

**MAHINDRA WORLD CITY
AT
JAIPUR**

**TENDER DOCUMENT
FOR
SOFTENING SYSTEM**

Architects

**RKA ASSOCIATES
B-6/17, SHOPPING CENTER
SAFDARJUNG ENCLAVE
NEW DELHI-110029.**

Consultants

**KKA ASSOCIATES
D_139, SAKET
NEW DELHI-110017**

Project: Mahindra world city at Jaipur

Subject: Technical Specification for softener, Pump & accessories

Section I Specification for Equipment

1. Scope of work

Work under this section shall consists of furnishing all labour, materials, equipment and appliances necessary and required to supply install and commission the sofetener with pumps as described hereinafter and given in the schedule of quantities and/or shown on the drawings.

2. General requirements

- 2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Project Manager.
- 2.2 All equipment shall be of the best available make manufactured by reputed firms.
- 2.3 All equipment shall be installed on suitable foundations true to level and in a neat workmanlike manner.
- 2.4 Equipment shall be so installed as to provide sufficient clearance between the end walls and between equipment to equipment in coordination with existing equipments
- 2.5 Piping within the pump house shall be so done as to prevent any obstruction in the movement within the pump house.
- 2.6 Each pumping set shall be provided with a butterfly valve on the suction and delivery side and a flap type non return valve on the delivery side
- 2.7 All pump couplings and belt guards for air compressors shall be totally enclosed with 5 mm mesh.

3. System of soft Water Supply

- 3.1 The water supply is from the authorities in total and supplied to domestic tank and fire tank also.
- 3.2 Water from domestic tank shall be pumped and transferred to soft water tank thru softener.
- 3.3 Water from the soft water U.G. tank shall be pumped to storage tanks of chillers at terrace of the utility block by separate pumps.

Specifications for Pumps

4 Soft water Transfer Pumps (Stainless Steel Pumps)

- 4.1 Water supply pumps shall be suitable for clean filtered water. Pumps shall be single stage, monobloc vertical/horizontal, centrifugal pumps with stainless steel body and stainless steel (DIN W-Nr .1.4301) impeller, stainless steel shaft and mechanical seal and coupled to a TEFC electric motor. Each pump should be operating to a curve required by the operating conditions.
- 4.2 All parts in contact with water shall be corrosion resistant stainless steel DIN-Nr.1.4401.
- 4.3 Each pump shall be provided with a totally enclosed fan cooled induction motor of suitable H.P. The motors shall be suitable for 410 volts, 3 phases, 50 cycles A.C. power supply and shall conform to IS 325 operating at 2900 RPM nominal speed.
- 4.4 Each pumping set shall be provided with 100-mm dia gunmetal “Borden” type pressure gauge with gunmetal valve and connecting piping.
- 4.5 Pump or the whole set shall be stable on rubber vibration eliminating pads appropriate for each pump as recommended by the manufacturer and accepted by the Project Managers.

4.6 Softner (M.S. Vessels)

- 1.1 Softeners shall be designed in accordance with the code of unfired pressure vessel conforming to I.S. 2825.
- 1.2 Softeners shall be designed to give required hardness. Softener shall provided with suitable grade of Cation exchange resins in quantity to be indicated by the contractor at the time of tendering.
- 1.3 Softener shall be fabricated from M.S. plates conforming to I.S. 2002 Gr. 2A. suitable to withstand a working pressure given in schedule of quantities.
- 1.4 The vessel shall have an internal collecting and distribution system of manufacturer's design.
- 1.5 Softener shall have a set of face piping for inlet, outlet brine injection with all valves. Suitable drain shall be provided. Pipes shall be G.I. heavy class
- 1.6 One set of hydraulic injector with control valve, brine delivery pipes with adjustable indicating lamps.
- 1.7 One cylindrical M.S. rubber lined saturator and mixing tank, provided with brine delivery piping with adjustable level indicating clamp and control valves complete. The tank shall be of capacity or as per vendor's design.
- 1.8 One orifice board for indicating wash and rinse rate to be filtered in drain sump.
- 1.9 One charge of supporting gravel, sand and "Cation" resin in requisite quantity.
- 1.10 One water testing kit with instructions for testing water samples.

5 Level Controllers

- 5.1 Level controllers shall be electronic low voltage type using required number of stainless steel type probes, shrouded in PVC sheath or encapsulated in a stainless steel pipe. The level controller will be used for auto cut in cut off pumps as per pre determined levels and dry level cut off also.

6 Pipe & Fittings (for Headers and Connections)

- 6.1 Pump suction and delivery headers shall be Galvanized iron pipes/MS heavy class with matching fittings. The pipe joints shall be threaded as per manufacturer's instructions.

6.2 Vibration Eliminators

All suction and delivery lines as shown on the drawings shall be provided with double flanged reinforced neoprene flexible pipe connectors. Connectors should be suitable for a working pressure of each pump and tested to the test pressure given in the relevant head. Length of the connectors shall be as per site requirements in accordance with manufacturer details.

