

**TENDER NOTICE**  
**NO. MPPCB/PURCHASE/02/2014-15**

**TENDER DOCUMENT**

**FOR SUPPLY OF  
LABORATORY INSTRUMENTS &  
OTHER ARTICLES**



**Year: 2014 - 15**

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M. P. Pollution Control Board  
E-5 Sector, Paryawaran Parisar,  
Araera Colony, Bhopal – 462016

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# M. P. POLLUTION CONTROL BOARD

PARYAWARAN PARISAR, E-5, ARERA COLONY, BHOPAL – 16

Phone: [0755] 2466191/2464428 Fax: [0755] 2463742 E-mail: [if\\_mppcb@rediffmail.com](mailto:if_mppcb@rediffmail.com)

## TENDER NOTICE NO. MPPCB/PURCHASE/02/2014-15

Sealed tenders are invited from the reputed manufacturers [approved by BIS/ISO for quality & precision] and / or their authorized dealer / agent /representatives, specially authorized for this tender, for the supply of following laboratory instruments, Filter Papers and other laboratory articles:

Sl. No.	PARTICULARS OF ITEMS	Qty.	EARNEST MONEY [Rs.]
<b>PART-A</b>			
1.	BTEX Analyzer/Monitor	02	80000.00
2.	Bomb Calorimeter	01	20000.00
3.	B.O.D. Incubator	02	4000.00
4.	Bacteriological Incubator	02	4000.00
5.	Bottle Top Dispenser	04	2000.00
6.	CO-HC Analyzer	03	18000.00
7.	Columns for Gas Chromatograph	02	4000.00
8.	Compound Microscope [Binocular]	02	4000.00
9.	Desiccators for PM <sub>2.5</sub> Sampler	11	5500.00
10.	Digital Burette	01	400.00
11.	Electronic Balance	04	8000.00
12.	Elemental [CHNS] analyzer	01	20000.00
13.	Flash Point Monitor	01	4000.00
14.	Flue Gas Analyzer	05	70000.00
15.	Filtration Assembly [Vacuum]	02	6000.00
16.	Filter Papers for Air & Water Analysis	l/s	60000.00
17.	Gaseous Pollutant Sampler	08	8000.00
18.	Gas Chromatograph with Mass Spectrometer [GC-MS]	01	100000.00
19.	Gas Detection Pump & Tubes	05	15000.00
20.	Hot Air Oven	02	2000.00
21.	Hot Plate	01	300.00
22.	Microwave Digester	01	20000.00
23.	Microprocessor based Mercury Analyzer	02	8000.00
24.	Noise Level Meter	06	30000.00
25.	pH Meter [Pen Type]	24	4800.00
26.	PC- controlled UV-VIS Spectrophotometer	02	24000.00
27.	Respirable Dust Sampler	30	7000.00

28.	Stack Monitoring Kit	26	52000.00
29.	Safety Personal Protective Equipment	02 sets	5000.00
30.	Smoke Density Meter	03	9000.00
31.	TKN Assembly	02	8000.00
32.	Top Loading Balance	01	2000.00
33.	TOC Analyzer	01	30000.00
34.	Water Bath	02	2000.00
<b>PART-B</b>			
1.	Rate Contract proposal for Laboratory Chemicals, Reagents [of brands E. merck, Rankem, Qualigens/Fisher scientific, SD fine chem., Thomas Baker, Sigma, HiMedia- for bacteriological tests only], Certified Reference Materials [of brands Dr. Ehrenstorfer, Merck, Sigma, LGC Standard, Accu Standard, Thomas Baker, Glassware [of brands Borosil, Rievera, ASGI, SD Fine, Merck, JSGW, Sigma] and Plastic Ware [of brands like HiMedia, Tarson, Merck, RFCL].	As required	Not required

The tender document including technical specifications of equipment shall be issued up to 3.00 PM on dated 09.10.2014 on payment of Rs. 1500.00 [Rupees One Thousand Five Hundred only] by cash or demand draft [Rs. 50.00 extra for supply of documents by post] in favor of Member Secretary, M. P. Pollution Control Board, Bhopal. The application for sending tender document by post shall not be accepted after 01.10.2014. The earnest money of requisite amount shall be submitted in a separate sealed envelop mentioning the details thereof. No tender shall be considered without requisite earnest money. The last date for submission of tender is 10.10.2014 by 1.00 PM and the same shall be opened on the same day at 2.00 PM in the presence of bidders, who wish to participate. The detailed terms & conditions are available in tender document. This Tender Notification may also be downloaded from Board's Web site [www.mppcb.nic.in](http://www.mppcb.nic.in) and [www.govtenders.nic.in](http://www.govtenders.nic.in) and the cost of tender document should be submitted in the form of demand draft along with Earnest Money in Envelop "A".

**[A. A. Mishra]**  
**Member Secretary**

# M. P. POLLUTION CONTROL BOARD

PARYAWARAN PARISAR, E-5, ARERA COLONY, BHOPAL – 16

Phone: [0755] 2466191/2464428 Fax: [0755] 2463742 E-mail: [it\\_mppcb@rediffmail.com](mailto:it_mppcb@rediffmail.com)

To,

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**Sub.: Sealed tenders for purchase of Laboratory Equipments, Filter Papers and Rate Contract offers for Lab. Chemicals/ CRMs/ Glassware/ Plastic ware.**

Dear Sir,

M. P. Pollution Control Board desires to procure laboratory equipments, Filter Papers and other articles such as Laboratory Chemicals, Certified Reference Materials [CRMs] & Glassware/ Plastic ware on annual rate contract basis for its laboratories spread over whole of the state. Sealed tenders are invited from the reputed manufacturers [approved by BIS/ISO] or their authorized representatives, specially authorized for this tender, who are capable of supplying laboratory equipment, filter papers & Rate Contract for Lab. Chemicals/CRMs/Glassware/Plastic ware from Reputed Manufacturer only, which are shown on Part "A" & Part "B" of the tender notice. The terms and conditions are as follows:

## **PART-A**

### **LABORATORY EQUIPMENTS & FILTER PAPERS:**

#### **[A] SPECIAL CONDITIONS:**

1. All prices quoted should be CIF New Delhi for imported equipment. Other charges like transportation, insurance, F.O.R. destination and installation charges should be quoted separately. For indigenous equipment prices should be F.O.R. destination.

2. Prices should be quoted for complete set of equipment including the cost of installation, minor civil works, electrical fittings and cabling etc.
3. Accessories required [if any] for maintenance for a period of three years should be given separately.
4. Annual Maintenance charges for three years should be quoted separately in Annexure – 2.
5. The technical specifications of the equipment are given on page no. 26 to 85. The technical specifications of the offered equipment should be furnished in annexure –1. Schedule of requirement is annexed as annexure-6[i] & 6[ii]. The check list is shown as annexure -7.
5. The equipment offered should necessarily contain a guarantee for its trouble free performance for a period of one year from the date of installation.
6. The offer should clearly mention make, name of the manufacturer, detailed specifications, detailed literature about the equipment/circuit diagram/drawing of the mechanism and any other information relevant to the equipment. For any printing error / mistake in final bid will be the responsibility of the bidder and no correspondence will be entertained by the Board in future.
7. The tenderer should furnish details of supplies made by him to important institutions, along with performance certificate, during last one year [Users' list]. In case of filter papers, the bidder must submit Client list along with the previous purchase order copies of similar item [s] supplied to any Central /State Pollution Control Boards / any CSIR Laboratory.
8. The firm / manufacturer submitting the offer shall only quote for one most suitable model of the offered equipment whose specification matches the Board's specifications. No alternate offers shall be considered and, if submitted, the offer shall be rejected.
9. Earnest money be furnished by a demand draft in favor of Member Secretary, M. P. Pollution Control Board, Bhopal in envelop "A". Offers without earnest money shall not be considered and the relevant envelopes [B & C] will not be opened and their offer shall be treated as rejected.

10. Bidders using downloaded tender forms must submit tender fee by demand draft along with Earnest Money in Envelop "A" drawn of Member Secretary, M. P. Pollution Control Board, Bhopal. The tender will not be accepted from the firm to whom the document is not issued by the Board and the bid downloaded from net without tender fee will not be accepted.
11. The bidder shall have to submit the copy of sales tax registration and Income Tax registration [PAN] along with envelop "B" otherwise the offer shall be liable for rejection.
12. An undertaking shall be submitted by the tenderer that they are not black listed in any Govt. organization / institutions along with envelop "B".
13. The bidder shall provide exclusive company profile including necessary certificates / license for manufacture the product from DGTD / SSI/SIA etc.
14. The specifications are clearly mentioned in the document and the Bidder is requested to submit Bid only if their offer strictly comply to these specifications. Please note that no deviation in the required specification will be permitted. The bidding for the instruments having different specification will be on Bidder's risk as the Board will not entertain such Bids.

15. **PROCEDURE FOR SUBMISSION OF TENDERS :**

Each bidders shall submit his offer in three sealed envelopes A, B and C. Envelop "A" shall contain earnest money and tender cost, if the tender document is downloaded from the web site. The Envelop "B" should contain technical specification, terms & conditions, company profile, copy of sales tax registration number, PAN number and authorization certificate from manufacturer for submission of offer for this tender, if offer is submitted by authorized representative. In case the manufacturer of any equipment authorizes more than one firm for submitting offer, then such offers shall be treated as rejected. Envelop "C" shall contain financial offer.

**[a] Envelop – "A" :** Envelop "A" should contain demand draft for the requisite amount of earnest money in favor of Member Secretary, M. P. Pollution Control Board, Bhopal. If the tender document is

downloaded from web site, then separate demand draft for tender cost shall be submitted with envelop "A". The name of instrument and the amount of the demand draft should be inscribed on the top of envelop. Envelop "A" shall be opened on 10.10.2014 at 2.00 pm in the presence of the bidders or their authorized representatives. Insufficient amount furnished as earnest money and tender cost shall make the offer liable for rejection.

**[b] Envelop – "B":** Bidders, who have furnished the desired amount of earnest money and tender cost shall be liable for opening of the Envelop "B" of their offer. The Envelop "B" should contain detailed technical specifications in annexure -1, make & model of the equipment, functioning procedure of the equipment and other literature relevant to the equipment and company profile. If the offer is submitted by authorized representative, he should submit authorization letter in envelop "B" from the manufacturer for submitting offer for this tender, otherwise tender offer of the firm shall not be considered and liable for rejection. The tenderer should furnish users' list and details of supplies made by him to important institutions along with performance certificate. The bidder shall have to submit the copy of sales tax registration and income tax no. [PAN] along with the envelop "B", otherwise the offer shall be liable for rejection. An undertaking shall be submitted by the tenderer, regarding whether they are not black listed in any Govt. organization / institutions, along with envelop "B". The details of service station in Madhya Pradesh and India should be furnished with other details.

**[c] Envelop – "C" :** The envelop "C" shall contain financial offer in annexure 3 or 4 [whichever is applicable] of the tender document. Offers received in due time shall be evaluated technically by a committee constituted by the Chairman, M. P. Pollution Control Board and as per the recommendation of committee , depending upon the suitability of equipment with respect to application, performance, after sale service and service centers in Madhya Pradesh or in India etc., the financial offer shall be opened. Notwithstanding anything stated above the Board reserves the right to assess the capability and capacity of the bidder to perform the contract, should the circumstances warrant such an assessment in the overall interest of the Board.

**[B] OTHER CONDITIONS:**

1. The Madhya Pradesh Pollution Control Board reserves its rights to reject any or all the tenders without assigning any reason there for.
2. Tender found incomplete shall be rejected forthwith.
3. The indigenous equipment, for which an order has been placed, after acceptance of the tender, shall have to be delivered, installed & demonstrated to the consignee mentioned in the supply order within 60 days from the date of issue of supply order. In case of late supply of the material, 2% per month penalty shall be charged up to one month, there after supply order shall be treated as cancelled and earnest money shall be forfeited and the supply order shall be issued to the second lowest firm. In case of unavoidable delay in supply a prior permission shall be obtained for extension in delivery period.
4. The time limit for the supply of imported equipment shall be 90 days, which can be relaxed for additional 30 days by the Member Secretary. After scheduled time limit, 2% per month penalty should be levied.
5. If the bidder is not a manufacturer himself, should have a facility for repairing and maintenance of the instrument. The details of service centers in Madhya Pradesh and India should be furnished along with other details.
6. It shall be the responsibility of the bidder to deliver the material to the consignee in sound condition without any damage. Any damage or loss during transit shall be on the account of the bidder.
7. The tenders shall be valid for a period of 360 days from the date of opening of envelop "A". In case the validity is to be extended; the Board may solicit the Bidder's consent to an extension on the period of validity and the bid shall remain valid for the extended period mutually agreed for.
8. The prices should include all taxes like sales tax, excise tax or any other tax.
9. In case of equipments, the approved firm / manufacturer shall have to submit 5% security deposit of the ordered value in the form of Bank Guarantee for a period of 12 months, other wise 5% amount shall be deducted from the bill.



