**المواصفات الفنية لمضخة دفع مباشر لرفع المياه من بئر واصل في منطقة حبله رقم 14-17/006 باتجاه خزان التوزيع في مشاتل شقيرو**

**The total price in this tender includes all the costs to carry on the following works (even if they are not mentioned in BoQ items).**

* Carry out pump unit miscellaneous civil works as in the BOQ.
* Submit as built drawings for implemented pipelines and other works
* Carry out installations from the existing irrigation well site outlet pipeline a until reaching the booster pump including all works to cross the roads
* All necessary works to carry the main connection and for all types of fittings between the water source (groundwater well 14-17/006) and the booster pump site.
* Construct the inlet and outlet, and washout for main connections for the booster pump
* Installing all fitting and make all connections according to the attached.
* The price includes supplying, transporting and unloading in the site of work and anywhere along pipeline route. This includes the tanks’ locations and booster pump.

**Terms of Executions**

* The Contractor shall commence work within 3 (three) days from the date of agreement
* The Contractor shall execute and complete the Works and in accordance with generally accepted construction practices, observing all local standards and implementing all regulations in force. The Contractor guarantees that the principles and methods of construction and the materials used are suitable for the local conditions.
* The Contractor shall supply booster pump and all the pipes and equipment and fittings needed to the implementation of works according to the specifications below
* The Contractor shall supply all needed materials, coordinating with the supervisor engineer and according the specifications mentioned in the BoQ
* The Contractor shall supply and assemble the valves and needed parts according the specifications mentioned in the BoQ and according the directions of supervising engineers.
* All the goods and supplies purchased for the implementation of the works must be new and renewed.
* The Contractor will receive all the work instructions from the supervising engineer.
* Before proceeding with the order of the needed materials, the Contractor shall get a written approval from the supervising engineers.
* All fittings and equipments must be subject to in site testing and approved in writing by supervising engineer. The supervising engineer will make sure that all the fittings and equipment match with the specifications agreed in this contract, then they will issue a written approval.
* The electric control panel and booster pump may installed in open air and must have ingress protection (IP66).
* The Contractor shall be responsible of substituting any part or material, or disjoin and assemble other parts, if these are not conforming to the specifications stated in this contract.
* The Contractor shall complete all works including testing and operating pump. The Contractor shall check and operate the pump and the control panel for all possible modes of operation.
* The Contractor will complete all works in all parts and he shall not leave any parts not achieved with 40 days.
* The Contractor shall observe that there are working locations and will have to prepare access the arrival and distribution of materials and workers to the project's location.
* The Contractor shall be responsible of guarding and safety the materials and location during the implementation process.
* The Contractor shall clean and remove all rubbishes and transfer it to the suitable place out of project location.

###### **The Electrical Mechanical Works:-**

1. Supplying, delivering, and installing for Wasel well site an electrical full automatic control panel. It include inverter (with minimum harmonics) with water proof electrical board (control panel IP66) to drive the motor of the booster pumping unit and shall be used to start, run, stop, protect and control the above mentioned motor . The electrical board shall be made of steel frame 2.0 mm, thermal paint.
2. The main board shall be constructed in a form of three cabinets separated, located together against the wall and anchored to the floor by concrete foundation. The first cabinet for utility's Electric meter, and the second for pump electrical motor, and the third for control.
3. The main elect. Panel shall be painted in accordance with the rules for paintings and painted with two coats of zinc chromate primer and red oxide antirust pained at least 60 microns thick, and final light green or other color paint at least 30 microns thick.
4. Executing all connection between the various compartments and from the compartment to the doors and all the output connections shall be made by means of terminals corresponding is size and cross-section of conductors.
5. Nameplates and as built drawings shall be mounted at the front of the board behind the doors and above every switch and group of lamps.
6. Executing an earthing unit (3 connections) complete by using suitable electrical bass bars as needed and fixed a cable bridges between the fittings and the main earth connections, and the all earthing resistant not increase than 2 ohm. Only.
7. Executing all electrical connections complete between the Power Supply, main Electrical panel. , Electrical Motor and other fitting to complete the work as needed
8. The work also include supplying all materials, cables and wires needed to finish all the work

