



क्रय अनुभाग  
वन अनुसंधान संस्थान  
देहरादून-२४८००६  
GSTIN 05AAAAI1708G2Z6  
PAN NO. AAAAI1708G

Purchase Section  
Forest Research Institute,  
DEHRADUN-248006  
Phone: 0135-2224205  
http://fri.icfre.gov.in/tender/  
Email: po\_fri@icfre.org



## निविदा दस्तावेज/ Tender Document

Ref. No X-71/ECC(SOIL)/PBK/AICRP/2019-20

Date: 13/02/2020

Physical Bids under two bid systems (Technical and Commercial) are invited from the reputed manufacturer /authorized supplier/dealer for the following items. The bids complete in all respect must reach to the Purchase Officer, Purchase Section, Forest Research Institute, P.O. New Forest, DEHRADUN-248006 Uttarakhand, India on or before:

Date	28-02-2020	Time	03:00PM
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### वस्तु की तकनीकी विशिष्टताये / Technical Specification of item:

Sr. No.	Name of item / Specifications/	Quantity	EMD (Rs.)
1.	Water Purification Systems	01	20,000/-
2.	Automatic Nitrogen Estimation System	01	20,000/-
(For Detailed Technical Specification Plz refer Annexure-VI)			
नोट-1: कृपया वस्तु का मूल्य एवं कर अलग-अलग दर्शाए / Please quote the rate & Taxes of the item separately.			
Note-2: E-way bill is to be issued by the Venders/Transporter			
Note-3: The HSN / SAC Code of the item must be mentioned.			
For Reasonability of Rates, The firm must enclose the last two supply orders for the same item with Financial Bid (Annexure-IV) only.			
Technical Clarifications:	Dr. Parul Bhatt Kotiyal	Forest Soils Discipline(Forest Ecology & Climate Change Division)	Ph: 0135-222-4406 Email: kotiyalpb@icfre.org

### Chapter-1: Instruction to bidders

A. The Tender should be enclosed with proper certifications like Agency Certification, Authorization certificate and /or Proprietary Certificate, as the case may be, in support of your offer.

B. बोली का जमा किया जाना / Submission of Bids:

- The bids should be submitted in two parts-
  - The Technical Bid (Annexure-I,II,III and VI with Supporting/Required documents) and
  - The Financial Bid (Annexure-IV & V).
 Both in separate sealed covers and then these two sealed packets (with the identification statement clearly written- Technical Bid or Financial Bid) should be put in one covering sealed envelope labeled on the left hand top corner of their envelope mentioning followings:

Ref. No X-71/ECC(SOIL)/PBK/AICRP/2019-20

Bid Submission End Date/Time: 28-02-2020 by 03:00 PM

Name (in full) and complete address of the firm should be mentioned on left hand bottom corner of the covering envelop.

- The bids should be printed on official pad preferably with GST Number of the firm.
- The quotations should bear full details and where possible may be duly supported with catalogues, pamphlets, literature, samples of the item/items as the case may be for comparing the quality and rates of the item(s).
- Quotation received after the closing date and time shall not be considered.
- The transportation cost, insurance charge etc., if any, Percentage/ rate of GST or all other taxes and duties should be clearly mentioned.
- The bids / rates / tenders should remain valid for a minimum period of 45 days from the date of opening.
- Since this purchase being for research purpose, the Forest Research Institute, Dehradun is registered in DSIR, New Delhi; it is therefore exempted from the payment of custom duty / GST up to the limit of exemption as per the Govt. Rules. The bidder should quote accordingly.
- There should not be any over-writing or cutting on rates quoted. However, all cutting/corrections must be duly authenticated else the offer will be rejected.
- The rates shall not be subject to escalation of any nature.
- The rates quoted should be applicable to educational institutions and any cost advantage received in lieu thereof should be passed on the Institution.
- While quoting/ sending rates, the firm shall give an undertaking as per Annexure-II.
- The quotations should be given for the items in the same order as in the enquiry letter.

C. निविदा शुल्क/ Tender Fee एवं/and अग्रिम धन राशि / Earnest Money Deposit (EMD)



The Technical Bid should accompany Tender Fee of Rs.590/- (including 18% Service Charge) in the form of Demand Draft only and an amount of EMD mentioned at the first page of this tender document only for the equipment(s) bidding by the bidder in the form of FDR only, issued only from any nationalized bank of India drawn in favour of "Director, Forest Research Institute, Dehradun" valid 90 days beyond the validity period of bid. The bids received without Tender Fee and EMD will be rejected.