10. In case the approved bidder fails to effect supply, within the specified period as per supply order, the earnest money is liable to be forfeited.
11. The consignee or any other officer authorized by the Board shall have the right to reject any or all the items of the supply, if they do not confirm to specifications mentioned in the supply order. The rejected items shall be lifted by the bidders at their own cost. The consignee will not be responsible for the custody and safety of such items.
12. The Board reserves its rights to effect any reasonable increase or decrease in the quantity or number of items at the time of issue of supply order in the interest of the Board.
13. All the clearance including the obtaining NMI [Not manufactured in India] certificate, custom clearance and custom duty will be the responsibility of the tenderer. This office will open the letter of credit [L/C] as may be required and will only sign the documents wherever required.
14. In case, if any supplier quote their rates in Indian Rupees for imported equipment and do not require custom duty exemption certificate from the Board, then the supplier has to submit import document like bill of entry, custom duty paid and NMI [Not manufactured in India] certificate from the manufacturer.
15. The bidder is expected to examine all instructions, forms, terms and conditions and specifications mentioned in the bid document. Failure to furnish all information required by the bid documents of submission of a bid not substantially irresponsive to the bid document in every respect will be at the bidder's risk and may result in the rejection of its bid.
16. The terms of payment shall be as under:
  - [A] Indigenous Items: 75% of the cost of material would be paid after receipt of the material by consignee and balance 25% payment shall be released only after satisfactory installation and demonstration of the equipments / material at site.
  - [B] Imported equipments: The letter of credit will be opened for total ordered value, but 75% of the cost will be released on shipment of

the material and balance 25% payment shall be released only after satisfactory installation and demonstration of the equipments / receipt of material at site.

17. Conditional offers will not be accepted and liable for rejection.
18. In case of human error regarding labeling of envelop, the committee constituted for the opening of envelop shall take appropriate decision.
19. In case of any dispute the decision of Chairman, M. P. Pollution Control Board shall be final & binding.
20. In order to comply the instructions of Department of Commerce & Industries, Govt. of M.P., minimum 30% of the quantity of the items shall be reserved for the manufacturers / entrepreneurs from Scheduled castes/ scheduled tribes based at Madhya Pradesh.

## **PART-B**

### **LABORATORY CHEMICALS, GLASSWARE ON RATE CONTRACT BASIS**

Sealed tenders are invited from reputed manufacturers [approved by BIS/ISO for quality and precision] for entering into Rate Contract for supply of indigenous & imported chemicals [of brands E. merck, Rankem, Qualigens/Fisher Scientific, SD fine chem., Thomas Baker, Sigma, HiMedia- for culture media only], Certified Reference Materials [CRMs] [of brands Dr. Ehrenstorfer, Merck, Sigma, LGC Standard, Accu Standard, Thomas Baker and Glassware [of brands Borosil, Rievera, ASGI, SD Fine, Merck, JSGW, Sigma] and Plastic ware [of brands like HiMedia, Tarson, Merck, RFCL]. The instructions are as follows:

#### **1. Preparation of Bids:**

- [a] Tenders must be sealed and super scribed with “ Rate Contract for Chemicals & Glassware”.
- [b] Tenders must be addressed to Member Secretary, M. P. Pollution Control Board, E-5, Arera Colony, Paryawaran Parisar, Bhopal – 462016. The last date for submission of tender is 10.10.2014 by 1.00 PM and the same shall be opened on the same day at 2.00 PM in the presence of bidders, who wish to participate.

- [c] Opened / Unsealed Tenders in any form shall not be accepted.
- [d] Tenders / quotations must be sent in advance, so that it reaches the destination on or before the due date and time. Quotations received after the due date and time shall not be considered at all. The Board shall not be held responsible for any postal delay, if any.
- [e] Conditional and ambiguous and late / delayed tenders shall be rejected summarily.
- [f] Incomplete tenders in any form shall be treated as non-responsive and non acceptable.

## **2. Scope of Contract:**

- [a] The supplier will have to maintain sufficient stock of the standard quality of all items to avoid inconvenience to the Board.
- [b] In case of failure or refusal to supply, the contract is liable to be cancelled at the risk and cost of supplier. Any extra cost involved in arranging supply from alternative source will be recovered from rate contract holder.
- [c] All chemicals should be of Analytical Reagent grade (AR Grade) or above and Glassware should be of Borosilicate Glass - Class "A" with certificate. The stores so supplied will have to be of high quality and grade and in the event of substandard / inferior quality; the supplier is liable to be blacklisted.
- [d] All the bids will be opened as per the date and time specified in the tender document. If desire, bidder's representative may attend the same.

## **[3] Period of Contract:**

The Rate Contract [RC] shall be for a minimum period of one year from the date of award of contract unless cancelled by the Board before the expiry of the period at its discretion. However, the contract may be extended beyond one year, if so agreed to, by both the parties. The rates shall remain valid for a period of minimum one year and there will be no change in price structure during the currency of the contract except, if the statutory levies are otherwise made applicable by the Govt. through notification / regulations. Enlistment can be cancelled at any time if the firm found as a habitual defaulter or supplying sub-standard material or for any reason or non – compliance of the terms and condition of

the RC. It may be noted that price / rate should not be higher than the market price at the point of time of supply and if such documentary evidence / es would be made available, only market price would be payable to the supplier. The Board has the option to renegotiate the price with the supplier / rate contract holder at any time within the period of contract & if there is strong reasons & necessary, negotiation may be possible before entering in to contract.

**[4] Board's Obligations:**

- **Opening of tenders:** The tenders will be opened by the committee of Board. Bidder / their representative may attend Price bid opening as per the mentioned / intimated schedule.
- Our Board is not entitled to issue either form "C" or "D" to avail concessional Sales Tax. Hence, the exact percentage of total sales tax / VAT is to be mentioned by the bidder.

**[5] Liabilities of the Bidders:**

- [i] Material should be door delivered at various laboratories located in Madhya Pradesh.
- [ii] Delivery must be made immediately preferably within 2-3 week after placement of order either directly or through their dealer network unless otherwise specified.
- [iii] If the supplier fails to deliver the stores within the allotted delivery period as specified above, the purchaser may procure goods or service similar to those un-delivered upon such terms and in such manner as it deems appropriate from any other firm / alternative source and the supplier will be liable to the purchaser for any excess cost.
- [iv] Part supply is normally not acceptable. But may be allowed on genuine cases, on written request only and permission of user.
- [v] Manufacturer's Price List / catalogue / Brochure / pamphlet etc must be sent along with the offer, failing which, the offer will not be considered. If your firm is selected for entering rate contract, five copies of same price list are to be sent to our Central laboratory, Bhopal and other Regional Laboratories

situated at Indore, Ujjain, Gwalior, Rewa, Jabalpur, Satna, Katni, Sagar, Vijaypur [Guna], Shahdol and Singrauli.

- [vi] Soft copies of price of the products can also be submitted in the form of CDs / any non- volatile portable form.
- [vii] Offered basic price must not be higher than price displayed by manufacturer on their website / price list / MRP on cover / genuine & authentic documentary evidence. Price list must be stamped and signed with date by the bidders.
- [viii] Discount: Please quote maximum discount on your price list as applicable to Government Research institutes. Discount must be indicated in words as well as in figures.
- [ix] For any rate contract items / Quantities / frequencies demand etc., if manufacturer has any discount offer / free gift scheme, the same shall have to be passed on to Board, without any additional cost.
- [x] Mere submission of application / proposal does not imply acceptance of the same at this end and the firms will be enlisted only after meeting the laid down qualifying parameters for which our decision will be final.
- [xi] Client list along with the previous purchase order copies of similar item [s] supplied to any Central /State Pollution Control Boards / any Govt. organization including details of price & all charges must be attached.
- [xii] Mode of Dispatch: Delivery must be up to FOR destination at their own risk / cost i.e free delivery at our laboratories located in Madhya Pradesh.
- [xiii] Delivery period: Delivery must be made immediately i.e two – three weeks after placement of order either directly or through their dealer network unless otherwise specified. In case of Ex-stock, the rates of transport, F&F, Insurance etc. must be included in your price.
- [xiv] Insurance: In the case of FOR destination, insurance should also be covered by supplier. The goods should be insured against all risks from ware house to ware house basis. The insurance charges, if any, must be included in your price.

[xv] Packing & Forwarding: Rate must include packing & forwarding charges.

[xvi] Printed terms and conditions of the bidder on their offer / literature/letter etc. will not be bidding on us.

**[6] Authorized Local Dealer / Stockiest:**

The manufacturers / firms /principals shall furnish the name and address of their local Stockiest / Dealer so that the copies of orders can be endorsed to them for expeditious supply. In such cases where local dealer / stockiest has been nominated by the principal, the bills raised by them against our purchase will be accepted. Any addition or deletion of dealership / distributorship shall be intimated to the undersigned immediately on authorization of a new party.

**[7] Estimated Sale:** The target of sale may vary depending upon the requirement. The Rate Contract agreement with this Board does not ensure business of any quantum, whatsoever.

**[8] Warranty:** One year standard warranty [wherever applicable] / life of the item (s) must be indicated with name and address of the manufacturer / service provider should invariably be given.

**[9] Eligibility Criteria for the Bidders:** The bidders have to produce following documents while submitting the tender. Non – production of any of the following documents may lead to rejection of the Bid / offers.

- i) Copy of Firms VAT / TIN No. [Registration Certificate]
- ii) Copy of PAN Card
- iii) Name, addresses and other contact details of Dealers / stockiest / distributors in annexure-5.
- iv) Current Price list of the manufacturer
- v) Offer maximum discount percentage, which will be one of the most important criteria for selection of firm to enter into rate contract. If one manufacturer will authorize more than one firm for supply, the offer with the highest discount will be preferred.
- vi) Experience with good track record and satisfactory service / reputation of vendors like CPCB / any SPCBs / any Govt. organization /PSU will be preferred in the same order.

vii) Any deviation from the tender & conditions mentioned above will imply disqualification for the firm.

**[10] Liquidated Damage /Penalty Clause:** A liquidated damage charges of minimum 2% of the ordered value per month for consumable maximum up to 5% of the total ordered value will be recovered from the vendor for non – compliance of the RC terms.

**[11] Loss, Damage & Shortage:** MPPCB shall not be responsible for any loss, damages and shortage during transit / transportation. Payment shall be made for materials received in good condition only.

**[12] Payment Terms:** The supplier shall present their triplicate copies of computer generated bills for each order / supply. All payment shall be made on bill basis on receipt of the material in full and all requisite documents as per terms & conditions of RC and order normally within 30 to 60 days from the date of delivery or otherwise specified in purchase order. Advance payment will not be made in any circumstances.

**[13] Discretion:** The Chairman, M. P. Pollution Control Board reserves the right to accept or reject any or all the tenders without assigning any reason what so ever. The Rate Contract can be terminated at any time without any prior notice. The contract may be extended or curtailed at any point of time at the discretion of the Chairman, MPPCB.

**[14] Disputes & its Jurisdiction:** The contract between the supplier and the buyer shall be governed by the Laws of India and under this contract shall be taken by the parties only in Bhopal to competent jurisdiction.

**[15] Arbitration:** Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, instructions and terms & Conditions herein before mentioned and so as to the quality of the materials, as to any question, claim, right, matter or thing whatsoever, in any way arising out of or relating to the contract. Specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, or the execution of the same whether arising during the process of work or after the completion or abandonment thereof shall be referred to the sole arbitration of a person nominated by the Member Secretary, MPPCB, and if he is unable to act to the sole arbitration, some other person appointed by him willing to act as such arbitrator. The

submission shall be deemed to be submission to arbitration under the meaning of the India arbitration & Conciliation, 1996 or any satisfactory modification or reenactment thereof for the time being in force conclusive and binding on all parties of the Contract. The venue of the arbitration will be Bhopal only.

**[17] Right of Acceptance:** The chairman reserves the right to accept the lowest or any other tender and reserves to himself the right of accepting the whole or any part of the tender without assigning any reason what so ever.

