भारतीय उष्णदेशीय मौसम विज्ञान संस्थान
(विज्ञान और प्रौद्योगिकी मंत्रालय, भारत सरकार का एक स्वायत्त संस्थान)
डॉ. होमी भाभा मार्ग, पाषाण, पुणे- ४११ ००८
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
(An Autonomous Institute of the Ministry of Earth Sciences, Govt. of India)
Dr. Homi Bhabha Road, Pashan, Pune - 411 008, India

TENDER DOCUMENTS

WS/IITM/RAD/ 2012/WTP
TENDER FOR THE WORK OF WATER TREATEMENT\SOFTENING PLANT FOR RADIANT COOLING SYSTEM COOLING TOWER OF CCCR OFFICE BUILDING
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE 411 008
VOLUME-I

ISSUED TO:
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ISSUING OFFICER

OFFICER MECHANICAL ENGINEERING WORKSHOP
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE 411 008

Tele : 020-2590 1505
Website: www.tropmet.res.in

TENDER NOTICE

1. Sealed **Turnkey basis** quotations are invited from reputed contractor of WTP Plant work with its supply, installation, testing and commissioning of the system.

Name of Owner: **INDIAN INSTITUTE OF TROPICAL METEOROLOGY PUNE.**
Name of Work: WATER TREATMENT PLANT TENDER FOR CCCR OFFICE BUILDING AT IITM, PASHAN, PUNE
Date of completion: **45 (forty five) days from the date of LOI.**

The Director,
Indian Institute of Tropical Meteorology
Dr. Homi Bhabha Road, Pashan, Pune - 411 008
Tel. No. 020 – 25904200

Note:-Tender documents also can be download from the Institute website www.tropmet.res.in

A. EMD : Rs. 10,000(Rs. Ten Thousand only)
B. Solvency: Rs. 3 lakhs Contractors shall produce banker's solvency certificate or revenue solvency certificate for value of Rs. Threee lakhs obtained not earlier than three months from last date.

Duly signed & stamped completed tenders shall be submitted in sealed envelopes at the office of Director IITM
Pune on address given below on **30\10\2012 at 12.30hrs.**

Indian Institute of Tropical Meteorology
Dr. Homi Bhabha Road, Pashan, Pune - 411 008
Tel. No. 020 - 25904200
Contact Person: Mr. Ravindra Bankar, Mechanical Engineer
Email: - ravindra@tropmet.res.in
Due Date and Time: - 30\10\2012 at 12.30hrs. and Technical bid will be open on 30\10\2012 at 15.00hrs.

The date of commercial bid opening will be intimated to technically qualified venders after evaluation of technical bids.

a) The Director IITM, Pune reserves right to accept or reject any or all the quotations without assigning any reasons.

b) This tender notice shall form part of Contract / Order.

ANNEXURE I

GENERAL:-

This item of specification relates to the design, drawing, supply of plant & equipment, erection, testing and commissioning of the Water treatment plant. All Civil work related WTP will be done by main civil contractor but will be supervised & approved by WTP vendor from time to time. The scope of work includes the entire electrical, mechanical, piping work within WTP area. Electrical Power up to WTP main Electrical panel will be arranged by electrical contractor further distribution will be WTP vendor's scope. The work is required to be carried out on a **'Turnkey basis'** covering a warranty of satisfactory performance as per standard laid for a minimum period of two year. The quoted priced shall be lump sum and cover entire work and services.

The tenders shall acquire themselves with site conditions and survey the allocated area for treatment plant before submitting offers. All units of WTP will be near cooling tower except the pump in well and should be of outdoor type.

DESIGN INPUT DATA:-

Please refer the water process diagram & UGR layout for the project. Inlet to WTP will be from site well water / Bore well water as well as from domestic water (PMC water). For design purpose vendor shall considered water test report of raw water as given along with the tender, capacity of plant shall be 1.5 m3/hr. Water will be pumped from site well to the Sintex tank of 10,000 lits. Also one connection of PMC (Pune Municipal Corporation) water will be done to this raw water tank. From this raw water tank water will be pumped to WTP units and treated water will be directly supplied to the sump of the cooling tower. Please refer the excel sheet for capacity and inlet & outlet parameters. All the vendors shall submit their Technical data for individual units in excel format only. Please note that pump from well to raw water tank and raw water tank to WTP is in vendor scope. Also piping from WTP to cooling tower is in vendor scope.