6.3 Valves

6.3.1 Butterfly Valves

Butterfly Valves shall be cast iron body with following details:-

- a) Disc shall be CI heavy duty electrolyses nickel plated abrasion resistant.
- b) The shaft is EN-8 Carbon Steel with low friction nylon bearings.
- c) The seat shall be drop tight constructed by bonding resilient elastomeric inside a rigid backing.
- d) Built in flanged rubber seals.
- e) Actuator to level operated for valves above ground and T Key operated for valves below ground.
- f) Built in flanges for screwed on flanged connections.

Manufacturer's details on fixing and installation will be followed.

6.3.2 Non Return Valves (NRV)

- a) Non return valves will be used at location to allow flow only in one direction and prevent flow in the opposite direction.
- b) NRV shall be cast iron slim type with cast iron body and gunmetal internal parts and accompanying flanges. Valves shall conform to the relevant BIS code.

7. Painting and cleanup

- a) On completion of the installation contractor shall scrub clean all pumps, piping, filters and equipment and apply one coat of primer.
- b) Apply two or more coats of synthetic enamel paint of approved make and shade on steel pipes.
- c) Provide painted identification legend and direction arrows on all equipment and piping as directed by engineer-in-charge.
- d) On final completion of the work, contractor should cleanup the site, filter room of all surplus materials rubbish and leave the place in a broom-clean condition.

8. Cables

- 8.1. Contractor shall provide all power and control cables from the motor control centre to various motors, level controllers and other control devices.
- 8.2. Cables shall conform to I.S. 1554 and Carry ISI mark.
- 8.3. Wiring cables shall conform to IS 694.
- 8.4. All power and wiring cables shall be aluminium conductor PVC insulated armoured and PVC sheathed of 1100 volts grade.

- 8.5. All control cables shall be copper conductor PVC insulated armoured and PVC sheathed 1100 volts grade.
- 8.6. All cables shall have stranded conductors. The cables shall be in drums as far as possible and bear manufacturer's name.
- 8.7. All cable joints shall be made in an approved manner as per standard practice.

9. **Cables trays**

- 9.1. Contractor shall provide M.S. Slotted cable trays at locations as shown on the drawings and of sizes as given in the schedule of quantities.
- 9.2. Cables trays shall be supported from the bottom of the slab at intervals of 30 cms at both ends by welding support rods with insert plates or to reinforcement bars. Cutting of holes in the slab for exposing of reinforcement bars and making good the same after welding of support rods shall be included in the rate of the tray and no separate payment shall be made on this account.
- 9.3. Cost of clips, bolts, nuts, supports rods and any other materials required to fix the trays in proper manner shall be included in the rate for trays.

10. **Earthing**

All equipment installed by the contractor shall be suitably earthed by making proper connection by means of G.I. Wires to the main earthing system laid by the electrical contractors.

11. **Motor control centres**

- 11.1. Switchboard cubicles of approved type shall be fabricated from 16 gauge M.S. Sheet with dust and vermin proof construction. It shall be painted with stove enameled paint of approved make and shape. It shall be fitted with suitable etched plastic identification plates for each motor. The cubicle shall comprise of the following: - (switchgear as given in the schedule of quantities).

- a) Incoming main switch fuse unit of required capacity.
- b) Isolation switch fuse unit, one for each motor.
- c) Fully automatic DOL/star delta starters suitable for motor H.P. with push buttons one for each motor and on/off indicating neon lamps.
- d) Single phasing preventer of appropriate rating for each motor.
- e) Rotary duty selector switch.
- f) Panel type ampere meters one for each motor.
- g) Panel type voltmeter on incoming main with rotary selector switch to read voltage between phase to neutral and phase to phase.
- h) Neon phase indicating lamps and indicating lamp for each motor.
- i) Rotary switch for manual or auto operation for each pump.
- j) Fully taped separate aluminium bus bars of required capacity for normal and emergency supply where specified.
- k) The panel shall be prewired with colour coded wiring. All interconnecting wiring from incoming main to switch gear, meters and accessories within the switch board panel.

11.2 All switch gears and accessories shall be approved make.

11.3. Switchboard cubicles shall be floor or wall mounted type as recommended by manufacturers.

12 Measurement

12.1 General

12.2 Unit rate for individual items, e.g. Pumps, MCC and level controller are for purposes of payments only. Piping, headers, valves, accessories, cabling and MCC to be measured separately in this contract only.

12.3 All items must include all accessories fittings as described in the specifications, BOQ and shown on the drawings.

12.4 Drainage Pumps

Drainage pumps shall be measured by numbers and shall include all items as given in the specifications and schedule of quantities to provide a complete working system.

12.5 Level controllers & Alarms

Level controllers for each set of pumps shall be measured as lot for all controls as required and inclusive of probes, cabling unto surface box near the pump and shall include all items as given in the specifications and schedule of quantities to provide a complete working system.

12.6 Piping Work

12.6.1 Suction and delivery headers for each pumping system is a part of pump including painting, supports etc all complete and shall include all items as given in the schedule of quantities.

12.6.2 G.I. pipes between various equipment's shall be in lot and to include all fittings, flanges, jointing, clamps for fixing to walls or hangers and testing with flanges of 3 mm thick insertion rubber gasket, nuts, bolts complete as required in for total system operation.