***NOTE: The tenders shall be liable for rejection in breach of any of the special or other general conditions of the tender document and no correspondence in this regard shall be entertained in future.***

**[A. A. Mishra]  
Member Secretary**



# **M. P. POLLUTION CONTROL BOARD**

## **TENDER AND CONTRACT FOR SUPPLY OF MATERIALS GENERAL RULE AND DIRECTIONS FOR THE GUIDANCE OF SUPPLIERS**

- (1.) All suppliers proposed to be obtained by contract will be notified in a form of invitation to tender posted in public places/News Paper.
- (2.) The tender form will State the supplies to be made, as well as the date for submitting and opening tenders and the time allowed for supply, also the amount of earnest money to be deposited with the tender.
- (3.) In the event of tender being submitted by a firm it must be signed separately by each member thereof or in the absence of any partner, it must be signed on its behalf by a person holding a power of attorney authorizing him to do so, such power of attorney should be produces with the tender and it must disclose that the firm is duly registered under the partnership Act.
- (4.) Any person who submits a tender shall fill up usual printed form stating at what rate he is willing to undertake supply of each items. Tender which propose any alteration in the work/supply specified in the said form of invitation to tender, or time allowed for carrying out work/supply will be liable for rejection.
- (5.) The Member Secretary or his duly authorized assistant will open tenders in the presence of any tenderer who may be present at the time and will enter the amount of several tenders in a comparative statement in a suitable form. Receipts for earnest money will be given to all tenderers except those whose tenders are rejected and whose earnest money is refunded on the day that the tenders are opened.
- (6.) The officer competent to dispose of the tenders shall have the right of rejecting all or any of the tenders.

## **CONDITIONS OF CONTRACT**

1. The time allowed for the supply of materials as entered in the tender shall be strictly observed by the supplier and reckoned from the date of which the order to commence supply of materials shall throughout the stipulated period of the contract be proceeded with all due diligence (time being deemed to be the essence of contract) on the part of the supplier and the supplier shall pay as liquidated damage an amount equal to one percent or such smaller amount as the Member Secretary, M.P. Pollution Control Board, may decide on the amount of estimated cost of the whole of the materials as shown in the estimated cost of the that the supply remains un commenced or unfinished after the proper dates. In the event of the contractor failing to comply with this condition shall be liable to pay as liquidated damage an amount equal to one percent or such smaller amount as the Member Secretary may decide on the said estimated cost of the whole of the materials for every day that the due quantity of supply remains incomplete to, provided that the due quantity of liquidated damage to be paid under the provisions of this clause shall not exceed ten percent on the estimated cost of the supply of materials as shown in the tender.
2. If the Tenderer shall be hindered in the supply of the materials so as to necessitate an extension of the time allowed in this tender he shall apply in writing well in advance or immediately after the cause occur to the Member Secretary, M.P. Pollution Control Board who shall if in his opinion (which shall be final) reasonable grounds be shown therefore authorize such extension for a period not exceeding in 15 days. Any further extension shall be subject to the previous sanction of the Chairman.
3. The supplier shall give notice to the consignee officer of his intention of making delivery of materials and on the materials being approved a receipt shall be granted by him to the Consignee Officer or his assistant, and no material will be considered for payment until so approved.
4. On the completion of the delivery of the materials the supplier shall be furnished with a certificate by the Consignee Officer of M.P. Pollution Control Board.

5. The material shall be of the best description and in strict accordance with the specification and the supplier shall receive payments for such materials only as are approved and passed by the Member Secretary/Consignee Officer.
6. In the event of materials being considered by the Consignee Officer to be inferior to that described in the specification the supplier shall on demand in writing forth with remove the same at his own charge and cost and in the event of his neglecting to do so within such period as may be named by the Consignee officer that officer may have such rejected material removed at the contractor's risk and expense incurred being liable to be deducted from any sum due or which may become due to the supplier.
7. Receipts for payment made on account of a supply when executed by a firm must also be signed by several partners except where the contractors are described in their as a firm in which case the receipt must be signed in the name of firm by one of the partners or by some other person having authority to give effectual for the firm.
8. Under no circumstances whatever shall the contractor be entitled to any compensation from Board on any account.
9. The supplier shall supply at it own expense all tools, plant & implements required for the due fulfillment of his contract and the materials shall remain at his risk till the date for final delivery, unless it shall have been in the mean time removed for use by the Consignee Officer.
10. No materials shall be brought to site or delivered on Sunday/holiday without the written permission of the Consignee Officer.
11. The supplier shall not sublet this contract without the written permission of the Member Secretary, M.P. Pollution Control Board. In the event of the contractor subletting his contract without such permission, he shall be considered to have thereby committed a breach of the contract, and shall forfeit his earnest money and shall have no claim, for any compensation for any loss that may occur from the materials he may have collected or engagements entered into.
12. The decision of the Chairman, M.P. Pollution Control Board, Bhopal shall be final, conclusive & binding on all parties to the contract upon all questions relating to the meaning of specification and instructions herein before mentioned and as to quality of materials or as to any way arising out of, or relating to the contract specifications, instruction

orders of these conditions or otherwise concerning the supplies whether arising the progress of after the completion or abatement thereof.

13. On the breach of any term of condition of this contract by the supplier, the said Chairman shall be entitled to forfeit the earnest money, security deposit and the balance thereof that may at that time be remaining and to realize and retain the same as damages and compensation for the said breach but without prejudice to the right of the said Board to recover any further sums as damages from any sums due or which may be come due to the contractor by M.P. Pollution Control Board, or otherwise howsoever.

**TENDER SPECIFICATIONS VS OFFERED SPECIFICATIONS**

Sl. No.	Tender Specifications	Offered Specifications

**Signature of Bidder**                    .....

**Name**    .....

**Business Address**                    .....

**Place:** .....

**Date :** .....

**Annexure – 2**

**PRICE SCHEDULE FOR ANNUAL MAINTENANCE AND REPAIR CHARGES AFTER WARRANTY PERIOD**

Sl. No.	Item Description	Qty.	Annual Maintenance & Repair charges for each unit including supply of spares [Price to be quoted either in Indian Rupees or in Foreign currency] Excluding guarantee period	Maintenance and Repair charges for 3 years, including supply of spares.

**Note:** In case of any discrepancy between unit price and total price, the unit price shall prevail.

Signature of the Bidder .....  
 Name .....  
 Business Address .....

Place .....  
 Date .....

**PRICE SCHEDULE FOR GOODS IMPORTED**

1 Sl. No.	2 Description	3 Country of origin	4 Quantity	5 Unit Price CIF New Delhi	6 Total CIF price per item	7 Unit price pf Inland delivery to final destination and unit price of other incidental services.

**Note: In case of discrepancy between unit and total price, the unit price shall prevail.**

**Signature of the Bidder.....**  
**Name .....**  
**Business Address .....**  
 .....

**Place: .....**

**Date: .....**

**Annexure – 4**

**PRICE SCHEDULE FOR GOODS INDIGENOUS**

Sl. No.	Name of equipment with make & model	Unit Price in Rupees	VAT/CST or any other Tax/duty	Unit price including all taxes up to final destination

**Note: In case of discrepancy between unit and total price, the unit price shall prevail.**

**Signature of the Bidder.....**  
**Name .....**  
**Business Address .....**  
 .....

**Place: .....**  
**Date: .....**



**APPLICATION FORM FOR RATE CONTRACT WITH MPPCB, BHOPAL**  
**(For Laboratory Chemicals/CRM & Glassware)**

**(A Separate Application Form is required for each Product Category)**

1.	Name & Address of the Manufacturer [With Tel./Fax/Mobile/e.mail address]	
2.	Name & address of the Local Authorized Dealer / Distributor [With Tel./Fax/Mobile/e.mail address]	
3.	Quoted Product Category	
4.	Percentage of Discount Offered [In figures & words]	
5.	Name of the Any Pollution Control Boards of similar RC [Max. Three]	
6.	Exact % of CST/VAT to be charged [Form "C" or "D" will not be issued by MPPCB]	
7.	Delivery Charges	
8.	Delivery Period	
9.	Delivery of materials	Free delivery at MPPCB laboratory
10.	CST/VAT no. of the Dealer	
11.	Period of Contract	Minimum one year from the date of award of contract.

Notes:

- We hereby declare that all the particulars given in the application are true and complete to the best of our knowledge and we will produce all the relevant documents promptly, if necessary or as and when asked for by MPPCB. We understand that information provided by us will serve as Pre-qualification Criteria for enlistment being detected even after the approval of Rate Contract our contract may be cancelled and all our claims may be forfeited by MPPCB. We have read and understood all the terms and conditions of RC and we fully agree to it.
- We also declared that we will not sell our product at a lesser price to other parties than those given to you and in the event of

happening of such situation, we will be bound to refund the difference and our enlistment maybe cancelled at the discretion of MPPCB.

- We also undertake that all the terms and such as product Range, price, Discount, Delivery/other charges, Terms of Payment and also the name/s of the Dealer/Distributor will remain unchanged during the period of no alteration will be done without your official approval. However, we will promptly change our distributor/supplier of a request/compliant is received from your end with regard to this effect due any reason.

**Date :**

**Place :**

**Signature**

**Name :**

**Designation :**

**Seal of the firm :**

# **TECHNICAL SPECIFICATIONS**

**BTEX MONITOR / ANALYZER**

## GENERAL

GENERAL	A complete monitor / analyzer system including automatic sampling (pump etc), detector, calibrator, computer hard ware and software for data display, acquisition (in excel format), data processing and instrument control for selective determination of volatile compounds in ambient air optimized for Benzene, Toluene, Ethyl benzene and o,m,p – Xylenes. Compatible to power supply ( voltage 230 volts $\pm$ 10 volts AC and 50 Hz $\pm$ 3%). Continuous un attended measurement of individual BTX samples. Software should have inbuilt facility for customized averaging period ( 1hr/4 hr/8 hr/ 12hr/ 24 hr/ monthly/annual mean values). System should work without cryogenic cooling. System should have protocol compatible to communicate & transfer data to main computer / website through modem. Raw data storage capacity without erase minimum for three months or more.
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## 2.0 TECHNICAL SPECIFICATIONS

2.1 Automatic Sampling (Monitor)	Analytical instrument / pump (single stage membrane) monitoring or automatic sampling, concentration of the organic compounds on an adsorption trap. Subsequent sample injections by thermal desorption and separation by wide bore capillary gas chromatography. Sample volume controlled by thermal mass flow controller (dust protected). The sampled volumes of air should be controlled by a calibrated sampling loop. Sample flow range may be 20 -100 ml / min or more (adjustable). Sample volume should be between 400 ml – one litre or more of ambient air over a 10 -15 min sampling cycle and about equal time for analysis. All sample transfer tubing's should be in stainless steel. The flow / pressure sensor to be preferred with digital display.
2.2 Sampling Trap	Light weight stainless steel mini trap containing selective adsorbents (active charcoal or carbotrap or tenax G.R. or chromosorb 106), integrated heating element and temperature sensing by thermocouple, operating temperature range 40 – 200 °C or so.
2.3 Heating Oven	Metal oven having space for installation of wide bore capillary column, precolumn and temperature sensor. Operating temperature 40 – 100 °C or so that high resolution, stability and reproducibility is obtained for analyte of interest (BTEX)
2.4 Columns	Approx. 5 m pre column (for back flushing) followed by an

	approx. 10m – 50m length analytical column (higher length to be preferred). Both columns capillary (0.22 mm – 0.32 mm i.d. or / and wide bore i.e. 0.53 mm i.d.) coated with suitable column packing capable of separating all analyte of interest (i.e. 94-95% dimethylpolysiloxane & 5-6% cyanopropylphenyl or CP WAX 52 /DB5/624 or equivalent), film thickness between 1 and 2 µm. Should guarantee high resolution, stability and reproducibility.
2.5 Detector	Type : Photo Ionization Detector [PID] PID Lamp eV : 10.6 eV Lowest detector limit : 0.1 µg/m <sup>3</sup> (0.03 ppb) for Benzene Detector Diagnostics : PID sensitivity sensor / check facility
2.6 Operating Conditions	Temperature range : 5 – 35 °C or ore Concentration Range : 1 – 1000 µg/m <sup>3</sup> ( 0.3 ppb to 270 ppb) Repeatability : Retention time - < 0.1 % RSD Amount - < 1.0 % RSD Typical Cycle Time : Total Cycle time – 15/30 min. Approx Sample collection Time - 15 min. approx. Analytical Time – 15 min. approx.
2.7 Calibration Unit with Span Gas / Permeation Tubes and gas mixing / Dilution Facility	The certified permeation tubes, span or calibration gas mixture (low conc. range) with S.S. container / cylinder, regulators & filters. With calibration unit having gas flow (approx): 10 ml / min (calibration gas) ; 1.4 – 2.0 lit/min (dilution gas). Auto gas selection option for automatic calibration for ppb level calibration gas (10 – 30 ppb of individual compound of interest). Dilution device for calibration gases. Manual and software selectable valves for sample, calibration span and blank zero air gases. Dilution factor between 1:50 to 150.
2.8 Gas Supply & Control	Mass Flow controller and pressure regulators with pressure gauge for carrier gas. Inlet pressure regulator with pressure limit switches for all necessary gases. Needle valve with quick shut off valves for zero air.
2.9 Memory and Control Facilities	Method auto load and system restart after power failure. Methods storage capacity with timed events programmes for control of system parameters and valves in permanent memory. Busy (operational) status; calibration / sample gas selection. Fault status: gas supply (low press). Detector signal (low) and communication errors. Status indicated on monitor by LED's & controlled from computer. Output signals: Analog 0 – 1 mV, Serial RS 232 for data intermission and CP – BUS for monitor control from remote. Both digital & analog outputs should be available.

