e. Local data storage backup for a minimum period of two (2) years.

II. The RMS shall push accurate and reliable data to the centralized portal/MIS. Non-functioning or unreliable RMS shall be treated as non-compliance, and the system may not be accepted until rectified

II. The Bidder(s) shall ensure uninterrupted operation and maintenance of the RMS throughout the contract period and provide necessary technical support

### 3.1.8Data Ownership, Hosting, and Compliance

I. All data generated, collected, transmitted, and stored through the RMS shall be the exclusive property of the Directorate. The Bidder(s) shall have no ownership rights over such data

II. The RMS data shall be hosted and stored at the State Data Centre (SDC) or any other data centre designated by the State Government/Directorate

III. The Bidder(s) shall ensure compliance with Government of India and State Government IT policies, including applicable data security, data privacy, cybersecurity, and hosting guidelines, as amended from time to time

IV. The Bidder(s) shall not share, transfer, monetize, or use the data for any purpose other than execution of the contract, without prior written approval of the Directorate

V. Upon completion or termination of the contract, the Bidder(s) shall hand over complete data, access credentials, documentation, and source configurations, and ensure secure deletion of any residual data from its systems, as certified to the Directorate.

### 3.1.9Type of Pumps

The following **types of pumps** are permitted for procurement, in accordance with **MNREspecifications**:

| Pump Capacity (HP) | Pump Type | Pump Position | Model Type (as per MNRE) | Controller Type | Minimum Command Area (Acres) |
|---|---|---|---|---|---|
| 5 HP | DC | Surface (Static) | Model–6 | Normal (Without USPC) | 5 |

### 3.1.10 Module Mounting Structure (MMS)

The Module Mounting Structure (MMS) shall be provided in accordance with the latest MNRE guidelines. The MMS configuration shall be permitted as either of the following:

- A combination of two standard MMS units of 8 modules each, or
- A combination of one standard MMS unit of 10 modules and one standard MMS unit of 6 modules

All MMS components, materials, and installation practices shall strictly comply with the **prevailing MNRE technical specifications and standards**.

### 3.1.11 Commissioning and Validation of SPWPS

I. The Selected Bidder(s) shall submit beneficiary consents monthly to the Directorate of Agriculture. Upon verification, the Directorate of Agriculture/Director SAMETI shall issue the corresponding Letter of Award (LoA). The Selected Bidder(s) shall supply, install, test, and commission (SITC) the allocated Solar Powered Water Pumping Systems (SPWPS) within forty-five (45) days from the date of issuance of the Work Order, or within such extended period as approved by the Competent Authority.

II. Commissioning of SPWPS shall be carried out strictly in accordance with the procedure specified under Clause 3.1.2 of the Bid Document. The Directorate of Agriculture/Director SAMETI or its authorized representative(s) shall have the right to inspect, witness, and verify the installation and commissioning at site(s).

III. Upon successful commissioning and verification, the Commissioning Certificate shall be issued by the Directorate of Agriculture/Director SAMETI, and only such SPWPS shall be treated as successfully commissioned for all purposes under this Bid.

### 3.1.12 SPWPS Uptime and Remote Monitoring Requirements

I. The Selected Bidder(s) shall ensure that a minimum of ninety-five percent (95%) of the total installed Solar Powered Water Pumping Systems (SPWPS) are functional and operational at all times, excluding downtime attributable to Force Majeure events duly accepted by the Competent Authority.

### 3.1.13 Quantity of SPWPS to be Supplied

**The approximate quantity of 5HP SPWPS to be supplied is 400 for the first year.** The quantity to be supplied for the subsequent years shall depend on the availability of funds. The decision of the Directorate of Agriculture shall be final in this regard. Further, the Directorate reserves the right to increase or decrease the quantity of SPWPS units to be supplied without assigning any reasons thereof.The Bidder (s) is not entitled to any claim or compensation if the procuring entity procures less than the approximate specified quantity.

# 4. Special conditions of Contract

## 4.1 Earnest Money Deposit (EMD)

I. The Bidder(s) shall submit an Earnest Money Deposit (EMD) of INR **40,00,000/- (Rupees Forty Lakh only)** shall be deposited electronically through RTGS/NEFT etc. A copy of the same shall be attached along with the technical bid.

II. **Exemption:**MSEs (Micro and Small Enterprises), registered within the state of Jharkhand shall be eligible for exemption

III. **Forfeiture of EMD**:
The EMD shall be forfeited/encashed by the Directorate of Agriculture in the following cases:

a. If the Bidder(s) withdraws or modifies the bid during the bid validity period;

b. If the Selected Bidder(s) fails to submit the Performance Bank Guarantee (PBG) within the stipulated time after issuance of LoA;

c. If any information or document submitted by the Bidder(s) is found to be false, misleading, or misrepresented at any stage.

## 4.2 Performance Bank Guarantee (PBG)

I. The Selected Bidder(s) shall furnish a Performance Bank Guarantee (PBG) equivalent to five percent (5%) of the total Letter of Award (LoA) value within 15 days of issuance of the Letter of Award (LoA). The PBG shall be submitted in lieu of retention money, and no retention amount shall be deducted from any running or final bills.

II. The Successful/Selected Bidder(s) shall furnish an irrevocable, unconditional, and enforceable Performance Bank Guarantee (PBG) in favour of the Directorate, issued by **any** Nationalized Bank or Scheduled Commercial Bank as listed on the website of the Reserve Bank of India (RBI) and valid as on the date of issuance of the Bank Guarantee.

III. The PBG shall be payable on demand**,** without demur, reservation, protest, or reference to the Bidder(s), and shall remain valid and binding for the entire period stipulated in the Contract, including any extensions thereof.

IV. Any Bank Guarantee issued by a foreign branch of a Scheduled Commercial Bank **shall be** mandatorily endorsed and confirmed by its Indian branch or by the State Bank of India (SBI)**,** making the same fully enforceable in India.

V. The PBG shall **not** be cancelled, withdrawn, modified, or reduced **without** theprior written consentof the Directorate.

VI. As installation and commissioning of SPWPS shall be undertaken in a staggered manner based on beneficiary identification and consent, the Comprehensive Maintenance Contract (CMC) period for each SPWPS shall commence from its respective date of commissioning.

VII. The PBG shall remain valid up to completion of the CMC period of the last commissioned SPWPS, and shall be renewed/extended accordingly, at least 30 days prior to expiry, to cover the entire CMC obligations.

VIII. In case of non-performance or breach of CMC obligations, the Directorate of Agriculture shall have the right to encash the PBG, wholly or partly. The PBG shall be released only after successful completion of the CMC period of all SPWPS and certification of satisfactory performance by the Directorate of Agriculture.

## 4.3 Letter of Award (LoA) and Completion Time

I. The selected Bidder(s) shall ensure execution and completion of the work strictly in accordance with the Letter of Award (LoA), tender terms and conditions, technical specifications, and applicable scheme guidelines.

II. The on-ground implementation work shall commence within fifteen (15) days from the date of issuance of theWork Order by the Directorate of Agriculture.

III. The successful Bidder(s) shall submit unpriced copies of purchase orders for solar pump sets, controllers, and solar PV modules to the Directorate of Agriculture within thirty (30) days from the date of Notification of Award/Letter of Award. This requirement shall not apply where the Bidder(s) itself is the manufacturer of all such items. Failure to submit the unpriced purchase order copies within the stipulated time may result in cancellation of the contract.

IV. The selected Bidder(s) shall mandatorily, within one (1) month from the date of issuance of the first Work Order in the respective district, establish and operationalize a fully functional field office and deploy adequate and competent technical manpower, supervisory staff, and field teams in each district in numbers commensurate with the scope of work.

V. Failure to comply with this requirement shall be treated as a material breach of contract and shall attract penalties as specified in the tender/contract, including but not limited to withholding of payments, levy of liquidated damages, encashment of Performance Bank Guarantee (PBG), and/or termination of contract, without prejudice to any other rights of the Directorate of Agriculture under the Agreement

VI. Notwithstanding the transfer of ownership of plant and equipment, the risk, care, and custody of the same shall remain with the Bidder(s), until completion of the facilities in which such equipment is incorporated.

## 4.4 Important note and instruction to Bidder(s)

I. Wherever information has been sought in specified formats, the Bidder(s)s shall furnish the same strictly in accordance with the prescribed formats. Bidder(s)s shall refrain from making any deviations or referring to any other document for providing information required to be submitted in the prescribed formats.

II. Selection of Bidder(s)s shall be based on the declarations made by them in the relevant schedules of the BID submitted on the**www.jharkhandtenders.gov.in**.

III. In the event a Bidder(s) conceals any material information, makes any incorrect statement, misrepresents facts, or submits any misleading information in its response to the BID, the Directorate of Agriculture reserves the right to reject such response and/or cancel the Letter of Award (LoA), if

issued, and encash the Bank Guarantee furnished up to that stage. The Bidder(s) shall be solely responsible for any disqualification arising out of its declarations submitted in response to the BID.

IV. All responses to the BID submitted by the Bidder(s)s shall become the property of the Directorate of Agriculture, and the Directorate shall have no obligation to return the same to the Bidder(s).

V. All documents forming part of the response to the BID (including the BID document and any subsequent Amendments / Clarifications / Addenda) submitted online shall be digitally signed by a person duly authorized by the Board of the Bidder(s). A notarized authorization letter in this regard shall also be submitted.

VI. All information and documents shall be submitted in the English language only. In case any document is in a language other than English, including documents of foreign affiliates, the same shall be submitted along with a certified English translation issued by an authorized translator. Bidder(s)s shall clearly mention in the Covering Letter the name of the contact person along with the complete postal address, telephone number, and email address, which shall remain active for a minimum period of seven (07) years.

VII. Any response to the BID that is incomplete or does not substantially comply with the requirements prescribed in this BID shall be liable for rejection by the Directorate of Agriculture.

VIII. Responses to the BID not submitted in the prescribed formats shall be liable for rejection by the Directorate of Agriculture.

IX. No additional information or clarifications in response to this bid document shall be sought by the Directorate of Agriculture.

X. Non-submission and/or submission of incomplete data or information required under the provisions of the BID shall not be construed as a waiver by the Directorate of Agriculture of the Bidder(s)'s obligation to furnish such data/information, unless such waiver is expressly granted in writing by the Directorate of Agriculture.

XI. Disputes arising out of this contract shall be subject to the exclusive jurisdiction of courts located within Ranchi only. The Parties irrevocably submit to the exclusive jurisdiction of such courts and waive any objection to the same on grounds of venue or forum non conveniens.

XII. All financial transactions with the Directorate of Agriculture, including delay charges and any additional charges, if applicable, shall attract GST as per prevailing statutory provisions, irrespective of whether such charges are specifically mentioned in the BID.

## 4.5 Payment Terms

### 4.5.1 Stage-I Payment (90%)

Ninety percent (90%) of the value corresponding to the month-wise number of SPWPS installed shall be released upon fulfilment of the following:

a. Approved **Project Execution Plan (PEP)**.
b. Verified installation completion certificates signed by the Officer-in-Charge and Beneficiary.
c. Submission of warranty documents, quality certificates, and Performance Test Reports.
d. Execution of Contract Agreement.
e. Submission of verified original supply invoices/bills.
f. Submission of software-generated installation reports and MIS data uploads.
g. Proof of distribution of O&M Manuals and handing-over certificates.
h. Submission of a minimum 15 days post-commissioning performance report, based on

RMS or data logger outputs.

i. Submission of an undertaking confirming SPWPS wind resistance up to 150 km/hr.

### 4.5.2 Stage-II Payment (10%)

The balance ten percent (10%) shall be released upon submission of ninety (90) days of accurate performance data of SPWPS through RMS/portal.

## 4.6 Eligibility Criteria

### A. General/Mandatory Eligibility Criteria

| Sl. No. | Eligibility Requirement | Mandatory Supporting Document |
|---|---|---|
| A1 | Bidder(s) shall be a Company incorporated under the Companies Act, 1956 or 2013, or an LLP registered under the LLP Act, 2008, or, a Registered Proprietorship Firm, and shall have been in continuous existence for a minimum period of five (05) years as on the bid submission deadline | Certificate of Incorporation / LLP Registration Certificate |
| A2 | Registered Proprietorship Firms are permitted only if they are Manufacturer or System Integrator, and only upon full compliance with all General, Technical and Financial Eligibility Criteria | Proprietorship Registration Proof + Self-Declaration |
| A3 | The Bidder(s), including its Parent, Affiliate, Ultimate Parent or any Group Company, shall submit only one (01) BID; submission of multiple BIDs shall lead to outright rejection | Disclosure Statement – Format **7.5** |
| A4 | Bidder(s) shall not be under liquidation, insolvency, court receivership or similar proceedings as on the date of BID submission | Declaration – Format **7.6** |
| A5 | Bidder(s) shall not be declared a wilful defaulter and shall not have any major litigation that may adversely affect execution capability | Undertaking – Format **7.4** |

### B. Technical Eligibility Criteria

| Sl. No. | Eligibility Requirement | Mandatory Supporting Document |
|---|---|---|
| B1 | Bidder(s) shall be either a Manufacturer of Solar PV Modules / Solar Pumps / Solar Pump Controllers (indigenous) OR an EPC / System Integrator | Manufacturer Profile + OEM Authorization Certificate |
| B2 | Bidder(s) shall have successfully completed minimum three (03) similar works of Design, Supply, Installation, Testing & Commissioning of standalone (off-grid) SPWPS for Agriculture / Irrigation for Govt. / PSU / SNA in India during the last five (05) years, wherein at least 1 (one) work shall be of minimum contract value ₹5 Crore AND the Bidder(s) shall have installed a minimum cumulative quantity of 250 (Two Hundred Fifty) SPWPS across such works | Work Orders / Agreements AND Completion Certificates mentioning value & quantity |
| B3 | The offered SPWPS shall strictly comply with technical specifications as per Annexure-A, MNRE guidelines and ALMM List-I requirements | Technical Compliance Statement (Bidder(s)-signed) |

| | | |
|---|---|---|
| B4 | Manufacturing facility for Solar PV Modules / Pumps / Controllers shall be operational, registered and functional as on bid submission date | Factory License and relevant BIS Certificates |
| B5 | Bidder(s) shall possess valid PAN and GST registration as on bid submission date | PAN Card + GST Certificate |
| B6 | Bidder(s) shall comply with indigenous manufacturing requirements as stipulated in the BID document | Declaration – Format 7.7 |
| B7 | Bidder(s) shall submit MNRE test certificates for Solar Water Pump Sets issued in 2023, as applicable | Declaration – Format 7.9 |
| B8 | Bidder(s) shall comply with MeITY Notification File No. 1(10)/2017-CLES dated 02.07.2018 | Certificate – Format 7.10 |

**C. Financial Eligibility Criteria**

| Sl. No. | Merged Eligibility Requirement (Single Clause) | Mandatory Supporting Document |
|---|---|---|
| C1 | Bidder(s) shall have minimum average annual turnover of ₹15 Crore during the last five (05) financial years, i.e. FY 2021-22 to FY 2025-26 | CA Certificate with UDIN – Format 7.3 |
| C2 | Bidder(s) shall have positive net worth and net worth not less than paid-up capital as on FY 2025-26 | CA Certificate with UDIN |
| C3 | Bidder(s) shall have been profitable in at least two (02) out of the last five (05) financial years | Audited Financial Statements |

## 4.7. Bid Evaluation

Bid evaluation shall be carried out by the Directorate of Agriculture, Jharkhand strictly based on information and documents submitted by the Bidder(s) on or before the bid submission deadline, in accordance with the provisions of this BID document.

***No document, clarification, explanation or additional information submitted after the bid submission deadline shall be considered for evaluation.***

### 4.7.1 Techno-Commercial Evaluation of Bidder(s) (Step–1)

i. Online opening of bids shall be undertaken only after end of the deadline for submission of passphrases on the www.jharkhandtenders.gov.inportal.

ii. All bids shall be examined to verify compliance with the General/Mandatory Eligibility Criteria, Technical Eligibility Criteria and Financial Eligibility Criteria, as prescribed in the BID.

iii. Only documents uploaded within the stipulated bid submission timeline shall be considered.

***No clarification, modification, supplementation or additional document shall be sought or accepted after the last date of bid submission.***

iv. Any bid found non-responsive, incomplete, or not meeting the prescribed eligibility requirements shall be rejected at this stage and shall not be considered further.

v. Only those Bidder(s)s found Qualified in step -1 shall be considered for Financial Bid Evaluation.

### 4.7.2 Financial Bid Evaluation (Step–2)

I. Financial Bids shall be opened only in respect of those Bidder(s)s who are declared Techno-Commercially Qualified.

### 4.7.3 Evaluation & Payment Clause

I. Evaluation shall be conducted on the basis of the Total Fixed Price quoted per 5 HP Solar Water Pumping System (SPWPS), inclusive of GST, on F.O.R. Destination basis, covering the entire scope of work as specified in the BID. The Bidder(s) shall quote line-item wise prices in the prescribed Price Bid format along with the total price per system. ***Line-item wise prices shall be for reference and payment purposes only*** *and* ***shall not be considered for financial evaluation or L1 determination.***

II. Length of suction pipe shall be 20 metres and that of delivery pipe shall be 100 metres

III. Based on the evaluated total prices per 5 HP SPWPS, Bidder(s) shall be ranked in ascending order as **L1, L2, L3**, etc.

### 4.8. L1-Based Selection, Empanelment and Award of Contract

I. For the 5 HP Solar Photovoltaic Water Pumping System category, the Bidder(s) quoting the lowest evaluated total price per system (L1) shall be declared as the Selected Bidder(s).

II. Technically qualified Bidders shall be called for rate negotiation. If these Bidders agree, in writing, to L1 rate, then these Bidders may be considered for empanelment.

III. The Directorate of Agriculture reserves the right to increase or decrease the quantity to be allocated to the Selected Bidder(s), subject to availability of funds and project requirements.

IV. In case the Selected Bidder(s)faPBFils to supply the allocated quantity within the stipulated timelines, the Directorate of Agriculture may take action in accordance with the BID conditions, including cancellation of award and forfeiture of Performance Bank Guarantee.

### 4.9. Validity of L1 Price

I. The L1 price finalized under this tender shall remain valid for a period of twenty-four (24) months from the date of opening of the Financial Bids.

II. During this validity period, the Selected Bidder(s) shall be bound to execute the work at the approved L1 price and shall **not have the right to refuse** the allocated work.

### 4.10. Recommendation and Issuance of Letter of Award (LoA)

I. Based on the evaluation and approval of the Competent Authority, SAMETI, Jharkhand shall issue the Letter of Award (LoA) to the Selected Bidder(s).

II. Failure to comply with LoA conditions shall result in cancellation of award, forfeiture of Performance Bank Guarantee, and/or blacklisting, as per applicable rules.

