

**Major Category - Industrial pumps & compressors; UNSPC Code: 4015**

**Product Category:Pumps UNSPSC : 401515**

**AC SPV Deep well (submersible) Pumping Systems: UNSPSC : 40151510-03**

S. No.	Parameter	Type of Field	Value 1	Value 2	value 3	value 4	value 5	value 6	Unit	Remarks/Validation
<b>GENRIC</b>										
1	Solar Deep well (submersible) Pumping Systems: With A.C. Induction Motor Pump Set and a suitable Inverter	CH	Solar Photovoltaic (SPV) Water Pumping Systems comprising PV Array, Submersible Pump Set, MPPT(Maximum Power Point Tracker), Inverter for A.C. Motors, Electronic Protections, Interconnect Cables and "On-Off" switch are basically for "Irrigation" applications. However, these may also be used for "Drinking Water Applications wherever such capacities are required"							M
2	Conformity to Indian Standard for Solar Deep well (submersible) Pumping Systems	CH	Ministry of New and Renewable Energy, Jawaharlal Nehru National Solar Mission, Solar Photovoltaic Water Pumping System -2015-16							M
3	Model Number as per MNRE specification	CH	Model-I	Model-II	Model-III	Model-IV	Model-V	Model-VI		G
			Model-VII	Model-VIII	Model-IX	Model -X	Model-XI	Model-XII		
			Model-XIII	Model-XIV						
4	Capacity of Solar PV Water Pumps with PV module	N	1200 Wp	1800Wp	3000 Wp	4800 Wp	6750Wp	9000Wp		G
<b>PV ARRAY</b>										
1	Operation of SPV Pumping System	CH	The SPV water pumping system should be operated with a required PV array capacity measured under Standard Test Conditions (STC).						M	M
2	Number of modules in series and parallel could be used to obtain the required PV array power output.	N							nos	M
3	The power output of individual PV modules used in the PV array, under STC	N	≥ 125 Watts peak						Wp	M
4	Source of PV Module	CH	Indigenously produced PV module (s) containing mono/ multi crystalline silicon solar cells							M

5	PV module certification	CH	Certificate as per IEC 61215 specifications or equivalent National or International/ Standards						M	
6	Safety Qualification Testing	CH	Modules must qualify to IEC 61730 Part I and II for safety qualification testing						M	
7	Efficiency of the PV module	N	$\geq 14\%$					%	M	
8	Fill factor for PV module	N	$\geq 70\%$					%	M	
9	The terminal box on the module should have a provision for "Opening" for replacing the cable, if required	CH	Yes						M	
10	Dimension of PV module	CH						mmxm mxmm	M	
11	Marking On PV module	CH	Name Plate fixed inside the module which will give: 1. Name of the Manufacturer or Distinctive Logo 2. Model Number 3. Serial Number 4. Year of manufacture						M	
<b>Motor Pump Set</b>										
1	Types of Submersible pump set	CH	BIS Marked Submersible Pumpsets to IS:8034 latest for use in borewells for handling clear cold water having ISI Marked motor to IS:9283 latest of wet type for continuous rating synchronous, Category-B, Duty Type-S1						M	
2	Submersible motor pump with controller Capacity	N	1 Hp	2Hp	3Hp	5Hp	7.5Hp	10Hp	Hp	G
3	Power Supply	CH	Single Phase AC through suitable Variable Frequency Drive(VFD)			Three Phase AC through suitable Variable Frequency Drive(VFD)				
4	Numbers of poles of motor	N	2	4						F
5	Motor speed	N							rpm	M
6	Bore Size	N	100	125	150				mm	M
7	Delivery Size	N	32	40	50	63	75	100	mm	F
8	Suction Head	N	$\geq 7$ meter					meter	M	
9	The suction/ delivery pipe (GI/HDPE), electric cables, floating assembly, civil work and other fittings required to install the Motor Pump set	CH	yes, inclusive						M	
10	Material of suction Pipe	CH	ISI Marked GI Pipe to IS 1239			ISI Marked HDPE Pipe to IS 4985				F
11	Length of Suction Pipe	N						Meters	M	
12	Material of Delivery Pipe	CH	ISI Marked GI Pipe to IS 1239			ISI Marked HDPE Pipe to IS 4985				F
13	Length of Delivery Pipe	N						Meters	M	