3.0 SOFTWARE	<p>Window based latest software's (English version) consisting instrumental control features as well as data acquisition, processing and handling in desired format including sorting of data (1/4/8/12/24 hourly, days wise / date wise reporting as micro gram /m<sup>3</sup>) or ppb (selectable) &amp; averaging etc.). Software should have following features:</p> <p>In-built facility for customized averaging period (1hr/4hr/8hr/12hr/24hr/monthly/annual mean values),</p> <p>Data presentation / graphical &amp; statistical processing &amp; data transfer &amp; storage facility to Excel / access.</p> <p>Communication software with protocol compatible to communicate &amp; transfer data from BTX monitor to central computer / website through modem (preferably including sample chromatogram). System should have remote access to BTX monitor.</p> <p>Resident program as well BTX control / monitor user programme with monitor start up / off/status, blank / calibration and sample gas measured, fault status, carrier gas and communication errors indication.</p> <p>Updation of response factors automatically after calibration run. Updation of retention times after every sample analysis.</p> <p>Auto tune facility.</p> <p>Raw data storage capacity without erase minimum for three months or more.</p>
4.0 Spares for 3 years	<p>One set of each including columns, filters / traps for removal of dust &amp; unwanted impurities (moisture / hydrocarbon); spare parts / electronic cards and sufficient septas, ferrules, dust filters, Teflon tubing etc &amp; other consumables usually get exhausted during first 3 years of operation apart from one set as essential part with main instrument.</p>
5.0 Installation & training	<p>Free of cost installation &amp; one week Training to concerned staff at MPPCB Laboratory.</p>

**BOMB CALORIMETER**

Sl. No.	Specifications	Requirement
1.0	Instrument Composition	1 set
	Oxygen Bomb with permanent fuse wire	1 set
	O <sub>2</sub> gas cylinder with regulator	2 nos.
	Electronic Balance	1 no.
	Pallet press	1 no.
	Laser Printer	1 no.
	Sample Crucible	3 nos.
	Accessories	As mentioned
2.0	Technical Specification	
	Type /Method	Compensated Isooperibol /Isothermal
	Instrument	Microprocessor controlled Bomb Calorimeter for determination of heat of Combustion, Gross calorific Values & Sulphur contents solids & liquid fuels as per Indian and International standards.
	Measurement Range	Upto 1200 Kcal / Kg for one gram of sample with a provision to extend the measurement range without reducing the sample size. Calorimeter software should identify different bombs automatically and maintain the history of the ignitions performed with each bomb.
		Bomb and bucket should be removable type to increase the number of samples per hours.
	Precision	0.1 % RSD or better on analysis of 1 gram sample
	Resolution	0.0001 Cal/gm
	Analysis Mode	Equilibrium mode / Dynamic mode or any other mode
	Temperature measuring Resolution	0.0001 deg C
	Temperature Measurement	With in-built high precision electronic thermometer
	Repeatability / Reproducibility	As per BIS 1350 (Part – 2), 1970, ASTM D-5865/04 & DIN 51900 Methods
	Display	Colour Touch screen with graphical user interface
	Correction	Spiking, Ash / Nitrogen or Acid, Fuse wire,

		Sulphur and Hydrogen
	Laser printer	HP or other equivalent make Laser Printer 1200 X 1200 dpi, 12ppm black compatible to the instrument along with connector.
	Sample Crucible Capacity	0.5 gm to 1.5 gm Metal crucible with Ni-Cr Alloy 3 Nos.
	Power requirement	230 ± 10 V AC, 50 Hz
	Processing Capacity	5 to 7 minute or better
	Number of Tests per hour	6 samples or more in an hour
	Oxygen Bomb	Combustion vessel made up of Special stabilized stainless steel to resist the mixed nitric acid and sulphuric acid produced in combustion with heavy duty screw cap.
	Memory Capacity	Inbuilt data storage for minimum 1,000 tests and data transfer to PC via Ethernet without using any additional software.
	Interface	In built USB interface for Balance, Printer and Computer without any additional accessories / software. Required extra software details should be mentioned separately.
	Up gradation	Calorimeter should have a facility to upgrade with different types of bombs by simply plug in without changing the main calorimeter configuration.
	Sample Volume	Approx 1 g
	Electronic Balance	<b>Weighing Capacity</b> : 120 g or more <b>Readability</b> : 0.0001 gram readability <b>Connectivity</b> : should be supplied with connecting cable to connect to the main instrument.
3.0	Accessories	<ul style="list-style-type: none"> <li>• Bucket &amp; water measuring Flask: 1 set</li> <li>• Benzoic Acid with certificate: 1 set</li> <li>• Spares / consumables : 1 set</li> </ul>



**BOD INCUBATOR**

<b>Sl. No.</b>	<b>Specifications</b>	<b>Requirements</b>
1.	Description	Digital Display, Vertical BOD Incubator for incubation of environmental samples for measurement of Biochemical Oxygen Demand having both cooling and heating facilities.
2.	Construction	Triple walled construction, Outer body made of Mild Steel with White Powder coated enamel.
3.	Shelves	Three adjustable Stainless Steel Perforated Shelves.
4.	Glass Door	Full view inner toughened Glass Door with Aluminium Frame closes on a resilient gasket and permits inspection of the specimens, without disturbing the thermal conditions of the chamber.
5.	Mounting	Cooling Unit is placed on heavy duty Iron angle frame below the Chamber with castor wheel
6.	Door	Door with magnetic gasket and lock & key arrangement
7.	Inside Chamber	Stainless Steel with ribs for adjusting perforated shelves at convenient illumination Lamp (15W) will be provided inside the Chamber
8.	Inside Chamber Size	900mm x 580mm x 650mm (H x W x D)
9.	Inside Chamber Capacity	0.339 cubic meter (12 cubic ft.)
10.	Insulation	75 mm gap between the walls is filled with PUF insulation to avoid thermal loss
11.	Temperature Range	5 – 60 °C with an accuracy of $\pm 0.2$ °C or better

**BACTERIOLOGICAL INCUBATOR**

Size (Inner chamber)	:	605x605x910mm (approx)
Temperature Range	:	Ambient to 70°C
Accuracy	:	±0.2°C
Timer	:	99hrs/cotinuuous
Chamber/Body	:	Tripple wall construction. Inner Chamber made of stainless steel SS-304 grade & middle wall made of G.I. sheet. Outer body made of M.S. painted in epoxy powder with perforated adjustable SS shelve 03No.
Power Supply	:	220/230Volt Single phase, 50Hz/AC

>Air Circulatory fan should be provided for circulation of hot air in between inner chamber.

>Digital Temperature Controller cum Indicator

Display: up to one decimal point

>Door with glass window should be provided.

>Wheel base should be provided.

## **Bottle Top Dispenser**

Digital Dispenser for Continuous, pulse free dispensing techniques for liquid dispensing continuous titration without volume restrictions. Cylinder refilling no longer necessary, no pulsing or accidental excess titration. Autoclavable up to 121 deg.C. Can be calibrated by the user by Gravimetric Methods.

Fits on bottles directly by means of adapter's safety valve for Dearing without loss of reagent (Refluxing type output valve). Voltage supply with long life primary cells and charging display.

Digital display prevents reading errors Simple calibration, calibration certificate for each instrument, Telescopic aspiration tube for automatically setting the length from 210 mm to 370mm (Refluxing Tube).

Non jamming sliding piston with cleaning ring adjustable dispensing angle, adjustable discharge tube, Dispensing range from 0.01 ml to 999.9 ml. Removable electronics unit. PTFE coated piston, Attachment of drying tube with Silica. Modular service friendly construction. Simple calibration program. Discharge tube should be rotatable by 360 degree. Horizontal : 142 – 220 mm, Vertical : 10 -200 mm, connection for dry tube.

For bottle threads with an outer diameter of 45 mm, complete with telescopic aspiration tube, 2 X 1.5 V micro batteries and adapters for outer diameter (mm): A-25, 28, 32, 38

## CO – HC ANALYZER

<b>SPECIFICATION</b>	<b>REQUIREMENTS</b>
Measuring Method	Non Dispersive Infrared [NDIR] method
Measurable Components	Carbon Monoxide (CO) and Hydrocarbon (HC) in automobile exhaust gases
Measuring Range	CO: 0 to 5% and 0 to 10% HC: 0 to 500ppm, 0 to 2000 ppm and 0 to 10000 ppm as normal hexane
Reproducibility	Within 1% of full scale
Stability	Within 1% of full scale / hour at constant temperature
Instrument deviation	Within 1% of full scale
Accuracy for range selection	CO measurement within 1% of full scale HC measurement within 2% of full scale
Accuracy	Within 2% of scale at constant temperature
Response Time	90% response within 10 second with 5 meter sampling line
Drift	Zero & Span drift $\pm 3\%$ FS (3 Hr) or less
Calibration	By span gas. Built in calibration check
Accuracy of span	Within $\pm 1-2\%$ of the concentration stated
Warming up time	Within 30 minutes
Interference effect from other gas	Less than 0.2 unit
Ambient Conditions	
(a)Temperature	0 to 50 Deg.C
(b)Humidity	Less than 95% R.H.
Display	Bright LED / LCD
Printer	Built – in or separate
Power Supply	220 $\pm$ 10 V AC; 50 Hz $\pm$ 3%
Accessories	For two years: Filter Paper for fine and coarse Particles ( two packets of each), calibration gas (two Cylinders), spares and consumables

### **Columns for Gas Chromatograph [GC]**

MS-5

Phase: MS-5 (DB/ELIT/BP/RESTEK)

Dimensions: L 30 meters  
ID 0.25 mm  
Film 0.25 mm

Temperature Range: -60°C – 330°C/350°C

608

Phase: 608 (DB/ELIT/BP/RESTEK)

Dimensions: L 30 meters  
ID 0.32 mm  
Film 0.5 mm

Temperature Range: 40°C – 280°C/300°C

**Microscope (Binocular)**

<b>Specifications</b>	<b>Requirements</b>
Description	Binocular Microscope with electrical illumination for magnification and observation of bacteria, viruses, slides, biological material etc. with built-in attached facility of display of magnified objects.
Objectives	Parfocalled, parcentered, achromatic
Functions	Count, capture, measure, record, amalgamate, Internal meeting
Illuminator	20W halogen with rheostat
Stage Dimensions	145 mm x 135 mm x 76 mm x 50 mm movement range
Pixel	640 x 480 with PCI card
Resolution	320 x 240, 480 TV lines
Shutter Speed	30 fps
Output	Digital
Cable(s)	USB, RCA – Video, S – Video
Data Transfer	7.5 MB/sec
Data Formats	BMP, JPG, MIG
Magnification	4x / 10x / 40x / 100x
Power Supply	230 ± 10 Volts AC, 50 Hz
Accessories	Spare Halogen Lamp – One, Spare Eyepiece, Cable & Plug
Warranty	Comprehensive warranty for at least three years

### **Desiccator for PM<sub>2.5</sub> Sampler**

Desiccator Cabinets for protecting humidity sensitive items specifically for filter papers of PM<sub>2.5</sub> Sampler. The cabinets are moulded of co-polyester plastic, resistant to staining, crazing and chemical attack. All the contents kept inside should be easily viewed through a large clear door that seals with positive latches and can be securely closed with seals. A dial hygrometer in the door allows for easy monitoring of relative humidity. Should work on 230±10VAC, 50Hz power supply.

Height	:	Approx 51cm
Width	:	Approx. 34 cm
Depth	:	Approx. 41cm
Internal Volume	:	Approx. 1.9 cu.ft

## **Digital Burette**

The Digital Burettes are capable of titrating with most common titrants such as NaOH, KOH (aqueous and non aqueous), EDTA, H<sub>2</sub>SO<sub>4</sub>, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, AgNO<sub>3</sub>, HCl, KMnO<sub>4</sub>, and many other common titrants up to 2N. Large digital display with push-button zeroing shows volumes up to 99.99mL without meniscus reading errors or volume calculations. Provision of recirculation valve eliminates reagent waste and reduces spurting during priming. Calibration should be easy and allows calibration adjustments in seconds—without retesting for simple ISO/GLP/GMP compliance. Capacity: 25 ml & 50 ml, Accuracy of  $\leq \pm 0.2\%$  of nominal volume with a coefficient of variation of  $\leq 0.1\%$ . Reliable single-piston design and lithium battery with hardened electronics and capable to provide up to 60,000 titrations without recharge.



**ELECTRONIC ANALYTICAL BALANCE**

- Capacity : 220 g [ $\pm 10$  g acceptable]
- Tare Range : Full scale display
- Sensitivity : 0.0001 g [0.1mg]
- Std. Deviation : 0.1 mg
- Linearity :  $\pm 0.2$  mg
- Pan diameter / size : Minimum 80 mm [ $\pm 5$ mm acceptable]
- Temp. Coefficient of sensitivity :  $\pm 2$  ppm/Deg. C
- Ambient Temperature : 5 ~ 40 Deg.C

Perfect self calibration, Motor cal-built in weight for internal calibration, External calibration, Built-in RS-232 Interface, Printer connectivity supported with standard weighing chamber, Power source- 230V 50 Hz. Over weight protection.