III. The decision of the Directorate of Agriculture regarding selection, rejection or cancellation shall be final and binding on all Bidder(s).

## 4.11. Inspection, Testing and Audit

I. All materials and equipment supplied against the LoA shall be subject to inspection, testing and audit by the Directorate of Agriculture or its authorized representative at any stage—before, during or after manufacture and supply.

II. Materials not conforming to the specified technical requirements shall be rejected, and replacement shall be carried out at the sole cost and risk of the Bidder(s), including transportation and incidental expenses.

## 4.12. Debarment from Future Tenders and Non-responsiveness of the Bid

I. In case of failure to perform, delay in execution, or violation of contract conditions, the Directorate of Agriculture reserves the right to debar the Bidder(s) from participating in future tenders for a period as decided by the Competent Authority.

II. The response to this BID submitted by the Bidder(s) along with the documents submitted online to Directorate of Agriculture shall be scrutinized to establish "Responsiveness of the bid". Each Bidder(s)'s response to the BID shall be checked for compliance with the submission requirements set forth in this BID.

III. Any of the following conditions shall cause the Bid to be "non-responsive":

a. Non-submission of the EMD as mentioned in the Bid Information Sheet.

b. Response to the BID not received by the due date and time of bid submission.

c. Non-submission of correct, valid, and operative Passphrases for both Technical and Financial Bid (Price Bid) Parts after the deadline of Bid Submission, and before the commencement of the Online Tender Opening Event (TOE) of Techno-Commercial Bid.

d. Any indication of price in any part of response to the BID, other than in the financial bid.

e. In case it is found that the Bidding Company including Ultimate Parent Company/Parent Company/Affiliate/Group Companies have submitted more than one response to this BID, then all such bids submitted shall be treated as non-responsive and rejected.

f. Any Bid submitted by a Joint Venture or Consortium shall be treated as non-responsive and rejected.

g. Any Bid from debarred bidders shall be treated as non-responsive and rejected.

h. Bid valid for shorter period than specified in this tender document shall be treated as non-responsive and rejected.

**In any of the above cases, the bid shall not be considered for bid opening and evaluation process.**

## 4.13 Method of Submission of Response

All documents of the response to the BID submitted online must be digitally signed and uploaded on the www.jharkhandtenders.gov.in portal which should contain the following:

### 4.13.1 Technical Bid:

The Bidder(s) shall upload single technical bid containing scanned copies of the following documents duly signed and stamped on each page by the authorized signatory as mentioned below.

a. Formats as elaborated in the BID.

b. All attachments elaborated in the BID, and Attachments, with proper file names.

c. All supporting documents regarding meeting the eligibility criteria.

### 4.13.2 Financial Bid:

I. Bidder(s) shall submit the Financial Bid through online BoQ on www.jharkhandtenders.gov.in portal

II. Bidding Parameter:

a. The quoted fixed price shall include all costs related to the Scope of Work as per the BID and Obligations of the Successful Bidder(s). The Bidder(s) shall quote for the entire facilities on a "single responsibility" basis such that the fixed price covers all the obligations in respect of Design, Supply, Erection, Testing and Commissioning including Warranty, Operation & Maintenance (05 years), inclusive of all taxes.

b. The price shall remain firm and fixed and shall be binding on the Selected Bidder(s) irrespective of actual cost of execution of the Project. No escalation on the price will be granted for any reason whatsoever. The Selected Bidder(s) shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.

c. The fixed price for each line item shall be inclusive of all duties and taxes, transportation, insurance etc. The prices quoted by the firm shall be firm and complete in all respect.

d. In case of the above deadline being a holiday, the next working day in Directorate of Agriculture will be the deadline for online submission of in the www.jharkhandtenders.gov.in.

### 4.14. Validity of Response to THE BID

The Bidder(s) shall submit the response to the BID which shall remain valid up to 180 days from the last date of bid submission ("Bid Validity"). Directorate of Agriculture reserves the right to reject any response to the bid which does not meet the aforementioned validity requirement.

### 4.15. Bid Preparation Cost

The Bidder(s) shall be responsible for all the costs associated with the preparation of the response to the BID and participation in discussions and attending pre-bid meeting(s) etc. Directorate of Agriculture shall not be responsible in any way for such costs, regardless of the conduct or outcome of the bid process.

### 4.16. Clarifications/ Pre-Bid Meeting/ Enquiries/ Amendments

I. Clarifications/ Doubts, if any, on the BID document may be emailed on directoragriculturejh @gmail.com. The format for submission of clarifications is available in forms 7.14.

II. Directorate of Agriculture will make effort to respond to the same in the Pre-Bid Meeting to be held as mentioned in the Bid Information Sheet. If necessary, amendments, clarifications, elaborations shall be issued by Directorate of Agriculture which will be notified on Www.jharkhandtenders.gov.in portal. No separate reply/ intimation will be given for the above, elsewhere.

III. A Pre-Bid Meeting shall be held as mentioned in the Bid Information Sheet.

### 4.17. Right of Directorate of Agriculture to Reject Bid

Directorate of Agriculture reserves the right to reject any or all of the responses to the BID or cancel the BID or annul the bidding process for the project at any stage without assigning any reasons whatsoever and without thereby any liability. In the event of the tender being

cancelled at any stage, the EMD submitted by the Bidder(s)s shall be returned to the respective Bidder(s)s (if applicable).

## 4.18. Post Award Compliances

I. Timely completion of all the milestones will be the sole responsibility of Bidder(s). Directorate of Agriculture shall not be liable for issuing any intimations/reminders to Bidder(s) for timely completion of milestones and/or submission of compliance documents.

II. Any checklist shared with Bidder(s) by Directorate of Agriculture for compliance of above-mentioned milestones to be considered for the purpose of facilitation only. Any additional documents required as per the conditions of the BID must be timely submitted by the Bidder(s).

## 4.19. Arbitration

Arbitration shall be carried out as per Arbitration Act 1996 and its subsequent amendment. The Contract shall be governed by and interpreted in accordance with the laws in force in India. Disputes arising out of this Contract shall be subject to the jurisdiction of courts located within Ranchi only. The Parties irrevocably submit to the exclusive jurisdiction of such courts and waive any objection to the same on grounds of venue or forum non conveniens.

## 4.20. Force Majeure

### 4.20.1 Definition:

"Force Majeure Event" means any act or event that prevents the affected Party from performing its obligation in accordance with the Agreement if such act or event is beyond the reasonable control of the affected Party and such Party had been unable to overcome such act or event with the exercise of due diligence (including the expenditure of reasonable sums). Subject to the foregoing conditions, "Force Majeure Event" shall include without limitation the following acts or events:

i.natural phenomena, such as storms, hurricanes, floods, lightning, volcanic eruptions and earthquakes;

ii.explosions or fires arising from lighting or other causes unrelated to the acts or omissions of the Party seeking to be excused from performance.

iii.acts of war or public disorders, civil disturbances, riots, insurrection, sabotage, epidemic, terrorist acts, or rebellion. A Force Majeure Event shall not be based on the economic hardship of either Party. In case of any damage because of force majeure event, the System shall be repaired/commissioned in line with the penal provisions of Scheme guideline/the BID.

### 4.20.2 Termination as a consequence of Force Majeure Event

If a Force Majeure Event shall have occurred that has affected the Bidder(s)'s performance of its obligations hereunder and that has continued for a continuous period of one hundred eighty(180) days, then Directorate of Agriculture shall be entitled to terminate the Agreement upon ninety (90) days' prior written notice to the Bidder(s). If at the end of such ninety (90) day period such Force Majeure Event shall continue, the Agreement shall automatically terminate. Upon such termination for a Force Majeure Event, neither Party shall have any liability to the other (other than any such liabilities that have accrued prior to such termination).

## 4.21. Bidder(s)'s Indemnity

The Bidder(s) agrees that it shall indemnify and hold harmless Directorate of Agriculture and its members, officers, employees, students, casual labourers, persons permitted to run any business or service, such as canteens, stores, photocopy units, banks, post office, courier

service, hospital and to any lawful visitors (collectively, the "Directorate of Agriculture Indemnified Parties") from and against any and all Losses incurred by the Directorate of Agriculture Indemnified Parties to the extent arising from or out of the following any claim for or arising out of any injury to or death of any Person or loss or damage to property of any Person to the extent arising out of the Bidder(s)'s negligence or wilful misconduct. The Bidder(s) shall not, however, be required to reimburse or indemnify any Directorate of Agriculture Indemnified Party for any Loss to the extent such Loss is due to the negligence or wilful misconduct of any Directorate of Agriculture Indemnified Party.

## 4.22. Insurance

I. The Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery. For delivery of goods at site, the insurance shall be obtained by the Contractor, for an amount not less than the Contract Price of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War risks and strikes. The Comprehensive insurance of all the components as mentioned under scope of work shall be provided for natural calamities, theft, burglary, & damage, fire, earthquake etc. for 5 years period. The selected Bidder(s) shall file insurance claim and shall be responsible to bring the insurance claim to a final settlement. The farmer and the empanelled Bidder(s) shall be jointly responsible for collection and submission of documents for the processing of the insurance claim. The insurance policy taken for the individual farmer shall be handed over to the beneficiary under intimation to Directorate of Agriculture at the time of processing of payment for the completed installations. The selected Bidder(s) shall do renewal of insurance certificate every year up to5years as per insurance clause.

II. In case of an incident covered under insurance, Bidder(s) must replace the lost/damaged part within 7 days from the date of intimation, failing which the rectification/replacement (keeping the same configuration in consideration) will be done by Directorate of Agriculture at the risk and cost of system integrator, after rectification/ replacement the warranty clause will remain compliable as per tender conditions.

## 4.23. Penalty

| S. No. | Nature of Default | Penalty / Action |
|---|---|---|
| 1 | Failure to accept the Letter of Award (LoA) within the stipulated time | The Earnest Money Deposit (EMD) shall be forfeited and/or the Bidder(s) shall be blacklisted for a period of 5 (five) years by the Directorate of Agriculture. |
| 2 | Failure to sign the Agreement and/or submit the Performance Bank Guarantee (PBG) within the prescribed time | The EMD shall be encashed and/or the Bidder(s) shall be blacklisted for a period of 5 (five) years by the Directorate of Agriculture. |
| 3 | Delay or non-execution of installation of 5 HP SWPS or delay in operation & maintenance services beyond the stipulated timeline (including approved extensions, if any) | The Directorate of Agriculture shall recover Liquidated Damages (LD) at the rate of 0.5% of the value of the delayed or unexecuted portion of work per week or part thereof, subject to a maximum of 10% of the total contract value. The LD amount shall be first recovered from the PBG, and the balance, if any, shall be adjusted from payments due to the Bidder(s). In addition, the Directorate of Agriculture reserves the right to blacklist the empanelled firm for a period of 3 (three) years. |

## 4.24. Transportation, Demurrage, Wharfage, etc.

I. Contractor/Selected Bidder(s) is required under the Contract to transport the Goods to place of destination defined as Site. Transport to such place of destination in Jharkhand including insurance, as shall be specified in the Contract, shall be arranged by the Contractor/Selected Bidder(s), and the related cost shall be included in the Contract Price.

II. Subsequent to an order being placed against Bidder(s)'s quotation, received in response to this 'enquiry', if it is found that the materials supplied are not of the right quality or not in accordance with our specifications (required by us) or received in damaged or broken conditions, not satisfactory owing to any reason of which we shall be the sole judge, Directorate of Agriculture shall be entitled to reject the materials, cancel the contract and buy our requirement from the open market / other sources and recover the loss, if any, from the supplier reserving to ourselves the right to forfeiture the BID security deposit, furnished by the supplier against the contract. The supplier will make his own arrangements to remove the rejected material within a fortnight of instruction to do so. Thereafter material will lie entirely at the supplier's risk and responsibility and storage charges, along with any other charges applicable, will be recoverable from the supplier.

III. Directorate of Agriculture reserves the right to accept or reject any quotation in full or in part without assigning any reason thereof. We also reserve the right to split and place order on more than one supplier.

## 4.25. Liquidated damages

I. In case of any delay in the execution of the order or delay in maintenance beyond the stipulated time schedule decided including any extension permitted in writing, Directorate of Agriculture reserves the right to recover from the Bidder(s) a sum equivalent to 0.5 % of the value of the delayed SPWPS installation or on the unexecuted portion of the work for each week of the delay and part thereof subject to a maximum of 10 % of the total value of the contract.

II. Alternatively, Directorate of Agriculture reserves the right to purchase of the material and completion of the works including maintenance from elsewhere at the sole risk and cost of the successful Bidder(s)/ contractor and recover all such extra cost incurred by Directorate of Agriculture in procuring the material from resources available including encashment of the bank guarantee or any other sources etc. Further, if any extra cost is incurred by Directorate of Agriculture due to delay in work completion by the party beyond the completion time as per PO/LOA, the same shall be recovered from the party's Invoice/BG/PBG etc.

III. Alternatively, Directorate of Agriculture may cancel the order completely or partly without prejudice to his right under the alternatives mentioned above.

## 4.26. Statutory Compliance/ Certification regarding Cyber Security Products

I. A certificate as per format mentioned in this BID is to be submitted by the Bidder(s)s that the items offered meet the definition of domestically manufactured/produced Cyber Security Products as per MeitY notification vide File no. 1(10)/2017-CLES dt. 02.07.18. The above certificate shall be on Company's letterhead and signed by Statutory Auditor or Cost Auditor of the Company.

II. 'Cyber Security Products means a product or appliance or software manufactured/ produced for the purpose of protecting, information, equipment, devices computer, computer resource, communication device, and information stored therein from unauthorized access, use, disclosure, disruption, modification or destruction'.

## 4.27. Warranty and Maintenance

I. The complete Solar Photovoltaic Water Pumping System and display board / Name Plate shall be warranted and maintained for 05 years from the date of installation.

II. The maintenance service provided shall ensure proper functioning of the system. All preventive/routine maintenance and breakdown/corrective maintenance required for ensuring maximum uptime shall have to be provided by the Contractor.

III. Successful Bidder(s), on whom letter of award is placed, is to ensure all safety guidelines, rules and regulations, labour laws etc. Successful Bidder(s) indemnifies Directorate of Agriculture for any accident, injury met by its labour, employee or any other person working for him. Any compensation sought by its labour, employee or any other person working for him shall be paid by successful Bidder(s) as per settlement solely.

## 4.28. Declaration of Local Content

Bidder(s) shall submit a certificate stating the percentage of local content as per the format provided in the BID Document. The certificate shall be from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. It is mandatory to mention UDIN No in the certificate.

## 4.29. Price Basis

Price basis of the price quoted shall be on F.O.R (Freight on Road) destination basis for site. Price mentioned in the quotation must be firm. Hence prices in Letter of Award shall be firm and not subject to escalation till the execution of the complete order and its subsequent amendments accepted by the Bidder(s) even though the completion / execution of the order may take longer time than the delivery period specified and accepted in the Letter of Award.

a. An Abnormally Low Bid is one where the Bid price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder(s) to perform the Contract for the offered Bid Price.

b. In the event of identification of a potentially Abnormally Low Bid, Directorate of Agriculture shall seek written clarifications from the Bidder(s), including detailed price analyses of its Bid price in correlation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.

c. After evaluation of the price analyses, in the event that Directorate of Agriculture determines that the Bidder(s) has failed to demonstrate its capability to deliver the contract for the offered tender price, Directorate of Agriculture shall reject the Bid.

## 4.30. Price fall Clause

I. In the event the Bidder(s), during the subsistence of the Contract, sells, supplies or offers to sell the same or similar goods / systems or provides similar services covered under this Contract to **anyGovernment Department, PSU, Autonomous Body, State Nodal Agency or anyone in the State**at a price lower than the price quoted under this Contract, the price applicable under this Contract shall automatically stand reduced to such lower price, with effect from the date of such reduction.

II. The Bidder(s) shall forthwith notify the Directorate of Agriculture in writing of any such reduction in prices and shall provide all relevant documentary evidence in support thereof. Failure to intimate such price reduction shall be treated as breach of Contract.

III. The Directorate of Agriculture shall be entitled to recover the excess amount paid, if any, on account of such price reduction, from the pending bills, security deposit, Performance Bank Guarantee (PBG) or any other dues payable to the Bidder(s) under this Contract or any other Contract with the Directorate of Agriculture.

IV. The Price Fall Clause shall be independent of and without prejudice to the provisions relating to Abnormally Low Bids, performance security, liquidated damages or any other rights of the Directorate of Agriculture under the Contract.

V. The burden of proof for demonstrating compliance with the Price Fall Clause shall rest solely with the Bidder(s), and the decision of the Directorate of Agriculture in this regard shall be final and binding

## 4.31 Roles and Responsibilities of Implementing Agency

I. The Implementing Agency will be responsible for the following activities:

a. Demand aggregation for solar Agriculture pumps through online application as reflected on KSY Portal-ksy.jharkhand.gov.in

b. Oversee installation of systems.

c. Inspection of installed systems and online submission of completion reports along with availability of the accurate data of the parameters of the SPWPS on the state monitoring portal as per due specifications provided by the Bidder(s).

d. Online submission of monthly and quarterly progress reports.

e. Ensure project completion within the given timelines and compliance.

f. Online and offline maintenance for records

g. Performance monitoring of installed system through third party.

h. Ensure compliance of CMC and training of locals by the Bidder(s)s.

i. Carrying out publicity of the scheme so as to increase awareness.

j. Any other activity to ensure successful implementation of the programme.

Each SPWPS shall be equipped with a Remote Monitoring System (RMS) that is integrally embedded within the pump controller. The RMS shall not be provided as a separate, detachable, or externally mounted unit. The integrated RMS shall be capable of continuously capturing, transmitting, and reporting accurate real-time operational data and system health parameters of the SPWPS.

The Selected Bidder(s) shall develop, host, and maintain a dedicated State-level monitoring portal/dashboard, and shall provide the Directorate of Agriculture with unrestricted access credentials for real-time monitoring, review, and reporting of SPWPS performance across the State. The portal shall display live status, historical data, alerts, and system-wise performance indicators as prescribed.

The RMS specifications, performance standards, and data parameters shall strictly comply with Annexure-A of the applicable MNRE Guidelines, as amended from time to time.

## 4.32 Code of Integrity for Bidders

The Bidder shall observe the highest standards of ethics, integrity, transparency, and fairness during the bidding process and throughout the execution of any contract awarded pursuant to this Tender. The Bidder shall comply with all applicable laws, regulations, and good industry

practices and shall undertake that neither it nor its representatives, employees, agents, subcontractors, or affiliates shall engage in any of the following practices:

1. **Bribery and Improper Inducement**
   Offering, giving, soliciting, or accepting, directly or indirectly, any bribe, reward, commission, gift, hospitality, favour, or other benefit intended to influence any decision or action relating to the procurement process or contract execution.