INSTRUMENTATION AND CONTROL EQUIPMENTS:-

These shall be adequately provided for an efficient, proper, trouble free operation and testing. Vendor shall detail out list of various equipment, instrumentation and controls provided along with cost and elaborate on control logics adopted for this plant.

INSPECTION AND COMMISSIONING:-

Testing and inspection in presence of PMC & IITM engineer

c) Mechanical and chemical testing shall be done for brought out material for vessels, fittings, valves, pumps and motor as required in codes / standards and test certificates shall be produced to the owner.
d) All pipes shall be tested hydraulically at 1.5 times as that of working pressure.
e) Dye penetration test shall be conducted for all weld joints.(only applicable for MS/GI piping)
f) Performance test for pumps.
g) Dimensional checks for all vessels including pressure testing.

COMMISSIONING:-

The commissioning shall be considered successful provided that the entire unit can operate continuously at the specified operating conditions and delivering the final results as per the specified requirements and meeting the stipulations laid down by client in annexure-A.

DRAWING / INFORMATION REQUIRED:-

Along with the proposal soft & hard copy

a) Process and instrumentation diagram for the complete system clearly indicating the scope of supply.
b) Process description of the entire system.
c) General layout drawing
d) Standard Catalogue
e) List of suppliers for brought-out items.
f) List of installation where similar type of work has been executed.
g) List of necessary spare parts required for two years of operations.
h) Design, drawing, providing, supply, erection and commissioning time schedule.

From Successful vendor (6 copies + 1 soft copy)

i) Final details of the items mentioned above for a,b,c,d
j) Piping layout details with levels.
k) Individual equipment GA and fabrication drawing along with design calculation.
l) Necessary civil drawings.
m) Operation and maintenance manual.
n) Final as built drawing 6 hard copes duly stamped & signed and one soft copy.

ANNEXURE II

CONDITIONS OF CONTRACT

1. **Definitions :** In the Contract (as hereinafter defined) the following words and expressions shall have meanings hereby assigned to them, except where the context otherwise requires:

Owner : *Shall mean* M/s IITM, Pune, India. *The term the Owner includes successors, assigns and affiliates.*

Chief Project Coordinator: *The Chief Project Coordinator shall be authorized by the Project manager to represent and act on behalf of the owner on a day-to-day basis during the execution of all packages of construction of the Project.*

Consultant : *Shall mean any person or persons duly appointed by the Owner / Architect to act as* ***'CONSULTANT'*** *to render consultancy services in any area / field of activity connected with and arising out of the Contract under a separate agreement setting out the consultant(s) responsibilities and terms.*

Contractor : *The Contractor shall mean the person or persons, firm, company or consortium whose tender has been accepted by the owner and includes the contractor's legal representatives, successors assigns and affiliates..*

Defects Liability Period : *Defect(s) Liability Period shall be the* ***24-month period*** *after Virtual Completion and any period extended as a result of rectification of the Work, between the Virtual Completion and the Final Completion of the Work, and during which period the Contractor shall be bound to replace and / or rectify and make good all defective materials, equipment and / or workmanship which arise in the Works or come to notice subsequent to the Virtual Completion of the Works and prior to the Final Completion of the Works.*

Site : *The Site shall mean the location* at IITM, ***Pune, India***

Virtual Completion : *Virtual completion will be deemed to have been achieved upon a virtual completion certificate being issued by the Chief Project Coordinator /Project Manager when the Work, according to the Owner and Project Manager, have been completed in every respect in conformity with the contract documents and are ready and fit for the intended purpose, complete with all systems and services having been tested and commissioned if as applicable.*

2. **Validity of Quotation:** The quotation shall remain valid for acceptance for a period of **90 days** from the last date of submission of quote.

3. Quoted offer: Shall be inclusive of all taxes including Works Contract tax, Sales Tax, Entry Tax & duties, Octroi, Turnover Tax, and all other Statutory Taxes and Levies if any applicable to the Contractors / Workers etc., and the Owner shall not be responsible in any way whatsoever to pay for the same. However the break-up of all taxes shall be given separately.

