



Kerala State Homoeopathic Co-Operative Pharmacy Ltd.

(sponsored by government of Kerala & aided by govt. of India)

Office:Pathirappally, Alappuzha, India Pin-688 521

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Website : www.homcokerala.com

Email : homcokerala@gmail.com

Supplier's Copy

USER REQUIREMENT SPECIFICATION

Name of the Company	:	
Contact Person	:	
Address	:	
Contact Details	:	
Department	:	Utility (On III rd floor-Service floor)
Equipment and Code No.	:	Purified water (PW) Generation, storage & Distribution System-Capacity 2000 LPH, including: 1) Soft water Generation, Storage & Distribution System(For PW generation system) 2) Additional Soft water Generation, Storage & Distribution System(For cooling & re- circulation system with cooling tower) 3) RO water Generation, Storage & Distribution System(For PW generation system) 4) Purified water, Storage & Distribution System along with SS 316L pipeline etc.
Name of work	:	Supply, Installation, Commissioning & Validation of cGMP model Soft-RO EDI Purified water generation, storage and distribution system, At M/s. Homco -Kerala
Ref. No.	:	
Date	:	
Enclosures	:	



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PURIFIED WATER (PW) GENERATION, STORAGE & DISTRIBUTION SYSTEM-2000 LPH(SOFT+RO EDISYSTEM

ANNEXURE -I : BASIC DETAILS OF SYSTEM

DESCRIPTION	
(To be specified by the supplier, if any variation)	
Scope	<p>: Supply, Installation, Commissioning and Validation of Soft water+RO thenpurified water generation system & additional Soft water system(For cooling& recirculation) including:</p> <ol style="list-style-type: none"> 1) Soft+RO+Purified water(EDI) Generation system 2) Additional Soft water system (Forcooling& re-circulation with cooling tower) 3) SS 304&SS 316 L Storagetanks 4) Distribution system including piping, instrumentation etc. 5) MS Structural Platform at site on third floor (Service floor) <p>Along with all interconnecting pipes, valves, instrumentation, electrical cables, Skid , support and all accessories along with steel platform with railing dully painted at site required for successful working of this system at second floor of M/s. Homco -Kerala</p>
Standard	: cGMP and USP guidelines
Working Principle	: PT-RO-EDI (Pre-treatment +RO EDI)
Output	: <ul style="list-style-type: none"> • Soft water for other usage: 15 KL storage & Distribution system* • Ro /potable: 3 KL storage & Distribution system* • 2000 liters/hour &1000-liter storage & Distribution system (final purified water) *

*** To be specified and confirm by the supplier as per their equipment design**



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DESCRIPTION

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Raw water source & Analysis: Source: Bore well

(As per water test report: 327/A/2024 date 21/05/2024 from M/s. New Udaya Pharmacy and Ayurveda lab -Cochin received from M/s. HOMCO) Test As per IS 10500:2012

Characteristic	Observed value	Acceptable limit
Colour	< 5	5
Odour	Agreeable	Agreeable
Taste	Objectionable	-
Turbidity	0.42	1 NTU
pH	7.56	6.5 to 8.5
Alkalinity	242	200 ppm
Total Dissolved solid (TDS)	2115 ppm	500 ppm
Total hardness as CaCO ₃	400 ppm	200 ppm
TSS	<10	ppm (Mg/L)
Calcium as Ca	84.17	75 ppm
Magnesium as Mg	46.17	30 ppm
Chlorides as Cl	150.87	250 ppm (Mg/L)
Electrical Conductivity at 25 Deg. C	3676	- (micromhos/cm)
Acidity	14	- (ppm)
Sulphate as SO ₄	166	200 ppm
Fluoride as F	0.66	1 ppm
Iron as Fe	1.25	1 ppm (Mg/L)
Nitrate as NO ₃	9.62	45 ppm
Residual Chlorine	Nil	0.2 ppm



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DESCRIPTION		
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Characteristic	Observed value	Acceptable limit
Coliform	Present	Shall not be detected in any 100 ml sample
E coli	Present	
Pseudomonas aeruginosa	Present	
Staphylococcus ureus	Absent	
Standard Quality of Treated purified water required		
Characteristic	Result	Unit
pH	5.0 to 7.0*	-
Conductivity (As per USP43)	<1.3*	us/cm @ 25 deg °C
TOC	<=500*	ppb
Microbial count	<=100 *	CFU/ml
Pathogen	Absent *	-

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DESCRIPTION

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A) Water Generation System

SYSTEM DESCRIPTION

The **Water Generation system** should be designed to achieve the required quality of soft water + RO (potable water) and purified water as per the current USP guidelines including following stages of treatment:

1) Pre – treatment System:

a) Chlorine Dosing :

Raw water should be chlorinated by dosing (NaOCl) Sodium Hypochlorite solution by means of a metering pump. Chlorination should serve the purpose of disinfection, in case bacteria are present in raw water. NaOCl should help to control/destroys all microorganisms including viruses, spores, gram positive & gram-negative bacteria. E-Coli, bacteriophages, including legionella, salmonella, fungi, protozoa, algae & bio films. The chemical should be dosed by means of an electronic dosing pump wherein a facility should be available for manual control of stroke length and stroke frequency.*

b) Multi (MGF) grade filtration

For removal of suspended solids and turbidity in the water. It should consist of graded sand and gravel which removes suspended particles from the feed water. Chlorinated water should help Multi Grade filter less prone for microbial growth. Multi grade filter should remove macro level particles up to 10 μ should containing different level of graded sand stacked in a FRP vessel with a manual individual valve.*

c) Iron Removal Filtration:

For removal of Iron in the water. It should consist of Iron removal media which removes Iron from the feed water and gravels to support this media. Chlorinated water should help Iron removal filter less prone for microbial growth. Iron Removal Filter should reduce iron should containing Iron removal media and different level of graded sand stacked in a FRP vessel with a manual individual valve for operation.*

d) Dual Softening System:

The water from the MGF is then led through a softening system. Softener should be provided to reduce the hardness (up to 5 ppm as CaCO₃) of water using the principle of ion exchange. The substances in the incoming water which causes hardness (calcium & magnesium ions) should replace by sodium ions. Softener



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should design for 16 hours operation and 1 hour regeneration. Softener resin should be suitable to withstand up to 1ppm residual chlorine.FRP vessel with a manual individual valve

DESCRIPTION

(To be specified by the supplier, if any variation)

for operation.*

- e) **Hydro-pneumatic System:**It should be used to pressurized air & water to provide water at a constant pressure and flow.

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DESCRIPTION

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2) Post Treatment System:

The water after pre- treatment system should directly feed to RO -& EDI System.

- **Micron Cartridge Filter (MCF):** The water from the soft water tank should be led through micron cartridge filtration for removal of suspended solids and turbidity and for the safe guard of the downstream equipment. For removal of suspended solids and turbidity in the water and it should remove macro level particles up to 5 microns*
- RO feed pump& high pressure pump should be to feed water to RO system. *
- The de chlorinationshouldcarry out with the help of Sodium Meta Bi-Sulphate ($\text{Na}_2\text{S}_2\text{O}_5$), which should remove the presence of chlorine in feed water. This dosing should helps to avoid oxidation of membranes. *
- Anti-scalent dosing to reduce the scaling tendency of calcium and magnesium over RO membrane should dosed with SHMP (NaPO_3)₆ to reduce the fouling the membranes. This should improve the life and efficiency of the membrane. Acid and anti-scalant dosing should prevent the fouling of the membrane due to high concentration of the salt in reject by inhibiting the activity of low solubility salts like calcium and silica. *
- After Anti-scalant dosing pH correction dosingshould be done to keep the pH in the range of 7.0 to 7.5. Carbon dioxide content in water should be considered as important water & process parameter, as carbon dioxide in gaseous form can pass easily through RO membrane. Hence pH dosing should be done which transforms Carbon dioxide as ion and should be easily eliminated by the RO process. *
- Plate type Heat Exchanger is provided to maintain water temperature to 22 Deg. C before Ozonation. RO-I Permeate water will be fed to Ozone Water tank through plate type heat exchanger. With the help of recirculation pump water will be recirculated and Ozone will be dosed in recirculation line to remove pathogens from the water. Ozone Water transfer pumps will transfer water to Ozone Destructor UV and then water will be collected in CSRO Permeate water tank.
- **Hydro-pneumatic System:** It should be used to pressurized air & water to provide water at a constant pressure and flow.



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DESCRIPTION
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3) RO-EDI system
<p>The water should feed to RO system by using RO high pressure pump, a fully automatic unit for the removal of dissolved impurities. *</p> <p>RO unit should works on principle of reverses osmosis which separates water from dissolve salt in solution by filtering through a semi permeable membrane. The concentrate form of reverse osmosis system which carries high salinity goes to the drain. *</p> <p>RO Permeate should be directly fed to the Electro De-ionization system which stands as a polisher unit to obtain the desired quality of treated water where ion selective membranes operate using the same principle as ion exchange resin. *After EDI outlet water will be stored in purifies water storage tank. *</p>

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DESCRIPTION

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B) Storage System Description

1) Soft water storage System

This system should be included following items and other accessories.

- Hydro-pneumatic Pressure vessel of capacity 100 liters of MSEP*
- High pressure (6.0 bar) centrifugal vertical multistage SS 304 pump of capacity 5 m³/hr TC end*
- SS 316 0 to 10 bar 4" dia pressure gauge with TC end*
- SS 316 ,0 to 10 bars of DN40 pressure transmitter of capacity 85 to 125 degree C operating temperature at expansion tank outlet*
- Manual ball valve for Hydro pneumatic system and at point of use and non-return valve SS 304 up to 16 bar pressure TC end. *
- **15000 liters HDPE** storage tank with Level Switch*

2) RO (Potable water) System

This system should be included following items and other accessories.