2. **Misrepresentation and Fraudulent Practices**
   Providing false, misleading, inaccurate, forged, or incomplete information, statements, certificates, declarations, or documents at any stage of the procurement process or during contract performance.

3. **Collusive Practices**
   Entering into any agreement, arrangement, or understanding with other bidders or parties that restricts competition, influences the preparation or submission of bids, manipulates prices, or otherwise distorts the competitive bidding process.

4. **Misuse of Confidential Information**
   Obtaining, using, disclosing, or attempting to obtain confidential or proprietary information relating to the Tender, the Procuring Entity, or other bidders in an unauthorized manner.

5. **Coercive or Obstructive Practices**
   Threatening, harassing, intimidating, influencing, or causing harm to any person or entity for the purpose of improperly affecting participation in the procurement process or the execution of the contract.

6. **Obstruction of Audit, Inspection, or Investigation**
   Deliberately destroying, falsifying, concealing, altering, or withholding evidence, records, or documents, or otherwise impeding any audit, inspection, inquiry, or investigation conducted by the Procuring Entity or any competent authority.

7. **Conflict of Interest**
   Promptly disclosing any actual, potential, or perceived conflict of interest that may affect, or be perceived to affect, the Bidder's objectivity, independence, or ability to perform the contract in a fair and transparent manner.

8. **Disclosure of Debarment or Blacklisting**
   Fully disclosing any current or past debarment, blacklisting, suspension, prohibition from participation in public procurement, or similar penal action imposed by any Government department, public authority, regulatory body, multilateral agency, or court of law.

9. **Compliance with Integrity Obligations**
   Cooperating fully with the Procuring Entity in any examination of compliance with this Code of Conduct and maintaining complete and accurate records relevant to the Tender and resulting contract.

**Consequences of Violation**

Any violation of the above provisions shall constitute a material breach of the Tender conditions and may result in one or more of the following actions, without prejudice to any other rights or remedies available under law:

- Rejection of the Bid;
- Forfeiture of EMD, Performance Bank Guarantee;

- Termination of the Contract;
- Suspension or debarment from future procurement opportunities;
- Recovery of losses or damages suffered by the Procuring Entity; and/or
- Initiation of civil, criminal, or administrative proceedings as may be applicable.

**The Bidder(s) found in violation of the above provisions shall be provided an opportunity by the Directorate of Agriculture to be heard before disqualification or any other consequences of violation mentioned above in the spirit of natural justice. However, the decision of the Director, Agriculture shall be final in this regard.**

**Declaration by Bidder**

The Bidder, through submission of its Bid, confirms its acceptance of and commitment to comply with this Code of Conduct and Integrity throughout the procurement process and during the execution of the Contract.

## 5.Beneficiary Eligibility and Selection

The implementation of Scheme is demand based. However, the following shall be ensured before inclusion of a beneficiary under the Scheme:

a. Installation of the new pumps not allowed in the notified areas issued by the Central Ground Water Board.

b. Priority to be given to small and marginal farmers.

c. Preference be given to the farmers using Micro irrigation systems or covered under Micro irrigation schemes or who opt for micro irrigation system.

d. The Selected beneficiary shall not have received any similar benefit from the State or the Central Government.

e. The selection of beneficiaries shall be done in accordance with the scheme guidelines by Director, SAMETI

## 6. Project Location & Coverage

Under the State Scheme "Kisan Samriddhi Yojana", the selected Bidder(s) shall be responsible for the supply, installation, testing, and commissioning (SITC) of Solar Powered Water Pumping System (SPWPS) units at the beneficiary locations across all 24 districts of the State of Jharkhand.

## 7. Definitions of terms

I. **"ACT" or "ELECTRICITY ACT, 2003"** shall mean the Electricity Act, 2003 and include any modifications, amendments, and substitution from time to time.

II. **"AFFILIATE"**means any legal entity which, directly or indirectly, through one or more entities, controls, is controlled by, or is under common control with the single bidding legal entity. For the purposes of this definition, "control" shall mean the ownership of more than 50% of the voting rights, the right to appoint a majority of the governing body, or the ability to otherwise exercise controlling influence over the management or affairs od such entity.

III. **"B.I.S."** shall mean specifications of Bureau of Indian Standards (BIS).

IV. **"BID" or "PROPOSAL"** shall mean the documents submitted by the Bidder(s) towards meeting the techno-commercial and financial qualifying requirements, along with the price bid

submitted by the Bidder(s) and submissions during the e-Reverse Auctions, if applicable, as part of its response to the bid issued by Directorate of Agriculture.

V. **"BIDDER(S)"** shall mean Bidding Company. Any reference to the Bidder(s) includes Bidding Company its successors, executors and permitted assigns, as the context may require.

VI. **"CHARTERED ACCOUNTANT"** shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949.

VII. For Bidder(s)s incorporated in countries other than India, "Chartered Accountant" shall mean a person, or a firm practicing in the respective country and designated/ registered under the corresponding Statutes/ laws of the respective country.

VIII. "COMPANY" shall mean a body corporate incorporated in India under the Companies Act, 2013 or any law in India prior thereto relating to Companies, as applicable.

IX. "CONTRACT YEAR" shall mean the period beginning from the Effective Date of the Contract Agreement and ending on the immediately succeeding 31st March and thereafter each period of 12 months beginning on 1st April and ending on 31st March provided that:

a. In the financial year in which the Scheduled Commissioning Date would occur, the Contract Year shall end on the date immediately before the Scheduled Commissioning Date and a new Contract Year shall commence once again from the Scheduled Commissioning Date and end on the immediately succeeding 31st March, and thereafter each period of 12 (Twelve) Months commencing on 1st April and ending on 31st March, and

b. Provided further that the last Contract Year of this Agreement shall end on the last day of the Term of this Agreement.

X. "CONTROL" shall mean the ownership, directly or indirectly, of more than 50% (fifty percent) of the voting shares of such Company or right to appoint majority Directors.

XI. "DAY" shall mean calendar day.

XII. "EQUITY" shall mean Net Worth as defined in Companies Act, 2013.

XIII. "IEC" shall mean specifications of International Electro-Technical Commission.

XIV. "JOINT CONTROL" shall mean a situation where a company has multiple promoters (but none of the shareholders has more than 50% of voting rights and paid-up share capital).

XV. "LETTER OF AWARD" or "LoA" shall mean the letter issued by State Implementing Agency (Directorate of Agriculture) to the selected Bidder(s) for award of the cumulative SPWPS capacity.

XVI. "LIMITED LIABILITY PARTNERSHIP" or "LLP" shall mean a Company governed by Limited Liability Partnership Act 2008 or as amended.

XVII. "MONTH" shall mean calendar month.

XVIII. "NET-WORTH" shall mean the Net-Worth as defined section 2 of the Companies Act, 2013.

XIX. "O&M/AMC" shall mean Operation & Maintenance/ Annual Maintenance Contract of the supplied equipment's.

XX. "PAID-UP SHARE CAPITAL" shall mean the paid-up share capital as defined in Section 2 of the Companies Act, 2013.

XXI. "PARENT" shall mean a Company, which holds more than 50% voting rights and paid-up share capital, either directly or indirectly in the Project Company.

XXII. "PROJECT" shall mean Solar Photovoltaic Water Pumping Systems (SPWPS).

XXIII. "PROJECT INSTALLATION" The Project (SPWPS) will be considered as installed if all equipment as per rated project capacity has been installed.

XXIV. "THE BID" or "THE BID DOCUMENT" or "BIDDING DOCUMENT(S)" or "TENDER DOCUMENTS" shall mean the "Request for Empanelment" document issued by Directorate of Agriculture along with subsequent clarifications and amendments thereof.

XXV. "SPWPS" shall mean Solar Powered Water Pumping System and would cover all the detailed requirement of units as mentioned under the Scope of Work.

XXVI. "TOE" shall mean Tender Opening Event.

XXVII. "ULTIMATE PARENT" shall mean a Company, which owns more than 50% (Fifty Percent) voting rights and paid-up share capital, either directly or indirectly in the Parent and Affiliates.

XXVIII. "BIDDER(S)" or "SUCCESSFUL BIDDER(S)" or "SELECTED BIDDER(S)" shall mean the Bidding Company participating in the bid and having been selected and allocated a Project capacity by Directorate of Agriculture (through a competitive bidding process) {in case of the Selected Bidder(s) Project}.

XXIX. "WEEK" shall mean calendar week.

XXX. "SIMILAR WORK"- mean design, manufacture/ supply/ installation/ testing, commissioning/ maintenance of irrigation systems, water pumping systems and/or solar energy systems, including solar-based, electrical or hybrid solutions, executed for Government, PSU, Autonomous Bodies, Government-funded schemes or private/institutional clients.

XXXI. "EPC"-EPC (Engineering, Procurement & Construction) EPC refers to a project delivery model in which a single contractor is responsible for the complete end-to-end execution of a project

## 8. Instructions to Bidders for Preparing the Bid: Check-list of documents to be Uploaded by the Bidder

| Sl. No. | Category | Document to be Uploaded | Applicability |
|---|---|---|---|
| A1 | Techno-Commercial | Covering Letter in Format 7.1, including bid validity of 180 days and unconditional acceptance of the Bid Document. | Mandatory |
| A2 | Techno-Commercial | Complete Bid Document, including all corrigenda, addenda and clarifications, digitally signed by the authorized signatory. | Mandatory |
| A3 | Techno-Commercial | Board Resolution/Power of Attorney and notarized authorization letter in favour of the authorized signatory. | Mandatory |
| A4 | Techno-Commercial | Proof of EMD payment of **INR 40,00,000 (Forty Lakhs only)**, including transaction/UTR details. | Mandatory unless valid exemption claimed |

| Sl. No. | Category | Document to be Uploaded | Applicability |
|---|---|---|---|
| A5 | Techno-Commercial | Valid MSE registration, operational-status proof, GST registration and exemption declaration. | Conditional: EMD exemption |
| B1 | Legal eligibility | Certificate of Incorporation/LLP Registration Certificate. | Mandatory, as applicable |
| B2 | Legal eligibility | Proprietorship registration proof and self-declaration of status as manufacturer/system integrator. | Conditional: proprietorship |
| B3 | Legal eligibility | Self-declaration that the Bid is submitted by a single legal entity, and no JV/Consortium is involved. (Refer Clause 4.6 A2) | Mandatory |
| B4 | Legal eligibility | Disclosure Statement in Format 7.5 regarding single participation by related entities. | Mandatory |
| B5 | Legal eligibility | Declaration in Format 7.6 regarding non-banning, non-liquidation, non-insolvency, non-bankruptcy and non-receivership. | Mandatory |
| B6 | Legal eligibility | Undertaking in Format 7.4 regarding wilful default and major litigation. | Mandatory |
| B7 | Legal eligibility | PAN Card and valid GST Registration Certificate. | Mandatory |
| C1 | Technical eligibility | Bidder/manufacturer profile and OEM authorization certificate for components not manufactured by the Bidder. | Mandatory, as applicable |
| C2 | Technical eligibility | Work Orders/Agreements for at least three qualifying similar works completed during the last five years. | Mandatory |
| C3 | Technical eligibility | Completion/Commissioning Certificates corresponding to the submitted Work Orders, showing contract value and quantity/capacity. | Mandatory |
| C4 | Technical eligibility | Summary statement establishing three works of at least INR 5 crore each and cumulative installation of at least 250 units of SPWPS of varying capacity. | Mandatory |
| C5 | Technical eligibility | Technical Compliance Statement confirming compliance with Annexure-A, MNRE, BIS, ALMM and DCR requirements. | Mandatory |
| C6 | Technical eligibility | Factory Licence/BIS Certificate and proof that the relevant manufacturing facility is operational and registered. | Mandatory, as applicable |
| C7 | Technical eligibility | Product catalogues, datasheets and make/model details for modules, pump, controller with integrated RMS, MMS, lightning arrester, pipes and BoS. | Mandatory |

| Sl. No. | Category | Document to be Uploaded | Applicability |
|---|---|---|---|
| C8 | Technical eligibility | RMS and State-level MIS/dashboard architecture, data parameters, hosting, cybersecurity and five-year support plan. | Mandatory |
| D1 | Product compliance | Declaration for local content in Format 7.7, including list of imported components, if any. | Mandatory |
| D2 | Product compliance | Local-content certificate with UDIN from the statutory/cost auditor or eligible practising professional, as applicable. | Mandatory |
| D3 | Product compliance | ALMM List-I documentary evidence for the offered PV module manufacturer and model. | Mandatory |
| D4 | Product compliance | DCR compliance evidence for indigenous solar cells and modules. | Mandatory |
| D5 | Product compliance | Declaration in Format 7.8 for supply of the same makes covered by the test reports. | Mandatory |
| D6 | Product compliance | Declaration in Format 7.9 and valid MNRE-compliant test reports under the applicable 2023 testing procedure. | Mandatory with Bid |
| D7 | Product compliance | BIS/MNRE certificates, component warranty certificates and MMS structural certificate. | Mandatory |
| D8 | Product compliance | Certificate in Format 7.10 regarding compliance with MeitY Notification File No. 1(10)/2017-CLES dated 02.07.2018. | Mandatory |
| D9 | Product compliance | Declaration in Format 7.12 with MNRE model details, heads, output, stages and discharge-pipe diameter. | Mandatory |
| E1 | Financial eligibility | CA Certificate with UDIN in Format 7.3 for average annual turnover and net worth. | Mandatory |
| E2 | Financial eligibility | Audited Balance Sheets, Profit and Loss Accounts, Auditor Reports and notes for FY 2021-22 to FY 2025-26. | Mandatory |
| E3 | Financial eligibility | Evidence of minimum average annual turnover of INR 15 crore and profitability in at least two of the five prescribed financial years. | Mandatory |
| F1 | Other | Certified English translation by an authorized translator for every document issued in another language. | Conditional |
| F2 | Other | Annexure-wise document index mentioning clause, format, file name and page number. | Mandatory |
| G1 | Financial Bid | Online BoQ/Financial Bid in Format 7.11, including all taxes, transport, installation, warranty, five-year CMC, insurance, RMS and MIS costs. | Mandatory; upload separately |

***Note: All documents in response to this Bid Document must be arranged with proper page numbers including a table of content as mentioned in this document***

**Format 7.1 – COVERING LETTER**

*(To be submitted on the Letterhead of the Bidding Company)*

Ref. No.: _____ Date: ___ / ___ / 20___

**From:**

Nameof Bidder(s): _____
Address: _____
Telephone: _____ Mobile No.: _____
Email: _____

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

**Subject:** Response to THE BID No. _____ dated _____ for **[Insert Title of THE BID]**

Dear Sir/Madam,

We, **[Insert name of the Bidder(s)]**, having carefully examined and fully understood the contents of **THE BID**, including the Qualification Requirements and all related documents, hereby submit our response to the aforesaid THE BID.

We confirm that neither we nor any of our **Ultimate Parent / Parent / Affiliate / Group Company** has submitted any other bid, directly or indirectly, in response to this THE BID,

**Category of Bidder(s)**

| **Type of Bidder(s)** | **Applicable (Yes/No)** |
|---|---|
| Pump / Pump Set Manufacturer | |
| Solar PV Module Manufacturer | |
| Solar Pump Controller Manufacturer | |
| System Integrator | |

**Category of SPWPS Applied For**

| **S. No.** | **Pump Category** | **Controller Type** | **Participation (Yes/No)** |
|---|---|---|---|
| 1 | 5 HP DC Surface (Static) | Normal (Without USPC) | |

*(Blank cells shall be treated as "No")*

We hereby **unconditionally accept** THE BID dated **[insert date]**, along with all amendments, corrigenda and clarifications issued by the Directorate of Agriculture. The complete set of documents has been duly digitally signed and submitted without any deviation, condition, assumption or qualification.

We undertake to install the **SPWPS** strictly within the timelines prescribed under the scheme guidelines and THE BID.

**Acceptance & Binding Nature**

We irrevocably agree that all decisions taken by the Directorate of Agriculture in relation to evaluation, selection and award under THE BID shall be final and binding upon us. We expressly waive any right to challenge or raise claims in this regard.

**Legal Compliance**

We confirm that we have familiarized ourselves with all applicable **Indian laws, rules and regulations** relevant to the execution of the project and shall comply with the same in the event of our selection.

**Bid Validity**

Our Bid shall remain valid for acceptance up to **{Insert date}**, being a period of **180 days** from the last date of submission of response to THE BID.

**Authorized Contact Person**

Name: _____
Designation: _____
Company: _____
Address: _____
Phone: _____
Mobile: _____
Email: _____

We certify that all information submitted by us in this Bid is **true, complete and accurate** to the best of our knowledge. Any misrepresentation or suppression of facts shall constitute an **event of default**, rendering our Bid liable for rejection and further action as per THE BID provisions.

Thanking you,

Yours faithfully,

**For and on behalf of [Name of Bidder(s)]**

Signature: _____
Name: _____
Designation: _____
Seal of the Company

*(Authorized Signatory as per Power of Attorney / Board Resolution.)*

**Format 7.2 – PERFORMANCE BANK GUARANTEE (PBG)**

*(To be executed on Non-Judicial Stamp Paper of appropriate value, as per applicable Stamp Act)*

**Reference:** _____
**Bank Guarantee No.:** _____
**Date:** _____

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

**WHEREAS**

M/s _____, having its registered office at _____ (hereinafter referred to as the "**Selected Bidder(s)**"), has been issued **Letter of Award No. _____ dated _____** by the Directorate of Agriculture for **[Insert title of THE BID]** pursuant to **THE BID dated _____**.

As per the terms and conditions of THE BID and the Letter of Award, the Selected Bidder(s) is required to furnish a **Performance Bank Guarantee** for due and faithful performance of its obligations.

We, **[Insert name and address of the Bank]**, a Nationalized Bank/Scheduled Commercial Bank, hereby **irrevocably, unconditionally and unequivocally guarantee** to pay the Directorate of Agriculture, on first written demand, without demur, protest or delay, **any sum or sums not exceeding INR _____ (Rupees _____ Only)**, on behalf of the Selected Bidder(s).

**TERMS OF GUARANTEE**

1. This Bank Guarantee shall be a **continuing, unconditional and irrevocable guarantee** and shall remain valid up to _____, and shall be invocable up to _____, unless extended as per contractual requirements.
2. The Directorate of Agriculture shall be entitled to **invoke this Bank Guarantee in full or in part**, as it may deem fit, without assigning any reason thereof.
3. The Bank hereby agrees that **no proof or justification** other than a written demand by the Directorate of Agriculture shall be required for invocation of this Guarantee.
4. Payment under this Guarantee shall be made **on first demand**, notwithstanding any dispute raised by the Selected Bidder(s) or any other person.
5. The Bank shall not be discharged or released from liability by reason of:
    - any extension of time or modification of contract terms;
    - any change in constitution of the Selected Bidder(s) or the Bank;
    - merger, amalgamation, restructuring or insolvency of the Selected Bidder(s).
6. This Bank Guarantee constitutes a **primary obligation** of the Bank, and the Directorate of Agriculture shall not be required to first proceed against the Selected Bidder(s) or any other security.
7. The liability of the Bank under this Guarantee shall not exceed **INR _____ (Rupees _____ Only)**.