Bidders registered with MSME/NSIC/KVIC etc as per Public procurement policy for Micro & Small Enterprises (MSE) order 2012 are exempted categories from payment of Tender Fee and EMD provided that the registration certificate issued by any one of these below mentioned agencies must be valid as on close date of tender.

**D. निष्पादन बैंक प्रत्याभूति / Performance Bank Guarantee (PBG):**

5% of the cost price in the form of Bank Guarantee or FDR pledged in favour of "Director, Forest Research Institute, Dehradun" is required at the time of installation of the equipment from the successful bidder only which should remain valid at least during the warranty period plus sixty days.

- 1) The technical Bids will be opened as given below. Representatives of the firms (s) may be present at the time of opening the technical bid if they so desire at below schedule (No information shall be given to the late arrivals regarding the bids):

<b>Bid Submission Opening Date/Time:</b>	<b>28-02-2020</b>	<b>04:00 PM</b>	<b>Venue: Purchase Section, Main Building FRI Dehradun</b>
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- 2) The Financial bids of only the Technically Qualified bidders will be opened. The date and time for opening the Financial Bid will be communicated to the respective firm later on by post/e-mail.
- 3) Representatives of the firms (S) may be present at the time of opening the financial bids if they so desire.

**Chapter-2: Conditions of Contract**

**A. कार्य अनुबन्ध / Award of Contract:**

The final selection of the bidder for the award of the contract will be made on the basis of the lowest commercial bid amongst the Technically Qualified Bidders.

**B. पूर्व आपूर्ति निरीक्षण/ Pre-supply Inspection:**

Authorized representative of the Institute shall make the final inspection before supply of the item at site of the firm, if required.

**C. वस्तु की आपूर्ति / Supply of Item:**

The whole supply as per order shall have to be completed within the time mentioned in the order failing which the FRI Dehradun shall have the right to accept or reject any quantity of items ordered. The firm will have to arrange for supply of the material/equipment in good condition.

**D. भुगतान की शर्तें / Payment Terms:**

**1) Payment in INR for supply of goods:**

Where installation is not required: 100% payment will be made after satisfactory delivery of material duly certified by the HOD.

**OR**

Where installation is required: 100% payment will be made after satisfactory delivery and installation of the material duly certified by the HOD.

**OR**

100% Advance will be paid against submission of 110% Bank Guarantee of the Total Order value.

**2) Payment in INR for AMC/CMC/Service:**

Quarterly/Half yearly after satisfactory completion of work/service duly certified by the H.O.D./P.I.

**3) Payment in Foreign Currency for supply of goods:**

Payment will be made as below after deducting Indian Agency Commission (if any). IAC is payable in Indian Rupee after satisfactory installation.

- (i) Payment through Letter of Credit (LC).
- (ii) Payment 100% through Sight Draft
- (iii) Payment through Wire transfer after receipt of material in good condition.

**4) Payment in Foreign Currency for AMC/CMC/Services:**

Quarterly/Half yearly after satisfactory completion of work/service duly certified by the H.O.D./P.I. through wire transfer.

**E. दंड/ Penalty:**

A penalty of 0.5% of the total order value per week shall be levied for the delay subject to a maximum of 5% of the total order value. In case of the non-supply of the item after the acceptance of the work/supply order, EMD will be forfeited by the Institute.

**F. अप्रत्याशित घटना/ Force Majeure:**

For the purpose of and within the scope of contract by way of indication and not of limitation, the term "Force Mejeure" shall mean acts of nature, strikes, Lockouts, or other industrial disturbances, act of public/enemy, wars, blockades, insurrection, riots, epidemics, landslides, earthquakes, storms lightening, flood, washouts, civil disturbances, explosion and any other similar even not within the control of either party on which by exercise of due care and diligence neither party is able to prevent or overcome.