4. **Payment terms**:

70% of supply value against supply of material at site against invoice
20% of supply of installation on value against testing & commissioning

Balance 10% payment can be released on submission of bank guarantee from nationalized bank of equal amount valid for 24 months from the date of virtual completion certificate. Payment will be released to vendor after joint certification of material supply by PMC and IITM engineer.

5. **Taxes (Deductable):** All Taxes as applicable and prevailing as per the Government rules will be deducted at source (income tax, service tax etc.) and deposited directly to the appropriate Authority.

6. **Performance Guarantees:** The contractor shall guarantee performance of plant and equipment and workmanship against fault for a period of 24 (twenty four) months called as "Defect Liability Period". A certain percentage of work value 5% or as per payment terms shall be retained for the entire "Defect Liability Period" as security. Such retention can be released on furnishing performance bond in form of bank guarantee of equal amounts for 24 month in favor of owner.

7. **Period of completion:** Period required for completion of work after getting LOI (including monsoon) – One & half month. Shall be 45days on receipt of LOI.

8. **Mobilization Advance**: No Mobilization Advance will be paid.

9. **Penalty clause \ Liquidated Damage for non-completion of work within the scheduled/extended completion date:** If the contactor fails to complete the part /whole of works within the stipulated contract duration including extended dated of completion granted by the Employer, if any. Employer shall recover from the contractor the liquidated damages for such default a sum of **1%** (one percent) of the total accepted contract value per week or part thereof beyond the stipulated date of completion subject to a maximum of **10%** (Ten percent) of the total accepted contract value.

10. **Experience:** Contractor will have minimum 5 years of experience.

11. **Escalation:** No Escalation on any of the items or statutory levies will be entertained. Prices will be firm till the end of Contract.

12. The Owner or its authorized representative reserves the right of accepting the whole or any part of the quotation received and the contractor shall be bound to perform the same at the rates quoted.

13. **Quantum of work:** The contract is Turn Key contract, Lump sum type so quantity variations do not come in to picture. The Owner reserves the right to increase or decrease the scope of the Work on any or all items or to change the nature of the Work involved in any or all items or to completely delete any items of the Work under the Contract. The Contractor shall not be entitled to claim for loss of anticipated profits, for mobilization of additional resources, or for any other such reason on account of these change orders.

14. The Work shall be carried out under the direction and supervision of the Architect/Chief Project Coordinator/ Project Manager / IITM engineer at the Site. On acceptance of the quotation, the contractor shall intimate the name of his accredited representative (the "Contractor's Representative") who would be supervising the work / construction and would be responsible for taking instructions for carrying out the work. All commitments made by such representative shall be binding upon the contractor, and such representative shall be deemed to be the duly authorized representative of the contractor.

15. The Architect's / Owner's / Project Manager's decision with regard to the quality of the material and workmanship will be final and binding. Any material rejected by the Architect/Owner/ Project Manager shall be immediately removed by the contractor and replaced by material of acceptable and specified quality and standards.

16. No additional claims will be entertained for under utilization of tools, plant, machinery and manpower. De-mobilization, relocation of plant and machinery / mobilization of P&M, manpower cost for the extended period of the project due to project delays will not be entertained unless the work has been stopped by the owners/ Project Managers through a written letter.

17. **Type of Contract:** The Contract shall be a Turnkey Basis which includes design, drawing, construction, erection, testing and commissioning of the water treatment plant. The Contractor shall be entitled to payment, in Indian Rupees, of no more than the contract as stated in the Letter of Award, in consideration of the work performed and completion of the work. The Contractor understands and agrees that the amount payable is assessed on a re-measurable basis in accordance with the tendered rates. However, the contract price may be altered on account of a

change order. The contract price shall include payment for the supply of all labour (including payment to his sub-contractors), equipment, materials, power, water, plant and machinery, tools, transportation, framework, scaffolding and all applicable taxes, duties, octroi, levies, royalties, fees, insurance premiums, contributions towards employees benefits including ESI and PF and funds and all services and activities constituting the Scope of Work defined in the general conditions of contract. The contract price shall also include the contractor's establishment, infrastructure, overheads and all other charges, and shall generally be inclusive of every cost and expense required by the contract to be borne by the Contractor and necessary for the proper execution and successful completion of the Work under the Contract, in conformity with the Contract documents and the best engineering and construction practices and to the satisfaction of the architect, Chief Project Coordinator, owner's Representative and the Owner.