- Hydro-pneumatic Pressure vessel of capacity 100 liters of MSEP*
- High pressure (6.0 bar) centrifugal vertical multistage SS 304 pump of capacity 5 m³/hr TC end*
- SS 316 0 to 10 bar 4" dia pressure gauge with TC end*
- SS 316 ,0 to 10 bars of DN40 pressure transmitter of capacity 85 to 125 degree C operating temperature at expansion tank outlet*
- Manual ball valve for Hydro pneumatic system and at point of use and non-return valve SS 304 up to 16 bar pressure TC end. *
- **3000 liters HDPE** storage tank with Level Switch*

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DESCRIPTION

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3) Purified Water storage and Distribution System

Should be designed for ambient temperature during normal working.

It must be sanitized by hot water at 80°C+5°C. *

- The pressure in the loop should always be maintained at 1.5 bar (g). *
- The flow in the loop should be maintained such that the minimum velocity of water in the loop should be 1.2 m/s. *

PW Storage and Distribution System

Should be in compliance with the current USP and cGMP regulations. This system should consist of a tank including spray ball and other accessories for storing water and centrifugal pumps (1 working + 1 standby) with single VFD. *

Storage Tank:

- The storage tank should be hygienically constructed in SS316L material, it should be vertical, cylindrical and leg mounted with top and bottom dish ends. *
- It should be internally electro polished to <0.5 Ra and externally to <0.8 Ra. *
- This tank should be designed as per ASME, Section- VIII, Div-1. *
- The working volume of the tank shall be 0.8 m³. *
- This storage tank should have dual/single type heating provision (steam jacketed or electrical heater) insulated and cladded. *
- The Sanitization temperature should be 80°C+5°C.
- It should include Sight glass, light glass & manhole *
- Capacitance type of level transmitter, Compound pressure Gauge, temperature element and transmitter with thermo well should be provided at the bottom dish end.
- It should be with 0.2 micron-code-7 electrically traced hydrophobic filter.
- Shadow free spray balls (1 no) capable of 360 degree rotation, that rinses the tank completely with help of water should be provided. *



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- **1000 liters SS 316L** storage tank with all aids and accessories

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DESCRIPTION

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4) Additional SOFTENER SYSTEM WITH COOLONG TOWER **(For Boiler feeding & other recirculation system for cooling)**

Should be designed in such way a that the soft water with a cooling tower facility to cool the temperature of soft water of inlet temp. 50 deg.C to outlet temp. 32 Deg C

Soft water system with including the following:

- Cooling tower, capacity: 10 m³/hr, Tonnage of 16 TR*
- Hydro pneumatic system (7.5 m³. /hr @ 40 mWC) With Single VFD, Pump Capacity: 7.5 m³/hr @ 40 mWC, SS 304*
- Inlet temp. Is 50 Deg. C and outlet temp. is 32 Deg. C*
- Hydro pneumatic Pressure Vessel, Capacity: 300 Liters*

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DESCRIPTION

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C) Distribution System:

For Soft water & RO (Potable water) : Details as mentioned in operation features:

Purified water distribution system

PW Recirculation Pumps:

- The pumps should be of sanitary grade centrifugal type (1 working + 1 standby)
- MOC should be SS316L. *
- The pump should be hot water sanitizable and should be provided with a single mechanical seal. *
- The pump housing should be completely drainable and must be equipped with drain valves. *
- All the connections of the pump should be including mechanical seal, drains vents and process connections of hygienic design. *
- It should be possible to isolate the circulation pump from the system with isolation valves before and after the pump. *
- Pump should equip with a single VFD, and this VFD takes the necessary action and allows only required amount of flow in the system. *

Distribution Loop Piping :

The Loop should be SS316L (Wall Thickness – 1.6mm) ERW bead removed Electro-polished with Internal finish of $Ra < 0.5 \mu m$ & External finish of $Ra < 0.8 \mu m$. *

The piping should confirm to design code ASTM-270. *



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DESCRIPTION

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Instrumentation :

- Purified water storage and distribution system should be monitored and controlled via PLC. *
- The output of all the instruments like on/off valves, conductivity transmitters, temperature transmitters, flow transmitters should be linked to the PLC. *
- PLC should be used for both controlling and online data logging.
- All the controls should be executed by the PLC and the status of the system should be available on the HMI. *
- Panel should consist of a HMI having color graphics and 10" size with color touch screen. All the parameters should be available on color monitor for operation, monitoring, control mode selection, alarms etc. *
- All electrical heat tracers shall be controlled through PLC. *

Online Instrumentation :

- System shall be equipped with online sensors cum transmitters for monitoring conductivity, flow, level, pressure, temperature. *
- The output of these transmitters should be synchronized with a centralized PLC to display and log the process parameters. *
- All instruments should be HART enabled. *
- Instruments should be calibrated before installation.

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ANNEXURE - II : cGMP FEATURES

DESCRIPTION	
(To be specified by the supplier, if any variation)	
MOC	: Contact Parts: SS 316 L* : Non-Contact Parts : SS 304* : Gasket /Seal/ 'O' Ring : Food grade*
Working Area Environment	: Temperature: $27 \pm 2^{\circ} \text{C}$ * : Relative Humidity : NMT 75 %
Finish	: Internal : Mirror Finish*
	: External : Matt Finish
The equipment should be smooth finished without any sharp edges and crevices*	

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ANNEXURE - III : OPERATIONAL FEATURES

Soft+RO+ Purified water Generation system + Soft water cooling:		
Feed water storage tank (Proposed location on Terrace or service floor)		
Make	:	(Tiara/ Hydropure / Hykon) *
Capacity/ Qty.	:	15000liters (1 No.) *
MOC	:	<u>HDPE</u>
Pipe connection	:	From tank to system should be in vendors scope*
Bag Filter		
MOC	:	Polypropylene (PP) reinforced molded*
Flow Rate	:	10 m3/hr *
Micron rating	:	50 micron*
Make	:	Pratham/Gopani/ETS*
Maximum differential pressure	:	1.2 kgs/cm2*
Maximum operating temperature	:	50 °C*
End connection	:	Threaded End *
Hypo dosing system		
Pump range	:	0 to 6 LPH*
Accessories	:	Dosing pump, Dosing tank with level switch and 3 meters tubing*
Range	:	0 to 5 PPM*
Dosing Tank Capacity / MOC	:	50 liters. / HDPE with top lid *
Make	:	Prominent/Edose/Seko*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Flow switch	
Type	: Paddle*
MOC	: SS *
Size/Qty.	: 2" BSP / 1 No. *
Voltage	: 230 V AC*
Make	: Scientific / honeywell*
Output	: SPDT*
Multi Grade Filter (MGF)	
Type	: Sand Filter*
Size	: 42"x72" *
Mounting	: Vertical*
Assembly Accessories	: Manual multiport valve, Stack,Diffuser,Vacuum breaker with drain line*
MOC	: FRP *
Make	: Pentair *
Capacity	: 15 m ³ /hr*
Media	: 1570 kg
Iron Removal Filter (IRF)	
Type	: Sand Filter*
Size	: 42"x72" *
Mounting	: Vertical*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Assembly Accessories	: Manual multiport valve, Stack, Diffuser, Vacuum breaker with drain line*
MOC	: FRP Liner*
Make	: Pentair *
Capacity	: 15 m ³ /hr*
Media	: Pebbles, Iron removal media-1390 kg (Support media-825 kg)
Dual Softener System	
Type	: Resin Base Ion Exchange *
Size	: 42"x72" *
Mounting	: Vertical*
Assembly Accessories	: Manual multiport valve, , Diffuser, Vacuum breaker with regeneration port , regeneration tank (1000 L) with drain line *
Media	: Resins * 1075liters of 400 ppm for each vessel*
Capacity	: 15 m ³ /hr*
OBR	: 10 hour/150 m ³ *
Make	: Pentair*
MOC	: FRP Liner*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Raw Water Feed Pump From Ground to Service Floor		
Capacity / Qty.	:	10 m ³ /hr / 2 No. *
Head	:	5.0 bar*
Type	:	Centrifugal*
MOC	:	CI/SS 304*
End connection/ Make	:	TC/Flange/Union *
Make	:	Grundfoss / Xylem / Wilo *
Raw water feed pump to Generation system		
Capacity / Qty.	:	15 m ³ /hr / 1 No. *
Head	:	4.5 bar*
Type	:	Centrifugal*
MOC	:	CI/SS 304*
End connection/ Make	:	TC/Flange/Union *
Make	:	Grundfoss / Xylem / Wilo *
Instruments		
Level Switch for raw water & soft water (4 nos.)		
Type	:	Displacer type , magnetic level switch*
MOC	:	SS 304*
Probe length	:	Suitable to raw water storage tank height*
End connection	:	ANSI 150 # flange End*
Enclosure	:	Cast Aluminium , weather proof IP-66*
Switch element	:	Micro switch 2 SPDT (DPDT) *
Switch capacity	:	5 Ampere, 250 VAC/24 VDC*
Make	:	Techtrol / Spink / Krohne*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Pressure Gauge (8 nos.)	
Type	: Bourden Type*
MOC	: 2" dial , SS 316 L contact parts*
Range	: 0 to 10 bar*
Sensing element	: Bourden gauge*
End connection	: Threaded*
Make	: Baumer / Wika / Cole-Parmer*
Pressure switches(2 nos.)	
Range	: 0.2 to 7.5 bar*
Contact system	: Single pole change over switch (SPDT)*
MOC	: SS 304*
Power supply	: 24 VDC*
Enclosure	: IP 66*
End Connection	: Threaded End*
Make	: Danfoss / Festo / Euroswitch / SMC*
Flow indicator (2 Nos.)	
Range	: Various as per flow rates*
Installation	: Upward flow vertical installation*
MOC	: UPVC with PVDF float *
Working temperature	: Ambient*
End connection	: Union End*
Make	: Aster /Pratham/ Techtrol / Spink / Krohne*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Flow totalizer (1 No.)		
Size	:	2"*
Installation	:	In line flow installation*
MOC	:	PVC*
Voltage and current output	:	100-230 VAC , 4-20 mA*
Working temperature	:	Ambient*
End connection	:	Threaded End*
Enclosure	:	IP 67*
Make	:	Aster /Pratham/ Techtrol / Spink / Krohne
Valves		
Manual Ball valve (34 numbers)		
Type	:	3 piece full port*
MOC	:	UPVC*
Size / Qty.	:	¾" to 2" / 34 nos. *
End connection	:	Union*
Operating pressure	:	Up to 10 bar*
Operation	:	Manually Operated*
Make	:	Cepex/Pimtas*
Manual Butterfly valve (1 numbers)		
MOC	:	UPVC*
Size / Qty.	:	¾" to 2.5" / 1 nos. *
End connection	:	Wafer end*
Operating pressure	:	Up to 10 bar*
Operation	:	Manually Operated*
Make	:	Cepex/Pimtas*