14	All parts of the pump and the motor of the submersible pumps should be made of stainless steel	CH	Yes	No		M	
15	Pump and all external parts of motor used in submersible pump which are in contact with water, are of stainless steel.		Yes				
16	Marking on Motor pump	CH	The following details should be marked indelibly on the motor pump set a) Name of the Manufacturer or Distinctive Logo. b) Model Number. c) Serial Number.			M	
<b>MOUNTING STRUCTURES AND TRACKING SYSTEM</b>							
1	Mounting on metallic structures	CH	The PV modules should be mounted on metallic structures of adequate strength and appropriate design			M	
2	Mounting structure Type	CH	Pole type structure	Roof type structure		F	
3	Strength of mounting structure	CH	suitable to withstand load of modules and high wind velocities up to 150 km per hour			M	
4	The support structure used in the pumping system should be hot dip galvanized iron with minimum 80 micron thickness	CH	yes			M	
5	Tracking system	CH	Manual	Passive	Auto Tracking	NA	G
6	Arrangement for seasonal tilt angle adjustment	CH	For manual tracking, arrangement for seasonal tilt angle adjustment and three times manual tracking in a day should be provided			NA	F
7	Inverter for Motor	CH	yes				F
8	Remote monitoring of Pump	CH	Provision for remote monitoring of the installed pumps must be made in the controllers or the inverters either through an integral arrangement or through an externally fitted arrangement				M
9	Provision to ascertain the daily water output, the power generated by the PV array, the UP TIME of the pump during the year, Number of days the pump was unused or under breakdown/repairs	CH	yes				M

ELECTRONICS AND PROTECTIONS										
1	Maximum Power Point Tracker (MPPT)	CH	Maximum Power Point Tracker (MPPT) should be included to optimally use the Solar panel and maximize the water discharge.							M
2	Inverter to operate an A.C. Pump	CH	yes							F
3	IP protection for Inverter to operate an A.C. Pump	CH	The inverter must have IP 54 protection or must be housed in a cabinet having at least IP54 protection.							M
4	Adequate protections should be incorporated against dry operation of motor pump set, lightning, hails and storms	CH	yes							M
5	Full protection against open circuit, accidental short circuit and reverse polarity should be provided	CH	yes							M
6	ON/OFF SWITCH	CH	A good reliable switch suitable for AC/DC use is to be provided. Sufficient length of cable should be provided for interconnection of the PV array, Controller / Inverter and the motor pump set.							M
7	Spares	CH	Required Spares for trouble free operation during the Warrantee period should be provided along with the system.							M
8	OPERATION AND MAINTENANCE MANUAL	CH	An Operation and Maintenance Manual, in English and the local language, should be provided with the solar PV pumping system. The Manual should have information about solar energy, photovoltaic, modules, 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. Name and address of the person or Centre to be contacted in case of failure or complaint should also be provided. A warranty card for the modules and the motor pump set should also be provided to the beneficiary.							M
PERFORMANCE										
1	Shut Off Dynamic head	N	45	70	75	100	150		meter	G
2	Water Output 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	N	38,400 litres per day from a total head of 30 metres	57,600 litres per day from a total head of 30 metres	96,000 litres per day from a total head of 30 metres	57,000 litres per day from a total head of 50 metres	39,000 litres per day from a total head of 70 metres	91,200 litres per day from a total head of 50 metres	liters	G

		N	62,400 litres per day from a total head of 70 metres	40,800 litres per day from a total head of 100 metres	128,250 litres per day from a total head of 50 metres	87,750 litres per day from a total head of 70 metres	57,375 litres per day from a total head of 100 metres	171,000 litres per day from a total head of 50 metres	liters	G
			117,000 litres per day from a total head of 70 metres	76,500 litres per day from a total head of 100 metres						
3	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 10 metres (Suction head, if applicable, minimum of 7 metres) and with the shut off head being at least 12 metres.		90 liters of water per watt peak of PV array,					NA		F
4	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 20 metres (Suction head, if applicable, up to a maximum of 7 metres) and with the shut off head being at least 25 metres		45 liters of water per watt peak of PV array,					NA		F
5	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 30 metres and the shut off head being at least 45 metres		32 liters of water per watt peak of PV array					NA		F
6	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 50 metres and the shut off head being at least 70 metres		19 liters of water per watt peak of PV array					NA		F
7	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 70 metres and the shut off head being at least 100 metres		13 liters of water per watt peak of PV array					NA		F
8	Minimum water output from a Solar PV Water Pumping System For A.C. Induction Motor Pump Set with a suitable Inverter from a Total Dynamic Head of 100 metres and the shut off head being at least 150 metres		8.5 liters of water per watt peak of PV array,					NA		F
<b>CERTIFICATION</b>										
1	BIS CM/L number and validity of ISI marked Submersible Pump	CH								M

2	Availability of Type Test Report to prove conformity of parameters as per MNRE specification form MNRE empanelled for solar pump laboratory	CH			M
3	Test certificate No and date	CH			M
4	Name of the Lab where test Conducted.	CH			M
5	Test Report to be furnished to the buyer on demand	CH	yes		M
6	The type of pump set used must match the total dynamic head requirement of the site . Moreover, it should be appropriately tested and certified by the authorized test centres of the Ministry to meet the performance and water discharge norms	CH	yes		
7	Scope of Supply	CH	with erection and commissioning at consignee end		F
8	Warranty	CH	The PV Modules must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. The whole Pumping system including pump shall be warranted for 5 years.		M