18. **Insurance:** Insurance for equipment, materials and labour involved in execution of the work upto to the date of handing over of this package. Before commencing the execution of the work, the contractor, without limiting his obligations and responsibilities under this contract shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the owner/ architect, sub-contractors, contractors or to any person including any employee of the owner / architect, sub-contractors, contractors or a member of the general public, by or arising out of the execution of the work or in carrying out the contract. It shall be obligatory for the contractor to obtain and retain for all relevant times the insurance cover under the following policies:

a. Contractor's All Risk Insurance Policy to inter alia cover the following:

i. Entire contract value including the contract price for the period of completion including defects liability period

ii.Third party insurance to cover for any damages to third party. This shall be up to the end of the defects liability period and shall include any damage to the properties and/or injury including death to the persons of the general public and any one else deemed to be third party.

iii. Civil commotion, riots, war and other disturbances.

b. Policy to cover contractor's liability under Workmen's Compensation Act 1923, Minimum Wages Act 1948, Contract Labour (Regulation and Abolition) Act 1970 and other relevant Acts listed elsewhere. This shall be for the period up to final completion of the work, including the defects liability period.

c. Insurance cover against damage or loss due to any reason in respect of materials, equipment and/or work done. Limit of liability shall not be less than the value of such materials at any stage of the contract, for the period of completion including defects liability period.

d. Automobile coverage

e. Commercial General Liability

f. Professional Indemnity including contractor, architect, consultants and owner's errors and omissions in contract documents.

The contractor shall insure against all such liabilities and shall continue such insurance during the currency of the contract including the defects liability period. Premium for all insurance policies shall be paid and borne by the contractor and shall not be reimbursable.

The contractor shall produce to the Chief Project Coordinator all certificates of insurance. These certificates shall be fully executed and shall state that the policies cannot be cancelled until completion of the contract.

The contractor shall obtain written confirmation of similar certificates from all sub-contractors and thereby assume responsibility for any claims or losses to the owner resulting from failure of any of the sub-contractors to obtain adequate insurance protection in connection with their work and shall indemnify the owner accordingly.

19. **Security:** The contractor shall be responsible for providing at his own cost proper adequate security for the materials and equipment belonging to the contractor and stored within the site. Contractor shall follow all the security rules of IITM

20. **Safety Equipment:** The contractor shall provide sufficient helmets, safety boots / shoes, PPE and protective clothing for use by all of their workmen on site. The Contractor shall make available at all times when work is being undertaken, a vehicle suitable for the emergency evacuation of personnel from the site to a hospital staffed and equipped to receive injured personnel.

21. **Communication facilities:** The key persons of the contractor's representatives including contractor's site Project Manager shall be provided with mobile phones at contractor's own cost. If the contractor fails to provide the same, the owner will arrange the same and the cost for the same will be recovered from the contractor's bills. All other supervisors to be provided with pagers.

22. **Child labour:** The contractor shall not employ any labourer under 18 years of age on this job. If female labourers are engaged, the contractor shall make necessary provisions at his own expense for safeguarding and care of their children and keeping them clear of the site at suitable crèches. No children shall be permitted to enter the site during construction.

23. **Co-ordination:** Contractor shall coordinate the work with the owners, architects, project managers, main project contractor, other contractors and various other consultants involved in the execution of the work.

24. **Extra / Non-Tendered Items:** Any extra / non-tendered items occurring in the works shall be worked out on the actual cost of material labour and P&M including provisions for overheads all taxes, levies and profits which includes ESI, WCT and Sales Tax components. For the entire extra / non-tendered items the same shall be got approved by the Architects and Project Manager before procurement and execution.

Rate only items, non-tendered / extra items and quantities exceeding the tendered quantities:

For all the above mentioned items a written variation order signed by the Owner's Representative/Project Manager has to be immediately obtained before procurement and execution. No payments will be entertained without the written variation order signed by Owner. **The onus shall be on the contractor to obtain such prior written variation order from the Owner's Representative and the Project Manager in order to be eligible for payments. If execution is completed without this written approval the cost of the same will have to be borne by the contractor.**

25. **Shop drawings:** The contractor shall prepare and forward shop drawings to architects / owner for their approval prior to execution / procurement along with relevant catalogues / manufacturer's drawings.