###### **Conditions of Control.**

* The proposed new pump unit shall pump water directly from the well, through a pipe line 6" to the distribution tank.
* The electric Motor for the pump shall start by using an inverter and soft start/stop conditions using flow and pressure sensors.
* Power Supply (3ph-380/440 v - 50 Hz).
* The control scheme shall utilize 2- pressure switches to sense the pump inlet/outlet state and the upper tank state.
* The pump must be able to work and stop when the flow switch indicates that there is no water flow after a time delay (1-60 sec) and it should not be permitted to work again without manual start (Reset).
* The pump must start either Auto or Manual and controlled through pressure and flow sensors. The manual start during well pump operation is as follows: a- open pump inlet valve. b- Manual starts the pump. c- close valve(s) on the lines. To manual shutdown of the pump is as follow: a- open valve(s) on the lines. b-manual shutdown the pump. c- close the pump inlet valve.
* The Auto starts /stop are a follows: a- open the pump inlet valve. b- if the inlet pressure around 3.5 bars then the pump must starts automatically after a time delay (1-60 sec). c- if the outlet pressure around 7 bars it must stop automatically after a time delay (1-60 sec). d- if there is no flow the pump must close automatically after a time delay (1-60 sec).
* The relay and timers of pressure and flow must be calibrated and set-up in harmony with main well submersible pump’s timers. In other words, the electrical motor for the pump must stop after a time delay (1-60sec) and should be started automatically after a time delay (10m -1hr) and it should not be permitted to work again without manual start (Reset).
* The pumping unit could be operated automatically or manually, with or without a timing clock as desired with all protection control.
* The wiring inside the main electrical board should utilize numbered connect plug and trenches.
* The electrical panel for the control system must be supplied with DC current at 24v.
* Install suitable capacitor at full load, with complete protection as needed (3ph-380/440 ) v+ H.R.C fuses).
* The contractor should handle an (As Built Drawing) to the supervision Engineer.

