

## **Bidder's eligibility**

Technical and financial proposals to be submitted in separate envelopes are required from approved pumping machinery suppliers. The bid will first be assessed on the basis of technical proposals. The firm should have experience of installing more than 500 water supply schemes in the past 03 years. The firm applying for the tender must have test bed facility to carry out pump performance acceptance test witnessed by third party inspectioner as per ISO-9906 standard. Each of the offered pump set models must undergo this witness test prior to supply and installation.

## **Submersible pump**

Pumping machinery should be supplied having standard ISO-9906 specifications (See Annex A for details). The pump type and material should be clearly mentioned. The characteristic curves showing the efficiency and performance of the pump should be provided in the technical proposal. The quoted pump should be tested for its performance and certified as per ISO-9906 standard.

## **Submersible motor**

The origin, make and material of the motor should be clearly mentioned in the technical proposal. The winding material should be 99.99% copper with PE+PA Insulation. The motor should have wet type, water cooled rewind-able/repairable stator. The motor should have non-disposable / non-hermetically sealed winding. The insulation class of the winding material should be mentioned. For each model quoted, all the technical parameters such as rated voltage, Power factor, efficiency, full load ampere, speed and other similar parameters should be provided in the technical proposal. The testing report with all basic parameters should also be provided in the technical proposal (For more detail specifications see Annex A).

## **Solar panels** ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

The solar panel offered should be of Mono-crystalline type, duly tested and certified by TUV under following international standards:

- IEC 61730-1:2004
- IEC 61730-2:2004
- EN 61730-1:2007
- EN 61730-2:2007
- IEC 61215:2005
- EN 61215:2005.

The type, number and total output power of the solar panels should be mentioned in the design. The output power should be 50% more than the maximum input power requirement of the motor. All the technical parameters should be provided in the technical proposal as well as with each panel supplied.

### **Inverter/controller**

The inverter/controller should have built-in overload protection; soft start/soft stop feature and variable frequency drive with Integrated Gate Bipolar Transistors (IGBTs) of European or Japanese origin. The inverter/controller should have the provision for both 220V AC and DC input. The make and origin of the inverter/controller should be clearly mentioned. All the electrical parameters like input and output voltage ranges, IP class and efficiency should be clearly mentioned in the technical proposal. In case of inverter the output should be sine wave.

### **Cable**

The cable should be made of 99.99% copper and double insulated. The cable must be tested and certified as per BSS standard and the following reports should be provided in the technical proposal:

- Conductor Resistance test Report
- Insulation Resistance test Report
- Pressure Test Report
- Spark Test Report.

### **Riser pipe**

The material and size of the riser pipe should be clearly mentioned in the technical proposal. Suitable pipe selection is to be made in order to have minimum pipe losses. The pipe losses should also be clearly mentioned in the technical proposal.

### **Panel mounting**

The panel mounting should be made of steel and should have the provision for manual seasonal adjustment.

### **System design**

Suitable factor of safeties should be applied while designing the system in order to have compensations for variations in irradiations. The motor output power should be at least 20% more than the pump required input power (Shaft power). Also the panel output power should be 50% more than the maximum required input power of the motor (motor consumption).

### **Annex A. Specifications for pumping machinery as per ISO 9906 Standard Pump**

Pumps coupled with electric motors shall be Submersible for designed for installation and operation in tube wells/dug wells/open well with clear water discharge. Pump shall comprise off bowl assembly coupled to an Electric Motor of suitable rating, riser column pipes of suitable thickness and diameter, discharge bend, non-return valve as integral part of pumps part, single or double cable depending upon the starting method (DOL or Star Delta) including all parts and appurtenances to provide a complete working assembly. Pump and motor shall be rigidly coupled through a coupling of NEMA standard.

The stage casings of pumps are connected as per NEMA /ANSI/AWWA/ASTM/BSS standard. Each stage casing must have replaceable wear ring. The impellers shall be secured to the pump shaft with tapered conical sleeves pressed into the taper bore of impeller or impeller secured through chrome plated. Stainless Steel hexagonal sleeves, suction casing must be between pump and motor with suction strainer as protection of pump against coarse impurities of the liquid handled. Pump shall have integral non-return valve with double.

Pump inlet body, intermediate bowl assembly and discharge bearing body shall be of grey cast iron/G-25.As the liquid to be pumped is fresh water and for drinking and irrigation purpose, therefore the pump impeller should be in cast iron/ bronze/ stainless steel as well as shaft sleeves and bearing in bowl assembly shall be of stainless steel/Bronze. Pump shaft shall stainless steel AISI 420; Fasteners shall be of stainless steel conforming to A2 grade.

#### **Specification for main components of the pumps**

**S.No**

**Components**

**Specification**

1

Casing / Diffuser

The Casing / Diffuser should be in metal casted invariably cast iron/bronze / stainless steel Sheet Fabric

2

Impellers

Cast iron/Bronze/Stainless steel , Noryle(compos

3

Driving Shaft

Stainless Steel 420

4

Sleeves

Bronze / Stainless Steel 304 for impellers sleeves.

5

Gaskets

Rubber Gaskets

6

Bearings

AISI 316 Stainless Steel with Hard-Chrome Cover for Top and Bottom Bushes.