26. Electricity & water supply - IITM will provide these facilities at chargeable basis. Contractor shall have to make his own arrangement.
27. Maintenance of site while working is in contractor's scope.
28. Contractor shall submit detailed work schedule & BAR Chart along with tender document.
29. All section wise total amounts shall be written in words also.
30. Storage & office shed required for WTP is in WTP vendor's scope.

31. **Delivery:** The work shall be completed within the time period indicated in the attached in the Order.

32. **Meeting:** Contractor will be bound to attend all IITM meetings as well as site meetings (every week).

33. **Warranty:** The system shall have minimum warranty of Two years on all equipment's & parts.

34. Bar-Chart:

Contractor shall prepare bar chart and finalize the same in consultation with project management consultants. This bar chart will also indicate inputs from Project Consultants & Clients, Links with other works.

Following items shall be included;

a. Time required for each activity and their relationship with other agencies activity.
b. Quantities in each activity.
c. Resource planning such as equipment & tools to be employed and manpower to be employed for each activity.
d. Cost of each activity.

The Bar chart shall be reviewed in every site meeting. CONTRACTOR will be bound to provide the minimum resources shown in the bar chart. In case it is found at any interim stage that the PROGRESS OF WORK is slow and completion time of any activity is likely to extend beyond the target dates the CONTRACTOR will have to increase the planned resources. Provision of time will be made by the CONTRACTOR for other agencies to carry out their part of the work and such lapse of time will be considered by the CONTRACTOR in the planning schedule. No compensation will be paid for idle labour due to work of other contractors

35. Civil – Work:

Contractor & his site engineers will be responsible for monitoring correctness civil works executed by civil contractor. Necessary detailed drawings & follow up for such work will also be done by WTP contractor.

36. **Exclusions:**

- Civil construction for units. All drawing related to WTP i.e. location, detailed plan, sections & loading of equipment etc. will be given by WTP Vendor.
- Civil works for foundations and drains
- Chemicals during normal operation if any,
- Electrical supply at the plant.

37. AMC:

After completion of 2 year warranty, 3 year AMC charges should be separately specify in price bid(including taxes).

38. Response Time: Bidder has to provide minimum response time for attaining complains. Time required In case of emergency and major break down. As radiant cooling system has to work on 24 X7 and water is required to keep this system working.

Project Name :- IITM CCCR Office Building HVAC applications.

Client:- IITM, Pune

Sample from :- Well at site

	Raw Water Analysis Parameters.		HVAC Consultant requirement	Well water test report submitted by IITM
Sr. No.	Parameters	Units	Quality of make up	Results
			Water (" ACCEPTABLE"	
			make up Water chemistry	
			should fall within the	
			following limits)	
1	pH value	-	Between 6.5 to 8	8.3
2	Chlorides	mg/l	< 50 ppm	8
3	Total hardness (as $CaCO_3$)	mg/l	< 50 ppm	296
4	Sulphates	mg/l	< 50 ppm	12.69
5	Sulphides	mg/l	< 1 ppm	< 1
		mg/l	< 30 ppm	(reactive silica as
	Silica			SiO2) 8.39
7	Iron	mg/l	< 1 ppm	0.198
8	Manganese	mg/l	< 0.1 ppm	< 0.01
9	Suspended Solids (Non Abrasive)	mg/l	< 50 ppm	< 5
10	Oil & Grease	mg/l	NIL	0
11	Organic Solvents (Oil & grease)	mg/l	NIL	0
		mg/l	NIL	(BOD3 at 27
	Organic Nutrients (Biological Oxygen			Degree Celcius) 1.5
	Demand)			
13		mg/l	< 1 ppm	(Free residual
	Free Chlorine			Chlorine) < 0.006
14	Langlier Saturation Index	-	Between -0.5 and +0.5	0.82
15	Color	Hazen	< 5	< 5
16	Total Dissolved solids	md/l	< 500	512
17	Turbidity	NTU	< 5	0.5
18	Total Alakalinity as CaCO3	mg/l	< 200	308
19	Nitrates	mg/l	< 45	7.61
20	Free chloriforms	CFU/ml	<1	47
21	E.coli (Qualitative)	-	absent	present
22	Polynuclear Aromatic Hydraocarbons	mg/l	absent	not detected

Fully Automated Remote controlled system .