**G. मध्यस्थता/Arbitration:**

In the event of any difference or dispute arising out this work, all effort shall be made by both the parties to settle the same amicably. Failing an amicable settlement, the dispute shall be finally settled through arbitration conducted under the Arbitration and Conciliation Act 1996, by arbitrators appointed in accordance with the said Act. The arbitration shall give reasoned and speaking award. All disputes are subject to Dehradun jurisdiction only.

**H. बोली अस्वीकृती के लिए मानदंड/ Criteria for bid rejection:**

- 1) If not received on or before due date and time.
- 2) If technical bid found without the required undertaking (Annexure-II).
- 3) If it found at a later date that any information given in the bids is incorrect/false then the bid is liable to be disqualified/rejected.
- 4) Canvassing in any form will result in disqualification.
- 5) If "extra, as actual" etc. are mentioned against any of the price components in the bid the bid will be rejected.
- 6) Technical bids should be sealed. More cover, Financial / Commercial bid should also be sealed separately. The sealed envelopes of technical and financial bids should be further put in the main envelop. Main envelop should be sealed. If the financial bid envelop is found opened/unsealed, then bid shall be rejected outrightly.
- 7) If any bidder submitting two/multiple bids for the same of a tender, both/all the bids if that bidder will be outrightly rejected.



8) If the firm quotes 'NIL' charges/ consideration, the bid shall be treated as unresponsive and will not be considered.

I. सत्यनिष्ठा संहिता / Code of Integrity

False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for upto 2 years as per rule 151 (iii) of the General Financial Rules along-with such other actions as may be permissible under law.

Chapter-3: Schedules of requirements

A. टिप्पणी/Note:

- 1) If the Supplier/firm is manufacturer/authorized dealer/sole distributor/of the item, the certificate to this effect should be attached.
- 2) Please note that the firms must submit the compliance Statement in an organized and structured manner in respect of all the specifications as per Annexure-V with the supporting printed catalogue/leaflet of the firm. **Annexure-I, II, III & VI have to be submitted with Technical Bid and Annexure-IV & V with Financial Bid.**
- 3) It may also be noted that the tender bids received after the stipulated date & time or found incomplete and tender bids containing false/incorrect information shall be summarily rejected. The Institute shall not entertain any communication in this regard, whatsoever.
- 4) The firm is required to give its Bank Account details with IFSC for the purpose of making e-payment.
- 5) The Forest Research Institute (FRI) Dehradun reserves the right to reject any quotation wholly or partly without assigning any reason.
- 6) The quantity shown against the item is approximate and may vary as per demand of the Institute at the time placing order.
- 7) The decision of the Institute in all matters relating to eligibility, acceptance, rejection of the bid will be final and binding on the applicants.
- 8) Forest Research Institute (FRI) Dehradun discourages High Sea Sale Purchase. All tenders with High Sea Sale will be rejected.
- 9) The firms should clearly mention (in the financial bid) the Harmonized System of Classification (HS code) defined by the Central Custom and Excise Board (Govt. of India) for the item (s) involving import.
- 10) If the due date happens to be a holiday, then the bid will be accepted till 03.00 PM and opened at 04.00 PM of the next working day followed by the holiday.
- 11) If an agent submits bid on behalf of the Principal/OEM, the same agent can not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
- 12) **Indian Agent should submit the certificate from the Foreign Principal that they are the Authorized & Registered Indian Agent.**
- 13) The quantity shown in the tender can be increased or decreased to any extent depending upon the actual requirement. Any corrigendum/addendum/errata in respect of the Tender Notice/ Enquiry letter shall be made available only at our Institute website <http://fri.icfre.gov.in/tender/>. Hence prospective bidders are advised to visit the Institute website regularly.
- 14) Bidders shall be responsible for the correctness of the information provided in the enquiry letter/tender document. If it is found at a later date that any information given in the bid is incorrect/false then the bid is liable to be disqualified/rejected.
- 15) Institute will not be responsible for non-receipt of bid(s) within the stipulated date due to any postal delay or delay for any other reason in transit.
- 16) Before submission of bids, bidders should read the complete enquiry letter/tender document carefully and ensure that the bidders fulfill the eligibility criteria.
- 17) In case the item /product is under rate contract with DGS&D or GeM, then bidder should certify that the rate quoted is not over and above (higher side) the rates under RC with the DGS&D or GeM.
- 18) In case calculation mistakes are found in the financial bid, then calculation shall be made by the Institute on the basis of rate per unit quoted by the bidders will be processed further.
- 19) The Institute reserves the right to rectify any discrepancy of this advertisement, if found later on. In case of any inadvertent mistake in the process which may be detected at any stage even after the issue of purchase order, the Institute reserves the right to modify/withdraw/cancel any communication made to the bidder.