**Bill of Quantities**

جدول الكميات

**Booster Pump and Fittings (Shqero Project)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TOTAL**  **Price (NIS)** | **UNIT**  **Price (NIS)** | | **QTY** | | **UNIT** | **DESCRIPTION OF WORKS** | **Item NO.** |
| **The contractor must submit the materials specifications, certificate of origin, catalogs and on site testing report which shows that the materials are matching with the manufacturer specifications.** The contractor shall submit in his offer and supply maintenance manuals, catalogs, characteristic curves, testing certificates, shipping, lading documents and specifications of pumps, motor, fittings, mechanical and electrical control devices, cables, wiring and all accessories and ancillaries to complete the work. All to be new and not renewed in accordance with the specified specifications. The contractor should verify the design equipments by conducting field visits to the pump site and must be before ordering any equipment or materials as follows: the contactor must check and verify and match between the reality and the design quantities mentioned in this tender. If he notices any difference or no matching, then he must inform the supervisor engineer and find together a suitable solution to such conditions. The contractor should be responsible technically and financially to supply the suitable materials. All connections including the electrical and mechanical fittings should be according to the standard pumping conditions. | | | | | | | 1.1 |
|  | | | | | | **Supply to the site of the Wasel well site 14-17/006, Main Electrical Control Panel Unit**: suitable for **100 m3/hr** at total dynamic head **65 m**, for the mode of operation, a control board according to the above conditions of control and following specifications and supervisor instructions:  **Main Electrical Control Panel Unit**: Price includes all works to carry on the electrical connections and cables to main grid and panels and supply and install suitable new control panel for pumping **100m3 @ 65** meter, and installing in the site for the mode of operation, a control board according to the following specifications and supervisor instructions: control panel box shall be made of **three major compartments** and the price for this item include all equipments and works mentioned below: The first compartment is for main hour meter and fusses- Main Company Breaker. The price includes all cables and connection necessary to connect between the main 3-phase power source at the Booster site (Municipality Transformer) and the Main Electric Control Board inside the pumping room. Cables size (XPLE high quality insulation 90 CO) **3x50** + **1x25 mm2.** The price includes all materials and works to install the above cables including whatever of electric, mechanical fittings and accessories as PVC and steel trenches, anchors with clamps, jumpers, stays including base, anchors steel wires, The cables must be lay inside 4"PVC/as rubber pipes of flexible spring type two layers. The price includes excavation inside all types of soil and rock trenches not less than 40\*30 cm and lay the cable inside these trenches and adding pure sand as backfilling to all size of the trenches and casting in the last 10 cm of the trenches with plain concrete over the pipes. **The second compartment** is for the **45 hp inverter** as Siemens/ ABB, or equivalent as shown specifications, main breaker as Siemens, contactors, capacitor(s) bank, main cables inlet/outlet.), It shall be IP66 protected, thermally painted paint as (RAL 7302). All main cables and wiring are inside ducts and must be closed with special plastic cover and protected against human electric shock. **The third compartment** includes all control circuits, and secondary contactor, breakers for the high voltage cabinet or the low voltage. The control panel must be fixed to the wall by six Jumbo screws and laid on a reinforced concrete foundation 40-50 cm above the ground. The contractor should submit as built drawing including soft and hard copy drawings. Meanwhile the price for this item includes training the well’s operator and owner how to operate the control panel and all installed equipment in this contract. The training period should not be less than 3-hours training hours including safe operation, manual instructions, faults and calibration of equipments (inverter, breakers, timers, etc..).  The labeled nameplates should be mounted at the front of the main board behind the doors and above every switch and group of lamps. Control electric lamps 24v must be fixed to control all operation system, the starter shall be used to start, run, stop , protect and control manually and automatically by using the general required installation of the following equipments completely. The price for this item includes:   * The power circuit must consist of the following: **main circuit breaker** MCCB 3**\*60 A**, 25KA * Bus bar **100A/0.6KV** (3 phases and neutral and earth) * Complete unit 4p \* 20KA **surge arrestors** of replaceable type. With box fuse **3\*63A**. * Digital screen inverter **45 hp** see the annex. Solid state frequency converter as ABB type (with **bypass contactor 45 hp** as MOELLER type equipped with over /under load, over temperature and all control system needed with all protections rated at suitable power that matches the pump motor with (0.8-1.2) over load range). The inverter must be programmed to meet with manufacturers obligations for start-up and shut down of the booster with minimum harmonics   **Capacitor Banks**: Capacitor banks with discharge resistors compensating reactor dry type 400v 50 Hz to reach power factor not less than 0.97 Ducati. Three phase capacitor with resistors 8 **KVAR** Ducati type.   * **Digital multi meter** which is able to read directly from a screen (V, Hz, KW, A, PF). * **Low and high voltage controllers, phase sequence and phase failure controllers (devices) and relay(s)** of best quality as MOELLER. * **On-off push** button set and overall emergency off button. * **Reset** push buttons red color 22 mm. * **Overload** relay unit rated at 1-1.5 of motor full load including digital motor screen protection control board. * **Temperature relay** unit and rated for the motor. It includes thermal protection relay and thermistor sensor, including cable screened twisted pair (screen earthed at one end only) digital motor screen protection control board with all cables and connections. * HRC fuses **3\*63 A** complete Fernaz type. * WHM 50\*50mm. * **24 h clock** with 150 hr mechanical reserve. * Suitable **automatic breaker** **60 A** with adjustable thermal and magnetic protection (ISC>=25KA) NZM. * 3 phase fuse holders set , 10\*38mm , with suitable fuses , * **Suitable earth leakage relay** class **A (AC and Dc trip).** * Contactor with discharge 10 KVAR Moeller type. * **Running hour** timer * **Manual motor speed** controller and mouthed on outside board (range 0.8-1.2 normal speed) * **On-off** lamps for inside doors cabinets * **Breakers** for service as Siemens type. * **Relays** and timers 24 V for no flow switch and high-pressure, low-pressure sensors, temperature. * Three phase 50 Hz 400V (**KWh-meter**), /5A-200/5 CT’s. The KW-h meter as electromechanical meter or solid state and pre-paid card electric type. * 24V/ 50Hz **indication lam**ps installed in front of the control cabinet.. * 3 position selector switch **A-O-M**. * 220-2\* 12V (AC) **transformer 100VA.