* To be specified and confirm by the supplier as per their equipment design



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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Actuated Ball Valve (2 numbers)		
Type/Make	:	3 piece full port*/Cepex/Pimtas*
MOC	:	UPVC*
Size / Qty.	:	1.5" to 2" / 2 nos. *
End connection	:	Union*
Operating pressure	:	Up to 10 bar*
Non return Valve (2 numbers)		
Type	:	Spring loaded / Flap type*
MOC	:	UPVC*
Size / Qty.	:	1.5" to 2" / 2 nos. *
End connection	:	Union*
Operating pressure	:	Up to 10 bar*
Make	:	Cepex/Pimtas*
Sampling valve (8 numbers)		
Type	:	3 piece design*
MOC	:	UPVC*
Size / Qty.	:	DN 15 / 8 nos. *
End connection	:	Union*
Operating pressure	:	Up to 10 bar*
Make	:	Cepex/Pimtas*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Strainer (1 number)		
Type	:	Y type Strainer*
MOC	:	UPVC*
Size / Qty.	:	DN 20 to DN50 / 1 nos. *
Foot Valve for Underground water tank		
MOC	:	UPVC*
Size / Qty.	:	DN 20 to DN50 / 1 nos. *
Soft Water Storage Tank for additional system (For recirculation system)		
Make	:	(Tiara/ Hydropure / Hykon)*
Capacity/ Qty.	:	3000 liters (1 No.) *
MOC	:	HDPE*
Pipe connection	:	From tank to system should be in vendors scope *

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
a) RO- EDI system		
CSRO Feed tank		
Make	:	(Tiara/ Hydropure / Hykon) *
Capacity/ Qty.	:	15000 liters (1 No.) *
MOC	:	HDPE*
Pipe connection	:	From tank to system should be in vendors scope *
HSRO feed tank		
Type	:	Cylindrical, Vertical insulated*
MOC	:	Contact parts –SS 316 L, Other parts SS 304*
Capacity	:	500 ltrs*
Micron rating	:	50 micron*
Accessories	:	Electrical heater*
Maximum operating temperature	:	80 to 85 °C during sanitization *
End connection	:	TC/Flange End *
Ozone Water Storage Tank		
Tank Capacity	:	5 KL
Type	:	Cylindrical, Vertical Plain tank
MOC	:	SS 316L
Micron Cartridge Filter with housing		
Type	:	Cartridge *
MOC	:	Housing : UPVC and Cartridge : PP pleated*
Flow rate	:	8 m3/hr*
Micron rating	:	5 micron*

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DESCRIPTION

(To be specified by the supplier, if any variation)

Make Cartridge	:	ETS/Pratham/Gopani*
Maximum operating pressure	:	1.5 to 3 kg/cm2*
Maximum operating temperature	:	Ambient*
End connection	:	TC End *

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
SMBS Dosing System	
Model	: Dosing pump : Prominent/Edose/Seko* Level Switch : Pune Techtrol/ Mahalaxmi/sai* Dosing tank : Sintex*
Dosing pump range	: 0 to 6 LPHwith 4-20mA output*
Accessories	: Dosing pump, tank, level switch and tubing*
Dosing tank	: 50 Ltrs. HDPE *
Level switch	: Magnetic float operated guide level switch*
Anti-scalent Dosing	
Model	: Dosing pump : Prominent/Edose/Seko* Level Switch : Pune Techtrol/ Mahalaxmi/sai* Dosing tank : Sintex*
Dosing pump range	: 0 to 6 LPH *
Accessories	: Dosing pump, tank, level switch and tubing*
Dosing tank	: 50 Ltrs. HDPE *
Level switch	: Magnetic float operated guide level switch*
pH Dosing System	
Model	: Dosing pump : Prominent/Edose/Seko* Level Switch : Pune Techtrol/ Mahalaxmi/sai* Dosing tank :Sintex*
Dosing pump range	: 0 to 6 LPH with 4-20 mA*
Accessories	: Dosing pump, tank, level switch and tubing*
Dosing tank	: 50 Ltrs. HDPE*
Level switch	: Magnetic float operated guide level switch*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
RO -I housing (2 nos.)	
Size/Qty.	: 8" (D) x 2.2 mt (L) x 8" (D) x 2.2 mt (L), 1 each*
MOC	: FRP*
End connection	: TC end*
Make	: standard*
RO -I Membranes (I) (4 nos.)	
Size/Qty.	: 8" (D) x 1.1 mt (L), 4 nos. *
MOC	: Polyamide thin film composite*
Capacity	: 4.2 m3/hr. maximum*
Type	: CSRO*
Make	: Toray/DOW/Hydronautics*
Operating pressure	: 10 to 14 bar*
Operating temperature	: Ambient*
System recovery	: 52.5%*
Plate Heat Exchanger (1 No.)	
Flow rate	: 4.2 m3/hr
Plate MOC	: SS 316
Temp. to maintain	: 22 Deg. C
Ozone Generator with Accessories (1 No.)	
Type	: Air based
Capacity	: 25 gm/hr
Accessories	: Oxygen Concentrator, Venturi system (PVDF MOC), Stand, SS Accumlator with Solenoid Valve, Ozone Destructor
Make	: Otsil/Equivalent

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Ozone Destructive UV (1 No.)		
Flow rate	:	4.2 m3/hr
MOC	:	SS 316
Make	:	Alfa UV/Equivalent
Vent Filter Housing (1 No.)		
MOC	:	SS
Size	:	10"
End Connection	:	TC End
Make	:	WSPL
Vent Filter Cartridge (1 No.)		
MOC	:	PP
Size	:	10"
Make	:	Parker/Equivalent
End Connection	:	Code 7

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
RO -II housing	
Size/Qty.	: 8" (D) x 2.2 mt (L), 1 no. *
MOC	: SS 316*
End connection	: TC end*
Make	: standard*
RO -I Membranes (II) (2 nos.)	
Size/Qty.	: 8" (D) x 1.1 mt (L), 2 nos. *
MOC	: Polyamide thin film composite*
Capacity	: 2.2 m ³ /hr. maximum*
Type	: HSRO*
Make	: Toray/DOW/Hydronautics*
Operating pressure	: 8 to 10 bar*
Operating temperature	: Ambient*
System recovery	: 81%*
EDI System	
Capacity	: 2000 LPH (operating) *
Type	: Hot water sanitizable*
Recovery	: 90%*
Maximum feed pressure	: 7 bar*
Operating temperature	: Ambient*
Make	: Qua/Equivalent*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Pumps		
RO -I Feed pump (1 number)		
Capacity	:	8.0 m ³ /hr*
Head	:	3 bar*
Type	:	Centrifugal*
MOC	:	CI/SS 304*
Power	:	3 phase ,415 V , 50 Hz*
End connection	:	TC end*
Make	:	Grundfoss / Xylem / Wilo*
CSRO High Pressure pump-I (1 no.) with VFD		
Capacity	:	8.0 m ³ /hr*
Head	:	12.5 bar*
Type	:	Centrifugal vertical multi stage *
MOC	:	SS 304*
Power	:	3 phase ,415 V , 50 Hz*
End connection	:	TC end*
Make	:	Grundfoss / Xylem / Wilo*
Ozone Recirculation Pump (1 No.)		
Capacity	:	2.5 m ³ /hr
Head	:	2.5 bar
Type	:	Centrifugal
MOC	:	SS 316
Power	:	3 phase ,415 V , 50 Hz
End Connection	:	TC end