Chapter-4: Specification and allied Technical details

Plz. See Annexure-I, II, III & VI

Chapter-5: Price Schedule (to be utilized by the bidders for quoting their prices)

Plz. See Annexure- V

Chapter 6: Contract Form

Purchase Order is used as Contract Form

Chapter-7: Other Standard Forms, if any to be utilized by the purchaser and bidders

Plz. See Annexure - IV

  
[PURCHASE OFFICER, FRI]



## तकनीकी बोली

(To be given on Company Letter Head)

विस्तृत विवरण अनुपालन रिपोर्ट के साथ प्रस्तुत किया जाना है (अपने आधिकारिक लेटरहेड पर विक्रेता/ फर्म द्वारा प्रस्तुत करने के लिए)

Detailed specification cum compliance report to be submitted with the Technical Bid

(to be submitted by the vender/firm on its official letter head)

(For Detailed Technical Specification Plz refer Annexure-VI)

Sr. No.	Name & Required Specifications of item (s)	Qty.	EMD	Offered specification of item (s) by the firm
1.				
2.				

	Firm's Profile
1)	Manufacturer/Authorized Agent/Distributor/Dealer/Supplier (Valid certificate must be attached)
2)	E-mail ID & Telephone/Mobile No. Detail of Bank A/C
Note:	(i) "Offered specification" should be filled up properly in the format provided as per Annexure-I
	(ii) Volume & Weight of the item should also be mentioned.
	(iii) The HSN / SAC Code of the item must be mentioned.

Signature:

Name:

Designation:

Seal of the Organisation



## उपक्रम/UNDERTAKING

## TENDER ACCEPTANCE LETTER

(To be given on Company Letter Head)

Date: .....

To,

Director  
Forest Research Institute  
Dehradun-248006

**Sub: Acceptance of Terms & Conditions of Tender.**

Ref. No X-71/ECC(SOIL)/PBK/AICRP/2019-20

Date: 13/02/2020

**Agreement/Contract Form**

Dear Sir,

- (i) I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from (including all documents like annexure(s), schedule(s), etc.), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.
- (ii) The corrigendum(s) issued from time to time by your department/organization too have also been taken into consideration, while submitting this acceptance letter
- (iii) I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.
- (iv) I / We do hereby declare that our Firm has not been blacklisted/ debarred / banned by any Govt. Department/Public sector undertaking.
- (v) I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organization shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.
- (vi) It is certified that the rate quoted is not over and above (higher side) the rates under RC with the DGS&D or GeM.

Signature:

Name:

Designation:

Seal of the Firm/Agency



## CHECK LIST

Sl No	(A) Qualifying documents	Yes/No	Page No.
1.	<b>Tender fees for Rs. 590/- (including 18% Service Tax)</b> in shape of crossed D.D in favour of Director, Forest Research Institute, Dehradun or Signed and scanned copy of Exemption certificate like MSME, KVIC, NSIC etc.		
2.	<b>EMD for item No. (1) of Rs. 20,000/- and item No (2) of Rs. 20,000/- in shape of FDR in favour of Director, Forest Research Institute, Dehradun or Signed and scanned copy of Exemption certificate like MSME/ NSIC/KVIC etc.</b>		
3.	Signed and scanned copy of <b>AUTHORIZATION</b> certificate, if applicable.		
4.	Signed and scanned copy of <b>PAN</b> card		
5.	Signed and scanned copy of <b>TENDER ACCEPTANCE LETTER</b> as per tender document Annexure II.		
6.	Signed and Scanned copy of <b>GST</b> certificate, if applicable.		
7.	Signed and Scanned copy of Affidavit of <b>PARTNERSHIP DEED</b> , if applicable.		
8.	Signed and Scanned copy of <b>AUDITED BALANCE SHEET</b> of last two years.		