End of Section I

Project : Mahindra World City at Jaipur

Subject : Soft water Pumps & Accessories

SI No.	Description	Unit	Qty	Rate	Amount
	SUB HEAD I :				
1	<p>Soft Water Supply Pumps Supply, installation, testing and commissioning of Vertical/horizontal monoblock centrifugal transfer pumping set with SS body and S.S impeller, S.S shaft mechanical seal, connected to a TEFC induction motor suitable for 415 volts \pm 3 phase 50 cycles A.C supply with a common suction header with valves on main connecting & pumps inlet and a common delivery header with valves, including water shock absorber, non return valves with M.S. galvanized supports and painting with one coat of primer and two coats of synthetic enamel paint including a pressure gauge, Vibration eliminating pads under foundation, all mounted on a common base plate of MS 80x40mm I section bolted to RCC foundation complete in all respects. (For detail refer tender drawing).</p> <p>i For softener system</p> <p>a) One Set (1 working + 1 stand by)+ space for 1 add up for future Capacity- 450 lpm (Each) Head - 30 m HP 5 H.P.</p> <p>ii For soft Water Transfer Pumps</p> <p>a) One set (1 working + 1 stand by) + space for 1 add up for future Capacity- 400 lpm (Each) Head - 30 m HP 5 H.P. or as required</p>	Set	1		
2	<p>Softener Supply, installation, testing and commissioning of "Cation" ion exchange water softener fabricated from MS plate as per IS:2825 (minimum thickness of shell 6mm and dished end 8mm) complete with initial charge of resins, GI class 'C' face piping, CI butterfly valves, pressure gauge, hydraulic brine injector, accessories, painting inside with epoxy paint and outside with two coat of red oxide primer and two or more coat of synthetic enamel paint, including PVC/HDPE brine tank of required capacity suitable for 2 regeneration capacity with resins of approved quality and make complete in all respects. Hardness- Inlet- 300 PPM Outlet- Commercial zero Capacity- 24,000 LPH Regeneration period 12 hrs. Quantity of soft water between two regenerations = 288,000 lit Operating pressure 1.5-2.0 kg/sqcm Test pressure 5 kg/sqcm</p>				
3	<p>MCC Panels Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of control panels, fabricated out of 14 gauge CRCA sheet steel in cubicle compartmentised, free standing floor mounted, with a base channel of 100x 50 x 6 mm MS channel dust and vermin proof with reinforcement of suitable size angle iron channel sections and or flats wherever necessary 3mm thick cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with seven tank process before painting as per specifications and a final approved shade of powder coated paint 2 Nos earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415 V 3 phase 4 wire, 50 HZ supply system, Lifting hooks shall also be provided in case of large panels. Approval shall be taken for each panel in the form of shop drawings before fabrication. Galvanized hard wares with Zinc passivation shall be used in fabrication of panels. MCC Panel suitable with MCCB.</p> <p>i Incoming</p> <p>a) 125 amps TPN MCCB with following accessories: b) 1 set 0-500 voltmeter with selector switch through 415/110 VOH PT, primary and secondary shall be protected by 2 amp MCBs set. c) 1 Set 0-250 amps ammeter with selector switch and 150/5 amps 15 VA.CL 1CTs. d) 1 set Phase indicating light with toggle switches through 415 110 V PT, primary and secondary of PT shall be protected by 2amps MCB's.</p> <p>ii Bus Bars 100amps (25KA) TPN aluminium bus bars with heat shrinkable insulation sleeve.</p> <p>iii Outgoing</p> <p>a) 6 Nos. 32 amps TP/TPN MCB with 7.5 HP DOL/star delta starter. Each compartment shall contain CT operated ammeters of 0-40amps range with selector switch. Auto/manual selector switch and an indicating lamp with MCB's and toggle switch for ON status of motor. (For domestic/Filter feedand Drainage Pumps) b) Spare MCCB's for starters of the following capacity : 2 sets of 32 amps TP/TPN MCCB</p> <p>Note : All MCCBs shall be of 20 KA breaking capacity and suitable for motor duty application. MCC panel to be as per actual load and design requirements for total working of system.</p>	Set	1		
4	<p>Power Cables Supplying and laying of following 1100 volt grade PVC insulated sheathed copper conductor armoured cables as required for all interconnecting within plant room and to terrace level of required sizes as required clamped to wall/in tray/in ground with suitable clamps, saddles fixing bolts including double compression glands, cable socket laid in MS conduits with junction boxes, cable trays etc. as required within plant room and terrace including testing and commissioning complete in all respects.</p>	Lot			
5	<p>Supply and fixing of 8 SWG bare copper wires including all necessary and effecting proper connections as required for all equipments complete in all respects.</p>	Lot			

6	<p>Level Controllers for auto cut in cut off mode with high water alarm and low level cut off. Low voltage liquid level controller with stainless steel probes and pvc shroud, wiring from connector box on top of sump to probes of required length with audible alarm to sound in the engg. Control room. (Number of probes as required for function of each controller)</p>	Lot			
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