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Make	:	Grundfoss / Xylem / Wilo *
Ozone Water Transfer Pump (1 No.)		
Capacity	:	4.2 m3/hr
Head	:	30 mWC
Type	:	Centrifugal
MOC	:	SS 316
Power	:	3 phase ,415 V , 50 Hz
End connection	:	TC End
Make	:	Grundfoss / Xylem / Wilo *
HSRO High Pressure pump-II (1 no.) with VFD		
Capacity	:	5.5 m3/hr*
Head	:	6.5 bar*
Type /Make	:	Centrifugal vertical multi stage */Grundfoss*
MOC	:	SS 316*
Power	:	3 phase ,415 V , 50 Hz*
End connection	:	TC end*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Instruments	
Level Switch for RO Feed Tank	
Type	: Magnetic float operated guided*
MOC/Qty.	: SS 316L/ 1 nos. *
Probe length	: Suitable to raw water storage tank height*
End connection	: TC End*
Enclosure	: Cast Aluminium , weather proof IP-66*
Switch element	: Reed (N/O) *
Switch capacity	: 40 VA 230 VAC *
Make	: Techtrol/baumer/Spink /Krohne*
Level Transmitter for Ozone Water storage tank & HSRO Feed Tank (2 No.)	
Type	: Capacitance type
MOC	: SS 316L
Length	: Suitable for Tank height
End Conn.	: TC Ended
Pressure Gauge(5 No.)	
Type	: Bourden Type*
MOC/Qty.	: 4" dial, SS 316 L contact parts / 5 nos. *
Range	: 0 to 10 and 0 to 21 bar*
Sensing element	: Bourden gauge*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
End connection	: TC end *
Make	: Baumer / Wika / Cole-Parmer
Pressure Transmitter (1 No.)	
Range	: 0 to 10 bar*
Contact system	: Single pole change over switch (SPDT) *
Size/ Location	: DN40/ Expansion tank outlet *
MOC	: SS 316L*
End connection	: TC*
Power supply	: 24 VDC , output 4-20 mA*
Operating temperature	: 85 to 125 °C *
Make	: Jumo/Keller / Radix*
Pressure Gauge (9 No.)	
Type	: Bourden Type*
MOC/Qty.	: 4" dial,SS 316 L contact parts / 9 nos. *
Range	: 0 to 10 bar*
Sensing element	: Bourden gauge*
End connection	: TC end *
Make	: Baumer / Wika / Cole-Parmer*
Low pressure Switch	
Range	: 0.2 to 7.5 bar*
Contact system	: Single pole change over switch (SPDT) *
MOC/Qty.	: SS 304/ 1 no. *
Enclosure	: IP66*
End connection	: Threaded End*
Make	: Danfoss / Festo / Euroswitch / SMC*
Power supply	: 24 VDC *

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Temperature Sensors & Transmitter		
Range	:	0 to 150 °C*
Size/Qty.	:	50 mm length / 3 nos. *
MOC	:	SS 316 L*
Location	:	Loop return line*
Working temperature	:	0 to 150°C*
End connection	:	TC End*
Make	:	Jumo / Keller / Radix*
High pressure Switch		
Range	:	0 to 14 bar*
Contact system	:	Single pole change over switch (SPDT) *
MOC/Qty.	:	SS 304 / 2 nos. *
Power supply	:	24 VDC *
Enclosure	:	IP66*
End connection	:	Threaded End*
Make	:	Danfoss / Festo / Euroswitch / SMC*
Flow Indicator for CSRO System		
Range	:	Various as per flow rates *
Installation	:	Upward flow Vertical installation*
Working Temp.	:	Ambient
MOC/ Qty.	:	Acrylic / 3 nos. *
End Conn.	:	Union End
Make	:	Aster/Equivalent

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Flow Indicatorfor Ozone, HSRO, EDI system		
Range	:	Various as per flow rates *
Installation	:	Upward flow Vertical installation*
MOC/ Qty.	:	SS 316 L / 8 nos. *
Fluid	:	Water*
Operating pressure	:	Up to 15 bar*
End connection	:	TC end / Union*
Make	:	Krohne Marshall*
Conductivity Sensors & Transmitter for RO		
Range	:	0 to 100 uS/cm*
Size	:	DN40*
MOC/ Qty.	:	SS 316 L /2 nos. *
End connection	:	TC end *
Operating temp.	:	Ambient*
Make	:	Forbes Marshall/Mettler/ Jumo*
Conductivity Sensors & Transmitter for EDI		
Range	:	0 to 10 uS/cm*
Size	:	DN40*
MOC/ Qty.	:	SS 316 L / 1 no. *
End connection	:	TC end *
Operating temp.	:	Ambient*
Make	:	Forbes Marshall /Mettler / Jumo*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Flow Switch		
Type	:	Sanitary SS 316 L*
Size/ Qty.	:	1" TC*2 nos.
Make	:	NK instrument *
ORP Sensors &Transmitter (1 No.)		
Range	:	\pm 1000 mV*
Type	:	2 Wire , PT-100*
Power supply	:	12 to 24 VDC*
Protection class	:	IP65*
Housing material	:	ABS*
Make	:	Forbes Marshall/Mettler/ Jumo*
pH Sensors & Transmitter (1 No.)		
Range	:	0 to 14*
Type	:	2 Wire , PT-100*
Power supply	:	12 to 24 VDC*
Protection class	:	IP65*
Housing material	:	ABS*
Make	:	Forbes Marshall/Mettler/ Jumo*
Compound Pressure Gauge for Ozone Water Tank (1 No.)		
Type	:	Sanitary Type, Diaphragm Sealed Glycerine filled
MOC	:	SS 316L
Range	:	-1 to 5 bar
Sensing Element	:	Bourden Gauge
End Conn.	:	TC End

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Dial Size	:	4"
Make	:	Baumer
Dual Channel Ozone Analyzer (1 set)		
Sensor	:	2 No.
Transmitter	:	1 No.
Make	:	Mettler / Equivalent
Valves		
Manual Ball valve		
Type	:	3 piece full port*
MOC	:	Body and End piece -CF8, Ball and Stem SS 316 Lever SS 304 , Seats PTFE*
Size / Qty.	:	1.5 "to 2" / 5 nos. *
End connection	:	TC end *
Operating pressure	:	Up to 16 bar*
Make	:	Unison/ Aira / Racer*
Manual diaphragm Valve		
Type	:	3 piece full port*
MOC	:	Body SS316L & Bonnet SS304,Diaphragm -EPDM*
Size / Qty.	:	DN 15 to DN40 / 10 No.*
End connection	:	TC end *
Operating pressure	:	Up to 7 bar*
Make	:	Mascon/Avcon/Leistung*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Manual diaphragm Valve for Ozone System	
Type	: 3 piece full port*
MOC	: Body SS316L & Bonnet SS304,Diaphragm - EPDM+PTFE*
Size / Qty.	: DN 15 to DN40 / 6 No. *
End connection	: TC end *
Operating pressure	: Up to 7 bar*
Make	: Mascon/Avcon/Leistung*
Pneumatic Piston valve	
Type	: Auto piston type*
MOC	: SS 316*
Size / Qty.	: DN 15 to 40 / 7 nos. *
Operating pressure	: Up to 16 bar*
Make	: Mascon/Avcon/Equivalent*
End connection	: TC end*
Manual Angle valve	
Type	: Manually operated*
MOC	: SS 304*
Size / Qty.	: 1" to 3/4" / 1 nos. *
End connection	: TC end*
Operating pressure	: Up to 16 bar*
Make	: Mascon/Avcon/Equivalent*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Actuated diaphragm Valve	
Type	: 3 piece full port*
MOC	: Body & Bonnet SS 316, Stem ASTM A276, Diaphragm -EPDM+PTFE*
Size / Qty.	: DN 40, /4 nos. *
End connection	: TC end *
Operating pressure	: 2-4 bar (Pneumatic operated) *
Make	: Mascon/Avcon/Leistung*
Non Return Valve	
Type	: Spring loaded /disc check*
MOC	: SS 316*
Size / Qty.	: 1 to 2", /3 nos. *
End connection	: TC end *
Operating pressure	: Up to 16 bar*
Make	: Festo/Inoxpa/Cipriyan*
Sampling Valve	
MOC	: SS 316L*
Size / Qty.	: 8 mm /11 nos. *
End connection	: TC end *
Operating pressure	: 2-4 bar *
Make	: Mascon/Avcon / Leistung*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Sampling Valve for Ozone System	
MOC	: SS 316L*
Size / Qty.	: 8 mm / 3 nos. *
End connection	: TC end *
Operating pressure	: 2-4 bar *
Make	: Mascon/Avcon / Leistung*
Flow diverter Valve	
Type	: Sanitary type*
MOC	: Body & Bonnet :SS 316L, Stem ASTM A276, Diaphragm -EPDM+PTFE*
Size / Qty.	: DN 40 /1 no*
End connection	: TC end *
Operating pressure	: 2-4 bar *
Make	: Mascon/Avcon / Leistung*
Operation	: Manually/pneumatic operated*
Trolley mounted CIP system	
Pump 5 m3/hr. at 4bars, with accessories-1 lot	
Make : Grundfoss / Xylem / Wilo	
RO-EDI Skid	
SS 304 skid with all interconnecting pipes, valve and accessories	

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Soft + RO+ Purified water+ Soft water cooling Storage & Distribution system:	
1) Soft water storage & Distribution system	
Hydro-pneumatic Pressure vessel	
Capacity	: 100 liters*
MOC	: MSEP*
PUMP : High Pressure Pump with VFD	
Capacity / Qty.	: 5 m ³ /hr / 2 Nos. *
Head	: 6.0 bar*
Type	: Centrifugal Vertical Multistage Pump*
MOC	: SS 304*
End connection/ Make	: TC End *
Make	: Grundfoss / Xylem / Wilo*
Instruments	
Pressure Gauge (1 no.)	
Type	: Bourden Type*
MOC	: 4" dia SS 316 L contact parts*
Range	: 0 to 10 bar*
End connection	: Screwed/ TC*
Make	: Baumer/ Wika / Cole-Parmer*

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DESCRIPTION (To be specified by the supplier, if any variation)		
Pressure Transmitter		
Range	:	0 to 10 bar*
Contact system	:	Single pole change over switch (SPDT) *
Size/ Location	:	DN40/ Expansion tank outlet *
MOC	:	SS 316L*
End connection	:	TC End*
Power supply	:	24 VDC , output 4-20 mA*
Operating temperature	:	85 to 125 °C*
Make	:	Jumo/Keller / Radix *
Valves		
Manual Ball Valve For Hydro pneumatic System & User points		
Type	:	3-piece full port*
MOC	:	SS304*
Size / Qty.	:	1.5 inch and ½"/ 4 and 5 nos. *
End connection	:	TC End*
Operating pressure	:	Up to 16 bars*
Operation	:	Manually Operated Ball Valve*
Make	:	Unison/Aira/Racer*
Non return Valve		
Type	:	Spring Loaded/ Disc Check Valve*
MOC	:	SS304*
Size / Qty.	:	1" To 2" / 2 nos. *
End connection	:	TC End*
Operating pressure	:	Up to 16 bar*
Make	:	Cipriani. *