Sl No	(B) Technical Documents	Yes/No	Page No.
1.	Signed and Scanned copy of the self certification only from the local suppliers that the item offered meets the minimum local content ( <b>50 % or more Indian manufactured parts are used in the item by cost/value</b> ) and shall give the details of the location at which the local value addition is made, wherever applicable.		
2.	Scanned and signed copy of users list and supportive documents from the users for the satisfactory performance and after sales service showing. The firm must enclose the last two supply orders for Reasonability of Rates.		
3.	All specifications should be certified and guaranteed for <b>GENUINENESS &amp; BRAND NEW ITEM</b> and that the model of the equipment is <b>NOT GOING TO BE OBSOLETE</b> in near future (5 years) (Scanned and signed copy of supportive documents from the Principal to be enclosed).		
4.	<b>AVAILABILITY OF SPARES/PARTS</b> for next five years to be ensured (supportive documents from the Principal to be enclosed)		

**Note:**

1. It is compulsory to fill the above check list with pagination.
2. The document should be submitted/uploaded online in CPP portal in the above order of the check list and place the check list as cover page with pagination of documents.
3. In the absence of any of the qualifying documents, the bid shall be rejected.
4. Tender fee:-The tender form downloaded from above web sites must include **Rs. 590/- (including 18% Service Tax)** by crossed Demand Draft in favour of Director, FRI as tender fee and be submitted by post/hand to Purchase Officer, Forest Research Institute, Dehradun-248006 on or before the opening date of technical bid, and the scanned copy of the same should be uploaded in the CPP Portal before date-time of submission technical bids.

Signature:

Name:

Designation:

Seal of the Firm/Agency



## Financial Bid

(To be submitted by the vendor/firm on its official letter head)

Ref. No X-71/ECC(SOIL)/PBK/AICRP/2019-20

Dated: 13/02/2020

Rates:						
Sr. No.	Name of item / Specifications/	Qty.	Unit Rate (Rs.)	Amount (Rs.)	GST etc. @.....%	TOTAL (Rs.)
1.	Water Purification Systems	01				
2.	Automatic Nitrogen Estimation System	01				
Total						
Grand Total Rs.						

- 1) Price of the items should be clearly mentioned if supplied Free of Cost.

## Term &amp; Conditions:

Prices (if quoted in Rs.):

FOR FRI, DEHRADUN

1. Prices (if quoted in Foreign Currency) : CIP/CIF New Delhi OR FOB/FCA/Ex-Work

2. Payment:

3. Validity:

4. Delivery period:

5. Other Charges:

6. Warranty:

Onsite 03 Years

7. Rejection:

Equipment if found not as per the required specification would be rejected.

8. Penalty Clause:

As per clause-E of enquiry letter.

In case of the non-supply of the item after the acceptance of the work/supply order, EMD will be forfeited by the Institute.

9. PBG:

5% of the cost price in the form of Bank Guarantee or FDR pledged in favour of "Director, Forest Research Institute, Dehradun" is required at the time of installation of the equipment which should remain valid at least during the warranty period plus sixty days.

It is certified that the rate quoted is not over and above (higher side) the rates under RC with DGS&D or GeM.

## Signature:

Name:

Designation:

Seal of the firm/Organisation



## Mandatory field to fill up by the supplier (enclosed with financial bid only):

Ref. No X-71/ECC(SOIL)/PBK/AICRP/2019-20

Date: 13/02/2020

1. Please tick (v) carefully the followings as per requirement:

- A. Customs Duty Exemption Certificate (with following supporting document) [ ]
- (i) GATT Declaration
- (ii) Authority letter for custom Clearance
- (iii) Bank Release Order (BRO)
- (iv) .....
- (v) .....
- (vi) .....
- (vii) .....
- B. Road Permit / Trade tax Declaration (against Form-32). [ ]
- C. GST Exemption Certificate. [ ]

2. Please fill up the following details:

- A. Complete address of Freight Forwarder, Air lines etc. in whose favor Bank Release Order (BRO) has to be issued:

M/s .....

- B. Complete address of Custom House Agent (Cha)/ Clearing Agent in whose favor GATT / Authorization for custom clearance has to be issued.

M/s .....

- C. Complete address of the firm / supplier / CHA to whom original clearance documents will be sent:

M/s .....

3. Supplier has to submit above details with the financial bid wherever possible and has to send the above detail to .....and our CHA well ahead in time prior to shipment.