This Bank Guarantee shall be governed by and construed in accordance with the **laws of India**, and disputes arising out of this Contract shall be subject to the jurisdiction of courts located within at Ranchi only. The Parties irrevocably submit to the exclusive jurisdiction of such courts and waive any objection to the same on grounds of venue or forum non conveniens.

Notwithstanding anything contained herein, the Bank shall be liable to pay the guaranteed amount or any part thereof **only if a written demand is received by the Bank on or before the date of expiry of this Bank Guarantee**.

**For and on behalf of [Name of the Bank]**

**IN WITNESS WHEREOF**

The Bank has executed this Performance Bank Guarantee on this ___ day of _____, *20*___

Signature: _____
Name: _____
Designation: _____
Power of Attorney No.: _____

Bank Seal & Full Address:

Contact Details of Bank:
Phone: _____
Email: _____

**Witnesses**

1. Signature: _____
   Name & Address: _____
2. Signature: _____
   Name & Address: _____

## Format 7.3 – FINANCIAL REQUIREMENT

*(To be submitted on the Letterhead of the Bidding Company)*

Ref. No.: _____ Date: ___ / ___ / 20___

**From**

Name of Bidder(s): _____

Address: _____

Telephone: _____ Email: _____

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

**Subject:** Financial Eligibility Compliance – Response to **THE BID No. _____ dated _____** for **[Insert Title of THE BID]**

Dear Sir / Madam,

We hereby certify that **M/s** _____, a **Bidding Company**, meets the **Financial Eligibility Criteria** prescribed in THE BID, in accordance with applicable provisions and instructions.

**A. NET WORTH COMPLIANCE***(As on 31.03.2026)*

The Bidder(s) fulfils the **minimum Net Worth requirement**, as detailed below:

**A.1 Statement of Net Worth**

| **Entity** | **Relationship with Bidder(s) (if Affiliate)** | **Net Worth (₹ Crore)** |
|---|---|---|
| Bidder(s) | Self | ___ |
| Affiliate (if any) | ___ | ___ |
| **Total Net Worth Considered** | | **₹ ___ Crore** |

**B. AVERAGE ANNUAL TURNOVER (MAAT) COMPLIANCE**

*(FY 2021-22 to FY 2025-26)*

The Bidder(s) meets the **Minimum Average Annual Turnover (MAAT)** requirement as follows:

**B.1 Turnover Statement**

| **Financial Year** | FY 2021-22 | FY 2022-23 | FY 2023-24 | FY 2024-25 | FY 2025-26 |
|---|---|---|---|---|---|
| **Turnover (₹ Crore)** | | | | | |
| **Average Annual Turnover** | **₹ ___ Crore** | | | | |

## C. PROFITABILITY COMPLIANCE

The Bidder(s) has been **profitable in at least two (02) financial years** during the last five (05) financial years, based on audited financial statements.

## D. LIQUIDITY / WORKING CAPITAL COMPLIANCE *(FY 2025-26)*

The Bidder(s) satisfies the **Liquidity Requirement** through:

a. Working Capital,

b. Sanctioned Line of Credit,

c. Combination of both

| **Entity** | **Relationship (if Affiliate)** | **Amount (₹ Crore)** |
|---|---|---|
| Bidder(s) | Self | ___ |
| Affiliate (if any) | ___ | ___ |
| **Total Liquidity Available** | | **₹ ___ Crore** |

**D.1 Liquidity Statement**

**DECLARATION**

We confirm that:

I. The above information is **true, complete and accurate**.

II. No financial data has been **double counted** across entities.

III. All computations are supported by **audited records** and **CA certification**.

IV. Any misrepresentation shall render the Bid liable for rejection and further action as per THE BID.

**For and on behalf of Bidder(s)**

Signature: _____
Name: _____
Designation: _____
Company Seal

**CERTIFIED BY**

**Chartered Accountant**

Name & Firm: _____
Membership No.: _____
Firm Registration No.: _____
UDIN: _____

Signature & Seal
Date: _____

**Format 7.4 - UNDERTAKING**

(To be submitted on the letterhead of the Bidder(s))

We, hereby provide this undertaking to Directorate of Agriculture, in respect to our response to the BIDvidethe BIDNo..... dated.....that M/s.....(insert name of the Bidder(s)), or any of its Affiliates is not a wilful defaulter to any lender, and that there is no major litigation pending or threatened against M/s.....(insert name of the Bidder(s)) or any of its Affiliates which are of a nature that could cast a doubt on the ability or the suitability of the Bidder(s) to undertake the Project.

(Name and Signature of the Authorized Signatory)

**Format 7.5- FORMAT FOR DISCLOSURE**

(To be submitted on the Letter Head of the Bidding Company)

To

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Subject: Disclosure in response to THE BID No. _____ dated _____ for [Insert Title of THE BID]

Dear Sir / Madam,

We, M/s _____, hereby declare and confirm that:

1. Single Participation-Only the undersigned entity is participating in the above-mentioned BID. None of our Parent Company, Ultimate Parent Company, Affiliate(s), or Group Company(ies) having direct or indirect relationship with us has submitted, or shall submit, a separate bid or participate in this BID process, directly or indirectly.

2. Truthfulness of Disclosure-The disclosures made herein are true, complete and correct to the best of our knowledge and belief.

3. Consequences of Misrepresentation
   We understand and accept that if any part of this disclosure is found to be false or misleading at any stage:

   - our Bid and/or Letter of Award shall be liable for rejection/cancellation; and
   - we, along with our Parent, Ultimate Parent and Affiliates, may be debarred/suspended from participating in tenders of the Directorate of Agriculture for a period of two (02) years, in addition to any other action permissible under THE BID and applicable laws.

4. Approved List of Models and Manufacturers (ALMM) issued and updated from time to time by the Ministry of New and Renewable Energy (MNRE), Government of India, listing eligible solar photovoltaic modules and manufacturers permitted for use in Government-supported or Government-funded solar projects, and shall include all amendments, clarifications and notifications issued thereunder.

5. ALMM Compliance-We declare that we are fully aware of and shall strictly comply with the ALMM Order and the applicable ALMM Lists, while quoting prices and executing obligations under THE BID.
   Any non-compliance with ALMM provisions shall attract penal action, including but not limited to blacklisting and invocation of Performance Bank Guarantee, as per THE BID and applicable policies.

6. Supporting Documents-Necessary certificates and declarations, as required under THE BID, are enclosed as Annexures to this Format. We acknowledge that submission of any false or incorrect certificate shall invite appropriate action by the Directorate of Agriculture.

We confirm that this disclosure shall be binding upon us throughout the BID process and the contract period, if awarded.

Dated this ___ day of _____, *20*___

Thanking you,

Yours faithfully,

For and on behalf of [Name of Bidder(s)]

Signature: _____
Name: _____
Designation: _____
Company Seal

*(Authorized Signatory as per Power of Attorney / Board Resolution)*

**Format- 7.6**

## DECLARATION REGARDING BANNING, LIQUIDATION, COURT RECEIVERSHIPETC.

(To be submitted on the Letter Head of the Bidder(s))

Ref. No. Date:

From: (Insert name and address of Bidder(s))

Tel.#: Fax#:

E-mail address#

To

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to the BID No..... dated.....for.....

Dear Sir/ Madam,

We hereby confirm that we are not on the Banning List by Directorate of Agriculture, Jharkhand or any other Department of Government of Jharkhand or any Public Sector Undertaking due to poor performance or Corrupt/ Fraudulent/ Collusive/ Coercive Practices or any other reason or banned by Government, Directorate/ Public Sector on due date of submission of bid.

We also confirm that we are not under any liquidation, court receivership or similar proceedings or bankruptcy.

In case it comes to the notice of Directorate of Agriculture that we have given wrong declaration in this regard, the same shall be dealt as Fraudulent Practices and we shall be banned by Directorate of Agriculture for a period which shall be decided by Directorate of Agriculture on case-to-case basis, subject to minimum period of banning being 06 months from the date of issuance of banning order.

Further, we also confirm that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to Directorate of Agriculture by us.

**Format 7.7-DECLARATION FOR THE LOCAL CONTENT**

(To be submitted on the Letter Head of the Bidder(s))

Ref. No. Date:

From: (Insert name and address of Bidder(s))

Tel.#:

Fax#:

E-mail address#

To

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to the BID No..... dated.....for.....

Dear Sir/ Madam,

We declare that we will be using indigenously manufactured solar panels with indigenous solar cells and modules. Further, we are agreeing to accept and follow Guidelines issued by MNRE and its subsequent amendment(s).

We are aware that in accordance with order no. F. No. 283/22/2019-GRID SOLAR dated 09.02.2021 issued by MNRE, only class-I Local Suppliers are eligible to bid under this BID. Also, we have carefully gone through the above-mentioned order to understand the whole process and definitions of various terms (Class-I Local Supplier, Local Content etc.) pertaining to above referred order and its supporting appendix and annexures as amended till date.

Further, we hereby undertake that I/We certify that we are not being under debar list/undergoing debarment period on account of breach of the code of integrity under Rule 175(1)(i)(h) of the General Financial Rules for giving false declarations of local content.

List of imported components used in the manufacturing of solar water pumping system:

**S. No.**

**ItemImported**

(Name and Signature of the Authorized Signatory of the Bidder(s))

**Format 7.8**

## DECLARATION FOR USING SAME MAKE OF EQUIPMENTS AS PER THE TEST CERTIFICATE

(To be submitted on the Letter Head of the Bidder(s))

Date:

Ref. No.

From: (Insert name and address of Bidder(s))

Tel.#:

Fax#:

E-mail address#

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to the BID No. …….. dated ……..for ……

Dear Sir/ Madam,

We are agreeing to accept that the same make of solar panels, pumps, VFD/inverter/controller for which the test report is to be submitted to the Implementing agency, as **per MNRE's latest revised solar pump testing procedure issued in 2023** and amendments thereof, will be supplied by us.

In case, if some different make of solar panels, pumps, VFD/inverter/controller will be supplied during the implementation or AMC period, we will submit the test report for that particular make component(s). We also agree that such test reports shall be issued by the National Institute of Solar Energy and any other lab accredited by NABL for testing of solar PV water pumping system as per MNRE specifications and testing procedure.

(Name and Signature of the Authorized Signatory)

**Format 7.9**

## DECLARATION FOR SUBMITTING THE TEST CERTIFICATE AS PER MNRE TECHNICAL SPECIFICATIONS FOR SOLAR WATER PUMPSETS ISSUED IN 2023

(To be submitted on the Letter Head of the Bidder(s))

Ref. No. Date:

From: (Insert name and address of Bidder(s))

Tel.#:

Fax#:

E-mail address#

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to the BID No. …….. dated ……..for……

Dear Sir/ Madam,

In order to have uniformity, the test reports issued by the Labs shall use a common format issued by MNRE dated: 09.06.2023. The test report shall be issued only in the name of applicant and shall clearly indicate that whether the Solar PV Water Pumping System qualify as per MNRE specifications or not along with the details. A soft copy of test report shall also be provided to the applicant and shall be made available on web-portal of test lab, which may be accessed by the implementing agencies for verifying the authenticity of the report. **Head- wise Test Report will be submitted by agencies along with the bid document or before the signing of agreement whichever is later. In failure of which empanelment will stand cancelled, without prior intimation.**

(Name and Signature of the Authorized Signatory)

**Format 7.10**

**CERTIFICATE REGARDING COMPLIANCE OF MeitY NOTIFICATION VIDE FILE NO. 1(10)/2017-CLESdt. 02.07.18**

(To be submitted on the Letter Head of the Bidder(s))

Ref. No. Date:

From: (Insert name and address of Bidder(s))

Tel.#: Fax#:

E-mail address#

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to THE BID No. ……..dated ……..for…….

Dear Sir/ Madam,

This is to certify that the products/items being offered/ quoted against ref. the BID by M/s…….. meet the definition of domestically manufactured/ produced Cyber Security Products as per Para 4 of MeitY notification vide File no. 1(10)/2017–CLES dt. 02.07.18 and the Bidder(s) shall strictly abide by all provisions of the subject notification.

(Name and Signature of the Authorized Signatory)

**Format 7.11**

**FINANCIAL BID (Only to be submitted through online mode-BoQ)**

**For 5 HP DC Surface Pump: as per MNRE**

| S. No. | Particulars | Estimated Cost | |
|---|---|---|---|
| | | (In Lakhs INR) (including of GST/all types of taxes, transportation and installation cost) | |
| 1. | System Cost | | |
| *i.* | *Module* | | |
| *ii.* | *Pump* | | |
| *iii.* | *Controller* | | |
| *iv.* | *Module Mounting Structure (MMS)* | | |
| *v.* | *Balance of System (BoS)* | | |
| 2 | *160 mm PVC Pipeline (2.5kgf) per meter unit rate cost & Total cost* | Unit Cost | Total Cost |
| | | | |
| 3 | *Pipeline accessories, suction, NRV, foot valve etc* | | |
| 4 | *1 Outlet Unit rate cost* | | |
| 5 | *Lightning Arrestor* | | |
| 6. | 5-year EMC Cost | | |
| 7. | 5-year Insurance Cost | | |
| 8. | Software and MIS dashboard for monitoring of RMS | | |

**Format 7.12**

## DECLARATION REGARDING THE DIFFERENT MODELS OF SOLAR WATER PUMPING SYSTEMS SPECIFIED IN THE MNRE SPECIFICATION FOR THE PARTICULAR CATEGORY/TYPE OF THE PUMPS

(To be provided on the letter head of the Bidder(s))

Ref No. Date:

From: (Insert name and address of Bidding Company)

Tel.#:

E-mail address#

**To**

The Director, Agriculture
Directorate of Agriculture, Krishi Bhawan Campus
Kanke Road, Ranchi, Jharkhand – 834008

Sub: Response to the BID No.....dated.....for.....

Vide this declaration this is to certify that M/s..... (Name of the Bidder(s)) has all the models mentioned w.r.t. 5 HP (Static) of the Solar Water Pumping System as per the MNRE revised specifications issued in 2023 (latest), for which the firm is participating in the bid, and will furnish the required test reports and details of the models specified: Shut Off-Head (meters), Dynamic-Head (meters),Water output (Liters per day), No. of stages in the model, diameter of each stage of the respective model, Diameter of the discharge pipe (in inches) to Directorate of Agriculture.

The details of the different models which are to be supplied by the firm:

**S. No.**

**Type/Category of thepump**

**Model No. as per MNRE Specification, to be supplied by the firm**

I, ....., on behalf of M/s..... (Name of the Bidder(s)) am aware, without any doubt, that any deviation of the above information with the information provided to Directorate of Agriculture at the time of signing of agreement would invite penalties such as forfeiture of EMD by Directorate of Agriculture and/or blacklisting of firm for the period of 3 years from the date of the issue of the Notice for the blacklisting.

Thanking you,

Yours faithfully,

(Name, Designation, Seal and Signature of Authorized Person in whose name Power of Attorney/ Board Resolution/ Declaration)

**Format -7.13**

**Pre-Bid Query Format**

| Sl. No. | RFP Clause No. | Section / Volume | Page No. | Clause Description (as per RFP) | Pre-Bid Query / Clarification Sought | Bidder(s)'s Suggestion (if any) |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |

**Instructions to Bidder(s)s (Pre-Bid Queries)**

1. Pre-bid queries shall be submitted only through email, strictly in the prescribed format available in the Bidder(s) Pad. Bidder(s)s shall submit a soft copy of the pre-bid queries as an email attachment to the designated official email ID within the stipulated date and time. Queries submitted through any other mode or not in the prescribed format shall not be considered.
2. Each query shall clearly mention the exact RFP clause number, section, and page number to which the clarification is sought.
3. Pre-bid queries must be submitted on or before the date and time specified in the Bid Schedule mail to directoragriculturejh@gmail.com. Queries received after the stipulated deadline shall not be entertained under any circumstances.
4. No individual correspondence, including emails, telephone calls, or verbal discussions, shall be entertained outside the Www.jharkhandtenders.gov.in pre-bid clarification process.
5. Responses to the pre-bid queries, along with any corrigendum/addendum, shall be published only on the Www.jharkhandtenders.gov.in portal and shall form an integral, binding, and enforceable part of the RFP.
6. It shall be the sole responsibility of the Bidder(s)s to regularly visit and monitor the Www.jharkhandtenders.gov.in portal for updates, clarifications, amendments, or corrigenda issued in relation to the RFP

# Annexure - A

# TECHNICAL SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEM

F. No. 41/3/2018-SPV Division
Government of India / भारत सरकार
Ministry of New & Renewable Energy / नवीन एवं नवीकरणीय ऊर्जा मंत्रालय
*****

Atal Akshay Urja Bhawan (AAUB),
Lodhi Road, Near CGO Complex
New Delhi –110003
Date: 22-03-2023

**Office Memorandum**

Subject: Updated Specification and Testing Procedures for the Solar Photovoltaic (SPV) Water Pumping System and Universal Solar Pump Controller (USPC).

This has reference to the specification and testing procedures for the Solar Photovoltaic (SPV) Water Pumping System and Universal Solar Pump Controller (USPC) issued by this Ministry vide OM of even number dated 02.02.2023. In supersession of the above OM and its enclosures, revised specifications and testing procedures are hereby issued for the information of all concerned, as under:

i) Specification for the SPV water pumping system. (Annexure-A)
ii) Testing procedure for the SPV water pumping system. (Annexure-B)
iii) USPC specification and testing procedure. (Annexure-C)

(Shobhit Srivastava)
Scientist-D

To:
All concerned.

Annexure-'A'

## SPECIFICATION FOR SOLAR PHOTOVOLTAIC WATER PUMPING SYSTEMS

### 1. SCOPE

These specification covers design qualifications and performance specifications for Centrifugal Solar Photo Voltaic (SPV) Water Pumping Systems from 1HP (0.75kW) to 25 HP (18.75 kW) suitable for bore-well, open well, water reservoir, water stream, etc., and specifies the minimum standards to be followed under MNRE Schemes.

### 2. TERMINOLOGY

In addition to the terminology specified in IS 5120 and IEC 62253, the following shall also apply.

**2.1 Static Water Depth** — It is the depth of water level below the ground level when the pump is not in operation.

**2.2 Draw-Down** — It is the elevation difference between the depth of static water level and the consistent standing water level in the bore-well during the operation the of pump set.

**2.3 Submergence** — It is the minimum height of the water level after drawdown above the pump suction casing.

**2.4 Manometric Suction Lift** — Manometric suction lift is the vacuum gauge/suction manometer reading in the meter of the water column when the pump operates at suction lift.