TECHNICAL SPECIFICATION

1. RAW WATER TRANSFER PUMP:

Quantity required : One No.
Material of construction : CI.
Capacity : 3.0 m^3/hr at 2.5kg/cm^2, head-25 m.
Make of material : Kirloskar/CRI/Eqvt.

2. MULTI-GRADE FILTER:

Numbers required : One No.
Normal operating flow rate : 3.0m^3/hr
Size of unit Dia × Ht. mm : 14"×65"
Material of construction : FRP
Normal operating pressure : 3.0kg /cm^2
Tested Pressure: 11.0 kg/cm2
Max. pressure drop : 0.5kg/cm^2
Flow control : Auto Multiport Valve
Media : Graded silex &sand
Make : Pentair/Aventura
Or

Dual Media Filter

Type	**Vertical**
Diameter	**16 Inch**
Height	**65 Inch**
MOC	**FRP**
Type of Operation	**Auto**
Back wash Time	**10-15 minute.**
Size of multi port valve	**1"**

3. ACTIVATED CARBON FILTER:

Numbers required : One No.
Normal operating flow rate : 3.0m^3/hr
Size of unit dia × Ht. mm : 14×65
Material of construction : FRP
Normal operating pressure : 2.5 kg/cm^2
Max. Pressure Drop : 0.5 kg/cm^2
Flow control : Auto multi-port valve
Media : Activated Carbon
Activated Carbon Make : VBD/Eqvt.
Make: Pentair/Aventura

4. ANTISCALANT DOSING SYSTEM:
Tank : One No.
Capacity of tank : 100 L
DOSING PUMP
No. required : One No.
Type : Diaphragm type electronic pump
Capacity : 0-6 LPH
Make : E-dose
Or

Anti Scaling dosing system

Pump	**1 Set**
Make	**Aqua Italy / E-Dose / Hi-tech**
Quantity	**1**
Type	**Electronic Diaphragm Type**
Capacity	**0 to 4 LHP**
Quantity of Tank	**1 Nos.**
Capacity of Tank	**100 Liters**
MOC of Tank	**HDPE.**

5. MICRON FILTER:
Quantity required : Two No.
Type : Disposable cartridge
Operating flow rate : 3.0 m^3/hr
Operating pressure : 2.5 kg/cm^2
Micron rating : 5 micron
Type of cartridge : PP spun
MoC : Polycarbonate.
Or

Cartridge Filter Housing

Flow rate	**3 M3/hr.**
MOC	**FRP**
Length of Housing	**20"**
Dia. Of Housing	**4"**
No. of Cartridge Housing	**2 Nos.**

Micron Cartridge Filter

Flow rate	**3 M3/hr.**
MOC	**PP**
Length of Cartridge	**20"**
Dia. Of cartridge	**4"**

6. HIGH PRESSURE PUMP:
Quantity required : One No.
Operating flow rate : 3.0 m^3/hr
Operating pressure : 12-14 kg/cm^2
Make of pump : Sumo /Grundfos./CRI
Type of drive : Single phase, 440 V, 60 Hz 2900 rpm.
Or

Pressure Pump

Type	**Vertical centrifugal multi stage**
No.	**1**
Make	**Grundfos**
Power consumption	**4 HP**
Flow	**4.5 M2**
Pressure	**10-12 Kg/CM2**

7. RO MENBRANE HOUSING:
Quantity required : Three No.
Material of pressure tube : FRP 4080
Element capacity : 02 No.
Max. working pressure : 300 psi
Make : Hi-Tech/Codeline/Maxima
Or

Pressure Tube

Item	**RO module consisting of membrane Housing With RO membrane mounted on skid.**
MOC	**SS**
Dia.	**4”**
Length	**42”**
Qty.	**5 Nos.**

8. RO MENBRANE:
Quantity required : Six No.
Dimensions : Dia-4”, Length–40”
Working pressure : 180 psi
Element : Spiral wound Membrane.
Make : Filmtech Dow (USA)/Hydronotics/Eqvt.
Pore size of semi-permeable membrane- 0.0001 micron diameters.
Or