4. Forest Research Institute, Dehradun Custom House Agent (CHA) Address

M/s Cwick (Import Consolidation), Private Limited,  
L-II/101, New Mahavir Nagar Extension,  
Outer Ring Road, New Delhi-110018,  
E-mail: info@cwickimport.com and followup@cwickimport.com  
Tel: + 91-09313996082, + 91-11-25996082, + 91-11-25992781

5. Details of Institute:

Import Export Code (IEC code FRI)	0100000011	
AD CODE	02900682870007	Union Bank of India, Main Branch, Rajpur Road, Dehradun-248001



## Item No. 1 Water Purification Systems

## Specification

- Water Purification system capable of independently dispensing both Type I and Type II water.
- Type II able to use tap water as feed (able to accept upto 2000 micro Siemens conductivity)
- Tap water should be treated in a pre-treatment cartridge for efficient removal of particles, colloids, free chlorine and hardness
- Reverse osmosis step should be water conservative and should ensure constant flow rate and optimal water quality
- All the cartridges used should have considerable life
- Should have electro deionization or other equivalent or superior technology for removal of ions
- The resin beads used should be of superior quality and should not degrade by exposure to harsh chemicals
- The Resin beads should be able to be continuously regenerated without affecting its quality
- The module should be able to continuously regenerate its beads used. Thereby effectively reducing operational cost
- The cartridges should be easily replaceable
- The replacement cartridges should not be very expensive
- The Equipment should have a low maintenance cost
- The generated water should be treated with UV to destroy bacteria, before it is stored in the storage tank
- The storage tank should be capable of maintaining the purity of stored water
- A vent filter should be there for preventing airborne contamination.
- Biofilm formation should be prevented
- The water dispenser should be designed such that various small filters/cartridges can be Connected for obtaining specific quality water for different research needs (Ultra pure water free of particulates, pyrogens, nucleases, VOCs, endocrine disruptors and organics for LC.
- Should be able to dispense pre assigned volume of water
- Production rate minimum 5L/h
- Should have calibrated meters for continuous monitoring and display of water quality parameter
- Should have customizable alert and alarms.
- Should have certificate of calibration from recognized international agencies
- Should have certificate of conformity from recognized international agencies
- Should meet internationally recognized safety norms
- Prompt services should be available
- A minimum warranty for one year.
- AMC terms & conditions beyond the warranty period to be specified

**Water Purification system for Type II quality water. 3) An integrated water purification system capable of producing and dispensing both Type I and Type II water**

- Type I water with the following properties





- Resistivity ( $M\Omega\text{-cm}$ ) =  $18.2M\Omega\text{-cm}$  @ 25 deg C
- Conductivity ( $\mu\text{S/cm}$ ) <  $0.055 \mu\text{S/cm}$
- TOC  $\leq 5\text{ppb}$
- Bacteria <  $10\text{CFU}/100\text{mL}$
- Pyrogens (endotoxins) <  $0.001\text{EU/mL}$
- RNases <  $1\text{pg/mL}$
- DNases <  $5\text{pg/mL}$
- Particulates(size> $0.22\mu\text{m}$ ) <  $1/\text{mL}$
- Sodium (ppb) < 1
- Chloride (ppb) < 1
- Total Silica (ppb) < 3
- Flow rate =  $2\text{L/min}$
- Type II water with the following property
  - Resistivity ( $M\Omega\text{-cm}$ ) =  $12\text{-}15 M\Omega\text{-cm}$  @ 25 deg C, or more
  - Conductivity ( $\mu\text{S/cm}$ ) < 1
  - TOC <  $30\text{ppb}$
  - Bacteria <  $10\text{CFU}/100\text{mL}$
  - Pyrogens (endotoxins) <  $0.001\text{EU/mL}$
  - RNases <  $1\text{pg/mL}$
  - DNases <  $5\text{pg/mL}$
  - Particulates(size> $0.22\mu\text{m}$ ) <  $1/\text{mL}$
  - Sodium (ppb) < 5
  - Chloride (ppb) < 5
  - Total Silica (ppb) < 3
  - Flow rate =  $2\text{L/min}$