**2.5 Static Suction Lift** —Suction lift/head is the vertical distance between sump water level and center of pump inlet.

**2.6 Daily Water Output** — It is the total water output on a clear sunny day with three times tracking of SPV modules, under the "Average Daily Solar Radiation" condition of 7.15 KWh / $m^2$ on the surface of SPV array (i.e., coplanar with the SPV Modules).

**2.7 Wire to Water Efficiency** — It is the combined system efficiency of SPV Module, Converter/Controller with Inbuilt MPPT mechanism, Motor-Pump set and piping.

**2.8 SPV Pump Controller** — Pump Controller converts the DC voltage of the SPV array into a suitable DC or AC, single or multi-phase power and may also include equipment for MPPT, remote monitoring, and protection devices.

**2.9 Maximum Power Point Tracker (MPPT)** — MPPT is an algorithm that is included in the pump controller used for extracting maximum available power from SPV array under a given condition. The voltage at which SPV array can produce maximum power is called 'maximum power point' voltage (or peak power voltage).

## 3. CONSTRUCTIONAL FEATURES

### 3.1 General

**3.1.1** SPV Water Pumping System set uses the irradiance available through SPV array. The SPV array produces DC power, which can be utilized to drive a DC or an AC motor-pump set using pump controller.

**3.2** A SPV Water Pumping system typically consists of:

**3.2.1** *Motor Pump Set see 3.4.*

**3.2.2** *SPV Pump Controller*

**Specifications of Controller/Drive for Solar Water Pumping Systems**

| S.No | Requirement | Specifications |
|---|---|---|
| 1. | *Controller Power Capacity to drive the Pump* | Controller Power Capacity should be at-least equal to Solar Panels Power Capacity (Wp), not Pump Capacity. Example: For **5HP** pumps, the pump capacity will be 3750W as per MNRE Specs, the solar panel capacity will be at-least 4800Wp the controller capacity should match the solar panel capacity. |
| 2. | *Point Tracking (MMPT)* | Should track power only and not Voltage at Maximum power point. |
| 3. | *Enclosure* | The Controller with RMS must have **IP65** protection. |
| 4. | *Isolator Switch* | Should be between Solar panels and the controller. |
| 5. | *RMS (GSM/GPRS connectivity)* | Controller shall be integrated with Remote Monitoring System with GSM/GPRS and Geo tagging. GSM/ GPRS Charges are to be included in the Costing till the end the of the Warranty period of the Motor-Pump set. |

| | | |
|---|---|---|
| 6. | Controller display/screen | The various parameters should be present on the SPV Pump Controller display/screen such as:- Pump On/Off status, Array Input DC Voltage, DC/AC output Current & voltage, operating frequency, Latest RMS Latitude, Latest RMS Longitude, Pump Capacity (HP), PV Module Capacity (KW), Pump Status, Current Generation (kW), Today Solar Generation (kWh), Cumulative Solar Generation (kWh), Today Runs Hours (Hrs.), Cumulative Pump Run Hours (Hrs.), Cumulative Water Discharged (Litres), Total Water Discharged (Litres), Peak Power (kW) supplied by the controller to Motor-Pump Set. |

**3.2.3.** Provision for remote monitoring unit for the pumps shall be made in the pump controller using GSM/GPRS Gateway with Geo tagging and through an internal/external arrangement having following basic functions:

a) Controller shall be assigned with a unique serial number and its live status shall be observed remotely on online portal through login credentials;
b) Live status shall indicate whether controller is ON/OFF
c) The parameter that is, the water output, water flow rate(calculated based on parameters),in fault condition; array input voltage/current and power shall be logged at an interval of 10min; and
d) Controller shall have a back up to store the data locally(at least for 1 year)

**3.2.3.1** *Remote Monitoring System (RMS)*

The detailed Specification of RMS is attached at Annexure I.

**3.3 Solar Photo Voltaic (SPV) Array**

**3.3.1 SPV** array contains specified number of same capacity, type and specifications modules connected in series or parallel to obtain the required voltage or current output. The SPV water pumping system should be operated with a SPV array of minimum capacity in the range of **900 Wp to 22500Wp**, measured under Standard Test Conditions (STC). A Sufficient number of modules in series and parallel could be used to obtain the required voltage or current output. The power output of individual SPV modules used in the SPV array, under STC, should be a minimum of **300 Wp**, with adequate provision for tolerances measurement. Use of SPV modules with higher power output is preferred.

**3.3.2** Modules supplied with the SPV water pumping systems shall have a certificate as per IS 14286/IEC 61215 specifications or equivalent National or International /Standards. STC performance data supplied with the modules shall not be more than one year old.

**3.3.3** Modules must qualify to IS/IEC 61730 Part I and II for safety qualification testing.

**3.3.4** The minimum module efficiency should be minimum 19 percent and fill factor shall be more than 75 percent.

**3.3.5** Modules must qualify to IS 170210 (Part 1) for the detection of potential-induced degradation - Part 1: Crystalline silicon (Mandatory in case the SPV array Open Circuit voltage is more than 600 V DC)

**3.3.6** In case the SPV water pumping systems are intended for use in coastal areas the solar modules must qualify to IEC/ IS 61701 for salt mist corrosion test.

**3.3.7** The name plate of SPV module shall conform to IS 14286/IEC 61215.

**3.3.8** Module to Module wattage mismatch in the SPV array shall be within ± 3 percent.

**3.3.9** Any array capacity above the minimum array wattage requirement as specified in these specifications for various models of SPV Water Pumping Systems is allowed.

**3.3.10** The SPV modules must be warranted for output wattage, which should not be less than 90% of the rated wattage at the end of 10 years and 80% of the rated wattage at the end of 25 years.

**3.3.11** The RFID tag shall be placed inside the glass laminate of the SPV modules.

**3.4 Motor-Pump Set**

**3.4.1** The SPV water pumping systems may use any of the following types of motor pump sets:

a) Surface Mono-set.
b) Submersible motor-pump set.
c) Any other type of the motor-pump set after approval from Ministry.

**3.4.2** Motor

The motors of the motor-pump set may be of the following types: -

a) AC Induction Motor.
b) DC Motor, PMSM/ SRM.

**3.4.3** The "Motor-Pump Set" should have a capacity in the range of 1 HP (0.75 kW) to 25 HP (18.75kW) and should have the following features:

a) The closed coupled or mono block DC/ AC centrifugal motor-pump set with appropriate mechanical seal(s) which ensures zero leakage.
b) The motor of the capacity ranging from 0.75kW to 18.75kW shall be AC/DC. The suction and delivery head will depend on the site-specific condition of the field; and
c) Submersible pumps could also be used according to the dynamic head of the site at which the pump is to be used.

**3.4.4** The pump and all external parts of the motor used in the submersible pump which are in contact with water, should be of stainless steel of grade 304 or higher as per IS 6911and IS 3444.The motor pump set shall have 60 months guarantee and therefore, it is essential that the construction of the motor and pump shall be made using parts which have a much higher durability and do not need replacement or corrode for at least 60 months of operation after installation. Further for submersible pumps used in coastal areas or bores with higher salinity, stainless steel of grade 316 or a higher grade may be used.

**3.4.5** The suction/ delivery pipe shall be of HDPE or uPVC column pipes of appropriate size, electric cables, floating assembly, civil work, and other fittings required to install the Motor-Pump set. In the case of HDPE pipes the minimum pressure rating of 8 kg/sqcm-PE100 grade for pump sets up to 3 HP, 10 kg/sqcm-PE100 grade for 5 HP pump set as per IS 10804 and further higher minimum pressure rating for above 5 HP as appropriate shall be used.

**3.5 Module Mounting Structures and Tracking System**

**3.5.1** The SPV modules should be mounted on metallic structures of adequate strength and appropriate design, which can withstand the load of modules and high wind velocities up to 150 km per hour. The raw material used and the process for manufacturing of module mounting structure including welding of joints should conform to applicable IS 822. The module mounting structure should be hot dip galvanized according to IS 4759. Zinc content in working area of the hot dip galvanizing bath should not be less than 99.5% by mass.

**3.5.2** To enhance the performance of SPV water pumping systems arrangement for seasonal tilt angle adjustment and three times manual tracking in a day shall be provided. In order to make structure rigid, the gap between Telescopic pattern supports should be minimal, further, for bearing of center load of whole structure only pins should be used instead of threaded bolts.

**3.5.3** The general hardware for structure fitment should be either SS 304 or 8.8 grade as per IS 6911. Modules should be locked with antitheft bolts of SS 304 Grade. Foundation should be as per the site condition, based on the properties of soil. Foundation can be done either with the help of 'J Bolt' (refer to IS 5624 for foundation hardware) or direct pilling, it should be decided as per the site and relevant IS i.e., IS 6403 /IS 456 /IS 4091 /IS 875 should be referred for foundation design.

**3.5.4** Details of Module Mounting Structure (MMS) for pumps of capacity 1HP and above with SPV modules of the capacity around 350Wp are attached at Annexure-II. These are indicative of minimum standards and the vendors may install MMS with higher standards, which shall be certified by the recognized civil/mechanical/structural engineering department of any IIT/NIT or IISC. The format of the certificate is placed at Annexure-III.

**3.5.5** In case of use of SPV Modules of capacity higher than that specified above, the size and weight of each SPV module will also increase. In such cases, the appropriate changes shall be made in the MMS design so that the stress on the individual structural members do not exceed the stress in the corresponding members in the MMS designs given in Annexure-II.

**3.6 SPV Pump Controller**

**3.6.1** Maximum Power Point Tracker (MPPT) shall be included to optimally use the power available from the SPV array and maximize the water discharge.

**3.6.2** The SPV Controller with RMS must have **IP65** protection.

**3.6.3** Adequate protections shall be provided in the SPV Controller to protect the solar powered motor-pump set against the following:

a) Dry running;
b) Open circuit;
c) Accidental Output short circuit;
d) Under voltage;
e) Reverse polarity; and
f) Surge protection to arrest high current surge

**3.6.4** A DC switch as per IS/IEC 60947-3 or DC circuit breakers as per IS/IEC 60947-2 suitable for switching dc power ON and OFF shall be provided in the SPV Pump Controller.

**3.6.5** All cables used shall be as per IS 694 or IS 9968(Part 1). Suitable size of cable shall be used in sufficient length for inter-connection from the SPV array to SPV Controller and from the SPV Controller to solar powered motor-pump set. Selection of the cable shall be as per IS 14536.

**3.6.6** The various parameters should be present on the SPV Pump Controller display/screen such as:- Pump On/Off status, Array Input DC Voltage, DC/AC output Current & voltage, operating frequency, Latest RMS Latitude, Latest RMS Longitude, Pump Capacity (HP), PV Module Capacity (KW), Pump Status, Current Generation (kW), Today Solar Generation (kWh), Cumulative Solar Generation (kWh), Today Runs Hours (Hrs.), Cumulative Pump Run Hours (Hrs.), Cumulative Water Discharged (Litres), Total Water Discharged (Litres), Peak Power (kW) supplied by the controller to Motor-Pump Set.

### 3.7 Protections

The system should be provided with all necessary protections like earthing, Lightning, and Surge Protection etc., as described below:

### 3.7.1 Earthing and Lightning Protection

1) The Earthing shall be done in accordance with the IS 3043 including its amendments and updated versions.
2) The Earthing system should be designed in such a way that it should be able to restrict the potential of each conductor according to the level of insulation applied and magnitude of the current conducted through human body should be less than the value that can cause ventricular fibrillation of heart.
3) Earth connections shall be done in such a way that they are visible for inspection and all the earth electrodes can easily be tested at any point of time.
4) It is recommended to keep the value of resistance of earth electrode less than 5 ohms.
5) All the materials, fittings etc. used for doing earthing shall conform to the Indian standard, wherever exists.
6) The actual value of soil resistivity should be considered while designing the earthing system at the site and for reference, selection criteria of the site, for any type of soil treatment to improve earth electrode resistance, etc. the IS 3043 shall be referred.
7) The electrode material should be selected according to the corrosivity of the soil in which it is used, for the relation between resistivity and corrosivity of the soil and method to safeguard the conductor against excessive corrosion, the IS 3043 shall be referred.
8) It is recommended for selection of type and installation of the earth electrode, the provisions of the IS 3043 should be considered. However, the pipe or rod-type earth electrode is preferable.

9) In case of the two-earth electrode or more, the separation among them should be twice the length of the electrode driven in the ground. Except in special conditions (for e.g.- where the soil is hard to dig out), a number of electrodes in parallel are to be preferred over a single long electrode.
10) The provisions given in the IS 3043 should be considered, while selecting or connecting the earthing/protective/grounding conductor from the components to the earth pit.
11) Separate earthing conductor shall be provided for the controller, motor-pump set and SPV array etc., for its connection to the earthing pit and it should be continuous in nature for electrical conductivity. However, even for the earthing of light current equipment (for example, high voltage testing equipment), the cross-sectional area of the earthing lead shall not be less than 6 $mm^2$.
12) For the maintenance of the earth electrode and measurement of the Earth electrode resistance the provisions of IS 3043 shall be referred.
13) Motor shall have suitable provision for earthing to facilitate earthing of the motor as per IS 3043 at the time of installation. In case GI pipes are used for the purpose of earthing the motor, an earthing connection may be made to the discharge pipe clamps. However, in case of HDPE/uPVC column pipes, a separate metallic cable from the motor to the control panel shall be provided for earthing purpose, and if a four-core cable is used, then the fourth core that is not connected to the terminals can be used for earthing.
14) Lightning protection shall be provided as per IEC 62305 and IEC 63227 standards including its amendments and updated versions.
15) An external lightning Rod, of height sufficient to meet the requirement of Lightning Protection System (LPS) designed to comply with the class III or higher (Class-I / Class-II), based on the site requirement including the area-specific lightning activity, shall be installed.
16) Arrangement and positioning of the separate air-termination systems (external lightning rod) can be determined using different methods given in the IEC 62305-3. While determining the position following points are to be considered such as: -
    a) The structure to be protected is fully located within the protected volume provided by the air-termination system.
    b) There should be a separation distance between the air-termination system and SPV power supply system to prevent dangerous sparking against parts of the SPV power supply system in case of direct lightning. The separation distances determined in accordance with IEC 62305-3 & IEC 63227 shall preferably be maintained.
    c) The possibility of the SPV modules being shadowed by air-termination systems shall be taken into account and distance from the SPV modules can be calculated using the IEC 63227.
17) A separate earth electrode is required for the dispersion of the lightning current into the ground with suitably low value of the earthing resistance i.e., less than 5 ohm. And the

minimum length ($l_1$) of vertical earth electrodes for lightning protection level III or higher shall be determined according to the IEC 62305-3.

18) The cross-section of the metal sub-structures used for the connection of the lightning arrestor to the earth electrode should be no less than 16 $mm^2$ Cu or 25 $mm^2$ Al or GI of equivalent current carrying capacity should be used, which will also depend upon the class of the Lightning protection system.

19) The earth pits given with the SWPS {i.e., Earth pit(s) for the BoS system (other than LA) and Earth Pit for LA} should be made equipotentialy bonded to each other.

### 3.7.2 Surge Protection Device

1) For SPDs IEC 63227 and its updated versions or amendments should be followed.
2) At the DC Input side of the controller, it should have protection from an External Surge Protection Device of Type-2 or higher (i.e.Type-1) in accordance with the IEC 61643-31.
3) The rated voltage of SPDs on the DC side, depends on the type of protective circuit and the magnitude of the maximum operating voltage of the SPV modules.

### 3.8 Use of indigenous components

It will be mandatory to use indigenously manufactured SPV modules with indigenous mono/multi-crystalline silicon SPV cells. Further, the motor-pump-set, controller and balance of system should also be manufactured indigenously. The vendor has to declare the list of imported components used in the SPV water pumping system.

## 4 PERFORMANCE REQUIREMENTS

**4.1** Under the "Average Daily Solar Radiation" condition of 7.15kWh / sq.m. on the surface of PV array (i.e., coplanar with the SPV modules), the minimum water output from a SPV Water Pumping System at different "Total Dynamic Heads" should be as specified below:

**For D.C. Motor Pump Set:**

i) 110 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 meters (Suction head, if applicable, minimum of 7 meters static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 12 meters.

ii) 55 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 meters (Suction head, if applicable, minimum of 7-meters static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 25 meters.

iii) 38 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 meters and the shut off head being at least 45 meters.
iv) 23 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 meters and the shut off head being at least 70 meters.
v) 15 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 meters and the shut off head being at least 100 meters.
vi) 10.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 meters and the shut off head being at least 150 meters.
vii) 9.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 120 meters and the shut off head being at least 180 meters.
viii) 7.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 150 meters and the shut off head being at least 225 meters.
ix) 5.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 200 meters and the shut off head being at least 300 meter.
x) 4.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 250 meters and the shut off head being at least 375 meters.

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

Indicative performance specifications for the Shallow and Deep well SPV Water Pumping Systems are attached at Annexure IV.

**For A.C. Induction Motor Pump Set:**

i) 99 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 meters (Suction head, if applicable, minimum of 7-meters static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 12 meters.
ii) 49 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 meters (Suction head, if applicable, minimum of 7-meters static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 25 meters.
iii) 35 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 meters and the shut off head being at least 45 meters.
iv) 21 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 meters and the shut off head being at least 70 meters.

v) 14 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 meters and the shut off head being at least 100 meters.

vi) 9 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 meters and the shut off head being at least 150 meters.

vii) 8.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 120 meters and the shut off head being at least 180 meters.

viii) 6.7 liters of water per watt peak of PV array, from a Total Dynamic Head of 150 meters and the shut off head being at least 225 meters.

ix) 5.0 liters of water per watt peak of PV array, from a Total Dynamic Head of 200 meters and the shut off head being at least 300 meters.

x) 4.0 liters of water per watt peak of PV array, from a Total Dynamic Head of 250 meters and the shut off head being at least 375 meters.

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

Indicative performance specifications for the Shallow and Deep well SPV Water Pumping Systems are attached at Annexure V.

## 5 TESTS FOR HYDRAULIC AND ELECTRICAL PERFORMANCE OF PUMPSET

**5.1** The AC motor-pump set shall be tested independently for hydraulic and electrical performance as per the relevant IS specification including the following test

a) Constructional requirements/features
b) General requirements
c) Design features
d) Insulation resistance test
e) High voltage test
f) Leakage current test

In case of the DC motor-pump set for (a), (b), (c) declaration will be given by the vendor and for (d), (e), (f) the relevant clause of IS 9283:2013 will be followed for testing until BIS notifies the Standard about it. Once the Standard gets released, then it will be effective for DC motor-pump set from its Date of notification.