7

Coupling & Screen + Cable Guard

Stainless Steel AISI 430 Stainless Steel 304

8

Non Return Valve

As per British Standard Specification(BSS), minimum 16 Bar Pressure Sustaining Design

9

Sluice Valve

As per British Standard Specification(BSS), minimum 16 Bar Pressure Sustaining Design

10

Pressure Gauge

As per British Standard Specification (BSS), having PSI and Bar scale.

11

Clamps

Steel - Pressed

12

Column/Bowl Assembly

Column /Bowl Assembly of ASTM53 standard material with stainless steel nut bolts/double galvanized

13

Pump Efficiency

Minimum efficiency of the pump should be 70% at duty point.

### **Motor**

The Motor shall be manufactured in compliance with National Electrical Manufacturer Association (NEMA) standards required three-phase motor shall be capable of operating at rated voltage of 380 Volts at 50 Hz. The motor should be capable of handling 10% variance in voltage. Winding of the motor shall of rewind-able type with class-IC40 insulation and IP68 protection. The synchronous speed for 2-poles 2850 – 2950 RPM. Motor shall be capable of operation in well water with temperature normally start from 40° C. Motor should be designed for continuous operation.

Motor must be filled with water with out any chemical additives hazards to health for cooling. The motor must be properly protected against the entry of well water sand, etc by double

mechanical seal one is rotating and other stationery and must be made of silicon carbide and must be protected with sand protection guards. Winding shall be of copper wire coated with polyvinyl chloride or PE+PA. All supports shall be of high grade cast iron and stator outer side jacket body should be in stainless steel AISI 304. The excessive pressure due to heating up of the filled water must be compensated by a pressure equalizing rubber diaphragm in the lower part of motor. The axial thrust of the pump shall be countered by oscillating sliding block type thrust bearing. The thrust bearing of the motor should be able to bear a download thrust force from the water pump and the upward thrust force produced while starting the water pump. Motor shall be capable of maximum of 20 starts in an hour. Motor efficiency must not be less than 80%.

**Technical Specification of rewind-able wet stators, three phase squirrel cage water filled submersible motor**

S.No

Components

Specification

1

Winding

Made of pure electrolytic copper a non-hygroscopic poly vinyl chloride for normal temperature and must



2

Stator

Energy efficient low-losses electrical magnetic sheet should be fixed in stainless steel casing. M800 or M

3

Rotor

Energy efficient low-losses electrical magnetic sheet fixed with high grade copper bars. M800 or M600 n

4

Spline Shaft

AISI 420 stainless steel, flange dimension according to NEMA standard, over size design to ensure stiff

5

Shaft Bearing

Water lubricated guide/general bearings fixed in upper and lower brackets should be made of metal imp

6

Lower Thrust Bearing

Thrust sliding block bearings, self aligning Mitchell type, should be 15500N/20000N stand

7

Mechanical Seal (Stationary & Rotary)

Silicon carbide or tungsten carbide Mechanical Seal.

8

Pressure Equalizing System and two way pressure relief valve

Consisted of Rubber Diaphragm

Safety valves with filters rubber diaphragm located at lower and working together with safety valves to b

Moreover fixed filters in safety valves allow only filtered water inside the motor.

9

Cooling Filling Fluid

Water mixed with non-toxic anti freeze provide cooling and lubrication, also protect and prevent inside p

10

Connection

Connected through rubber sheathed cable H07RN-F available in Delta and WYE (star) configuration (up

11

Degree of Protection

IP68.

12

Insulation Class

With winding wire poly vinyl chloride up to 70

0

13

Voltage Tolerance

+6% to -10%

14

Mounting Position

Vertical Horizontal

15

Class

IC 40

16

Maximum Immersion Depth in Water

150 Meters

17

Stating per Hour

20

### **Submersible flate electric cable**

The submersible cable should be made of 99.9% copper, coated with double PVC, should be adequately flexible, and environment friendly. The cable must have undergone quality tests as per BSS standards. Following lab tests are mandatory.

- Conductor Resistance Test
- Insulation Resistance Test

- Pressure Test
- Spark Test

Note: The supplier should provide the quality tests certificates.

### **Column pipe**

The column pipe shall be flanged ERW steel pipes confirming to ASTM designation A-53 with a minimum thickness of 3.5mm and shall be painted with corrosion resistance paint of suitable thickness. Flanges thickness of 20 mm may have grooves for cable passage. Each column pipe shall be complete with gaskets, bolts/studs, washers and nuts. All nuts, bolts and washers shall be made of minimum A2 grade stainless steel or double galvanized.

The column pipe shall be supplied in interchangeable section having an approximate length of 10 feet, column pipes shall be flanged perpendicular to the axis of pipe. Sole plate and clamps shall be provided for the support of pumps.

### **Features**

- Manufacturer's pipes should meet international standards like BSEN 10255 & ASTM A53.
- Dimensional accuracy, circularity and plan end cut should be observed.
- Weld strength of pipe & mechanical properties of raw material should be tested as per manufacturing standards.
- Pipes should be NDT tested (Non destructive testing – Eddy Current).
- Pipes should be hydrostatically pressure tested as per manufacturing standard.
- Pipes should be gone through straightening process to remove bendiness.

### **Topset**

Bore Cover Plate, (Covering Bore hole completely and securely), sluice valve, Reflex valve, Connector and cable jointing material (Cable connection form motor to switching device shall be joint free) pressure gauge and cable ties.

Friday 19th of April 2024 08:18:31 PM