Glass draft shield with sliding doors.

As soon as the mains connected and switched ON, the unit will perform all function self test with all display segments for half second and then normal display will be displayed.

## Elemental (CHNS) Analyzer

S. No.	Specifications	Requirement
1.0	<b>Macro Elemental Analyzer System</b>	Fully automated PC Controlled simultaneous CHNS, O and Cl analyzer with high sensitivity detector and capable for multiple operating mode with sample (solids & liquids) size of 0.02 to 1000 mg.
1.1	<b>Application</b>	The Instrument should accept 50 – 80 mg of solid sample such as solid waste, hazardous waste, coal, coke, biomass, liquid waste etc. System should be real multi matrix analyzer, capable to analyze solids, liquid, liquid volatile samples and gases.
1.2	<b>Selectable Operation mode</b>	Measurement of CHNS, CHN, CNS, Total carbon, Total N, Total S, Traces sulphur and O-TCD, O-IR, Total Cl separately.
1.3	<b>Sample Combustion System</b>	Should have at least two furnaces for working in both vertical and horizontal operation with same system with independent temperature control up to 1200 °C for each furnace to ensure complete oxidation of sample.
		Should have ash finger to hold ash and prevent ash from affecting catalyst and quartz combustion tube.
		Should have mass flow controller for constant flow of carrier gas.
		System should have auto protection due to fully integrated safety features for increased operational safety and minimized maintenance expenditure.
1.4	<b>Analytical range</b>	PPB to prevent weight for all elements with the capability of measuring following absolute weight.
		Total Carbon [C] : 0 to 100% wt, 0 to 10000mg/l (water matrices)
		Hydrogen [H]: 0 to 3 ng or better
		Total Nitrogen [N] : 0 to 10000 mg/l
		Total Sulphur [S]: 0 to 40000 mg/l
		Oxygen [O] : 0 to 6 mg or better
Total Chloride [Cl] : 0 to 10000mg/l		
1.5	<b>Minimum Detection Limits</b>	Total carbon : 100 µ/l (organics, 200 µ/l (water)
		Total Nitrogen : 30 µ/l

		Total Sulphur : 0.5 mg/l
		Total Chloride : 100 µ/l
<b>1.6</b>	<b>Standard Deviation</b>	< 0.1 % of absolute
<b>1.7</b>	<b>Analysis Time</b>	Self optimizing depending on element content and weight, but less than 8 minutes in any case.
<b>1.8</b>	<b>Separation system</b>	Adsorption desorption principle for separation of gases using multiple columns with independent temperature control for each column.
<b>1.9</b>	<b>Analytical gases</b>	Nitrogen, Argon, and Oxygen, Microprocessor control for gas flow control
<b>1.10</b>	<b>Detector System</b>	Temperature stabilized TCD detector for measurement of C-H-N-S-O
		IR Detector for trace measurement of sulphur as low as 2 ppm
		Simultaneously CHN –Trace S detector and automatic switching from normal S to Trace S.
		NDIR detector for Chlorine and Trace oxygen determination
<b>2.0</b>	<b>Auto Sampler</b>	Electro Mechanical auto sampler system with 100 positions or more for solid and liquid samples with possibility of direct syringe injection of liquid and gas.
<b>3.0</b>	<b>Consumables</b>	Consumables to be supplied should be sufficient for 3000 sample analysis.
<b>4.0</b>	<b>Reference Standards</b>	Pure chemical reference standard (one set for each element) must be supplied with the system.
<b>5.0</b>	<b>Computer System</b>	
	<b>Make</b>	Reputed brand such as HP / Compaq/Dell
	<b>Processor</b>	Intel Core i7 (3 <sup>rd</sup> generation) processor
	<b>RAM</b>	4 GB DDR RAM ( upgradable to 8 GB)
	<b>HDD</b>	500 GB SATA
	<b>Monitor</b>	21" TFT – LCD Flat colour ( digital)
	<b>DVD Writer</b>	DVD – Multi drive
	<b>Ports</b>	2 serial, 1 parallel and 2 USB front 3 rear USB 2 Port, 1 VGA 4 bays( 2external & internal) with LAN 1 PS, 2 mouse port
	<b>Key Board</b>	Latest multimedia (HP/Microsoft)
	<b>Mouse</b>	Optical mouse with pad
	<b>Ethernet</b>	32 bit auto selectable 10/100 MBPS
	<b>Graphics</b>	Internet ready with integrated Graphics
	<b>Sound</b>	Integrated sound card and inbuilt stereo speakers
	<b>Printer</b>	HP laser jet color printer 1200 x 1200 dpi 12 ppm
<b>5.1</b>	<b>Software</b>	Pre – loaded Windows 7 professional or latest

		operating system with Licensed CD compatible with application software
		MS Office 2010 Professional with media manual and licensed CD compatible with application software
		Pre loaded Norton Antivirus with latest version of 3 years life time along with licensed CD compatible with application software
<b>5.2</b>	<b>Application Software</b>	Programme facility with multitasking windows base software displaying method sample and analysis status.
		Display of set and actual pressure, flow rate, temperature no. of sample analyzed.
		Provision for setting maintenance interval with warning regarding maintenance needed.
		Online display of graphics and text data
		Should have segmented leak check through software.
		Auto leak failure or electronic failure detection
		Instrument control reintegration / report calibration, automatic data acquisition and processing.
		Calculation of data and report formatting
<b>6.0</b>	<b>Sample Packing</b>	Should be supplied with required accessories for solid sample packing
		Should be supplied with liquid sample sealing press for packing and analysis of liquid samples. The sealing press should allow for sealing of samples under inert gas flow to ensure air free packing.
<b>7.0</b>	<b>Optional Items</b>	
<b>7.1</b>	<b>Micro balance</b>	Micro balance capable of direct transferring the data to the analyzer
	<b>Operation</b>	Balance operation through bright touch screen
	<b>Control</b>	Hands free Infra Red controlled opening and closing of draft should
	<b>Weighing Range</b>	Weighing Range: up to 6100 mg
		Resolution : 0.001 mg
		Repeatability : 0.8 to 0.9 micro gram
		Linearity : $\pm 2$ to 4 $\mu\text{g}$
<b>7.2</b>	<b>Auto sampler</b>	System should have provision for autosampler to handle both solid and liquid samples. Auto sampler should have provision to analyze more than 100 samples in liquid mode and 30 samples in solid mode
<b>8.0</b>	<b>Additional Items</b>	Oxygen analysis kit
		Chlorine analysis kit
		Kit for trace sulphur analysis using IR detector

<b>9.0</b>	<b>Operation and Maintenance Training</b>	On site comprehensive training for scientific officials operating the system and support services till customer satisfaction with the system followed by complementary ( all expenditure including) one week training for two scientists on operation and maintenance aspects of the instrument at manufacturers application laboratory in the country / abroad.
<b>10.0</b>	<b>Warranty</b>	Comprehensive warranty with spares for three years from the date of installation of the instrument should be covered. The AMC charges to be mentioned for next two years after warranty is over.

**FLASH POINT APPARATUS**

<b>SPECIFICATIONS</b>	<b>REQUIREMENT</b>
Description	Portable, Electrically heated equipment to measure flash point of waste, oils, lubricating oils, waste fuels, petroleum products, water liquid, paints as per latest flash point ASTM Standards method ASTM D 5450 & D 7094
Controller	Microprocessor based process controller – cum- indicator. Flash Point measurement by continuously Closed Cup with RTD sensor.
Sample Volume	Small, 1 to 10 ml
Ignition	Electric arc ignition inside closed measuring chamber, Ignition transformer having O /P of 10.6 KV DC from 230 ± 10 V AC i/p.
Temperature Range	Upto 400 deg. C
Temp. Readout & Control	Digital, Built – in temperature control
Heater	800 watt Electronic heater with energy regulator
Flash Detector	Automatic Ionization principle based flame detector sensor with audible signals and on screen prompt
Stirrer	At least two speed or more
Measuring Time	5 – 10 min per sample
Pressure correction	Automatic
Cooling	Force cooling facility
Interface	<ul style="list-style-type: none"> <li>• Computer &amp; Printer</li> <li>• Connection for external keyboard or bar code reader</li> </ul>
Calibration	Simple, factory calibrated with calibration certificate from NABL accredited calibration laboratory. Should be supplied with calibration Liquid - 2 bottles
Power Supply	230 ± 10 V AC 50 Hz single phase
Safety Features	Fire safe with fire sensor over temperature cut off facility
Accessories	Syringes, ignitor, electrical cable, instruction manual (2 nos.), calibrated thermometer fro NABL accredited calibration laboratory
Other Accessories	<ul style="list-style-type: none"> <li>• Sample Cup 4 ml for ASTM D 6540 – 01 No.</li> <li>• Sample Cup 7 ml for ASTM D 7094 – 01 No.</li> <li>• Sample Cup carrier – 01 no.</li> <li>• Stirring magnet – 06 Nos.</li> <li>• Brass eraser - 02 nos.</li> <li>• Power supply cable</li> <li>• RS 232 printer cable</li> <li>• Other accessories necessary of operation of equipment [if any]</li> </ul>

**Flue Gas Analyzer**

1.	Gases to be measured	CO, O <sub>2</sub> , CO <sub>2</sub> , SO <sub>2</sub> , NO, NO <sub>2</sub> , HC and combustion efficiency
2.	Sensors	IR or Electro – chemical Sensors with high accuracy and life span of 3 to 5 years (CO, O <sub>2</sub> , CO <sub>2</sub> should be measured directly with respective individual sensors)
3.	Responsive Time	15 seconds for 90% response for NO <sub>x</sub> , CO and CO <sub>2</sub> ; 30 seconds for 90% response for SO <sub>2</sub> and O <sub>2</sub>
4.	Gas Flow	1 to 2.5 Liter / min.
5.	Temperature Measurable	Up to 1200°C with K type thermocouple Accuracy ±1°C
6.	Operating Temperature	0 to 50 °C ( The instrument should be capable to handle high temperature through inbuilt dilution system / cooling system for accurate measurement)
7.	Power Supply	Rechargeable Li-ion Battery along with built in charger and Power adopter 230V± 10VAC, 50Hz AC
8.	Flue Gas Probe	Suitable metallic probe to withstand 1200°C temperature with insulated handle. Probe length: Minimum 30 cm (12 inch) stainless Steel or more; minimum hose length 2 m or more with Piston Grip.
9.	Pump	Built in pump nominal flow rate 700 cc/min
10.	Pre Programming	For Natural Gas, Light Oil, Heavy Oil, LPGs, Propane, Butane, Coke, Coal etc.
11.	Display	Remote hand set with backlit 4 line LCD 15 Ft cable connects the display hand set to the analyzer
12.	Parameter wise specifications	Please see annexure- “A”
13.	Software/ operator	Easy to handle Key Board operated and user friendly, Data Format transferable to user software and data logger
14.	Weight	Light weight /Portable housed in sturdy Carrying Case
15.	Calibration Certificate	Calibration and certificate of approval from recognized agency like EPA, TUV
16.	Documents	Instruction manual for operation, Circuit details for each electronic card for repair and maintenance.