**5.2** Testing of SPV Water Pumping System shall be done as per the procedure specified by the MNRE.

## 6 GUARANTEE OF PERFORMANCE

**6.1** The SPV Water Pumping Systems shall be guaranteed for their performance of the nominal volume rate of flow and the nominal head at the guaranteed duty point as specified in **4.1** under the "Average Daily Solar Radiation" condition of 7.15 kWh/$m^2$ on the surface of SPV array (i.e., coplanar with the SPV modules. The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

**6.2** Solar Photo Voltaic Water Pumping Systems shall be guaranteed by the manufacturer against the defects in material and workmanship under normal use and service for a period of at least 60 months from the date of commissioning.

**6.3** Sufficient spares for trouble free operation during the guarantee period should be made available as and when required.

## 7 MARKING AND PARAMETERS TO BE DECLARED BY THE MANUFACTURER

**7.1** The motor-pump set and Controller used in SPV Water Pumping Systems shall be securely marked with the following parameters declared by the manufacturer:

**7.1.1** Motor-Pump set

a) Manufacturer's name, logo or trade-mark;
b) Model, size and SI No of pump-set (To be engraved/laser marked on the motor frame);
c) Motor Rating (kW / HP);
d) Total head (m), at the guaranteed duty point;
e) Capacity (LPD) at guaranteed head;
f) Operating head range (m);
g) Maximum Current (A);
j) Voltage Range (V) and;
k) Type - AC or DC Motor-Pump set;
l) Solar Photo Voltaic (SPV) Array Rating in Watts peak ($W_p$);&
m) Country of origin.

Note: -In addition, a metal name plate containing the above details shall be fixed on the Module Mounting Structure for the information of user.

**7.1.2** Controller

a) Manufacturer's name, logo or trade-mark;
b) Model Number;

c) Serial Number;
d) Voltage Range(V);
e) Power Range (kW) for Controller;
f) Current rating (A);&
g) Country of origin.

## 8 OPERATION AND MAINTENANCE MANUAL

**8.1** An Operation and Maintenance Manual, in English and the local language, should be provided with the solar PV water pumping system. The Manual should have information about solar energy, photovoltaic, modules, DC/AC motor-pump set, tracking system, mounting structures, electronics and switches. It should also have clear instructions about mounting of PV module, DO's and DONT's and on regular maintenance and Trouble Shooting of the pumping system. Helpline number, Name and address of the Service Centre and contact number of authorized representative to be contacted in case of failure or complaint should also be provided. A guarantee card for the modules and the motor pump set should also be provided to the beneficiary.

## 9 COMPREHENSIVE OPERATION AND MAINTENANCE

i. The Contractor should provide 5 years comprehensive maintenance of the Solar Photovoltaic Water pumping system, which shall include corrective maintenance as well as routine service visits during CMC period.

ii. CMC shall be in line with scheme guidelines and its amendment (if any). Apart from the monitoring, regular periodical maintenance of system has to be done. The report has to be maintained in a prescribed format containing Month, Inspection Date, Action taken against the Defects found in the System and along with signatures of both service Engineer and the farmer/ beneficiary. Maintenance report in digital form to be sent to Scheme implementing agency (SIA) and also uploaded on the portal of SIA whenever such portal or mobile app is made available.

iii. The deputed personnel shall be in a position to check and test all the equipment regularly, so that preventive actions, if any, could be taken well in advance to save any equipment from damage.

iv. Normal and preventive maintenance of the Solar Photovoltaic Water pumping systems such as cleaning of module surface, tightening of all electrical connections, changing of tilt angle of module mounting structure, cleaning & greasing of motor pump sets, changing filters etc. are also the duties of the deputed personnel during maintenance visits.

v. During the operation and maintenance period of the Solar Photovoltaic Water Pumping Systems, if there is any loss or damage of any component due to miss management or miss handling or due to any other reasons pertaining to the deputed personnel by empaneled vendor, what-so-ever, the supplier shall be responsible for immediate replacement or rectification. The damaged component may be repaired or replaced by a new component.

vi. The maintenance shall include replacement of any component irrespective of whether the defect was a manufacturing defect or due to wear and tear.

## LIST OF REFERRED INDIAN STANDARDS

| | |
|---|---|
| 456:2000 | Plain and reinforced concrete - Code of practice (Fourth Revision) |
| 811:1987 | Specification for cold formed light gauge structural steel sections (Second Revision) |
| 822:1970 | Code of procedure for inspection of welds |
| IS 875: Part 1: 1987 | Code of practice for design loads (Other Than Earthquake) for buildings and structures: Part 1 dead loads - Unit weights of building materials and stored materials (Second Revision) |
| 694:2010 | Polyvinyl Chloride Insulated Unsheathed--And Sheathed Cables/cords With Rigid And-Flexible Conductor for Rated Voltages-Up To And Including 450/750 V |
| 1079:2017 | Hot rolled carbon steel sheet, plate and strip - Specification (Seventh Revision) |
| 1161:2014 | Steel tubes for structural purposes - Specification (Fifth Revision) |
| 1239 (Part 1):2004 | Steel tubes, tubulars and other wrought steel fittings - Specification: Part 1 steel tubes (Sixth Revision) |
| 2062:2011 | Hot rolled medium and high tensile structural steel - Specification (Seventh Revision) |
| 2629:1985 | Recommended practice for hot-dip galvanizing of iron and steel (First Revision) |
| 2633:1986 | Method for testing uniformity of coating on zinc coated articles (Second Revision) |
| 3043:2018 | Code of Practice for Earthing |
| 3444:1999 | Corrosion resistant high alloy steel and nickle base castings for general applications-Specification |
| 4091:1979 | Code of practice for design and construction of foundations for transmission line towers and poles (First Revision) |
| 4759:1996 | Hot - Dip zinc coatings on structural steel and other allied products - Specification (Third Revision) |
| 5120:1977 | Technical requirements for rotodynamic special purpose pumps (First revision) |
| 5624:2021 | Foundation bolts - Specification (First Revision) |
| 6403:1981 | Code of practice for determination of bearing capacity of shallow foundations |
| 6745:1972 | Methods for determination of mass of zinc coating on zinc coated iron and steel articles |
| 6911:2017 | Stainless steel plate, sheet and strip-Specification |
| 7215:1974 | Tolerances for fabrication of steel structures |
| 8034:2018 | Submersible pump sets - Specification (third revision) |
| 9079:2018 | Monoset pumps for clear, cold water for agricultural and water supply purposes - Specification (third revision) |
| 9283:2013 | Motors for submersible pump sets |
| 9968 (Part 1):1988 | Specification for elastomer insulated cables: Part 1 for working voltages up to and including 1100 volts (First Revision) |

| | |
|---|---|
| 10804(Part I):2018 | Recommended pumping systems for agricultural purposes: Part 1 Surface pumps |
| 10804(Part 2):2018 | Recommended pumping systems for agricultural purposes: Part 2 Submersible pump set |
| 14220:2018 | Open well submersible pump sets - Specification (first revision) |
| 14536:2018 | Selection, installation, operation and maintenance of submersible pumpset - Code of practice (First Revision) |
| IS/IEC61701: 2011 | Salt mist corrosion testing of photovoltaic (PV) modules First Revision |
| IS 17210 (Part 1): | Photovoltaic (PV) Modules — Test Methods for the Detection of Potential-Induced Degradation Part 1 Crystalline Silicon |
| IS/IEC 60034-1:2004 | Rotating Electrical Machines – Part 1 Rating and Performance |
| IS/IEC 61683:1999 | Photovoltaic System-Power Conditioners — Procedure for Measuring Efficiency |
| IEC 62253:2011 | Photovoltaic Pumping Systems – Design qualification and performance measurements |
| IS 14286: 2010 /IEC 61215 : 2005 | Crystalline Silicon Terrestrial Photovoltaic (Photo Voltaic (PV)) modules - Design Qualification and Type Approval (First Revision) |
| 17429:2020 | Solar Photovoltaic water pumping systems-Testing procedure |
| IS/IEC 61730-1: 2016 | Photovoltaic (PV) Module Safety Qualification Part 1 Requirements for Construction |
| IS/IEC 61730-2: 2019 | Photovoltaic (PV) Module Safety Qualification Part 2 Requirements for Testing |
| IEC 60068-2-6:2007 | Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal) |
| IEC 60068-2-30:2005 | Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 + 12h cycle) |
| IEC 62305-1/2/3/4 | Lightning Protection |
| IEC 63227 | Lightning and Surge Voltage Protection for photovoltaic (PV) power supply systems |
| IEC 61643-31 | Low-voltage surge protective devices |
| IS/IEC 60947: PART 1: 2007 | Low - Voltage switchgear and control gear: Part 1 general rules (First Revision) |

Note:- The latest editions of the indicated standards shall be considered.

Annexure-I

## Specifications for Remote Monitoring System (RMS)

The Remote Monitoring System shall be capable of providing and handling the following:

a. Solar System Performance: DC Voltage, DC current, AC output Current, Power, Drive frequency, Energy, etc.
b. Pump Performance: Running Hours, Water Discharge (Output), etc.
c. RMS Performance: % of Device Connectivity, % of Data Availability, etc.
d. Geo Location: Real time latitude and longitude should be captured with an accuracy of less than 10m horizontal.
   This is required to ensure that system is not moved from its original location.
e. Events and Notifications: Faults related to Pump Operation, Solar generation, Controller/Drive faults like overload, dry run, short circuit, etc.
f. Consumer Management: Name, Agriculture details, Service No. Contact Details, etc.
g. Asset Management: Ratings, Serial Number, Make, Model Number of Pump, SPV Module and Controller, Geo Location, IMEI number (of communication module) and ICCID (of SIM).
h. Complaint and Ticket Management: Complaint management system is a part of centralized monitoring software platform.
i. Consumer Mobile Application: Generation, Running Hours, Water Discharge, Complaint logging, etc.

Communication Architecture of the RMS should be as mentioned below:

a. **Communication Connectivity:**
   i. **Pump Controller Connectivity:** Communication between RMS and Pump Controller should be on UART/RS485 MODBUS RTU protocol to ensure interoperability irrespective of make and manufacturer.
   ii. **Remote Connectivity:** RMS of SWPS should use GSM/GPRS/2G/3G/4G cellular connectivity.
   iii. **Local Connectivity:** Ethernet/Bluetooth/Wi-Fi connectivity to configure parameters, notifications, communication interval, set points etc. or to retrieve locally stored data
   iv. **Sensor Connectivity:** RMS should have provision for at least two Analog and Digital inputs with 0.1% accuracy to address the requirement of local sensors connectivity if required by SIA/Consumer for applications such as irradiation, flow meter for water discharge, moisture sensor for micro-irrigation, etc.
   **As mentioned in specifications, Analog and digital sensor inputs will be required for integration of flow meter for water discharge, moisture sensor for micro irrigation, level sensor for overhead tank**

**water storage etc. Only provision for Analog and digital inputs with 0.1% accuracy of Full-Scale Range is required. Sensors will not be in scope of bidder.**

v. RMS should have provision to give various modes of operations which are as follows:
   i. Remote Mode: - Pump can be made ON/Off using the Mobile App or in case, farmer do not have a smart phone, farmer shall be able to on-off pump through SMS/missed call.
   ii. Auto Mode: - Pump can ON/Off automatically using the sensor data which are installed in the field by the beneficiary. (Cost of sensors will be worn by the beneficiary)
   iii. Timer Mode: - Pump controller shall operate pump as per configured schedule using mobile application i.e.,daily start time and running hours of pump.
   iv. Manual Mode: - Pump can be made to run into manual mode from field.

**To save ground water, provision for remote operation is required so that farmer can switch on and off remotely.**

**b. Communication Modes:**
   i. Push Data on Event/Notification: such as pump on, pump off, protection operated, etc.
   ii. Push Data Periodically: important parameters of solar pump (as mentioned above) should be pushed to central server on a configurable interval. **Default interval should be of 15 minutes. However, if required, it should be possible to configure the periodic interval in multiples of 1 minute starting from 1 minute and up to 15 minutes. Further, in case of any abnormalities or events, RMS should push on event immediately.**
   iii. Command on Demand: It should be possible to send commands via GSM or GPRS to RMS either to control pump operations or to update configuration.

**c. Communication Protocol:** RMS should provide data on MQTT protocol to establish communication with thousands of system.

**d. Security:**
   i. Communication between RMS and Server should be secured and encrypted using TLS/SSL/X.509 certificate etc.

ii. As a part of IoT protocol, Authentication and Authorization should be implemented using a token/password mechanism

e. **Message Format:** RMS should provide data in a JSON message format as per requirement of implementing agency.

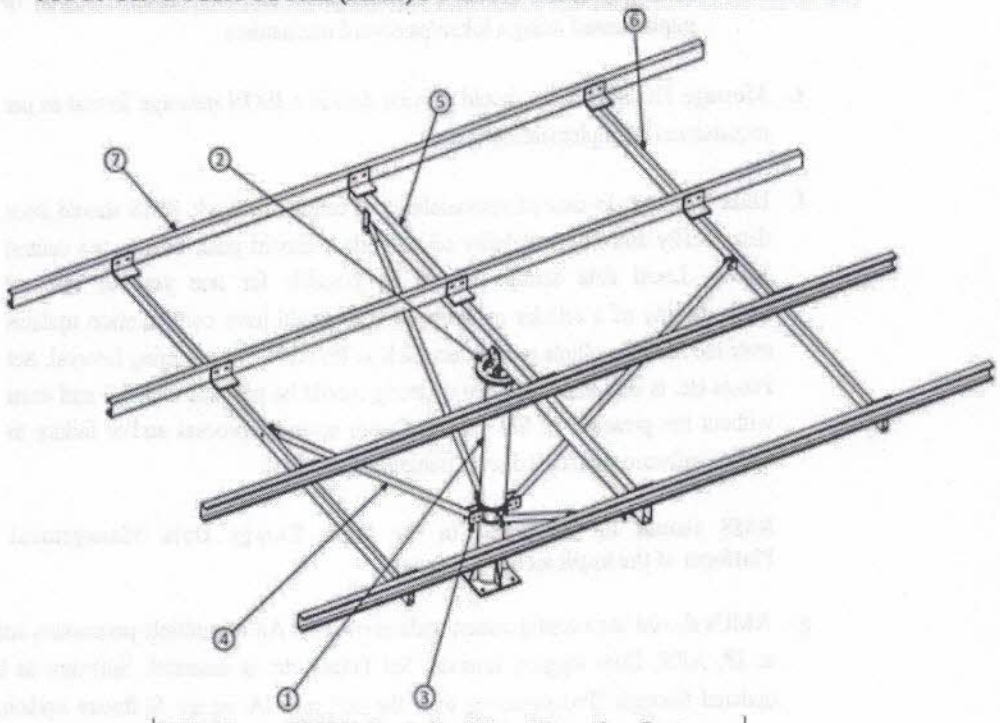
f. **Data Storage:** In case of unavailability of cellular network, RMS should store data locally and on availability of network it should push data to the central Server. Local data storage should be possible for one year in case of unavailability of a cellular network. RMUs should have configuration updates over the Air of multiple parameters such as IP, APN, Data logging Interval, Set Points etc. is essential. Software updating should be possible with 2G and even without the presence of SD card. Software updating process and/or failure to update software shouldn't disrupt pumping operations.

**RMS should be connected to the Solar Energy Data Management Platform of the implementing Agency.**

g. RMUs should have configuration updates over the Air of multiple parameters such as IP, APN, Data logging Interval, Set Points etc. is essential. Software to be updated through "Programming over the air" on SIA server. Software updating process and/or failure to update software shouldn't disrupt pumping operations.

**Manufacturer should consider Programming Over the Air (POTA) instead of Firmware Over the Air (FOTA) to update configurable parameters such as server IP, URL, Port, APN, Periodic Interval etc.**

## SPECIFICATIONS FOR DUAL AXIS MANUAL TRACKING TYPEMODULE MOUNTING STRUCTURE (MMS) FOR SPV WATER PUMPING SYSTEM




| Main Parts of MMS for Solar Water Pumping System | | |
|---|---|---|
| *Sl No.* | *Part Name* | *Qty./Set* |
| 1 | Main Column | 1 |
| 2 | Top Plate | 1 |
| 3 | Clamp with blade | 2 |
| 4 | Supporting pipe | 6/8 |
| 5 | Main tube | 1 |
| 6 | Side tube | 2 |
| 7 | Mounting purlin | 4 |

For hot dip galvanizing of fabricated structure following shall be referred:

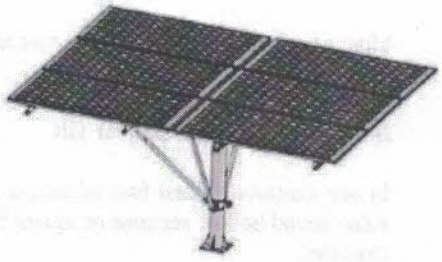
a) Minimum coating required shall be as per IS 4759;
b) Preece test ($CuSO_4$ Dip test) as per IS 2633;
c) Mass of zinc (IS 6745 or IS 4759); and
d) Adhesion test (IS 2629).

**B-1 STANDARD MMS FOR 4, 6, 8 AND 10 SOLAR MODULES HAVE BEEN SPECIFIED. THESE STANDARD MMS MAY BE USED IN COMBINATIONS FOR DIFFERENT CAPACITIES OF SOLAR WATER PUMPING SYSTEMS AS FOLLOWS**

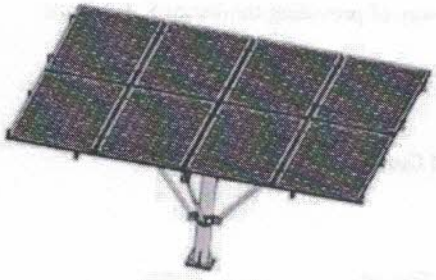
a) Standard MMS of 4 modules for 1 HP;
b) Standard MMS of 6 modules for 2 HP;
c) Standard MMS of 10modules or combination of standard MMS of 4 Modules and standard MMS 6 Modules for 3 HP;
d) Combination of two standard MMS of 8 modules or combination of standard MMS of 10modules and standard MMS 6 modules for 5 HP; and
e) Combination of three standard MMS of 8 modules or combination of twostandard MMS of 10 Modules and one standard MMS 6 modulesfor 7.5 HP and so on.