## Item No. 2 Automatic Nitrogen Estimation System

### Specification

#### **A. Automatic Digestion System**

- Eight Place 250 ml capacity PC Compatible Block Digestion System with all essential accessories
- Aluminium Block with Casted Aluminium Alloy Heaters
- TFT Graphic Touch Screen Display with unique wireless mouse to operate at a distance of 1-2 mtrs.
- Should have 2 Ports in the motherboard one for PC connectivity another for direct connection to Remote Mouse/Datalogger/ Memory stick for data storage with separate port in mother board apart from PC Port
- Integrated autosequencing time/temperature domain of > 50 programs and >10 sequencing steps
- Inbuilt mini printer for print options to document preprogrammed settings and logged datas
- Temperature Controller should be isolated separately in a control tower to protect electronics from digestion heat zone and acid reaction zone
- Temperature Control Range: Room temperature to 450 ° C, Temperature Accuracy :  $\pm 0.5^{\circ}\text{C}$
- PC software performs Live graphical representation of time /temperature gradient on touch screen display directly.
- Remote control module for wireless data monitoring, control and transfer to PC at a distance of 5-10 feet . The Entire display screen of Controller should wirelessly appear in the PC/ Laptop of user, to monitor & control from his work table.
- Data logger with real time clock with memory stick for data storage
- Displays User ID, channel names, channel comparison graph of stored data in different formats like graph chart, pie chart, line chart, bar graph etc with print options.
- Auto over temperature protection, Auto Sensor break protection, Auto Error Indication, Inbuilt software program for micro nutrient, macro nutrient, trace element, diacid & triacid analysis
- All essential accessories like Digestion Tubes, SS Insert Rack, Exhaust Manifold, Suction assembly for safe removal of acid fumes

#### **B. Scrubber System**

- **Four stage acid neutralization scrubber.**
- First stage: Condensation with water condensor, Second Stage: Neutralization in Alkali, Third Stage: Neutralization in Water, Fourth Stage: Dissolution of air free of acid fumes in raw tank water.
- Recirculation Pump: Non corrosive centrifugal inbuilt magnetic suction pump for water recirculation in 10 litres tank avoids requirement of running water during digestion.
- Non Corrosive submersible pump for condensor water recirculation.
- Fibre Reinforced plastic Tank of capacity 10 litres
- Containers for Alkali and Water, Electrical Requirement: 230v/50Hz Mains.

#### **C. Automatic Distillation System**

- Autosequencing Programmable Microprocessor based Distillation with inbuilt software, Colour Touch Screen high resolution TFT LCD Display,



- Auto Intelligent run of programmable steps, Addition of Boric Acid, Dilution, KMNO<sub>4</sub> Addition for Available Nitrogen, Alkali Addition, Steam Processing, Process over indication with inbuilt delay time features, Auto Titration Connectivity feature for integrated online titration, Complete Automatic safety features.
- The suction module of waste residue should be door mounted for easy serviceability.
- Facility to program and control distillate volume for determination of available nitrogen
- Auto sensing of "NO WATER" condition in condenser & steam generator with alarm & signal to alert user.
- Auto deactivation of operation after warning in case of user non availability
- Enables Automatic monitoring and measuring of high temperature in distillate with sensor for auto warning signal and safety alarm to alert user to control distillate temperature. Temperature displayed digitally.
- Auto reagent Level Sensor with Alarm for Reagents, Stainless steel non corrosive steam Generator
- The control panel unit along with inbuilt temperature controller, timer, mother board and SMPS should be isolated in separate compartment to protect electronics from wet chemistry & acid/ alkali process area for longevity and safety of all electronic components.
- Nitrogen level : 0.1 to 200 mg Nitrogen (Min / Max Detection Limit)
- Nitrogen Reproducibility:  $\pm 0.1\%$  RSD , Nitrogen Recovery :  $> 99.5\%$
- Electrical Requirement: 220-230V single phase 50Hz A.C