Annexure-“A”

Parameter	Range	Resolution	Accuracy
<b>TEMPERATURE MEASUREMENT</b>			
Flue Temperat	Option:1 (single probe) 20°- 1200°C	0.1° (C)	0.1° (C) ± 0.3% of reading

ure	Option:2 (Two probes) 20°C - 600°C 500°C - 1200°C or more		
Inlet temperature	0°- 1200°C	0.1°C	0.1° (C) ± 0.3% of reading
<b>GAS MEASUREMENT</b>			
Oxygen (O <sub>2</sub> )	0 to 25%	0.1%	± 0. 2%
Carbon Monoxide (CO)	0 to 10000 ppm	1 ppm	± 2% of reading Up to <2000ppm ± 5% of reading >2000 ppm
Pressure	0 – 150 mbar	0.01 mbar / kpa	± 0.05% full scale
Carbon Dioxide (CO <sub>2</sub> )	0 to + 50 Vol. % CO <sub>2</sub>	0.01 vol. % CO <sub>2</sub> ( 0 to 25 Vol. % CO <sub>2</sub> )	± 0.3 Vol. % CO <sub>2</sub> + 1% of mv ( 0 to 25 Vol. % CO <sub>2</sub> )
Efficiency	0 – 100%	0.1%	± 1%
Hydrocarbon (HC)	0 – 10000 ppm	0.01	± 5% of reading
<b>OPTIONAL SENSORS</b>			
Nitric Oxide (NO)	0 to 5000ppm	± 1 ppm	± 5 ppm < 100 ppm 5% > 100 ppm
Nitrogen Di Oxide (NO <sub>2</sub> )	0 to 200 ppm	± 1ppm	± 2 ppm for < 20 ppm ± 5% for > 20 ppm
Sulphur Dioxide (SO <sub>2</sub> )	0 to 2000 ppm	± 1 ppm	± 5 ppm for < 100 ppm ± 5% for > 100 ppm
Hydrogen Sulphide (H <sub>2</sub> S)	0 – 200 ppm	± 1 ppm	± 2 ppm for < 40 ppm ± 5% for > 40 ppm
Hydrogen Chloride (HCl)	0 – 50 ppm	± 1 ppm	± 5 ppm for < 40 ppm ± 5% for > 40 ppm
High Capacity Carbon Monoxide	0 – 100000 ppm	± 1 ppm	± 5 ppm for < 100 ppm ± 5% for > 100 ppm



### Vacuum Filtration Assembly [Suction Pump]

Specifications	Requirements
<b>A. Filter Holder</b>	
1. Material	Stainless Steel Lid, Funnel, base, clamp and filter support of SS perforated filter mesh with 6 place Manifold.
2. Filter Diameter	47 mm
3. Filtration Area	12.5 cm <sup>2</sup>
4. Funnel Capacity	Autoclable SS body, 47 mm dia with 650 ml (Minimum) Capacity
5. Suction Flask Cap	1.0 / 2.0 litre
6. Connections	Outer diameter of base outlet 10 mm
7. Operating pressure	Vacuum only
<b>B. Vacuum Pump</b>	
8. Type	Single Phase motor with IP 44 type of protection, with carrying handle and sturdy rubber feet
9. Vacuum	Should be adequate for smooth filtration of water / waste water. The pump should be an oil free pump / diaphragm with continuous heavy duty type.
10. Flow Rate /Rating	15 LPM (maximum) / 0.12 KW or 1/16 HP
11. Supply Voltage	230 ± 10 Volts, 50 Hz, Single Phase AC
12. Ambient Temperature	45°C (Maximum)
13. Warranty	Comprehensive warranty / Guarantee should be valid for three years.
The Filtration Assembly should be complete with perforated Neoprene stopper, Vacuum hose pipes, stainless steel forceps, power cord with plug and toggle switch and operating manual with standard tool kit.	

## FILTER PAPERS

- (a) **Filter Paper (Quantitative)** Equivalent to Whatman Grade No. 41 & 42, Ash Less with specifications -Pore Size - 2.5  $\mu\text{m}$ , Ash content - 0.007% & Thickness- 0.20 mm and weight - 100  $\text{g}/\text{m}^2$  or less with the finest particles retention of all cellulose filter typical analytical precipitates include Barium Sulphate, Metastanic Acid and finely precipitated calcium carbonate ash less circles, 125 mm diameter. [Box containing minimum100 no. circle form paper]
- (b) **Filter Paper (Quantitative)** Equivalent to Whatman Grade No. 40, Ash Less with specifications- Pore Size - 2.5  $\mu\text{m}$ , Ash content - 0.007% & Thickness- 0.20 mm and weight - 100  $\text{g}/\text{m}^2$  with the finest particles retention of all cellulose filter typical analytical precipitates include Barium Sulphate, Metastanic Acid and finely precipitated calcium carbonate ash less circles, 125 mm diameter. [Box containing minimum100 no. circle form paper]
- (c) **Filter Paper (Quantitative)** Equivalent to Whatman Grade No. 42, Ash Less with specifications - Pore Size - 2.5  $\mu\text{m}$ , Ash content - 0.007% & Thickness- 0.20 mm and weight - 100  $\text{g}/\text{m}^2$  or less with the finest particles retention of all cellulose filter typical analytical precipitates include Barium Sulphate, Metastanic Acid and finely precipitated calcium carbonate ash less circles, 90 mm diameter. [Box containing minimum100 no. circle form paper]
- (d) **Glass Micro - Fiber Extraction Thimbles** Equivalent to Whatman Grade HP-GF with specifications - High purity, internal diameter X External length [19mm X 90mm] The Thimble should be free of binders or additives and can be used at temperature up to 500<sup>o</sup> C. [Box containing minimum 25 Thimbles] [to be used for stack monitoring]
- (e) **Cellulose Extraction Thimbles** Equivalent to Whatman Grade with specification - Internal diameter X External length [28mm X 100mm] [Box containing minimum 25 Thimbles] [to be used for stack monitoring].
- (f) **Glass Micro- Fiber Filters sheets** Equivalent to Whatman Grade GF/A with specifications- to be used in Ambient Air monitoring for measuring PM10, high purity borosilicate glass filter, thickness -maximum 0.43mm, Particle retention - 99.95 % (min.), Flow rate - 1.52  $\pm$  0.18  $\text{M}^3/\text{min.}$ , weight - 80  $\text{g}/\text{m}^2$  maximum and should sustain for temperature of 500<sup>o</sup>C. Size - 203mm X 254 mm [Box containing minimum100 sheets]

- [g] Glass Micro- Fiber Filters sheets** Equivalent to Whatman Grade GF/A and EPM 2000 with specifications- to be used in Ambient Air monitoring for measuring PM<sub>10</sub>, high purity borosilicate glass filter, binder free, thickness -maximum 0.43mm, Particle retention - 99.95 % (min.), Flow rate -  $1.52 \pm 0.18$  M<sup>3</sup>/min., weight - 85 g/m<sup>2</sup> maximum and should sustain for temperature of 500°C. Size - 203mm X 254 mm [Box containing minimum100 sheets]
- (g) PM 2.5 monitoring filters** Equivalent to Whatman Grade with specifications - Made up of high purity thin PTFE membrane required for ambient air monitoring. Size - 46.2mm circular box containing minimum 50 circles in box. Filter Pore size - maximum 2.0 µm, thickness - 40 µm, Particle retention - 99.7%.
- (h) Glass Micro Fiber Filter** Equivalent to Whatman Grade 934-AH with specifications-Pore Size - maximum 1.5 µm, Thickness- minimum 0.33 mm and weight - maximum 64 g/m<sup>2</sup> with the finest particles retention, Circle size-47 mm diameter. [Box containing 100 no. circle form paper] suitable for suspended solids in all types of water and effluent and filtration of particles in water, algae and bacterial culture.
- (i) Glass Micro Fibre Filter** Equivalent to Whatman grade GF/A with specifications - Pore size- maximum 1.6 µm, Thickness - 0.26 m, Dry tensile 430 gm, suitable for PM 2.5 sampling in ambient air quality monitoring. Circle size - 37mm diameter. (Box containing minimum100 no. paper circles)

### Gaseous Pollutant Sampler

Specifications	Requirements
<b>Description</b>	Suitable for monitoring of gaseous pollutants like SO <sub>2</sub> , NO <sub>2</sub> , CL <sub>2</sub> , H <sub>2</sub> S, O <sub>3</sub> , NH <sub>3</sub> in ambient air. The system should have facility to maintain the effective cooling of the absorbing solution.
<b>Construction</b>	Robust, powdered coated Aluminium cabinet
<b>Sampling Rate</b>	0.3 to 2.0 lpm using rota meter
<b>Sampling Train</b>	A manifold having four inlets and one outlet
<b>Flow Control</b>	Flow control of each inlet with built in needle valve
<b>Sampling Time</b>	28 hours (maximum)
<b>Sampling Time Record</b>	0 to 9999.99 Hrs, 24 hours programmable timer to automatically shut off the assembly after preset interval
<b>Power Requirement</b>	230 ± 10 Volts, 50 Hz, AC single phase supply
<b>Impingers</b>	3 nos. of borosilicate glass impingers as per BIS 5182 (part 6) 2006 and one fritted disc impinger for monitoring of sparsely soluble gases along with One amber coloured glass impinger for monitoring of ambient ozone.

**GAS CHROMATOGRAPH MASS SPECTROPHOTOMETER (GC-MS)**

<b>SI No.</b>	<b>Specifications</b>	<b>Requirement</b>
1.0	Instrument Composition	
	Gas Chromatograph with accessories	One set
	Mass Spectrometer with accessories	One set
	Capillary columns with accessories	One set of each specified columns
	Software for Automatic control of the system, Data Acquisition and processing	One set
	Vacuum Pump for MS with accessories	One set
	Auto Sampler	One set
<b>2.0</b>	<b>Technical Specifications</b>	
2.1	Gas Chromatograph	Fully Computer controlled with Injectors, Oven, Detector, EPC and related electronics
2.2	Make	Basic unit as well as other major components of the same manufacturer
2.3	Display	Alphanumeric digital display in at least four lines.
2.4	Parameters setting & control	Through Application Software as well as through Key board of the Instrument
2.5	Injector / Detector mounting	2 Injectors and Electron Capture Detector (ECD)
2.6	Capillary Column Mounting	Capable to hold two capillary columns of different diameter ( 100 $\mu\text{m}$ to 530 $\mu\text{m}$ )
2.7	Heated Zones	At least five Heated Zones including two injectors, Oven, Detector and Auxiliary.
2.8	Purge System	Gas Saver and Septum Purge System
2.9	Memory Protection	Memory Protection during power Failure
2.10	Diagnostics & self testing	Built in Diagnostics and comprehensive Self – Testing
2.11	Data Acquisition	Simultaneous from two signal channels i.e. Mass Spectrometer and ECD
<b>3.0</b>	<b>Injector -1</b>	Split / split less Injector ( for Manual Injection)
3.1	Constituents	Modular Injector with Heater, temperature and Pressure Sensors
3.2	Modes of Injections	Split less and split injections

3.3	Column Compatibility	100 to 530 mm ID Capillary Columns
3.4	Provision for	Over heat Protection, Septum Purge and Gas Saver
3.5	User Settings	User adjustable setting of split Ration, Purge Flow and Purge Time
3.6	Temperature Range	50°C to 450°C
3.7	Temperature Increments	Minimum 1°C in the entire operating range
3.8	Temperature programming capability	Injector temperature programming
3.9	Temperature Program Ramps	At least 3
3.10	Temperature Ramp Rate Range	From 0.1 to 120 °C/min
3.12	Number of Pressure Programme Ramps	At least 3
3.13	EPC Pressure Range	0 to 100 psi
3.14	Operation Modes	Constant Pressure. Ramped Pressure, Constant Flow and Ramped Flow
3.15	Total Flow Setting range	N <sub>2</sub> : 0.1 to 100 ml/min, He: 0.1 to 100 ml/min, H <sub>2</sub> : 0.1 to 1000 ml / min
3.16	Maintenance	Quick and easy maintenance provisions.
<b>4.0</b>	<b>Injector -2</b>	Multimode Injector ( For use with auto sampler) – Located at back position
4.1	Constituents	Modular Injector with Heater, Temperature and Pressure Sensors
4.2	Inlet Options	Split / split less, temperature programmable, Large Volume Injection and cool on column injections
4.3	Modes of Injections	Hot or cold split / split less, Pulsed split /split less, Solvent vent and Direct.
4.4	Column Compatibility	50 to 320 mm ID Capillary Columns
4.5	Provisions for	Overheat Protection, Septum Purge and Gas Saver
4.6	User Settings	User adjustable setting of Split Ration, Purge Flow and Purge time
4.7	Temperature Range	50°C to 450°C
4.8	Temperature Increments	Minimum 1°C in the entire operating range
4.9	Temperature Programming capability	Up to 7 ramps at up to 450°C /min or above
4.10	Temperature Programme Ramps	At least 3
4.11	Temperature Ramp rate Range	From 0.1 to 120°C/min