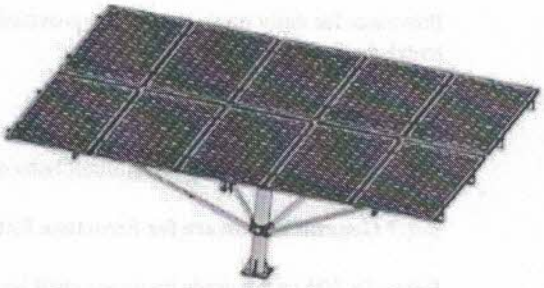
4 MODULE MMS



6 MODULE MMS



8 MODULE MMS



10 MODULE MMS

**B-2 SPECIFICATIONS OF MAIN PARTS USED IN MMS ARE GIVEN BELOW**

**B-2.1 Centre Shaft**

Centre shaft used in structure shall be of:

a) *For 4, 6 and 8 Modules Structure* —Minimum 139 OD with minimum thickness of 4 mm with base plate minimum 10 mm thickness if used and foundation hardware shall be as per IS 5624.

b) *For 10 Modules Structure* —Minimum 165 OD with minimum thickness of 4 mm

with base plate minimum 20 mm thickness if used and foundation hardware shall be as per IS 5624.

For system without base plate that is, direct pilling is shall be as per the site condition based on the properties of Soil and refer (IS 6403/4091/875/456) for foundation design.

**B-2.2 Rafters**

The main and secondary rafter used in structure shall be of either SHS or RHS pipe sections.

**B-2.3 Purlin**

Mounting purlins used in the structure shall be made of cold form steel section as per IS 1079 with minimum thickness of 2mm.

**B-2.4 Provision for Seasonal Tilt**

In one structure at least four telescopic supports (three may be used in MMS for 4 modules) either round hollow sections or square hollow section to be provided to support the mounting structure.

**B-2.5 Provision for Daily Tracking**

Provision for daily tracking shall be provided by the way of providing minimum 8 mm thick metal sheet with precision cut grooves.

**B-2.6 Module Locking System**

Modules shall be locked with antitheft bolts of SS 304 Grade.

**B-2.7 General Hardware for Structure Fitment**

Either SS 304 or 8.8 grade hardware shall be used for fitment.

**B-2.8 Hot Dip Galvanizing**

All structure parts shall be hot dip galvanized according to IS 4759.

**B-2.9 Tolerance for Fabrication**

Tolerance for fabrication of steel structure shall as per IS 7215.

**B-2.10 Welding**

Welding shall be done as per IS 822 and grade of welding wire shall be (ER70S-6).

**B-2.11 Raw Material Test Certificates (MTC)**

MTC of all types of raw material used in dual axis manual tracking type MMS as per appropriate Indian Standard shall be submitted along with dispatch documents.

**B-2.12** Tests to be performed on dual axis manual tracking type MMS for solar water pumping system.

**B-2.12.1** For ascertaining proper welding of structure part following shall be referred:

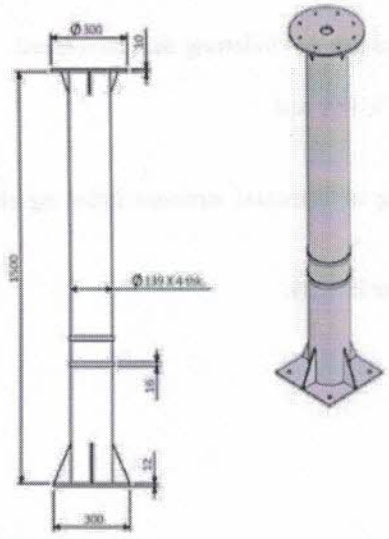
a) Weld wire grade shall be of grade (ER 70 S-6); and
b) D.P. test (pin hole/crack) (IS 822).

**B-2.12.2** For ascertaining hot dip galvanizing of fabricated structure following shall be referred:

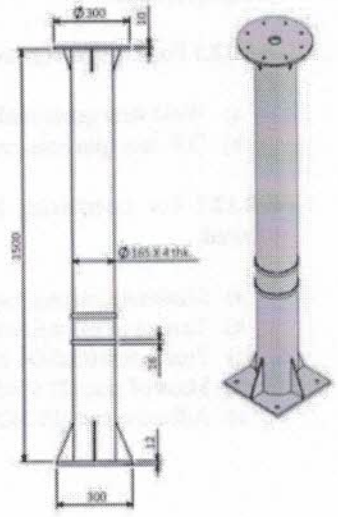
a) Minimum coating required shall be as per IS 4759;
b) Testing of galvanized material;
c) Preece test (CuSO4 dip test) (IS 2633);
d) Mass of zinc (IS 6745 or IS 4759); and
e) Adhesion test (IS 2629).

## Part 1 Main Column

Common for 4, 6 and 8 MMS




For 10 MMS

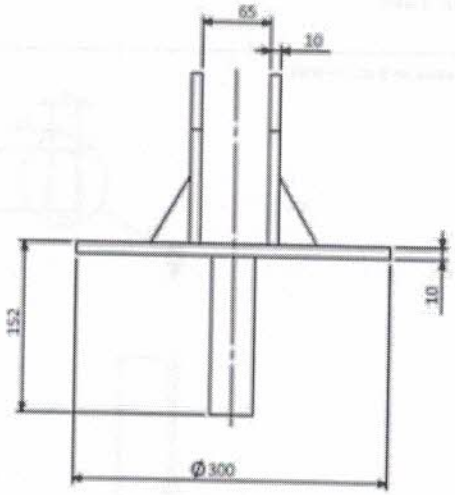


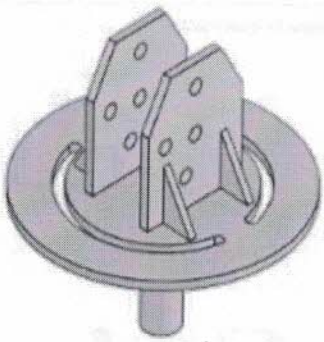

All dimensions are in mm.

| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 1. | **MAIN POLE** | | | |
| | 4, 6 and 8 Modules | 139 OD | 1500 | 1 |
| | 10 Modules | 165 OD | 1500 | 1 |

## Part 2 Top Plate

**Common for 4, 6, 8 and 10 MMS**



All dimensions are in mm.

| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 2. | TOP PLATE (Common for all) | 300 OD | — | 1 |

## Part 3 Main Tube

Common for 4 and 6 MMS




Common for 8 and 10 MMS

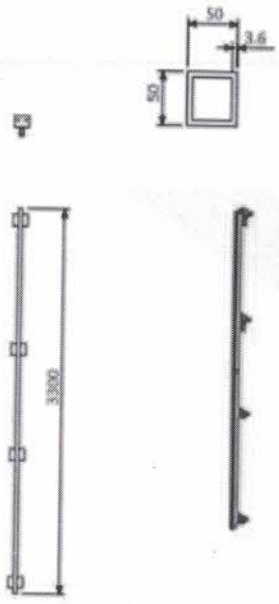



All dimensions are in mm.

| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 5. | MAINTUBE | | | |
| | 4 and 6 Modules | 60 × 60 × 3.6 | 3300 | 1 |
| | 8 and 10 Modules | 112 × 61 × 3.6 | 3300 | 1 |

## Part 4 Side Tube

**Common for 4 and 6 MMS**



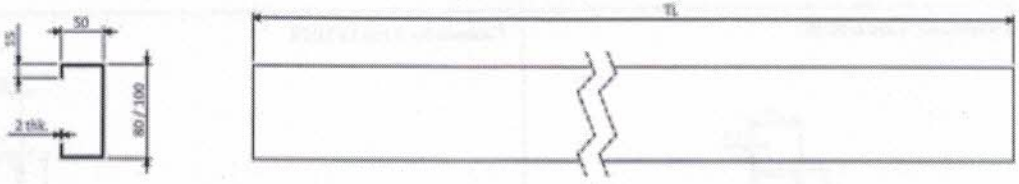

**Common for 8 and 10 MMS**

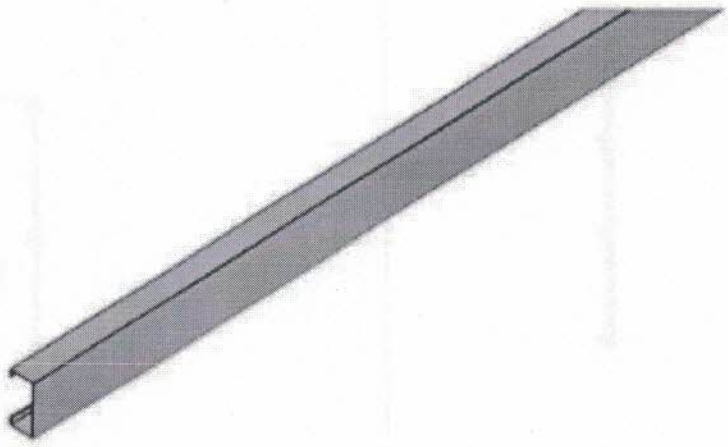



All dimensions are in mm.

| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 6. | **SIDE TUBE** | | | |
| | 4 and 6 Modules | 50 × 50 × 3.6 | 3300 | 2 |
| | 8 and 10 Modules | 80 × 40 × 3.2 | 3300 | 2 |

**Part 5 Purlin**



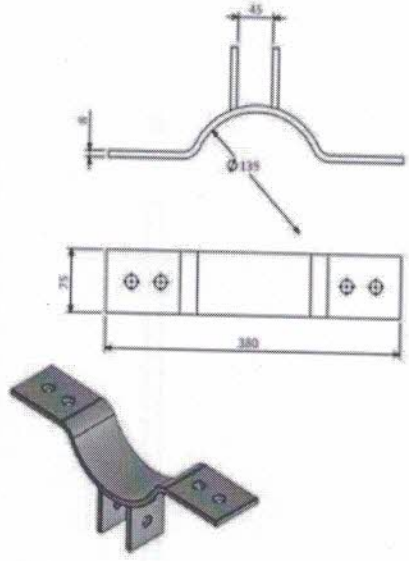



All dimensions are in mm.

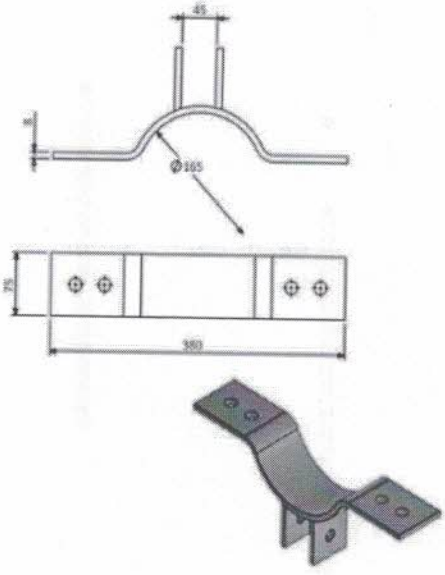
| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 7. | **MOUNTING PURLIN** | | | |
| | 4 Modules | 80 × 50 × 15 × 2 | 2050 | 4 |
| | 6 Modules | 80 × 50 × 15 × 2 | 3100 | 4 |
| | 8 Modules | 80 × 50 × 15 × 2 | 4150 | 4 |
| | 10 Modules | 100 × 50 × 15 × 2 | 5200 | 4 |

## Part 6 Clamp with Blade

Common for 4, 6 and 8 MMS




For 10 MMS




All dimensions are in mm.

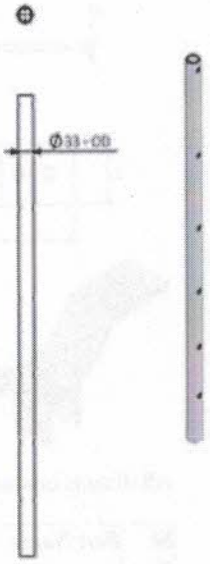
| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length(mm)* | *Quantity Per Set* |
|---|---|---|---|---|
| 3. | **CLAMP WITH BLADE** | | | |
| | 4, 6 and 8 Modules (For 139 OD Pole) | 75 × 8 | 380 | 2 |
| | 10Modules (For 165 OD Pole) | 75 × 8 | 380 | 2 |

## Part 7 Supporting Pipes

4A) Supporting Pipe - 4 Nos./Set
Common for 4, 6, 8 and 10 MMS




4B) Supporting Pipe - 2 Nos./Set
Common for 4, 6, 8 and 10 MMS

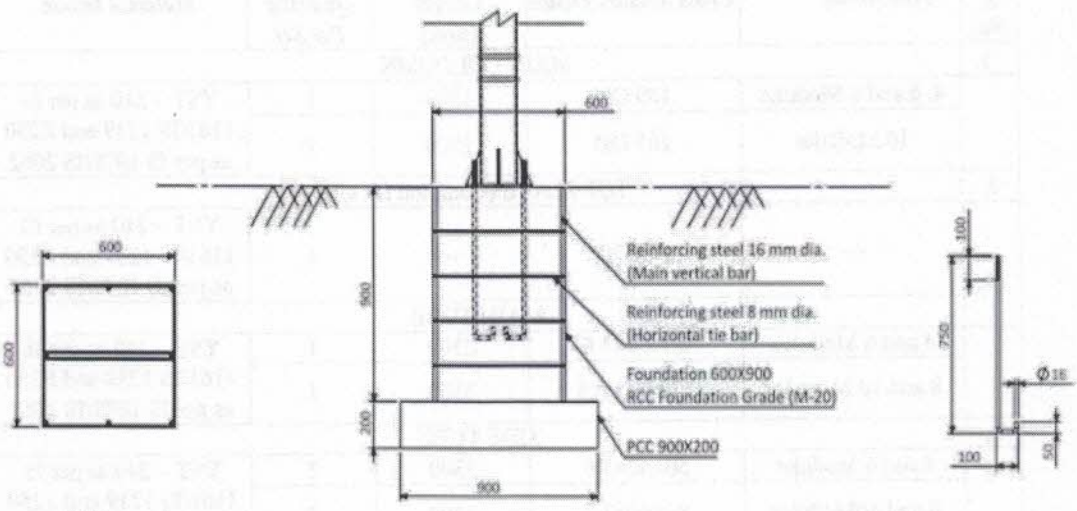



All dimensions are in mm.

**Main-Parts of MMS for SPV Water Pumping System**

| *Sl No.* | *Part Name* | *Cross Section Detail* | *Length (mm)* | *Quantity Per Set* | *Material Grade* |
|---|---|---|---|---|---|
| 1. | MAIN COLOUMN | | | | |
| | 4, 6 and 8 Modules | 139 OD | 1500 | 1 | YST – 240 as per IS 1161/IS 1239 and E250 as per IS 1079/IS 2062 |
| | 10 Modules | 165 OD | 1500 | 1 | |
| 2. | TOP PLATE (Common for all) | | | | |
| | — | 300 OD | — | 1 | YST – 240 as per IS 1161/IS 1239 and E250 as per IS 1079/IS 2062 |
| 3. | MAIN TUBE | | | | |
| | 4 and 6 Modules | 60×60×3.6 | 3300 | 1 | YST – 240 as per IS 1161/IS 1239 and E250 as per IS 1079/IS 2062 |
| | 8 and 10 Modules | 122×61×3.6 | 3300 | 1 | |
| 4. | SIDE TUBE | | | | |
| | 4 and 6 Modules | 50×50×3.6 | 3300 | 2 | YST – 240 as per IS 1161/IS 1239 and E250 as per IS 1079/IS 2062 |
| | 8 and 10Modules | 80×40×3.2 | 3300 | 2 | |
| 5. | MOUNTING PURLIN | | | | |
| | 4 Modules | 80×50×15×2 | 2050 | 4 | E250 as per IS 1079/IS 2062 and IS 811 |
| | 6 Modules | 80×50×15×2 | 3100 | 4 | |
| | 8 Modules | 80×50×15×2 | 4150 | 4 | |
| | 10 Modules | 100×50×15×2 | 5200 | 4 | |
| 6. | CLAMP WITH BLADE | | | | |
| | 4, 6 and 8 Modules (for 139 OD pole) | 75×8 | 380 | 2 | As per IS 1079 and E250 as per IS 2062 |
| | 10 Modules(for 165 OD pole) | 75×8 | 380 | 2 | |
| 7. | SUPPORTING PIPES | | | | |
| | 4, 6 and 8 Modules | 41 OD and 33 OD | — | 6 | YST – 240 as per IS 1161/IS 1239 and E250 as per IS 1079/IS 2062 |
| | 10 Modules | 41 OD and 33 OD | — | 8 | |

**Foundation Design for 4 and 6 MMS**

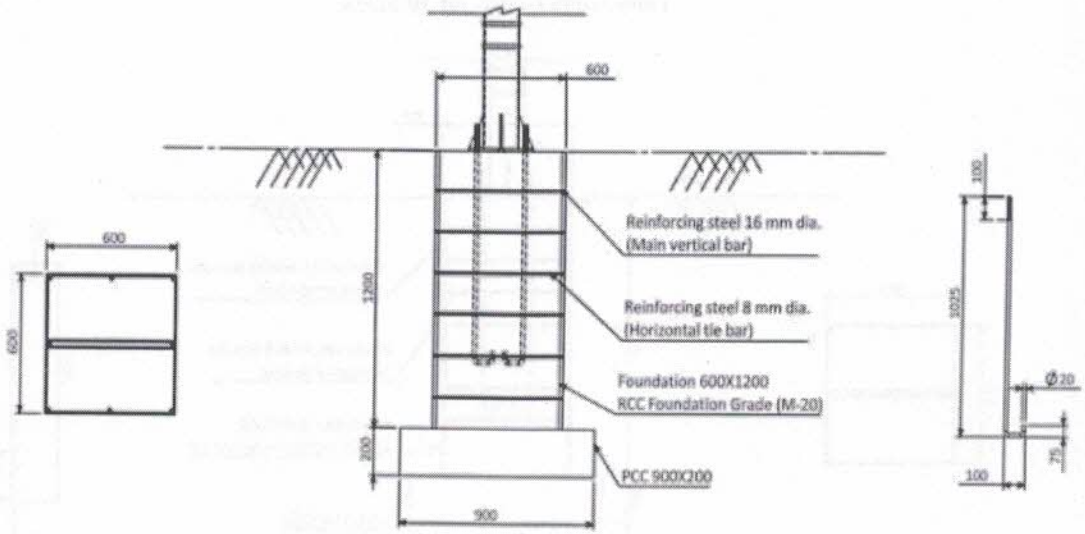



All dimensions are in mm.

| BOM For Steel | | | | |
|---|---|---|---|---|
| *TMT Bar* (mm) | *Length* (mm) | *Unit Weight* (kg) | *Quantity* (Pcs.) | *Total Weight* (kg) |
| 16 | 1000 | 1.578 | 8 | 12.6 |
| 8 | 2400 | 0.950 | 4 | 3.8 |
| 8 | 1250 | 0.500 | 4 | 2 |

| BOM For RCC and PCC | | | | |
|---|---|---|---|---|
| *Block* | *Width* (m) | *Length* (m) | *Height* (m) | *Volume* ($m^3$) |
| RCC Column | 0.600 | 0.600 | 0.900 | 0.324 |
| PCC | 0.900 | 0.900 | 0.200 | 0.162 |