#### **D. Fully Automatic Titration System:**

- Compact Titrator for Colorimetric titration with Photometric Sensor
- The titration interconnectivity Hardware module enables direct online titration without need of sample transfer from receiver end.
- **Intelligent inbuilt software chip gives automatic trigger signal to the titration system to initiate simultaneously distillation process for Auto start of titrator.**
- Compact Eco Titrator ideal for Acid/Base-aqueous and Non-aqueous titrations.
- **3 modes of titration in a single system.**
- **MET** - Monotonic equivalence point titration 3 measured quantities are available: pH, U or I<sub>pol</sub>.
- **DET** - Dynamic equivalence point titration 3 measured quantities are available: pH, U or I<sub>pol</sub>.
- **SET** - End Point titration 3 measured quantities are available: pH, U or I<sub>pol</sub>.
- One measurement mode for pH and milli volt with upgradable pH electrode.
- **The potentiometric titrator with touch screen panel with interface for operation.**
- **Display: LCD VGA color touch screen display.**
- **Status display uses flashing patterns to display status such as Ready, In Operation, Waiting, Malfunctioning, Error etc.**
- **The instrument performs Live Titration Curve Display in touch screen.**
- **PHOTOMETRIC SENSOR FOR CALORIMETRIC TITRATION:**
- Colorimetric titration with Superior colorimetric sensor with Hitech Optrode Photometric electrode to work on a wide range of wave length between 470 to 660 nm with wavelength selection switch & selected wavelength indication in electrode.
- Incorporates dedicated modes to perform all types of potentiometric titrations like, acid-base, non-aqueous, argentometric, redox, complexometric titration and calorimetric titration.
- Incorporate facility to perform photometric titrations and Voltamperometric Titrations.



- The instrument has built in magnetic stirrer with adjustable rotation speed from 150 to 1800 rpm with status indication in touch screen.
- Incorporates facility to store > 100 methods with more than 30 standard methods.
- The instrument has the facility to generate pdf reports with date and time stamp and store it in the USB memory stick connected to the instrument.
- Upgradable pH electrode with long life cartridge technology for extended life time, in the same instrument.
- Incorporates motor driven piston burette, with a high burette resolution of 1/20,000 of burette volume or better. Complies with DIN EN ISO 8655-6 standard.
- Very high resolution possible to the tune of 1/20,000th of burette volume ie 0.00025ml / step in a 5 ml burette
- The instrument has the possibility of connecting burettes of volume 5, 10, 20 and 50 ml allowing maximum flexibility.
- Live data entries like sample weight, stop criteria is possible, when the titration is in progress.
- Incorporates the facility to lock date and time with password protection.
- High-precision measuring Input, Operation by mouse-click.
- Anti-diffusion/check valve at dispensing point to avoid the diffusion of reagents back to burette tip and to ensure micro level dispensing.
- High resolution measuring input guarantees results of the highest precision.
- **\*Automatic calculation of results and display up to 9 decimals (user programmable)**
- Results: Directly in %, ppm, g/L, mg/mL, mol/L, g, mg, mL, mg/pc.
- **Incorporates > 100 operator programmable protocols with inbuilt standard 30 methods library to carry out all types of titration for different application. User can load methods, change methods parameters, store methods, create new methods, Save methods to USB flash drive and Add methods from USB flash drive.**
- **\*Memory stick with USB port to store more than 50,000 values.**
- Facility for Good Laboratory Practice (GLP) routines supported by sample data registration in the instrument with details such as user name, date, performance test, sample code, sample weight, etc.
- Includes accessories and two burette tips, one of them with micro outlet valve. Buret volume 20 mL,
- **Incorporates ethernet facility to send the data to PC / LIMS.**
- The instrument incorporates facility to send and receive remote signals from other instruments like Analytical balance for automatic weight input
- mV Range & Resolution:  $\pm 2000$  mV with  $\pm 0.1$  mV or better
- pH Range & Resolution: 0.0 to 14.0 pH with 0.001 pH or better (with optional pH electrode)
- Polarization current:  $\pm 120$   $\mu$ A with  $\pm 0.01$   $\mu$ A or better

**SPECIAL CONDITION:** Company should have good performance track record of 10 years with references of users of similar equipment with atleast 25 installations with documentary proof. The Supplier should be ISO certified, CE Certified to fulfill good laboratory practice norms of International Safety requirements to ensure quality standard with certified calibration. The instrument shall strictly confirm to the specifications with relevant brochure. The company should be reputed supplier should not be blacklisted or should not have any adverse remarks in the past. Spares should be made available for minimum period of **10** years after the warranty period by the supplier. The company should provide the staff strength of trained service Engineers for after sales service with documentary proof which is most important for Research and Analytical work to upkeep of equipment for uninterrupted work.