4.12	Pressure Programming capability	Yes
4.13	EPC Pressure Range	0 to 100 psi
4.14	Operation Modes	Constant Pressure, Ramped Pressure, Constant Flow and Ramped Flow
4.15	Total Flow Setting Range	N <sub>2</sub> : 0.1 to 100 ml/min, He: 0.1 to 100 ml/min, H <sub>2</sub> : 0.1 to 1000 ml / min
4.16	Maintenance	Quick and easy maintenance provisions
<b>5.0</b>	<b>OVEN</b>	
5.1	Volume	More than 13 litres, should have provision to accommodate minimum two nos. Capillary columns or more at a time.
5.2	Column Compatibility	Capillary ( 0.10/0.20/0.32/0.53mm ID)
5.3	Temperature Range	50°C to 450°C or more
5.4	Temperature Increments	Minimum 1°C
5.5	Temperature Accuracy	± 1% for the entire range
5.6	Temperature Stability	± 0.1°C
5.7	Column Overheat Protection	User defined setting
5.8	Oven Safety Features	Oven power must turn off automatically when the lid / door is opened automatic carrier gas shut off if inlet pressure drops significantly.
5.9	Temperature Programming	Minimum six ramps and seven Plateaus
5.10	Programming Rate Range	0.1°C to 120°C / min
5.11	Heat up time	Less than 2.0 min. ( 50°C or lower to 250°C)
5.12	Cool Down Time	Less than 4.0 min. ( 450°C or lower to 50°C)
5.13	Resetting of Programme	Automatic by user defined sequence
5.14	Maximum Run Time	Minimum 650 minutes
5.15	Injector Compatibility	Split / Split less Injector Multimode Injector
5.16	Detector Compatibility	Mass Spectrometer (MS) and ECD
<b>6.0</b>	<b>Electronic Pneumatics Control (EPC) System</b>	
6.1	Type	Dual column, dual flow
6.2	Control of inlet pressure, flow rate of the carrier gas and split ratio	Through the Application Software
6.3	Parameters Display	On – screen digital display
6.4	Pressure & Flow Programming	Time Programmable between the run
6.5	Dean's Pressure Switch	For bifurcating the column eluents to two different columns
7.0	Capillary Columns	Low Bleed Capillary Columns with following

		dimensions
7.1	HP-5MS or equivalent	60M X 0.25MM X 0.25 μMM
7.2	Uncoated deactivated Silica Column ( Guard Column)	5m x 0.25 mm
8.0	<b>Mass Spectrometer (Detector)</b>	
8.1	Control	Provisions for automatic Start and Shut Down through Application Software Parameters should be set and controlled through the Software
8.2	GC Interface	Short heated Interface
8.3	Interface Temperature Range	100°C to 350°C
8.4	Mass Source	Should have EI, CI, Positive CI, Negative CI facility with automatic tuning and acquire both SIM and scan data from single injection.
8.5	Electron Source	Easy access heated inert Filament
8.6	EI /CI Source Change – over	Easy & Quick changeover by user
8.7	Source Temperature Range	125°C to 300°C
8.8	Analyzer Type	Transmission Quadrupole with pre – filter
8.9	Noise Reduction	Heated Quadrupole Pre- filter /Entrance lens/any other proven means for noise reduction
8.10	Analyzer Temperature Range	150°C to 200°C
8.11	Mass Range	10 to 1000 amu or more
8.12	Mass Stability	Less than ± 0.1 amu accuracy over 48 hours
8.13	Ionization Modes	Electron Ionization, Positive /Negative Chemical Ionization
8.14	Electron Ionization Voltage	10 to 100eV
8.15	Vacuum Pump	200 L/sec or better highly efficient Turbo – Molecular Pump
8.16	Pump Down Time	For Air / Water < 3 minutes
		For qualitative Stability < 15 minutes
		For quantitative Stability < 90 minutes
8.17	Detector	Electron Multiplier or Photo Multiplier
8.18	Mass Tuning Standard	PFTBA (FC-43), BFB, DFTPP
8.19	Resolution	1 amu or better
8.20	Scan rate	Fully variable 10000 amu / sec or more
8.21	Scan Step Size	0.1 amu or less
8.22	Acquisition Rate	50 full Scans or better / sec depending on mass



		range
8.23	Linear Dynamic Range	Concentration $10^5$ Electronic $10^6 - 10^7$ dependent on acquisition rate
8.24	Number of SIM Groups /Run	Minimum 30 Groups
8.25	Number of Ions /Group	Minimum 30 Ions
<b>9.0</b>	<b>Sensitivity (detection Limits)</b>	
9.1	EI Scan	1pg of OFN at S/N of 600 : 1 RMS
9.2	EI SIM Scan	100fg of OFN at S/N of 25 : 1 RMS
<b>10.0</b>	<b>Mass Spectral Libraries</b>	
10.1	NIST Mass Spectral Library	Version Year 2011 or latest pre loaded on Data Station and licensed backup Licensed CD compatible with operation software
10.2	NIST Chemical Structures database	Latest version available on date of quotation preloaded on Data station and back up Licensed CD compatible with operation software.
<b>11.0</b>	<b>Additional Capabilities</b>	
11.1	Acquisition	Simultaneous Full Scan as well as SIM Acquisition
11.2	Ability to split column effluent	To ECD in addition to MS with dual signal capability
11.3	Applying constant flow rate	To the MS regardless of column flow rate ( use of any column at any flow rate)
11.4	Column Replacement	Without cooling and venting the MS
11.5	Injector Maintenance	Without cooling and venting the MS / Back flushing
<b>12.0</b>	<b>Electron Capture Detector (ECD)</b>	Coaxial design based on Ni <sup>63</sup> Source
12.1	Linear Dynamic Range should be	$10^4$ or higher
12.2	Departure from linearity should be	Less than $\pm 1\%$ for the entire range
12.3	Operating temperature (Maximum)	400 °C
12.4	Pressure / Flow control	Electronic pressure / flow control
12.5	Sensitivity	Less than 10 fg / sec of Lindane
12.6	Makeup Gas	Argon / 5% Methane or Nitrogen
<b>13.0</b>	<b>Auto Sampler</b>	
13.1	Number of Samples Vials	Capable of accommodating 100 Vials or more
13.2	Syringe Capacity	Capable of accommodating up to six different syringe capacity
13.3	Injection Volume	Selectable between 1 and 10 micro litre or more

		should be available
13.4	Washing solvent	Up to four different washing solvents in 4 ml vials
13.5	Programming	Sequence and repetition programmable from work station software.
<b>14.0</b>	<b>Operating Conditions</b>	
14.1	Power Supply	230 ± 10 Volts, 50 ± 1 Hz AC Power supply
14.2	Operating Temperature	15°C to 30°C
14.3	Relative Humidity	40 to 80 %, non condensing
<b>15.0</b>	<b>Data Station</b>	
	Application Software	Multitasking software with programming facility
	Capabilities	Accurate and reproducible Integration
		Reintegration / Replot
		Baseline Correction
		Multi level calibration
		Background Subtraction
		Library Search
		Quantitative Analysis
		Customizable Report Formats
	Software Control	The whole system including GC-MSD, Injectors and additional Detector (ECD)
	Parameters Control	Flow, Temperature, Pressure and Vacuum System
	System Auto Tuning	Through Tuning Standards
	Analytical Quality Control	Calibration check samples
		Spike recoveries
		Calibration verification and
		QC limits
<b>16.0</b>	<b>Computer System</b>	
	Make	Reputed brand such as HP/Compaq/Dell
	Processor	Intel Core i7 ( 3 <sup>rd</sup> Generation) processor
	RAM	4 GB DDR RAM ( upgradable to 8 GB)
	HDD	500 GB SATA
	DVD Writer	DVD – Multi drive
	Ports	2 serial, 1 parallel and 2 USB front 3 rear USB 2 Port, 1VGA 4 bays ( 2 external & internal) with LAN 1 PS, 2 mouse port
	Key Board	Latest multimedia (HP /Microsoft)
	Mouse	Optical mouse with pad
	Ethernet	32 bit auto selectable 10 / 100 MBPS
	Graphics	Internet ready with integrated Graphics
	Sound	Integrated sound card and inbuilt stereo

		speakers
	Printer	HP Laser jet colour printer 1200 x 1200 dpi 12 PPM color
	Software	Pre loaded Windows 7 professional or latest operating system with licensed CD
		MS Office 2010 Professional with media, manual and licensed CD
		Pre loaded Norton Antivirus with latest version of 3 years life time along with licensed CD
<b>17.0</b>	<b>Spares &amp; Consumables</b>	
	Column nut	2 nos.
	Washer	02 nos.
	Graphite / vespel ferrules different sizes	20 nos. each
	Inlet Septa ( self sealing for injectors)	200 nos.
	O-ring	20 nos.
	Copper Tubing with connectors	50 mtrs.
	Micro syringes for manual injection (5µl)	4 nos.
	Micro syringes for manual injection (10µl)	4 nos.
	Copper tube cutter	01 no.
	Auto sampler vials (2 ml)	500 nos.
	Auto sampler septa and caps	2000 nos.
	Auto sampler spare syringes	1.0µl – 5 nos. 5.0 µl- 5 nos. – additional
	Any Other	Any other spares and consumables sufficient for three years trouble free operation should also be included in the offer and supplied with each system
<b>18.0</b>	<b>Accessories</b>	
18.1	Operation & maintenance manual	Two sets
18.2	Application notes for the analysis of	VOCs, PCBs, PAHs, Pesticides, carbamates and Carbonyl compounds
18.3	Service Manual	One set
18.4	Requisite Tools	One set
18.5	List of spare parts & consumables	One set
18.6	Troubleshooting guide	One set

18.7	High Capacity Carrier gas purifier	2 each
18.8	Consumables for three years operation	One set
18.9	Operation kit	One set containing all essentials accessories and spares such as Column nut washers, inlet septa, O-ring copper tubing with connector, micro syringes, copper tube cutter, column cutter, brass / stainless steel nuts, brass / stainless steel ferrules.
18.10	Gas Purification Panel	Complete with Gas Purification traps moisture trap – silica gel – Molecular sieve 50 : 50 length 10 inch – Two nos.
18.11	Gas Cylinders	High pressure Stainless Steel cylinder fitted with high purity 99.99% analytical gases ( as mentioned ahead) having gas capacity 7 m <sup>3</sup> ( water capacity 47 ltrs). Cylinder should be ISI marked confirming to IS 7285 flat bottom fitted with valve as per IS: 3224 complete with neck ring and cap painted as specified under Gas Cylinder Rules 1981. Gas Cylinder should be supplied with hydraulic test certificate and explosive certificate from Chief Controller of Explosives, Nagpur. Helium: One No., Nitrogen: One No. Hydrogen: One No.
18.12	Gas Cylinder Trolley	One No. <ul style="list-style-type: none"> <li>• Gas Cylinder trolley for transporting gas cylinder from transport vehicle to Gas Room / Laboratory</li> <li>• Stainless Steel trolley heavy duty construction with rugged polypropylene straps, stainless steel cinch buckles with 8 inch wheel made up of high strength polymer material for safe easy and convenient transfer of single stage cylinder up to 12" in diameter.</li> </ul>
19.0	<b>Warranty</b>	Comprehensive warranty with spares for 3 years from the date of installation of the instrument should be covered. The AMC charges to be mentioned for next two years after warranty is over.
20.0	<b>Training</b>	The principal supplier has to impart onsite

		<p>training at the time of installation followed by complimentary one week training ( all expenditure inclusive) to minimum two Scientist on operation, method development, maintenance, software training, data interpretation (qualitative and quantitative) at instrument manufacturer's application laboratory including application for analysis of VOCs, PAHs, PCBs, Pesticides and other hazardous organic compounds.</p>
<p><b>21.0</b></p>	<p><b>General Conditions of Supply</b></p>	<ul style="list-style-type: none"> <li>• The instrument and all its sub units should operate on 230 ± 10 volts 50 Hz power supply.</li> <li>• All the operation and maintenance manuals, circuit diagrams, application notes and application software to be supplied in English language.</li> <li>• The supplier / manufacturer should have Indian Agent to provide after sales service.</li> <li>• The principal should provide a certificate that they will provide the spares in future for at least 10 years.</li> <li>• The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier.</li> <li>• The Bidder should be a manufacturer / authorized representative of a manufacturer, who must have designed, manufactured, tested and supplied two numbers of such equipment in the past five years similar to the type specified, which shall be in successful operation for atleast 2 years as on the date of bid opening.</li> <li>• The bidder should furnish the information on past supplies and their satisfactory performance.</li> <li>• Bidder shall invariably furnish documentary evidence (client's certificate –at least two) in support of the satisfactory operation of the equipment as specified above.</li> </ul>

### Gas Detection Pump & Tubes

**Gas Detection Pump:** Portable, handy piston type pump. The Pump should have built in tip breaker for breaking of gas detector tubes. The flow Indicator should be available to not down a fixed volume 50 ml to 100 ml. The pump should be of good quality, plastic preferable ABS resin material of better, so as to avoid reaction with the gases collected.