** * The price includes **all cables** to be used for control purposes shall have the following cross section: * **(3\*35 mm2 +16 mm2**) for the internal connections inside main board and the contractor has to check and order the exact required length (as item 2 properties). * 1.5 mm2 for the coil driving wheel circuits. * 2.5 mm2 for the circuits of tension measurements. * 1.5 mm2 for the sensors. * 4.0 mm2 for the circuits of intensity measurements. * All terminals shall be carefully protected to assure electrical insulation. * Switches, measuring instruments, and warning lights shall be installed in the front side of the panel. * The control panel shall be manufactured with enough space **(minimum 40% free space of the total size)** to insure easy maintenance and no interface between the wiring for all circuits. * **All wires must be coded clearly** and fixed with special wire heads to avoid loose connection. * All timers (PSK), relays and contactors shall be of best quality as Siemens * The contractor shall supply any other materials and devices that might be missed here and considered to be essential to complete the work without claiming any changes in unit prices. * The control panel must be equipped with an alarming bell (100 dB at 50 meters distance) and flashing red alarm (should be visible from 300 meter during day time). **Alarms for all cases of failure as: voltage drop, low or high voltage or phase failure, phase sequence, high or low pressure and no flow, high temperature etc…** * The control panel **must be equipped with** control circuit for both the flow pressure sensors. * **Temperature control** as digital screen * The alarm must be muted with/without general reset and there should a special button in the front door to stop/reset it alone. * Circuits must consist of the all necessary materials to operate and protect the system automatically and manually, the wiring color system, numbering all the components. The price includes the design of the whole system of control the contractor is intending to carry. The contractor should also submit at the end of work a s built drawing.   The control panel deign should include:   * Transformer 230/24V 150VA * Water flows relay HK type. * **High and low pressure controller** (installed on pumping line) for Manual/automatic starts of booster pump and float valve at the upper tank * **No flow water relay controller** (installed on pumping line) enables Manual/automatic shutoff booster pump * 220V AC /120 Watt and **two fans** with filter in each compartment, one for taking in air and the other for taking out the air with grid ( for the panel) complete with thermostat protection. * SIREN (alarm system)   Alarm system 24V are equipped **ON-delay timers** for :   1. High pressure outlet 2. Low pressure outlet 3. No flow 4. Soft start faults 5. High temperature 6. Low, high voltage, phase sequence , failure   The motor must not restart more than the recommended number of starts per hour and day by the manufacturers.   * The price includes **all works, as excavation** works for installing pressure switches, flow switch and all the electrical parts with suitable conduits and metal ducts to complete the works. * The price includes installing and testing for the mode of operation all mentioned devices and sensors. The control panel must be equipped with earthling unit so the price includes. * **Earthling**: The price of the control panel includes supplying and installing complete earth unit with earth equalizer compressing C40 box copper B.B. 25 mm2, with minimum two concrete manholes as foundation lines , two earth electrodes, D>19m, L=1.5m and any other missing materials to earth the pumping station . The price includes testing earth unit so as to fulfill the standard requirements (resistance less than 1.5-2 ohm). The across different fittings in the piping system. * The price also include supply all materials (as cables, in-out sockets and install, outlets as 3-phase complete service unit for the pumping including Main MCB 5\*20A -10 KA MOLLER type. MCB 2 \*10A – 10KA Moeller type the control * The price include all cable materials and works to conduct the electrical connections of the sensors controllers.; moreover, the thermistor sensor inside the motor -(the cable 3x1.5 mm2 , the cable should be of suitable length. Use flexible thermal conduits, cable glands, wire terminals& labeling at both ends and all the accessories needed to complete the work as excavation & backfilling, the cable from the control panel to the head of pump motor. |
| 14000 | 14000 | 1 | | L.S | |
| 17000 | 17000 | 1 | | pump | | **Supply and install** near the site of the well 14-17/006 a **booster pump** with a capacity of **100 m3/hour at a total dynamic head of 65 m.** It has to be installed inside or outside well as shown in the specifications below. All bowel stages of the turbine made from casting iron, impellers bronze zinc free, stainless steel column and any other additions to achieve the required head and quantity. Operating efficiency should not be less than 73%, The booster technical data are as follows:   * Liquid water is suitable drinking. * Design capacity (m3/h): **100** * Design anticipated total head (TDH) (m): * Anticipated turbine discharge at TDH at **65 m** * Shut-off head limits (m):minimum **110m** * Pump overall efficiency at the intended point is not less than 73% * The pump and motor type must withstand static and dynamic inlet pressure minimum **8** bars. * Minimum bowl efficiency at run out capacity (78 %) * NPSHA at maximum run out capacity (m): 6 * NPSHA at maximum anticipated TDH (m): 4 * Motor and pump operating speed (rpm): 2900-3000 * Stainless steel column * Closed impellers manufactured from bronze and cast iron bowels available and replicable in local market * the pump shall be capable to run at shut off head for a few minutes without mechanical problems * The electrical motor must run continues at voltage range (380-440 v) and be supplied with RTD (PT 100) temperature protection. The type of motor connection must be suitable to present the motor temperature digitally. The price include all wiring, PT cables and connections and works required to connect the motor inside the well and the main control panel with relay and off-alarm * Contractor has to connect the motor to the control panel upon his responsibility and the price includes all cables as follows:   The price includes supplying all cables and materials and executing all electrical connections needed between the following elements and despite of the length required: A- cable one (including works and materials) to connect between the main 3-phase power source (Municipality Grid) and the Main Electric Control Board inside the pumping room as ABC type **3x50+1x25** mm2 B- a cable between the Main Electric Control Board and the electric motor. The cable size and specifications are as follows green color, copper conductors are solid and made of pure copper XPLE, PVC insulated, with inner sheath, 600 V, conductors sizes 3x35+1x16 mm2. The price includes supply and install suitable flexible joint and all materials and works to install the above cables including whatever of electric, mechanical fittings and accessories as PVC and steel trenches, anchors with clamps, jumpers, stays including base, anchors steel wires, standard wood columns. The cables must be lay inside 4"PVC/as rubber pipes of flexible spring type two layers. The price includes excavation inside all types of soil and rock trenches not less than 40\*30 cm and lay the cable inside these trenches and adding pure sand as backfilling to all size of the trenches and casting in the last 10 cm of the trenches with plain concrete over the pipes. The price includes supplying and installing all electric motor control devices (as RTDs thermal, over load) and any other connections including cabling inside or outside the pumping station relevant to this work and according to standard specifications for this work. The opening tender committee will receive an offer about type and motor specifications, catalogues, and an in site testing report which shows that the motor is matching with these specifications.   * The motor shall be designed and built for continuous 24-hours continuous service at any and all points within the required range of operation without overheating, cavitations excessive vibration and strain. * Motor has to be new and furnished with a stainless steel name plate with data of the serial no., speed, Kw, input voltage, full load, Hz, power etc.) and motor must be at least 1.25 larger than Pump brake horse power or 1.15 larger than the total Input Horsepower to the Electrical Motor. * All works from supplying, installing connecting running and testing are under the contractor's expenses. * All works must be according to the Palestinian standards and engineer’s instructions and the specification and drawings. * The price also includes any missing works not mentioned to execute this work. * The contractor must submit the motor specifications, certificate of origin, catalogues and on site testing report which shows that the motor is matching with the manufacturer specifications. * The booster pump shall be capable to run at on/off without electro-mechanical problems. * The turbine and motor torque design should be duty inverter at speed range the design torque values between 1:10   The price includes supplying and installing all required flanges, coupling, 6" flexible joint, reducers, flexible joint, bolts, spacers, sleeves, nuts, etc. to connect between the booster inlet/outlet, and well pumping pipes and fittings. The price includes all materials and works to carry the 2" connections as (elbows, Tees..etc) and galvanized pipes) 4 mm to connect the pressure relief valve and pump wash out to the main pumping line. The price also includes casting reinforced concrete foundation and to hold the motor and pump. The price includes supply and install suitable size reinforced concrete foundation (2-mesh steel bars 10 mm diameter @ 15 cm in all directions). The size of the concrete foundation must be suitable to hold the booster pump and motor.   * The contractor shall do in site testing the booster in accordance with the performance curve and submitting the test report. Before installing any new materials, the contractor must get the initial records for the proposed inline pumping including: booster inlet pressure, well supply capacity in m3/hr and suction if expected. Calibration of booster timers according the well relay controllers. * The booster electric motor of suitable power must be inverter duty, 3000 rpm, and basic run as 50 Hz, 380/440 volts and motor efficiency not less than 0.9 with 1.15 service factor (squirrel cage induction motor). The motor has to be inverter duty as 10:1 (6-60 Hertz) Speed Range Constant Torque voltage 220/380-440. The motor shall be of standard construction and suitable high thrust bearing (minimum inlet pressure 8 bars) to carry the loads of the rotating radial thrust, equipped with weather protection type-1 standard, insulation class H complete thermal protection unit, complete current overload unit. * The electrical motor must be supplied with RTD (PT 100-3/4 cables) temperature protection. The type of motor connection must be suitable to present the motor temperature digitally inside the control panel. The price of this item includes all costs of materials and works to install and test the RTD control device.   The price for the booster pump includes testing the pump and matching with factory performance curve. The price includes all works and materials to connect the booster pump to the line in the direction to the balance tank and install inlet/outlet connections to the existing well pipe at pump site. | 2.1 |
| 400 | 400 | 1 | | piece | | **Flow Control switch:** Supplying and installing an electrical flow switch suitable for 6" pipes 16 bar, powered by a 24 v-dc power source. Price includes all cables required to connect it with the control panel. | 3.1 |
| 800 | 400 | 2 | | piece | | **Pressure Control switch** Supply and install two pressure switches 1-16 bar. Price includes all cables required to connect it with the control panel. | 4.1 |
| 200 | 200 | 1 | | Num. | | **Gate valve**: Supply and assemble globe valve, 2" complete, 16 bar. Price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed according to specifications mentioned above Annex 1, S2 . | 5.1 |
| 100 | 100 | 1 | | Num. | | **Dresser conical record:** Supply and assemble 2" dresser complete. Price includes rods and screws, bolts, excavation, cutting, welding, and adding accessories that are needed to assemble the dresser with NP 16 bar, as shown pumping layout view. | 6.1 |
| 800 | 1000 | 1 | | Num. | | **Relief valve:** Supply and install a 2 inches pressure relief valve, 16 bar, complete, The price includes excavation, cutting, welding, adding 2” record, screws, bolts and accessories that are needed to assemble the valve and according to specifications Annex 1/ S7 | 7.1 |
| 1000 | 800 | 1 | | Num. | | Supplying and installing of **6" Strainer** of cast iron body for 16 bar working pressure complete with companion flanges, gaskets, bolts and nuts. The general specifications are according to Annex S6. The installation works includes all costs of excavations, cutting, shaping, welding, paintings, either on new or old pipe lines. | 8.1 |
| 700 | 700 | 1 | | Num. | | Supply and install in the site of work **2 inches** (Steel **compound air valve-double orifice)** complete As ARI, 16 bar or local and international equivalent and according to general specifications mentioned in Annex 1, S3. The price includes the installation of 2" ball valve and 2” black coupling welded on the steel pipes. The installation works includes all costs of excavations, cutting, shaping, welding, paintings, either on new or old pipe lines. | 10.1 |
| 2500 | 2500 | 1 | | Num. | | Supply and install **6 " Woltman water meter** complete with flanges, gaskets, bolts and nuts for 16 Bar (W.P)- Epoxy coated. The measuring unit should be removable type without removing the body from the pipe (interchangeable type). The price includes all necessary works and costs for installing by **welding** steel coupling and nipples and all necessary accessories for the farms’ openings to irrigate the farms and to install future branches across these pipes. The water meter should be according to ISO 4064 or equivalent as S5 | 12.1 |
| 15600 | 1500 | 1 | | Num. | | Supply and install in the site of work **6" cast iron wedge gate valve** for 16 Bar working pressure (W.P).-enamel coated. Complete with flanges, gaskets, bolts and nuts, (None rising stem) with hand wheel for each valve. All in accordance with ISO Standard No. 5996 or local and international equivalent. The general specifications are according to Annex S2. The installation works includes all costs of excavations, cutting, shaping, welding, paintings, either on new or old pipe lines. | 13.1 |
| 2500 | 2500 | 1 | | Num. | | Supply and install in the site of work **(6") cast iron swing check** valve, complete with complete with counter weight, flanges, gaskets, bolts and nuts, for 16 Bar working pressure) -Epoxy coated with extended arm and lid (cover) in accordance with BS. No. 5153 or local and international equivalent and according to general specifications mentioned in Annex 1, S1. The installation works includes all costs of excavations, cutting, shaping, welding, | 15.1 |
| 400 | 400 | 1 | | Num. | | Supply to the site of work **(6") Dresser** for (16) Bar working pressure) complete (flanges, gaskets, nuts, bolts etc.) with two tie rods 600 mm long, diameter of 5/8" and 4 ears for each dresser. | 16.1 |
| **56000** | **Total of supplying and installing materials (including vat) of the booster pump and its fittings** | | | | | | |