***To be specified and confirm by the supplier as per their equipment design**



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DESCRIPTION		
(To be specified by the supplier, if any variation)		
2) RO (Portable water) storage & Distribution system		
Hydro pneumatic Pressure Vessel		
Capacity/ Qty.	:	100 liters (1 No.) *
MOC	:	MSEP*
PUMP : High Pressure Pump with VFD		
Capacity / Qty.	:	1.5 m ³ /hr / 1 No. *
Head	:	6.0 bar*
Type	:	Centrifugal Vertical Multistage Pump*
MOC	:	SS 304*
End connection/ Make	:	TC End *
Make	:	Grundfoss / Xylem / Wilo*
Instruments		
Pressure Gauge (1 no.)		
Type	:	Bourden Type*
MOC	:	4" dia , SS 316 L contact parts*
Range	:	0 to 10 bar*
Sensing element	:	Bourden gauge*
End connection	:	Screwed/ TC*
Make	:	Baumer / Wika / Cole-Parmer / Bourden*

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DESCRIPTION		
(To be specified by the supplier, if any variation)		
Pressure Transmitter		
Range	:	0 to 10 bar*
Contact system	:	Single pole change over switch (SPDT) *
Size/ Location	:	DN40/ Expansion tank outlet *
MOC	:	SS 316L*
End connection	:	TC End*
Power supply	:	24 VDC , output 4-20 mA*
Operating temperature	:	85 to 125 °C*
Make	:	Jumo/Keller/Radix *
Valves		
Manual Ball Valve For Hydro pneumatic System & User points		
Type	:	3 piece full port*
MOC	:	SS304*
Size / Qty.	:	1 inch and 1/2 inch / 4 nos. and 26 nos. *
End connection	:	TC End*
Operating pressure	:	Up to 16 bar*
Operation	:	Manually Operated Ball Valve*
Make	:	Unison/Aira/Racer*
Non return Valve		
Type	:	Spring Loaded/ Disc Check Valve TC end *
MOC	:	SS304*
Size / Qty.	:	1" To 2" / 2 nos. *
Operating pressure	:	Up to 16 bar*
Make	:	Cipriani*

* To be specified and confirm by the supplier as per their equipment design



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DESCRIPTION	
(To be specified by the supplier, if any variation)	
3) Purified water storage & Distribution system	
Storage tank	
Capacity	: Working: 1000 liters *
MOC of all contact parts	: SS 316 L *
MOC of non-contact parts	: SS 304*
Type of tank	: Vertical, cylindrical , limped coil with insulation*
Design	: ASME Section VIII DIV-I*
Shell/Dish thickness	: 4 mm*
Insulation	: 50 mm thick Rockwool and SS 304 cladded *
Internal finish	: Electro-polished with finish,0.4 Ra*
Accessories	
Level Transmitter	: Capacitance type, SS316 L, 0-1000 ltrs, as per height of tank with TC end(1.5'') Make - E & H / Spink / Pune Techtrol / Krohne*
Compound pressure gauge	: Sanitary Type, Diaphragm Sealed Glycerine Filled 4" dia with diaphragm (-1 to 7 bar) , SS 316L,TC end (1.5'') Make - Baumer / Wika / Cole-Parmer / Bourden*
SS 316L Vent filter	: Size 4"x10" , Type Electrically heated Insulated & cladded - 1.5" TC end *
PP/PTFEVentCartridge	: Hydrophobic Type,0.2 x10" micron with code 7 cartridge electrical heat traced - 1.5" TC end Make:Sartorius /Parker*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Spray ball with assembly for return line connection	: 1.5"TC x360 degree, SS 316L, with adapter, and operating pressure 1 bar Make :Spraytech / Jetspray*
Tank outlet pipe and fittings	: SS 316 L, 2.0" ASME BPE, Make :Rensa / Reliant / Vishal*
Temperate sensor cum transmitter	: SS 304, PT 100 3 wire, 1/2" BSP, 150 mm long, with thermo well*
Two way manual diaphragm valve	: DN50 ,SS 316L with TC connection at tank bottom suction line Make : Mascon/Avcon/ Leistung*
Two way manual diaphragm valve	: DN25 SS 316L with TC end at tank drain valve Make : Mascon/Avcon/ Leistung*
TC clamp and Gasket	: As required*
Valve	
Actuated Angle seat valve	: SS 304, 25 NB, single acting actuator, TC end ,0 to 500 °C operating temperature *
Ball valve for Steam inlet	: SS 304, 1" TC end 3 nos., 0 to 500 °C operating temperature-3 nos.*
Ball valve for Steam condensate	: SS 304, 1/2" TC end , 0 to 500 °C operating temperature-3 nos.*
Manual ball valve for Jacket air vent	: SS 304, 1/2" 1 no., TC end ,0 to 500 OC operating temperature *
Pressure safety valve with blow down piping	: Brass/MS powder coated, spring loaded type, 1/2" at 0-5 bar and 0 to 500 OC operating temperature*
Steam Trap	: MOC :CS, 15 NB, TC end , pressure up to 10 bar , to 500 OC operating temperature*
Pressure Indicator	: SS 304, , 0 to 10 bar 4" dia , 1/2" BSPT, *
Steam Syphon	: Pig tail type, SS 304, 1/2" BSPT-M-F *
Accessories	: 1 Lot as per requirement.*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
4) Softener with cooling Tower&Re-circulation system	
Softener System	
Type	: Resin Base Ion Exchange *
Size	: 21" x 62"*
Mounting	: Vertical*
Assembly Accessories	: Manual Multiport Valve, Diffuser,Vaccum Breaker with Regeneration Port, Regeneration Tank (250L)and Drain Line*
Media	: Resins and pebbles* Resin Qty: 285 L For Each Vessel, Hardness Considered Max. is 325 ppm*
Capacity	: 3.0 m3/hr*
OBR	: 16hrs/ 48 m3*
Make	: Pentair*
MOC	: FRP Liner*
Raw Water Transfer pump	
Capacity / Qty.	: 3 m3/hr/ 1 No. *
Head	: 25 mWC*
Type	: Centrifugal*
MOC	: SS 304*
End connection/ Make	: TC/Flange/Union *
Make	: Grundfoss / Xylem / Wilo *

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Instruments	
Level Switch for raw water & soft water (2 nos.)	
Type	: Displacer Type Magnetic Level Switch*
MOC	: SS 304*
Probe length	: Based on Raw water storage Tank Height*
End connection	: ANSI 150# Flanged End*
Enclosure	: Cast Al. Weatherproof IP-66*
Switch element	: Micro S/W 2 SPDT (DPDT)*
Switch capacity	: 5A, 250 VAC/24 VDC*
Make	: Techtrol / Spink / Krohne*
Pressure Gauge (2 nos.)	
Type	: Bourden Type*
MOC	: 2" dial , SS 316 L *
Range	: 0 to 10 bar*
Sensing element	: Bourden gauge*
End connection	: Threaded*
Make	: Baumer / Wika / Cole-Parmer*
Pressure switches	
Range	: 0.2 to 7.5 bar*
Contact system	: Single pole change over switch (SPDT)*
MOC	: SS 304*
Power supply	: 24 VDC*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Enclosure	: IP 66*
End Connection	: Threaded End*
Make	: Danfoss / Festo / Euroswitch / SMC *
Flow indicator	
Range	: 400- 4000 LPH*
Installation	: Upward flow vertical installation*
MOC	: UPVC with PVDF float *
Working temperature	: Ambient*
End connection	: Union End*
Make	: Aster /Pratham/ Techtrol / Spink / Krohne*
Flow totalizer	
Size	: 1''*
Installation	: In line flow installation*
MOC	: UPVC*
Voltage and current output	: 100-230 VAC , 4-20 mA*
Working temperature	: Ambient*
End connection	: Threaded End*
Enclosure	: IP 67*
Make	: Aster /Pratham/ Techtrol / Spink / Krohne
Valves	
Manual Ball valve (3 numbers)	
Type	: 3 piece full port*
MOC	: UPVC*
Size / Qty.	: DN 15 TO DN 40 / 3 nos. *

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
End connection	: Union*
Operating pressure	: Up to 10 bar*
Operation	: Manually Operated Ball Valve*
Make	: Cepex/Pimtas*
Actuated Ball Valve	
Type/Make	: 3 piece full port*/Cepex/Pimtas*
MOC	: UPVC*
Size / Qty.	: DN 25 TO DN 50/ 1 no. *
End connection	: Union*
Operating pressure	: Up to 10 bar*
Non return Valve	
Type	: Spring loaded / Flap type*
MOC	: UPVC*
Size / Qty.	: DN 25 TO DN 50/ 1 no. *
End connection	: Union*
Operating pressure	: Up to 10 bar*
Make	: Cepex/Pimtas*
Sampling valve	
Type	: 3 piece design*
MOC	: UPVC*
Size / Qty.	: 8 mm / 2 nos. *
End connection	: Union*

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Operating pressure	: Up to 10 bar*
Make	: Cepex/Pimtas*
HYDROPNEUMATIC SKID	
Hydro pneumatic system (3.0 M3/hr @ 40 mWC) With Single VFD, 1 Nos.	
Pump Capacity	: 3.0 M3/hr @ 40 mWC*
Quantity	: 2 Nos
MOC	: SS304 *
Make	: Grundfoss / Xylem / Wilo *
Hydro pneumatic Pressure Vessel	
Capacity & Qty	: 100 Litrs, 1 Nos.*
MOC	: MSEP*
Instruments	
Pressure Gauges	
Type, MOC, Dial Size, End Connection	: Bourden Type, SS316L, 4", Screwed/ TC *
Range	: 0 to 10 Kg/Cm2*
Make	: Baumer / Wika / Cole-Parmer / Bourden*
Pressure Transmitter	
MOC, Size, End Connection, Qty	: SS316L, DN40, TC End, 1 Nos. *
Range, Operating Temperature	: 0 to 10 Bar, Ambient *
Input, Output	: 24VDC, 4-20 mA *
Make	: Jumo/ Keller / Radix *