Membrane

Type	**TFC POLYAMIDE**
Size	**4” dia. x 40”**
Qty.	**5 Nos.**
Make	**Flimtech(Dow)/CSM/ Hydranautics /Hi-Tech/Toray**
Rating	**0.0001 Micron.**

9. ELECTRICAL CONTROL PANEL

Quantity required : One no.
Material of construction : PLC based automatic Panel.
Make: Waterlife

INSTRUMENTS

1. Pressure Gauges (0-7 kg/cm^2) : 02 Nos.– 100mm Dia, L/AEqvt.
(0-15 kg/cm^2) : 02 Nos. – 65mm Dia, L/AEqvt.
2. Flow meters : 02 Nos. (One Reject & One Permeate)
3. Pressure limiting Switches : 02 Nos. Line mounted Adjustable.
4. Online digital conductivity Meter: CI-550 Aster
or

A	**Digital Conductivity OR TDS Meter**
Quantity	**1 Nos.**
Maximum Temperature	**40 Degree Centigrade**
Location	**RO Permeate.**
B	**Flow Indicators**
Quantity	**2 Nos.**
Type	**Float Type Panel Mounted.**
Maximum Op. Temp.	**40 Degree Centigrade.**
Measuring Points	**RO Module Product ,Waste Flow**
C	**Pressure Gauges**
Quantity	**4 Nos.**
Range	**0-4 & 0-35 Kg / Cm2.**
Location	
	1) After Feed Pump.
	2) After Dual Media Filter.
	3) After Micron Filter.
	4) After High Pressure Pump.
D	**High Pressure Switch And Low Pressure Switch**

Quantity	**1+1 Nos.**
Location	**Before & After High Pressure Pump.**
E	**Pressure Control Valve**
Location	**Reject Water Line**
Nos.	**1 Nos.**
Make	**Spring System USA.**
F	**Auto Flushing switch with Solenoid Valve.**
G	**Electronic Control Panel With A meter, Voltmeter, indicators, On off Switch**

All panels are out door type. All safety aspect should have to be consider.

PIPEING
UPVC ASTRAL
or
PIPE LINE

 CPVC pipe line from Feed Pump to Inlet of High Pressure Pump.

 SS pipe line from outlet of High Pressure pump to Membrane.

SKID

 SS 304 box pipe frame.

भारतीय उष्णदेशीय मौसम विज्ञान संस्थान
(विज्ञान और प्रौद्योगिकी मंत्रालय, भारत सरकार का एक स्वायत्त संस्थान)
डॉ. होमी भाभा मार्ग, पाषाण, पुणे- ४११ ००८
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
(An Autonomous Institute of the Ministry of Earth Sciences, Govt. of India)
Dr. Homi Bhabha Road, Pashan, Pune - 411 008, India

TENDER DOCUMENTS

WS/IITM/RAD/ 2012/WTP
TENDER FOR THE WORK OF WATER TREATEMENT\SOFTENING PLANT FOR RADIANT COOLING SYSTEM COOLING TOWER OF CCCR OFFICE BUILDING
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE 411 008

VOLUME-II
(PRICE BID)

ISSUED TO:
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ISSUING OFFICER

OFFICER MECHANICAL ENGINEERING
WORKSHOP
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE 411 008

Tele : 020-2590 1505
Website: www.tropmet.res.in

BILL OF QUANTITES

NAME OF WORK: - TENDER FOR THE WORK OF WATER TREATEMENT\SOFTENING PLANT FOR RADIANT COOLING SYSTEM COOLING TOWER OF CCCR OFFICE BUILDING
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE 411 008

Detail BOQ as per Bidder designed with amount and tax shown separately is required to attach with this document.

SR.NO	Description of work	QTY	AMOUNT
1.	WATER TREATEMENT\SOFTENING PLANT FOR RADIANT COOLING SYSTEM COOLING TOWER Taxes :	01	
	Total		

Total Amount including all taxes is: Rs. ----------(Rs.)

AMC Charges for First Year: ----------

AMC Charges for Second Year: ----------

AMC Charges for Third Year: ----------

Signature of Bidder