**Summary of the bill**

|  |  |  |
| --- | --- | --- |
| **Item** | **Description** | **Price (NIS)** |
| **1** | **Total of supplying, installing & transporting of the booster pump including vat** |  |
| **Total of all works including vat** | |  |
| **Final total in words including vat** | | |

**Name of company /contractor:**

**Address:**

**Date:**

**Signature and stamp:**

**Annex 1: Fittings Materials Specifications**

**S1: Check valves**

1. Body: Cast Iron
2. Disc: Cast Iron
3. Cover: Cast Iron
4. Seat Holder Cast: Iron
5. Body Seat Ring: Bronze ASTM B62
6. Disc Seat Ring: Rubber (BUNA-N) ASTM D 2000 AA 7008
7. Hinge Pin: Stainless Steel
8. Plug: Malleable Iron
9. Cover: Bolt & Nut: Steel
10. Seat Holder Bolt: Stainless Steel
11. Cover Gasket: Rubber (BUNA-N)
12. Coating: fusion bonded epoxy inside and outside

**S2: Gate valves none rising stem:**

1. Body: Cast Iron
2. Bonnet: Cast Iron
3. Packing Box: Cast Iron
4. Disc Cast: Iron
5. Hand Wheel: Cast Iron
6. Body Seat Ring: Bronze
7. Disc Seat Ring: Bronze
8. Gland Cast: Iron
9. Stem Nut: Bronze
10. Stem Bronze
11. Bonnet Gasket: steel
12. Packing Box Gasket: steel
13. Bonnet Bolt & Nut: Steel
14. Gland Stud & Nut: Steel
15. Packing Box Stud & Nut: Steel
16. Top Nut: Steel
17. Washer: Steel
18. Packing: Graphite Fiber Commercial
19. Operating Nut: Cast Iron A 126 Class B
20. Coating: Electro statically applied epoxy inside and outside,