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Flow Indicator	
Range	: 200- 2000 LPH, 300-3000 LPH*
MOC, Working Temperature, Quantity	: Acrylic, Ambient, 2 Nos. *
Installation, End Connection	: Upward flow Vertical Installtion, Union End *
Accuracy	: ± 4 mm *
Make	: Aster/ Spink / Krohne Marshall *
Valves	
Manual Ball Valves	
Operating Pressure,	: Upto 16 bar, 6 Nos. *
Operation, Operating Temperature	: Manually Operated Ball Valve, Normally Ambient *
Type, End Connection	: 3 Piece Full port, TC End
MOC, Size	: SS304, DN 25-DN40 *
Make	: Unison/Aira/Racer*
Non Return Valve	
Type & Qty	: Spring Loaded/ Disc Check Valve, 2 Nos.*
MOC, Size	: SS304, DN 25 - DN 40*
End Connection, Operating Temperature, Operating Pressure	TC End, Normally Ambient, Upto 16 Bar

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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Cooling tower	
Capacity	: 10 m ³ /hr *
Quantity	: 1 Lot *
HYDROPNEUMATIC SKID FOR RECIRCULATION OF SOFT COOLING TOWER WATER	
Hydropneumatic system (7.5 m ³ ./hr @ 40 mWC) With Single VFD, 1 Nos.	
Pump Capacity	: 7.5 m ³ /hr @ 40 mWC*
Quantity	: 2 Nos
MOC	: SS304*
Make	: Grundfoss / Xylem / Wilo *
Hydropneumatic Pressure Vessel	
Capacity & Qty	: 300 Litrs, 1 Nos.*
MOC	: MSEP*
Instruments	
Pressure Gauges	
Type, MOC, Dial Size, End Connection	: Bourden Type, SS316L, 4", Screwed/ TC*
Range	: 0 to 10 Kg/Cm ² *
Make	: Baumer / Wika / Cole-Parmer / Bourden*
Pressure Transmitter	
MOC, Size, End Connection, Qty	: SS316L, DN40, TC End, 1 Nos. *
Range, Operating Temperature	: 0 to 10 Bar, Ambient *
Input, Output	: 24VDC, 4-20 mA *
Make	: Jumo/ Keller / Radix *

* To be specified and confirm by the supplier as per their equipment design



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DESCRIPTION	
(To be specified by the supplier, if any variation)	
Flow Indicator	
Range	: 300- 3000 LPH, 600-6000 LPH *
MOC, Working Temperature, Quantity	: Acrylic, Ambient, 2 Nos. *
Installation, End Connection	: Upward flow Vertical Installtion, Union End *
Accuracy	: ± 4 mm *
Make	: Aster/ Spink / Krohne Marshall *
Valves	
Manual Ball Valves	
Operating Pressure,	: Upto 16 bar, 6 Nos. *
Operation, Operating Temperature	: Manually Operated Ball Valve, Normally Ambient *
Type, End Connection	: 3 Piece Full port, TC End
MOC, Size	: SS304, DN 25-DN40*
Make	: Unison/Aira/Racer*
Non Return Valve	
Type& Qty	: Spring Loaded/ Disc Check Valve, 2 Nos. *
MOC, Size	: SS304, DN 25 - DN 40*
End Connection, Operating Temperature, Operating Pressure	TC End, Normally Ambient, Upto 16 Bar

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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Distribution System for SOFT+RO+ Purified water:			
1) Soft water system			
Pipe & Pipe fittings			
Description	Make	Dimension	Qty.
Pipe:MOC : SS 304	Rensa /Reliant / Vishal	1.5"OD	385mtrs.
		1/2"OD	15 mtrs.
Elbow MOC : SS 304 Type : ERW	STD.	1.5"OD	56nos.
		1/2"OD	05nos.
TC Ferrule MOC : SS 304	STD.	1.5"OD	37nos.
		1/2"OD	03nos.
TC Clamp MOC : SS 304 Standard : ASTM A 270	STD.	1.5"OD	47nos.
		1/2"OD	04nos.
TC Gasket MOC : Silicon Standard Compliance : FDA Complied	Hiten /Eqv	1.5"OD	47nos.
		1/2"OD	04nos.
PH Clamp MOC : SS 304	STD.	1.5"OD	223nos.
		1/2"OD	18nos.
Stud MOC : SS 304	STD.	1/2"x50mm	73nos.
Standard Support MOC : SS 304 (round plate with stud)	STD.	1/2"x100mmx 80mm dia	150nos.
Anchor Bolt/ Panel Bolt MOC : SS 304	STD.	1/2" (M10x75mm)	305nos.
Anchor Bolt MOC :MS	STD.	1/2" (M10x75mm)	122nos.
Square Plate MOC :MS	STD.	100x100x6m m	61nos.
MS Angle	STD.	40x40x6mm	50nos.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION (To be specified by the supplier, if any variation)			
2) RO (Potablewater)			
Pipe & Pipe fittings			
Description	Make	Dimension	Qty.
Pipe MOC : SS 304	Rensa / Reliant / Vishal	1.0"OD	265 mtrs.
		1/2"OD	185 mtrs.
Elbow MOC : SS 304 Type : ERW	STD.	1.0"OD	80nos.
		1/2"OD	56nos.
TC Ferrule MOC : SS 304	STD.	1.0"OD	53nos.
		1/2"OD	37nos.
TC Clamp MOC : SS 304 Standard : ASTM A 270	STD.	1.0"OD	67nos.
		1/2"OD	47nos.
TC Gasket MOC : Silicon Standard Compliance : FDA Complied	Hiten /Eqv	1.0"OD	67nos.
		1/2"OD	47nos.
PH Clamp MOC : SS 304	STD.	1.0"OD	143nos.
		1/2"OD	103nos.
Stud MOC : SS 304	STD.	1/2"x50mm	133nos.
Standard Support MOC : SS 304 (round plate with stud)	STD.	1/2"x100mmx 80mm dia	102nos.
Anchor Bolt/ Panel Bolt MOC : SS 304	STD.	1/2" (M10x75mm)	204nos.
Anchor Bolt MOC :MS	STD.	1/2" (M10x75mm)	266nos.
Square Plate MOC :MS	STD.	100x100x6mm	133nos.
MS Angle	STD.	40x40x6mm	25nos.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION

(To be specified by the supplier, if any variation)

3) Purified water loop system SS 316 L with pumps & skid

Pipe & Pipe fittings			
Description	Make	Dimension	Qty.
Pipe MOC :SS316L Type: ERW Finish: Internal Electro polish (ra<.4µm), External Matt finish standard : ASTM A 270	Rensa /Reliant / Vishal	1.5"OD	800 mtrs.
Elbow MOC :SS316L Type: ERW Finish: Internal Electro polish (ra<.4µm), External Matt finish standard : ASTM A 270 Radius: 1.5D	Made from Parent Tube	1.5"OD	240Nos.
TC Ferrule MOC :SS316L Type : Rod Machined Finish: Internal Electro polish (ra<.4µm), External Matt finish standard : ASTM A 270	Made from Parent Tube	1.5"OD	160 Nos.
TC Clamp MOC :SS304 standard : ASTM A 270	Std	1.5"OD	200 Nos.
TC Gasket MOC :Silicon standard Compliance : FDA Complied	Hiten /Eqv	1.5"OD	200 Nos.
PH Clamp MOC :SS304	Std	1.5"OD	410 Nos.
Stud MOC :SS304	Std	1/2"x50mm	292 Nos.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Description	Make	Dimension	Qty.
Standard Support	Std	1/2"x100mmx80mm dia round plate with stud	118 Nos.
MOC :SS304			
Anchor Bolt/ Panel Bolt	Std	M10x75mm	236 Nos.
MOC :SS304			
Anchor Bolt	Std	M10x75mm	584 Nos.
MOC :MS			
Square Plate	Std	100x100x6mm	292 Nos.
MOC :MS.			
MS Angle	Std	40x40x6mm	180 Nos.
SS Square box			
		40x40x1.5mm	18 Nos.
Zero dead leg Valve for POU	Mascon/Avcon/ Leistung	DN40	27 Nos.
MOC :SS316L			
Diaphragm: EPDM Backed PTFE			
Manual Zero Dead Leg			
Size: Equal Inlet Outlet DN40			
Handle: ABS Plastic			
End Connection : TC			
Location: User point			
Temperature: Ambient-90 Degree Celsius			
Hose Nipple for Userpoints	Std	2"x1/2"/3/4"/1"	27 Nos.
MOC :SS316L			
End Connection : TC			
Location: User point			