## Foundation Design for 8 MMS

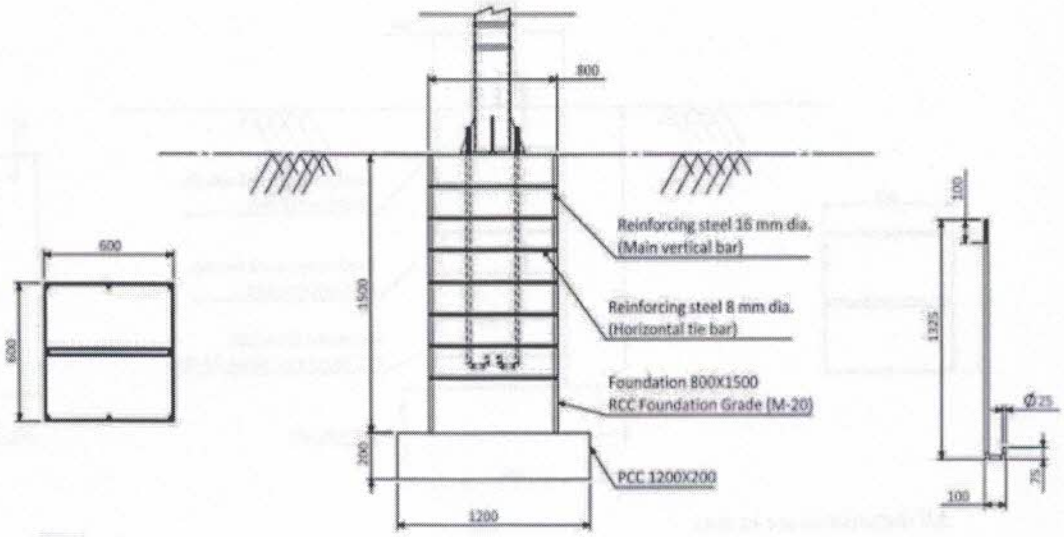



All dimensions are in mm.

| BOM For Steel | | | | |
|---|---|---|---|---|
| *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) |
| 16 | 1300 | 2.050 | 8 | 16.4 |
| 8 | 2400 | 0.950 | 6 | 5.7 |
| 8 | 1250 | 0.500 | 6 | 3 |

| BOM For RCC and PCC | | | | |
|---|---|---|---|---|
| *Block* | *Width* (m) | *Length* (m) | *Height* (m) | *Volume* ($m^3$) |
| RCC Column | 0.600 | 0.600 | 1.200 | 0.432 |
| PCC | 0.900 | 0.900 | 0.200 | 0.162 |

**Foundation Design for 10 MMS**




All dimensions are in mm.

| BOM For Steel | | | | |
|---|---|---|---|---|
| *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) | *TMT Bar* (mm) |
| 16 | 1800 | 2.500 | 8 | 20.0 |
| 8 | 3200 | 1.250 | 7 | 8.75 |
| 8 | 1650 | 0.650 | 7 | 4.55 |

| BOM For RCC and PCC | | | | |
|---|---|---|---|---|
| *Block* | *Width* (m) | *Length* (m) | *Height* (m) | *Volume* ($m^3$) |
| RCC Column | 0.800 | 0.800 | 1.500 | 0.960 |
| PCC | 1.200 | 1.200 | 0.200 | 0.288 |

**Annexure-III**

**Format of Certificate by the Civil/Mechanical/Structural Engineering Department for MMS**

*(To be submitted on the letterhead of the Department/College)*

This is to certify that the MMS structure drawing along with the foundation .....(copy enclosed) supplied by.....(Vendor Name) is evaluated at our structural Engineering Department facility at.....(College Name) and it is found superior( in terms of the structural integrity/ load bearing capacity/ stress on the individual structural member) to the MMS structure along with foundation specified in the Specification of Solar Water Pumping System notified by the Ministry of New and Renewable Energy (MNRE) vide **F.No-41/3/2018-SPV Division dated 06.03.2023.**

The following are the changes when compared to the MNRE's MMS suggestive design: -

| S.No. | According to the MNRE MMS | According to the vendor MMS |
|---|---|---|
| | | |

These are the following improvements in the MMS design submitted by the vendor over the MNRE's MMS suggestive design: -

1.
2.

*Note:- The lab may attach drawings/calculations wherever needed*

Signature of the head (Structural/ Mechanical/ Civil engineering department)

ANNEXURE – IV

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with D.C. Motor /PMSM/SRM

| Description | Model-1 | Model-2 | Model-3 | Model-4 | Model-5 | Model-6 | Model-7 | Model-8 | Model-9 | Model-10 | Model-11 | Model-12 | Model-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 900 | 1800 | 2700 | 2700 | 4800 | 4800 | 4800 | 6750 | 6750 | 6750 | 9000 | 9000 | 9000 |
| Motor Pump-set capacity (HP) | 1 | 2 | 3 | 3 | 5 | 5 | 5 | 7.5 | 7.5 | 7.5 | 10 | 10 | 10 |
| Shut Off Dynamic Head (meters) | 12 | 12 | 12 | 25 | 12 | 25 | 45 | 12 | 25 | 45 | 12 | 25 | 45 |
| Water output * (Liters per day) | 99000 (from a total head of 10 meters) | 198000 (from a total head of 10 meters) | 297000 (from a total head of 10 meters) | 148500 (from a total head of 20 meters) | 528000 (from a total head of 10 meters) | 264000 (from a total head of 20 meters) | 182400 (from a total head of 30 meters) | 742500 (from a total head of 10 meters) | 371250 (from a total head of 20 meters) | 256500 (from a total head of 30 meters) | 990000 (from a total head of 10 meters) | 495000 (from a total head of 20 meters) | 342000 (from a total head of 30 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum of 7 meters static suction lift corrected for atmospheric pressure and water temperature.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

Indicative Technical Specifications of Shallow Well (Surface) Pumping Systems with D.C. Motor /PMSM/SRM

| Description | Model-14 | Model-15 | Model-16 | Model-17 | Model-18 | Model-19 | Model-20 | Model-21 | Model-22 | Model-23 | Model-24 | Model-25 | Model-26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 11250 | 11250 | 11250 | 11250 | 13500 | 13500 | 13500 | 13500 | 15750 | 15750 | 15750 | 18000 | 18000 |
| Motor Pump-set capacity (HP) | 12.5 | 12.5 | 12.5 | 12.5 | 15 | 15 | 15 | 15 | 17.5 | 17.5 | 17.5 | 20 | 20 |
| Shut Off Dynamic Head (meters) | 12 | 25 | 45 | 70 | 25 | 45 | 70 | 100 | 45 | 70 | 100 | 45 | 70 |
| Water output * (Liters per day) | 1237500 (from a total head of 10 meters) | 618750 (from a total head of 20 meters) | 427500 (from a total head of 30 meters) | 258750 (from a total head of 50 meters) | 742500 (from a total head of 20 meters) | 513000 (from a total head of 30 meters) | 310500 (from a total head of 50 meters) | 202500 (from a total head of 70 meters) | 598500 (from a total head of 30 meters) | 362250 (from a total head of 50 meters) | 236250 (from a total head of 70 meters) | 684000 (from a total head of 30 meters) | 414000 (from a total head of 50 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum of 7 meters static suction lift corrected for atmospheric pressure and water temperature.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

Indicative Technical Specifications of Shallow Well (Surface) Pumping Systems D.C. Motor /PMSM/SRM.

| Description | Model-27 | Model-28 | Model-29 | Model-30 | Model-31 | Model-32 | Model-33 | Model-34 |
|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 18000 | 18000 | 20250 | 20250 | 20250 | 22500 | 22500 | 22500 |
| Motor Pump-set capacity (HP) | 20 | 20 | 22.5 | 22.5 | 22.5 | 25 | 25 | 25 |
| Shut Off Dynamic Head (meters) | 100 | 150 | 70 | 100 | 150 | 70 | 100 | 150 |
| Water output (Liters per day) | 270000 (from a total head of 70 meters) | 189000 (from a total head of 100 meters) | 465750 (from a total head of 50 meters) | 303750 (from a total head of 70 meters) | 212625 (from a total head of 100 meters) | 517500 (from a total head of 50 meters) | 337500 (from a total head of 70 meters) | 236250 (from a total head of 100 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum of 7 meters static suction lift corrected for atmospheric pressure and water temperature.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with D.C. Motor /PMSM/SRM.

| Description | Model-1 | Model-2 | Model-3 | Model-4 | Model-5 | Model-6 | Model-7 | Model-8 | Model-9 | Model-10 | Model-11 | Model-12 | Model-13 | Model-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 1200 | 1800 | 3000 | 3000 | 3000 | 4800 | 4800 | 4800 | 6750 | 6750 | 6750 | 9000 | 9000 | 9000 |
| Motor Pump-set capacity (HP) | 1 | 2 | 3 | 3 | 3 | 5 | 5 | 5 | 7.5 | 7.5 | 7.5 | 10 | 10 | 10 |
| Shut Off Dynamic Head (meters) | 45 | 45 | 45 | 70 | 100 | 70 | 100 | 150 | 70 | 100 | 150 | 70 | 100 | 150 |
| Water output * (Liters per day) | 45600 (from a total head of 30 meters) | 68400 (from a total head of 30 meters) | 114000 (from a total head of 30 meters) | 69000 (from a total head of 50 meters) | 45000 (from a total head of 70 meters) | 110400 (from a total head of 50 meters) | 72000 (from a total head of 70 meters) | 50400 (from a total head of 100 meters) | 155250 (from a total head of 50 meters) | 101250 (from a total head of 70 meters) | 70875 (from a total head of 100 meters) | 207000 (from a total head of 50 meters) | 135000 (from a total head of 70 meters) | 94500 (from a total head of 100 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
2. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with D.C. Motor /PMSM/SRM.

| Description | Model-15 | Model-16 | Model-17 | Model-18 | Model-19 | Model-20 | Model-21 | Model-22 | Model-23 | Model-24 | Model-25 | Model-26 | Model-27 | Model-28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 11250 | 11250 | 11250 | 11250 | 13500 | 13500 | 13500 | 13500 | 15750 | 15750 | 15750 | 15750 | 18000 | 18000 |
| Motor Pump-set capacity (HP) | 12.5 | 12.5 | 12.5 | 12.5 | 15 | 15 | 15 | 15 | 17.5 | 17.5 | 17.5 | 17.5 | 20 | 20 |
| Shut Off Dynamic Head (meters) | 100 | 150 | 180 | 225 | 100 | 150 | 180 | 225 | 100 | 150 | 180 | 225 | 150 | 180 |
| Water output * (Liters per day) | 168750 (from a total head of 70 meters) | 118125 (from a total head of 100 meters) | 106875 (from a total head of 120 meters) | 84375 (from a total head of 150 meters) | 202500 (from a total head of 70 meters) | 141750 (from a total head of 100 meters) | 128250 (from a total head of 120 meters) | 101250 (from a total head of 150 meters) | 236250 (from a total head of 70 meters) | 165375 (from a total head of 100 meters) | 149625 (from a total head of 120 meters) | 118125 (from a total head of 150 meters) | 189000 (from a total head of 100 meters) | 171000 (from a total head of 120 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
2. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems D.C. Motor /PMSM/SRM.

| Description | Model-29 | Model-30 | Model-31 | Model-32 | Model-33 | Model-34 | Model-35 | Model-36 | Model-37 | Model-38 | Model-39 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 18000 | 18000 | 20250 | 20250 | 20250 | 20250 | 20250 | 22500 | 22500 | 22500 | 22500 |
| Motor Pump-set capacity (HP) | 20 | 20 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 25 | 25 | 25 | 25 |
| Shut Off Dynamic Head (meters) | 225 | 300 | 150 | 180 | 225 | 300 | 375 | 180 | 225 | 300 | 375 |
| Water output * (Liters per day) | 135000 (from a total head of 150 meters) | 99000 (from a total head of 200 meters) | 212625 (from a total head of 100 meters) | 192375 (from a total head of 120 meters) | 151875 (from a total head of 150 meters) | 111375 (from a total head of 200 meters) | 91125 (from a total head of 250 meters) | 213750 (from a total head of 120 meters) | 168750 (from a total head of 150 meters) | 123750 (from a total head of 200 meters) | 101250 (from a total head of 250 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
2. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.

**ANNEXURE – V**

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

| Description | Model- | Model-2 | Model-3 | Model-4 | Model-5 | Model-6 | Model-7 | Model-8 | Model-9 | Model-10 | Model-11 | Model-12 | Model-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 900 | 1800 | 2700 | 2700 | 4800 | 4800 | 4800 | 6750 | 6750 | 6750 | 9000 | 9000 | 9000 |
| Motor Pump-set capacity (HP) | 1 | 2 | 3 | 3 | 5 | 5 | 5 | 7.5 | 7.5 | 7.5 | 10 | 10 | 10 |
| Shut Off Dynamic Head (meters) | 12 | 12 | 12 | 25 | 12 | 25 | 45 | 12 | 25 | 45 | 12 | 25 | 45 |
| Water output * (Liters per day) | 89100 (from a total head of 10 meters) | 178200 (from a total head of 10 meters) | 267300 (from a total head of 10 meters) | 132300 (from a total head of 20 meters) | 475200 (from a total head of 10 meters) | 235200 (from a total head of 20 meters) | 168000 (from a total head of 30 meters) | 668250 (from a total head of 10 meters) | 330750 (from a total head of 20 meters) | 236250 (from a total head of 30 meters) | 891000 (from a total head of 10 meters) | 441000 (from a total head of 20 meters) | 315000 (from a total head of 30 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum 7 meters static suction lift corrected for atmospheric pressure and water temperature.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4. (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE –V (CONTD.)

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

| Description | Model-14 | Model-15 | Model-16 | Model-17 | Model-18 | Model-19 | Model-20 | Model-21 | Model-22 | Model-23 | Model-24 | Model-25 | Model-26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 11250 | 11250 | 11250 | 11250 | 13500 | 13500 | 13500 | 13500 | 15750 | 15750 | 15750 | 18000 | 18000 |
| Motor Pump-set capacity (HP) | 12.5 | 12.5 | 12.5 | 12.5 | 15 | 15 | 15 | 15 | 17.5 | 17.5 | 17.5 | 20 | 20 |
| Shut Off Dynamic Head (meters) | 12 | 25 | 45 | 70 | 25 | 45 | 70 | 100 | 45 | 70 | 100 | 45 | 70 |
| Water output * (Liters per day) | 11,13,750 (from a total head of 10 meters) | 5,51,250 (from a total head of 20 meters) | 3,93,750 (from a total head of 30 meters) | 2,36,250 (from a total head of 50 meters) | 6,61,500 (from a total head of 20 meters) | 4,72,500 (from a total head of 30 meters) | 2,83,500 (from a total head of 50 meters) | 1,89,000 (from a total head of 70 meters) | 5,51,250 (from a total head of 30 meters) | 3,30,750 (from a total head of 50 meters) | 2,20,500 (from a total head of 70 meters) | 6,30,000 (from a total head of 30 meters) | 3,78,000 (from a total head of 50 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

**ANNEXURE – V (CONTD.)**

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

| Description | Model-27 | Model-28 | Model-29 | Model-30 | Model-31 | Model-32 | Model-33 | Model-34 |
|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 18000 | 18000 | 20250 | 20250 | 20250 | 22500 | 22500 | 22500 |
| Motor Pump-set capacity (HP) | 20 | 20 | 22.5 | 22.5 | 22.5 | 25 | 25 | 25 |
| Shut Off Dynamic Head (meters) | 100 | 150 | 70 | 100 | 150 | 70 | 100 | 150 |
| Water output * (Liters per day) | 2,52,000 (from a total head of 70 meters) | 1,62,000 (from a total head of 100 meters) | 4,25,250 (from a total head of 50 meters) | 2,83,500 (from a total head of 70 meters) | 1,82,250 (from a total head of 100 meters) | 4,72,500 (from a total head of 50 meters) | 3,15,000 (from a total head of 70 meters) | 2,02,500 (from a total head of 100 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

**ANNEXURE – V (CONTD.)**

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

| Description | Model-1 | Model-2 | Model-3 | Model-4 | Model-5 | Model-6 | Model-7 | Model-8 | Model-9 | Model-10 | Model-11 | Model-12 | Model-13 | Model-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 1200 | 1800 | 3000 | 3000 | 3000 | 4800 | 4800 | 4800 | 6750 | 6750 | 6750 | 9000 | 9000 | 9000 |
| Motor Pump-set capacity (HP) | 1 | 2 | 3 | 3 | 3 | 5 | 5 | 5 | 7.5 | 7.5 | 7.5 | 10 | 10 | 10 |
| Shut Off Dynamic Head (meters) | 45 | 45 | 45 | 70 | 100 | 70 | 100 | 150 | 70 | 100 | 150 | 70 | 100 | 150 |
| Water output * (Liters per day) | 42000 (from a total head of 30 meters) | 63000 (from a total head of 30 meters) | 105000 (from a total head of 30 meters) | 63000 (from a total head of 50 meters) | 42000 (from a total head of 70 meters) | 100800 (from a total head of 50 meters) | 67200 (from a total head of 70 meters) | 43200 (from a total head of 100 meters) | 141750 (from a total head of 50 meters) | 94500 (from a total head of 70 meters) | 60750 (from a total head of 100 meters) | 189000 (from a total head of 50 meters) | 126000 (from a total head of 70 meters) | 81000 (from a total head of 100 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
2. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.

**ANNEXURE – V (CONTD.)**

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

| Description | Model-15 | Model-16 | Model-17 | Model-18 | Model-19 | Model-20 | Model-21 | Model-22 | Model-23 | Model-24 | Model-25 | Model-26 | Model-27 | Model-28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV array (Wp) | 11250 | 11250 | 11250 | 11250 | 13500 | 13500 | 13500 | 13500 | 15750 | 15750 | 15750 | 15750 | 18000 | 18000 |
| Motor Pump-set capacity (HP) | 12.5 | 12.5 | 12.5 | 12.5 | 15 | 15 | 15 | 15 | 17.5 | 17.5 | 17.5 | 17.5 | 20 | 20 |
| Shut Off Dynamic Head (meters) | 100 | 150 | 180 | 225 | 100 | 150 | 180 | 225 | 100 | 150 | 180 | 225 | 150 | 180 |
| Water output * (Liters per day) | 157500 (from a total head of 70 meters) | 101250 (from a total head of 100 meters) | 95625 (from a total head of 120 meters) | 75375 (from a total head of 150 meters) | 189000 (from a total head of 70 meters) | 121500 (from a total head of 100 meters) | 114750 (from a total head of 120 meters) | 90450 (from a total head of 150 meters) | 220500 (from a total head of 70 meters) | 141750 (from a total head of 100 meters) | 133875 (from a total head of 120 meters) | 105525 (from a total head of 150 meters) | 162000 (from a total head of 100 meters) | 153000 (from a total head of 120 meters) |

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the SPV modules).

Notes:

1. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.