**S3: Combination Air Valve**

1. Body: PN21 Sphero Nodular ASTM-536 60-40-18
2. Rolling Seal: Rubber E.P.D.M
3. Clamping Stem: Reinforced Nylon
4. Float: Foamed Polypropylene
5. Base: Brass ASTM B-124
6. O-Ring: Buna-N
7. Cover : PN21 Cast iron ASTM A-48 CL-35B
8. Nozzle Seat: Bronze ASTM B-62 B-271 C83600
9. Nozzle Seal: Rubber E.P.D.M
10. O-Ring: Buna-N
11. Bolt and Nut: Galvanized Steel, Chromate Plated
12. Float: Stainless Steel 304L
13. Body: PN21 Cast iron ASTM A-48 CL-35B
14. Sleeve: Reinforced Nylon
15. Threaded Outlet: Brass
16. Coating: fusion bonded epoxy inside and outside

**S4: Butterfly Valves: (GEAR)**

1. Stem: Stainless steel
2. Body: Cast iron
3. Bushing: Brass
4. O ring: EPDM
5. Bushing (spacer): Polymeric
6. Disc: Stainless steel
7. Liner: EPDM
8. Washer: Bronze
9. Retaining ring: Spring steel
10. Plug: Plastic
11. Coating: Fusion bonded epoxy inside and outside

**S5: Water meter specification and materials.**

1. Working pressure 16 or 25 bars as required.
2. Max. temperature 60 C
3. Body: cast iron
4. Coating: epoxy
5. Connection: Flanged ends for 4” and above diameters or records 3” and less diameters

**S6: Strainers Specifications:**

1. Body: cast iron ASTM 126 class B
2. Cover: cast iron ASTM 126 class B
3. Screen: stainless steel
4. Gasket: Buna -N
5. Plug: steel
6. Bolts: steel
7. Coating: fusion bonded epoxy inside and outside

**S7: Control Valves specifications (float valves and pressure reducing valves)**

1. Connection: flanged
2. Water temperature up to 60 C
3. Working pressure 16 bars
4. Valve body and cover ductile iron (ASTM A-536)
5. Valve internals: stainless steel and bronze
6. Control trim: brass
7. Elastomers: Buna-N
8. Coating: fusion bonded epoxy

**S8a: the price per meter length includes all of the following.** Spreading along the route of pipe lines, welding two passes of the steel pipes including welding of readymade elbows (the unit price per meter length is valid for all the 6”, 4”,3” pipes and include all welding costs between each two pipes, or between pipes and elbows, or pipes and tees….etc. The price also includes the shaping and welding of elbows on site so as the pipe line will be always in the center of the route. The price include all welding of Tees, nipples and couplings for branches as 4”, 3”, 2″&1″, ¾” with plug for the future customers and as required by the supervisor engineer. Any pipes irregularities or damages must be repaired. Installation works are not limited to the routes specified in the attached drawing, but new route lines are expected as well and without variation in the technical specification and quality of works and unit prices in the whole tender items. No additional prices for the unit price what so ever the site of work is rough or far from the dirt roads. The distribution and welding works must be carried out in all intended pipes routes without variation in unit prices. Each Main pipe route line must be connected to the source well. The welding, cutting and shaping are including in the unit price (per meter length), and the welding costs include shaping and cutting without using elbows in case the outside angle is less than 22 degrees or the internal angle more than 168 degrees. The price of welding all types of elbows, tees, and other fittings are included in the unit price of the steel pipes and no payments for welding all these connections.

**S8b: Painting works include** adding two faces (red oxide as priming paint and zinc oxide base oil paint for finish). The pipe surface must be painted with two coats from all sides, particularly lower part to the ground. Therefore, the pipe must hold on supports above the ground minimum 30 cms, and then released to ground down after the paint was dry. Prepare the surface and stir the paint before use or mix using a power agitator. Before applying paint, a thinner liquid has to be added to the pipes surface to clean away oil and grease, use a detergent to remove excess dirt and contaminants. Remove the metallic debris such as mill scale and rust using disc sanders, sandpaper or wire brushes which ensures an adhesive surface.