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Process & Instrumentation with Skid for recirculation system			
Description	Make	Dimension	Qty.
PW distribution pump, Type : Centrifugal & Sanitary Application : water Internal surface finish : < 0.8 Micron Moc : Contact Part SS316L End Connection : Tc End Provided with casing drain Plug	Alfa Laval / Fristam / Inoxpa	5.2 m3/hr @ 8.7 bar	2 nos.
UV Sterliser in supply Application : water Internal surface finish : < 0.4 Micron Moc : Contact Part SS316L End Connection : Tc End Provided with casing drain Plug Wave Length: 254Nm Accessories: Hour meter, Intensity Monitor,Uv intensity Sensor Power Rating: 100 Watts Out Put: 4-20mA output Signal	Alfa Laval	5.2 m3/hr	1 no.
Two Way Manual Diaphragm Valve in supply line MOC: SS316L (Base) Diaphragm: (PTFE Backed by EPDM Rubber) Type: Manual Diaphragm valve Size: Equal Inlet Outlet End Connection : TC	Mascon/Avcon/ Leistung	DN 40	1 no.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Description	Make	Dimension	Qty.
Pressure Gauge for pump Discharge	Baumer / Wika / Cole-Parmer / Bourden	1.5"	1 No.
Type: Bourden Type			
MOC :SS316L			
Range:0 to 10 bar			
Sensing Element : Bourden Gage			
End Connection : Tc End			
Dial Size: 4"			
Pressure Gauge for Return line	Baumer / Wika / Cole-Parmer / Bourden	1.5"	1 No.
Type: Bourden Type			
MOC :SS316L			
Range:0 to 10 bar			
Sensing Element : Bourden Gage			
End Connection : Tc End			
Dial Size: 4"			
Sampling Valve (Diaphragm Valve)	Mascon/Avcon/ Leistung	8mm	4 No.
MOC :SS316L			
Diaphragm: EPDM Backed PTFE			
Type: Manual Diaphragm valve			
End Connection : Plain			
Conductivity Sensor & Transmitter in the return Line	Forbes Marshal/ Mettler/ Jumo	0 to 10 μ S/cm	1 No.
MOC :SS316L			
Type: Compensated type			
End Connection : Tc End			

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Description	Make	Dimension	Qty.
Temperature Sensor & Transmitter, in the return Line			
MOC :SS316L	Radix / Jumo / Keller	50MM	1 No.
Range : 0- 150°C			
End Connection : Tc End			
Vortex Flow Transmitter PW return Line			
MOC :SS316L	Krohne Marshal /Jumo / Radix/ Keller	DN 40	1 No.
Range : 0-9100LPH			
End Connection : Tc End			
TOC Analyzer			
Type: Dual Stream for PW and WFI loop	Mettler/GE	0 - 2000 ppb	1 Set
Location: In PW return line			
Two Way Actuated Diaphragm Valve			
MOC: SS316L (Base)	DN15	Mascon/Avcon/ Leistung	1 No.
Diaphragm: (PTFE Backed by EPDM Rubber)			
Type: Auto Diaphragm valve			
Size: Equal Inlet Outlet			
End Connection : TC			
Actuated 3-Way valve for Dumping			
MOC :SS316L, Diaphragm- EPDM + PTFE	IDMC/Leistung	DN40	1 No.
Type: Flow diverter valve			
End Connection : TC End			
Operating Pressure: 0-10 Bar			

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Process & Instrumentation with Skid for recirculation system			
Description	Make	Dimension	Qty.
Pipes, Fittings,Union,Bends,Tees,Skid Inter-connecting		1.5"	1 lot
Common Control panel for purified water generation, soft and potable water distribution system, PLC etc. Including electrical cabling from panel to all instruments, VDFs etc.	Allen Bradley/Siemens	-	1 no.
Skid Structure for Instrumentation and distribution System	*	STD.	1 no.
Closed Head Orbital Welding Joints	*	STD	1 lot
Internal Borescope of the Orbital Weld joint (10%)	*	STD	1 lot
Standard SS 304 support , anchor bolt ,Ms Square plate, Ms Angle SS square boxes etc.	1 lot as per site requirement		

MS Structural Platform 3x12 (W x L) meter
<ul style="list-style-type: none">• Size of 3x12 (W x L) meter MS structural platform and as per site condition.• To be made at site to access plant room from service areas.• This will act as a bridge in the void area between service area and WTP room (North - South direction).• The MS structural platform to be with made with structural sections to should take the load of the WTP tanks & Equipments leading to the plant locations.• The MS structural platform should have proper platform, railing etc. fully epoxy coated with all the required items.• Quantity – 1 Lot as per site requirement

- **Quantity of pipe and accessories may vary as per site conditions, bidders should submit rate for individual items.**
- **In Lot all items should be considered as per requirement, no extra payment should ask for any additional items required at site**

***To be specified and confirm by the supplier as per their equipment design**



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
5) DISTRIBUTION SYSTEM FOR SOFT WATER(SOFT WATER WITH COOLING TOWER)			
Pipe & Pipe fittings			
Description	Make	Dimension	Qty.
Pipe MOC : SS 304	Rensa / Reliant / Vishal	1"OD	200 mtrs.
Elbow MOC : SS 304 Type : ERW	STD.	1.0"OD	60 nos.
TC Ferrule MOC : SS 304	STD.	1.0"OD	40 nos.
TC Clamp MOC : SS 304 Standard : ASTM A 270	STD.	1.0"OD	50 nos.
TC Gasket MOC : Silicon Standard Compliance : FDA Complied	Hiten /Eqv	1.0"OD	50 nos.
PH Clamp MOC : SS 304	STD.	1.0"OD	110 nos.
Stud MOC : SS 304	STD.	1/2"x50mm	88 nos.
Standard Support MOC : SS 304 (round plate with stud)	STD.	1/2"x100mmx 80mm dia	22nos.
Anchor Bolt/ Panel Bolt MOC : SS 304	STD.	1/2" (M10x75mm)	44nos.
Anchor Bolt MOC :MS	STD.	1/2" (M10x75mm)	176nos.
Square Plate MOC :MS	STD.	100x100x6mm	88 nos.
MS Angle	STD.	40x40x6mm	28 nos.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION (To be specified by the supplier, if any variation)			
6) RECIRCULATION OF COOLING TOWER SOFT WATER (SOFT WATER WITH COOLING TOWER)			
Pipe & Pipe fittings			
Description	Make	Dimension	Qty.
Pipe MOC : SS 304	Rensa / Reliant / Vishal	1.5"OD	200 mtrs.
Elbow MOC : SS 304 Type : ERW	STD.	1.5"OD	60 nos.
TC Ferrule MOC : SS 304	STD.	1.5"OD	40 nos.
TC Clamp MOC : SS 304 Standard : ASTM A 270	STD.	1.5"OD	50 nos.
TC Gasket MOC : Silicon Standard Compliance : FDA Complied	Hiten /Eqv	1.5"OD	50 nos.
PH Clamp MOC : SS 304	STD.	1.5"OD	110 nos.
Stud MOC : SS 304	STD.	1/2"x50mm	88 nos.
Standard Support MOC : SS 304 (round plate with stud)	STD.	1/2"x100mmx 80mm dia	22 nos.
Anchor Bolt/ Panel Bolt MOC : SS 304	STD.	1/2" (M10x75mm)	44 nos.
Anchor Bolt MOC :MS	STD.	1/2" (M10x75mm)	176 nos.
Square Plate MOC :MS	STD.	100x100x6mm	88 nos.
MS Angle	STD.	40x40x6mm	28 nos.

Note: Mentioned quantity may vary as per site condition and actual requirement.



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Process & Instrumentation with Skid for recirculation system			
Description	Make	Dimension	Qty.
PIPE ERECTION / LAYING / WELDING OF PIPING PER MTR (Size- 1.0" / 1.5"OD) of Pipes, Fittings, Union, Bends, Tees, Skid Inter-connecting	—	1.0"	200 mtrs.
	—	1.5"	200 mtrs.
Control panel for recirculation of Cooling Soft water distribution system & Cooling tower, PLC etc. Including electrical cabling from panel to all instruments, VDFs etc.	Allen Bradley/Siemens	-	1 no.
Electrical Cabling	Polycab / Finolex	STD.	1 no.
Pneumatic Tubing with Accessories	Festo / Euroswitch / SMC	STD.	1 lot
Closed Head Orbital Welding Joints	*	STD	1 lot
Internal Borescope of the Orbital Weld joint (10%)	*	STD	1 lot
HYDRO TESTING & PASSIVATION	—	—	1 lot
Standard SS 304 support , anchor bolt ,Ms Square plate, Ms Angle SS square boxes etc.	1 lot as per site requirement		

Quantity of pipe and accessories may vary as per site conditions, bidders should submit rate for individual items.

In Lot all items should be considered as per requirement, no extra payment should ask for any additional items required at site



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ANNEXURE - V : ELECTRICAL DETAILS

DESCRIPTION		
(To be specified by the supplier, if any variation)		
Standard Operating Frequency	:	50 Hz
Standard Operating Voltage	:	230 /415V
Total power consumption	:	Vendor to specify *
Motor Details with rpm	:	Vendor to specify *
Gear Box Details (If any)	:	Vendor to specify *
PLC and HMI details	:	Vendor to specify *
VFD details (If any)	:	Vendor to specify *
Tower lamp	:	Vendor to specify *
Starter	:	*
Major Cabling details		
For Main supply (In client's scope)	:	*
For Main drive motor	:	*
End connection details	:	MCB or Sockets should be with equipment*
Earthing requirement	:	Arrangement should be with system
An Isolator Circuit breaker	:	To be supplied with machine at power supply in point of appropriate capacity by vendor. *
Cable length with equipment	:	*
<i>Any other detail not mentioned above, also to be included.</i>		
<i>Client will provide & connect the required cable in to vendor's panel. From machine panel to machine and its other accessories to be supplied and connected by vendor at site.</i>		

***To be specified and confirm by the supplier as per their equipment design**



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□

- ❖ Wiring between Panel and the Machine is in the Scope of Vendor. The exact measurements shall be taken by visiting the site.
- ❖ The Incomer to the Operating Panel shall be provided by HOMCO, however any Cable Trays or SS 304 Conduits required for the same shall be provided by the Vendor.
- ❖ Cable routing from Operating Panel to the Machine shall be done as per cGMP i.e. routing through Cable Trays outside Clean Room Areas and SS 304 Conduits inside Clean Room Areas.
- ❖ All the Component Makes should match the Approved Makes list provided. Any deviation from this should be documented and communicated to HOMCO.
- ❖ All Calibration Certificates are to be produced during Installation of Machine, without which the Installation is deemed incomplete. All the Certificates should be Traceable to National / International Standards.
- ❖ The Validity of Calibration shall be minimum 9 months and maximum 12 months from the date of Installation.
- ❖ All the Signal Cables should be shielded to avoid interference.
- ❖ Complete Earthing should be provided to Equipment.
- ❖ Complete covering of Electrical Cables and Other Connections.