**S9: Irrigation Steel Pipes Welded Black Steel Pipes,** [**ASTM A53**](http://www.techstreet.com/cgi-bin/detail?product_id=911886) **Or as API5L:**

**A53 Type F**, which is longitudinally furnace butt welded or continuous welded (Grade A only), **A53 Type E**, which is longitudinally [electric resistance welded](http://en.wikipedia.org/wiki/Seam_welding) (Grades A)

**S10: Road crossing for 6”, 4” and 3” pipes**. The price per unit length for any pipe diameter in this tender includes all costs of excavation (80\*50 cm) and basecourse backfill 98% relative compaction and where along roads and road crossings as shown in the drawings. This includes all excavation works necessary for making pipes trenches across the whole road width (whatever is the road width). The width of trench should be not less than 50 cm plus the pipe diameter. The total trench depth should be not less than 70 cm plus the pipe diameter. The backfill materials must include soft back fill as follows: fine aggregates 2-3 mm diameters (symismya) below 10 cm below the pipe bottom plus pipe diameter and 10 cm above the pipe top crown (total soft backfill thickness inside the trench equal 20 cm plus the pipe diameter). The final backfill up to the original ground level must of compacted base course grade B.

**S11**- **Solid state frequency inverter**

* Wide Voltage Range: 320 ~ 480V
* Input Frequency Range: 40 ~ 65Hz
* Output Voltage Range: 0 ~ rated input voltage
* Output Frequency Range: 0 ~ 500Hz
* Overload Capacity: 60s with 150% of rated current, 2s with 180% of rated current
* From 0.75 ~ 7.5KW Plastic house; 11 ~ 630KW is metal house
* Control Mode: High Quality V/F Control
* Speed Accuracy: V/F + 0.5% of maximum speed
* 20 channels for frequency setting
* Analog signal: 0 ~ 10V,-10V ~ 10V,0 ~ 20mA.
* Pulse setting input: 0~50 KHz.
* Built-in RS485 communication port
* Solid state programmable screen and PLC configurations
* All model are integrated IGBT
* The malfunction ratio is 0.8% within 24 months warranty

**Booster Pump**: The contractor should attach in his offer type of booster pump and details information on it including data sheet. In any case, he should include the manufacturer brand name, performance and testing curves (and due point), full specifications of manufacturing materials and dimensions of the stages, bowels, main shaft, retainers, stabilizers, lockers, etc. . The contractor must submit the pump original performance/testing curve from the company or from an approved turbines test lab. Before installing any new materials, the contractor must get the initial records for existing conditions of the well including: the well pumping capacity in m3/hr; electric power capacity, voltage drop..etc. these tests must be reported before start any import and supply orders. Therefore, the contractor must prepare suitable meters to carry on these measures. The contractor will not be paid any money for taking these records and their cost will be considered as undeclared/indirect costs that are already included in the booster price. The contractor is responsible to supply and install all materials including booster pump and control panel that fits with real pumping conditions (in line booster) and desired pumping quantity.

**Fittings:** All fittings in this project must meet the standard specifications. The contractor should install them wherever the supervisor engineer decides within each project area and not to claim any variation for that. The installation process includes all works such as excavation in all kinds of rocks and soils, welding, shaping, cleaning the site of work and painting.

**The rate in each of the BoQ items includes all labor costs as workers and all machines works costs that are necessary to construct the civil works; the rate includes but not limited to the following types of works and labor. The units prices of all items mentioned in the BOQ include all conditions and technical specifications which are shown under this item below.**

* The unit price in the items below includes the transportation of materials to the work site. Therefore, the contractor should visit the sites and put his prices according to all the necessary works for this sub –items and all other items in this project.
* Cleaning the site from any excess of materials, accumulated inside or outside the well’s site.

**Electric Cables**

The cable is **flat with a light blue outer sheath**, drinkable conductors for permanent submersion in potable water, to respective depths and up –to 600 meters. It is water resistance tested according to the European standard EN 505825-2-21 (AD8 condition complete submersion in water) and meets the requirements of BS 6920, and IEC 60228 covering the suitability of non-metallic materials and products for use in contact with water. The **EPR (Ethylene Propylene Rubber)** insulation and Elastomeric Cross-linked outer sheath should provide a robust and **water-tight** barrier.

The voltage rating is **0.6/1kV** and a temperature rating of -25oC to +90oC. It is suitable for use in water of a maximum temperature of 80oC

the conductor main construction properties are as follows:

* **Class 5** (Flexible Conductor) fine stranded tinned pure Copper
* Voltage rating: (0.6/1kv) 600 V between the conductor and earth, and 1000 V rms between adjacent conductors.
* Inner Insulation: **EPR** (Ethylene Propylene Rubber)
* **Outer sheath/ Jacket**: Elastomeric Cross-linked compound including filler materials