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ANNEXURE - VI : SAFETY FEATURES

DESCRIPTION (To be specified by the supplier, if any variation)
Safety of system operation is of utmost importance.
All guards if any, to be with interlock switches. *
System to be provided with overload safety relay. *
In the event of malfunction or stoppage of utilities, the unit must contain all necessary protection devices to ensure that equipment and product remain in safe condition. *
System settings should not get disturbed due to power failure and should not Re-start without human intervention. *
Plant should indicate fault through audio / visual signal with details on Control panel/PLC (Failure mode detection). *
An easily accessible emergency stop to be provided on main control panel door. **
Lubricant should not come in product contact.*
Wherever possible, warning symbols should be provided.*

***To be specified and confirm by the supplier as per their equipment design**



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ANNEXURE - VII : SAFETY INTERLOCK

DESCRIPTION			
(To be specified by the supplier, if any variation)			
Following alarms shall be provided and categorized as critical (C) and monitor (M)*			
Sr. No.	Parameter	Control Action	Category
A.	PRETREATMENT SYSTEM :		
1.	No flow in raw water feed line	Alarm actuate & Dosing pump will trip and Actuated valve will close	C
2.	Low level in Dosing Storage Tank	Alarm actuate & Dosing pump will trip and Actuated valve will close	C
3.	Low level in water Storage Tank	Alarm actuate & Pump will trip	C
4.	Mid-level in water Storage Tank	Pump will start	M
5.	High Level in Raw water Storage Tank	Alarm actuates & Actuated valve will close and dosing pump will trip	C
6.	Mid-level in Raw water Storage Tank	Actuated valve will open and Dosing pump will start	M
7.	OBR Exceeds at outlet of Softener	Alarm generate for Regeneration	C
8.	Pressure Exceeds at Inlet of MGF	Alarm actuates & Feed pump will trip	C
9.	Low level in Soft water Storage Tank	Alarm actuate & Soft Water Transfer Pump will trip	C
10.	Mid-level in Soft water Storage Tank	Transfer Pump will start	M



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DESCRIPTION			
(To be specified by the supplier, if any variation)			
Sr. No.	Parameter	Control Action	Category
B.	RO-EDI SYSTEM :		
1.	High Level in RO Feed Water Tank	Actuated Inlet Valve will close & Transfer pump will trip and RO-EDI System will start	C
2.	Low level in RO Feed Tank	Feed Pump & RO System will start	M
3.	Low Low level in RO Feed Tank	Alarm actuate & Feed Pump & RO-EDI System will trip	C
4.	Low level in Dosing Storage Tank	Alarm actuate & Dosing pump will trip	C
5.	pH above action limit after pH dosing system (High pH)	Alarm actuates & actuate drain valve will open to drain and process line valve will close.	C
6.	ORP above action limit after SMBS dosing system (High ORP)	Alarm actuates & ORP dumping started & RO-EDI System will trip	C
7.	High ORP, dumping time elapsed	Alarm actuates & RO-EDI System will trip	C
8.	Low pressure at feed of High Pressure Pump-1 & 2 (LPS)	Alarm actuates & High Pressure Pump will trip.	C
9.	High pressure at discharge of High Pressure Pump-1 & 2 (HPS)	Alarm actuates & High Pressure Pump will trip.	C
10.	High conductivity at RO-EDI permeate	Alarm actuates & dumping valve will open & dumping time elapsed then RO-EDI System will trip	C
11.	High/Low pressure at EDI Inlet	Time elapsed then EDI System will trip	C
12.	Low flow at EDI concentrate inlet line	Alarm actuates & EDI will trip.	C
13.	Low flow at EDI Permeate line	Alarm actuates & EDI will trip.	C
14.	During Sanitization set point will achieved in Temperature Transmitter	Alarm actuates & Band Heater will stop	M
15.	Emergency button is pressed	Alarm actuates & trips RO-EDI system	C

Note: Alarms & interlock should be considered based on the critical parameters, operation, process requirements and safety.



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ANNEXURE - VIII : CLEANING TECHNIQUE

DESCRIPTION	
(To be specified by the supplier, if any variation)	
Mode of machine cleaning	: *
Use of Lubricants	: *
All contact parts should be easily dismantled and cleanable.	
If required CIP, please provide the details of CIP and water consumption for the same. *	
Drain points:Vendor should specify the pipe size and location of drain points required as per system requirement *	

ANNEXURE - IX : UTILITY REQUIREMENT

DESCRIPTION	
(To be specified by the supplier, if any variation)	
Steam	: *
Vacuum	: *
Compressed Air	: *
Raw Water	: *
Power	: *
Any other which is not mentioned but required	: *

***To be specified and confirm by the supplier as per their equipment design**



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ANNEXURE - X : PHYSICAL DETAILS

DESCRIPTION		
(To be specified by the supplier, if any variation)		
Dimension (In mm)	:	*
Net Weight (In Kgs.)	:	*
Type of Packing	:	*
Case Dimension (In mm)	:	*
Gross Weight (In Kgs.)	:	*
Foundation details if required	:	*

*** To be specified and confirm by the supplier as per their equipment design**



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ANNEXURE - XI : LIST OF ANCILLARY / ACCESSORIES / OPTIONAL ITEMS

DESCRIPTION

(To be specified by the supplier, if any variation)

- Optional Items (If any, Vendor should provide the list with rate) *
- Recommended Spares along with list & quantity (Vendors should submit with tender) *
- If any items required but not included in URS , to be mentioned and submitted with unit rate and quantity* **(And it can be indicate during pre-bid meeting in writing)**

Details of Bought out components to be specified.

Any other ancillary or accessories or optional items not mentioned above also to be quoted.

*** To be specified and confirm by the supplier as per their equipment design**

ANNEXURE - XII : TRAINING REQUIREMENT

- Training to all concern of HOMCO, Kerala for Installation, Operation, Maintenance and Cleaning of Blister Packing Machine should be provided by vendor and training record will be documented.
- Vendor shall support client in execution of all the Qualification Phases.



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ANNEXURE - XIII : DOCUMENTATION

List of all Documents to be supplied along with equipment [AS APPLICABLE]			
Sr. No.	Document to be supplied	Qty	Remarks
1	Design and operational qualification	2 sets	
2	SAT/FAT procedures and format	2 sets	
3	Operation manual / Maintenance manual	2 sets	
4	Spare parts manual	2 sets	
5	All engineering drawings (GA drawings)	2 sets	
6	List of instruments / Calibration certificates	2 sets	
7	Warranty / Guarantee	2 sets	
8	List of all components with referencing	2 sets	
9	Civil foundation drawings if required	2 sets	
10	Pre installation requirements	2 sets	
11	Installation requirements / Installation manual	2 sets	
12	Technical literature, data sheets and equipment catalogues	2 sets	
13	DQ, IQ, OQ, & PQ documents.	2 sets	
14	Calibration Report of all sensors, controllers, PLC, transmitters, indicators etc.	2 sets	
15	Test Certificates of all material of construction /Contact parts material composition test certificates / Surface finish test certificates	2 sets	
16	Test Certificates of the software used in machine control / monitoring system.	2 sets	
17	Orbital weld procedure / Orbital weld machine calibration certificate / Orbital welder qualification certificates / Boroscopic machine and operator certificate	2 sets	
18	Hydro test certificates / Cleaning & passivation reports	2 sets	
19	Pump performance curve	2 sets	



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ANNEXURE - XIV : TERMS AND CONDITIONS

Delivery Period	:	*
Payment Terms	:	Payment terms mentioned in the tender document.
Un-loading at site	:	By Vendor. <ul style="list-style-type: none">(If required, help for the arrangements of unloading can be done by client) Installation and in position at site by the vendor under the client's supervision
Taxes / GST	:	*
Material for Trial	:	To be arranged by client
Packaging and Forwarding	:	By Vendor
Installation and Commissioning	:	By Vendor
Submission of documents and drawings		
Submission of detail functional design specification and schematic drawings	:	Within a week after order finalization
Submission of FAT / SAT specification	:	2 weeks before FAT
Submission of IQ AND OQ documents	:	With equipment delivery
Drawings / diagrams	:	Within one week of receiving PO
The supplier should notify customer 2 weeks in advance of the beginning of FAT		
Catalogue, Equipment drawing, List of clients and year of establishment to be submitted along with quotation.		
<i>Any other terms, not mentioned above, also to be specified.</i>		

*** To be specified and confirm by the supplier as per their equipment design**



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ANNEXURE - XV : ABBREVIATION

1.	URS	:	User Requirement Specification.
2.	HOMCO	:	Kerala State Homeopathic Co-operative Pharmacy Ltd.
3.	DQ	:	Design Qualification
4.	IQ	:	Installation Qualification
5.	OQ	:	Operational Qualification
6.	PQ	:	Performance Qualification
7.	SS	:	Stainless Steel
8.	RHS	:	Right Hand Side
9.	MOC	:	Material of Construction
10.	KW	:	Kilo Watt
11.	HP	:	Horse Power
12.	RPM	:	Rotation Per Minute
13.	FLP	:	Flame Proof
14.	cGMP	:	Current GoodManufacturing Practices
15.	O&M	:	Operation and Maintenance
16.	GA	:	General Arrangement
17.	SLD	:	Single Line Diagram
18.	HOD	:	Head of Department
19.	QA	:	Quality Analysis
20.	MRP	:	Maximum Retail Price
21.	NMT	:	Not more than
22.	VFD	:	Variable frequency drive

Any other details, not mentioned in Annexure I to XIII, to be specified in the quotation/specification by the vendor.



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