Description & Ranges of Gas Detection Tubes		
1.	Ammonia	0.5 to 1 ppm
		2.5 to 5 ppm
2.	Benzene	0.5 to 10 ppm
		1 to 20 ppm
3.	Carbon Monoxide	1 to 30 ppm
		25 to 1000 ppm
4.	Chlorine	0.05 to 0.5 ppm
5.	Chloride	0.05 to 1 ppm
6.	Hydrogen Chloride	0.2 to 1 ppm
7.	Hydrogen Sulphide	0.2 to 2 ppm
8.	Mercaptans	0.1 to 0.2 ppm
9.	Methyl Mercaptans	0.25 to 2.5 ppm
10.	Ethyl Mercaptans	0.2 to 0.5 ppm
11.	Nitrogen Oxides	0.04 to 0.08 ppm
		0.2 to 0.1 ppm
12.	Sulphur Dioxide	0.2 to 5 ppm

### Hot Air Oven

Specifications	Requirements
<b>Internal Chamber Size</b>	75cm x 75cm x 120cm ( L x W x H)
<b>Outer Body</b>	Powder Coated Mild steel, White stoned enamel
<b>Inner Chamber</b>	Double walled construction inner chamber made of stainless steel
<b>Trays</b>	4 nos. stainless steel , perforated adjustable
<b>Door</b>	Single door fitted with heavy brass chorme plated hinged and door lock
<b>Cabinet</b>	Cabinet double walled mild steel
<b>Insulation</b>	Minimum thickness 5 cm of glass wool
<b>Air Circulation</b>	Ventilated through internal fan with ISI marked motor to assist circulation or air
<b>Operating Temperature Range</b>	Ambient to 300°C
<b>Temperature Control</b>	Digital temperature controller cum indicator with accuracy of $\pm 0.5^{\circ}\text{C}$ , installation should be on top towards door side. The supplier will have to provide Calibration Certificate for Digital Temperature Controller from NABL recognized Calibration Laboratory
<b>Timer</b>	Digital with rage upto 999 minutes, installation should be at top towards door side, Automatic to control ON/OFF cycle.
<b>Power</b>	230 $\pm$ 10 Volts AC 50 Hz
<b>Heaters &amp; heating load</b>	ISI marked heating elements 2 KW
<b>Ventilator</b>	Two adjustable air ventilator on both upward side of the instruments
<b>Standards</b>	The apparatus should confirm to IS 6365 – 1971 (Reaffirmed 1995) with latest amendments in Indian Standard Specification for laboratory Electric Ovens or equivalent International Standards covering marking tests and safety requirements.

### Hot Plate

Specifications	Requirements
<b>General</b>	General Purpose hot plate with digital electronic temperature controller cum indicator
<b>Case Structure</b>	Steel Epoxy coated case for structural strength to support heavy loads
<b>Top Structure</b>	Stainless Steel / Teflon Coated top plate to resist physical abuse and thermal shock
<b>Size</b>	600 mm x 450 mm
<b>Maximum Temperature</b>	300 °C
<b>Operating Temperature</b>	Ambient to 300 °C Selectable at any point
<b>Temperature Control</b>	Digital electronic temperature controller
<b>Temperature Indicator</b>	Digital Display
<b>Temperature Uniformity</b>	± 10°C
<b>Temperature Stability</b>	± 0.5°C
<b>Heating Elements</b>	Embedded long lasting nichrome heating elements (2 KW) transfer heat across the entire top place surface.
<b>Accessories</b>	Power cord ISI Marked 2 meter each two sets with male & female plug



### MICROWAVE DIGESTER

SL. No.	Specifications	Requirement
1.	<b>Description</b>	Microwave Digester must have 10 high throughput closed vessel microwave. Digestion / extraction / synthesis workstation suitable for AAS spectrophotometer samples for the best digestion. The workstation meets the need of batch processing of samples and raises safety and reaction control accuracy with following features
2.	<b>Chamber</b>	Chamber capacity – 65 L, with double magnetron microwave emission, with the highest microwave output power of 1800 W. the operating power realises automatic variable frequency control (VFC) and non – pulse continuous microwave heating via reaction temperature and pressure feedback
3.	<b>Chamber Door</b>	Six – layer steel structure armoured glass explosion proof chamber door is equipped with an automatic pop up buffer structure and electronic and mechanical dual-control door lock
4.	<b>Reaction Vessel</b>	High pressure reaction vessel must have a fully closed anticorrosive super strength composite fiber outer vessel under the support of high strength frame structure and vertical explosion pressure relief technique with Max. Sustained pressure of 15 MPa (2250psi) and the highest sustained temperature of 300°C.
5.	<b>Pressure Control &amp; Display</b>	System have piezoelectric crystal pressure sensors controls and displays the internal pressure and pressure rise curve of reaction vessel in real time, with pressure control range of 0 to 10 MPa (1500psi) and control precision of 0.01 MPa.
6.	<b>Temperature Control &amp; Display</b>	System have high precision platinum resistor sensor controls and displays the internal temperature and temperature rise curve of the reaction vessel in real time, with temperature control range of 0 to 270°C and the precision of $\pm 1^\circ\text{C}$
7.	<b>Reactions Vessels Table</b>	Should be high throughput reaction rotary table can bear upto 15 high pressure reaction with the capacity of 100 ml simultaneously, and system should have the facility to increase or decrease such vessels according to need.
8.	<b>Technical Specifications</b>	

	<b>Maximum Stand Pressure</b>	15 MPa (2250psi)
	<b>Temperature</b>	300°C
	<b>Inner Vessel Capacity</b>	100 ml
	<b>Outer Vessel material</b>	fully closed anticorrosive super strength composite fiber
	<b>Inner Vessel Material</b>	TFM (intensified Polytetrafluoro Eylene)
	<b>Cooling Mode</b>	Automatic Air Cooling inside chamber / natural cooling outside chamber
	<b>Sample Processing Capacity</b>	More than 10 pieces per time

**MERCURY ANALYZER**

S. No.	Specification	Requirement
1.0	<b>DIGITAL MERCURY ANALYZER</b>	Main Unit – One set
	Measuring Range in Solutions	20 – 200 ng Absolute (with small reaction vessel)
		20 – 600 ng (with B.O.D. Bottle as reaction vessel)
	Sensitivity	3 ng Absolute for 1% Transmittance
	Detection Limit	10 ng Absolute or 0.0001 ppm (0.1 µg/Litre)
	Stability	+/- 1% of full scale
2.0	<b>VAPOUR GENERATION SYSTEM</b>	All glass reaction assembly including B.O.D. Bottle (one set with magnetic stirrer & stand – Two sets)
	Read Out	Digital display of Absorbance % Transmittance on DPM
	Radiation Source	Mercury Lamp
	Detector	Silicon Photo detector
3.0	<b>MERCURY ANALYZER INTERFACE</b>	RS 232 Interfacing with mercury analyzer:
		Include interface cable and windows based software
4.0	<b>DATA STATION</b>	Mercury Analyzer Data Station with mercury software CD & interface cable
4.1	<b>Computer System</b>	Reputed make such as HP/Compaq/IBM/Dell
	Processor	Intel Core 2 Duo processor 3.00 GHz or above
	RAM	4 GB (upgradeable to 8 GB)
	HDD	500 GB ultra DMA or higher HDD (7200 RMP),
	Monitor	21" TFT – LCD Flat Colour
	CD ROM	52x CD-ROM
	DVD-CDRW	32x DVD-ROM and CDRW-Combo Drive Max speed 48x24x48
	Ports	2 Serial, 1 parallel and 2 USB front 6 Rear USB2 PS/2 Port,
4.2	<b>Application Softwares</b>	Windows based application software capable to fully control the Digital Mercury Analyzer operation data capture, data calculation,

		quality control protocols etc.
4.3	<b>Softwares (General)</b>	Pre-loaded Windows 7.0 Professional operating system with Licensed CD compatible with Application software
		MS Office 2000 Standard with media, manual and Licensed CD compatible with Application software
		Preloaded Antivirus with latest version along with Licensed CD compatible with Application software
5.0	<b>ADDITIONAL ITEMS</b>	
	Manual	Operation and maintenance manual for each unit.
	Application notes	Application notes (CD-ROM) for mercury analysis in environmental, geological, metallurgical, biological and industrial samples.
	Service manual	Service manual with set of required tools for each system/unit.
	Trouble shooting charts	Trouble shooting charts of all sub units
	Dust cover	Dust cover for all sub units
	Consumables	Consumables for three years operation of the system, spare tubings, magnetic beads, glass impingers are required.
6.0	<b>OPERATION AND MAINTENANCE TRAINING COMPONENT</b>	Complimentary (all expenditure inclusive) two weeks training to two Scientists on operation and maintenance aspect of the instrument at manufacturer's facility / application laboratory in India.

7.0	<p><b>GENERAL CONDITIONS OF SUPPLY</b></p>	<ol style="list-style-type: none"> <li>1. The instrument and all its sub units should operate on 230 ± 10 volts 50 Hz power supply.</li> <li>2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language.</li> <li>3. The main unit and all the sub units of the instrument should be serviced by the supplier.</li> <li>4. The Bidder should be a manufacturer/authorized representative of a manufacturer, who must have designed, manufactured, tested and supplied two numbers of such equipment similar to the type specified in the past five years, which shall be in successful operation for at least 2 years as on the date of bid opening.</li> <li>5. The bidder should furnish the information on past supplies and their satisfactory performance.</li> <li>6. Bidders shall invariably furnish documentary evidence (client's certificate – at least two) in support of the satisfactory operation of the equipment as specified above.</li> </ol>
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**NOISE LEVEL METER WITH DATA LOGGER**

<b>Specifications</b>	<b>Requirement</b>
Measurement Range	should cover 20 – 140 dBA
Frequency weighting	Switchable to A, Linear, Octave and 1/3 <sup>rd</sup> Octave
Accuracy	Min. IEC 804 ( BS 6698) Grade I or ANSI Type I
Resolution	0.1 dB over full range
Display	Digital [Leq, SPL, L <sub>max</sub> and L <sub>min</sub> ]
Time Weighting	Switchable to different time intervals i.e 1/8 Sec., 1 Sec., 10 Sec. etc. or slow, fast, max.
Power supply	Rechargeable Battery system
Computer Interface	Data Logging system with RS 232 interface
Calibration	Automatic Calibration
Temperature	0°C to 50°C
Memory	Sufficient memory to store at least 8 hrs. data for all parameters given in modes and octave band analysis.
Accessories Required	Calibrator [see specification], Microphone [spare, see specification], Tripod Stand, Wind screen, Rechargeable Batteries, Carrying Case or kit, Extension cable with pre amplifier

**Specifications:****Calibrator:**

Level (dB)	Two – one each in lower and higher range
Frequency	1khz.
Accuracy	± 0.3 dB at 25°C
Adaptors	25mm, 12.5mm, 6.25mm

**Microphone:**

Type	Premacharge air –condenser unit
Polarization Voltage	Not required
Response Type	Free Field 'O' degree incidence
Response Accuracy	min. IEC 651 type I
Operating Temperature	0 to 55°C

Range	20 – 140 dB(A)
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**Data Logger:**

Communications with data logger should be possible using a standard RS 232 cable along with compatible modems in order to provide communications facilities (Radio/Telephone). Compatible software supplied with the data logger shall be able to handle all communication requirements.

**Built-in Information:**

- Leq in bytes
- Built in memory in bytes
- Whether data logger in built in the unit or is a separate system
- Details of software, in built/ spread sheet
- System compatibility for measurement of other parameters like meteorology: please mention details.

**Whether octave provided or not.**

- if yes; its range

**Whether the software has facility for :**

- Retrieval of short (1sec.) leq elements
- Post processing to produce Leq and Ln measurements over any period automatic event detection etc.

## PC-CONTROLLED UV - VISIBLE SPECTROPHOTOMETER

Type:	Double beam, automatic scanning
Light source :	Tungsten-halogen and deuterium
Wavelength range :	should cover 190-1100 nm range
Wavelength accuracy	better than or equal to $\pm 0.2$ nm
Wavelength repeatability	better than or equal to $\pm 0.1$ nm
Band pass range	2 nm or smaller
Scan speed	5 to 3000 nm/min
Photometric drift	0.0003 absorbance units/hour at 340 nm
Slew speed	10,000 nm/min
Power	220 VAC $\pm 25\%$ , 47 to 53 Hz
Requirement	
Accessories	, PC , compactable for operation control and monitoring of UV – Spectrophotometer and accessory modules, Colour monitor, Printer, Essential spare parts including Holonium Oxide filter for five year of operation, Voltage stabilizer, Dust cover, Operation manual, Matching cuvettes ( 2 pairs).

Software performing analysis at least as per DIN/ISO/US-EPA, calibration, blank correction, data import, data export, data handing and reporting, quality control protocols, computer based training.



**pH Meter [Pen Type]**

General Characteristics:	Water tight, impact resistant corrosion resistant, housing, battery operated, pen or stick type
Calibration	Automatic with buffers
Modes	pH, Temperature
Display	LCD, 3 ½ digits
Measuring Range	0.00 to 14.00
Accuracy	± 0.1 pH
Temperature Compensation	Automatic for entire range
Measuring Electrodes	Combination electrode [built –in]

## **RESPIRABLE DUST SAMPLER**

<b>Specifications</b>	<b>Requirements</b>
Blower	0.8 to 1.4 meter cube per minute free flow with flow controller and brushless motor operated at 230 Volts preferably noiseless.
Particle Size	Particles of 10 microns and below collected on filter paper, Filter holder designed to accept any standard filter sheet of 203mm x 254 mm. Separate provision for collecting particles bigger than 10 microns under the cyclone.
Sampling Time	0 to 24 hours flexible to set any time interval.
Time Totalizer	0 to 9999.99 hours. Time totalizer circuit detects blower stoppage due to any reason including brush failure.
Automatic sampling	24 hours programmable timer to automatically shut off the system after pre-set time intervals.
Power	Normal 230 ± 10 V, single phase, 50 Hz AC, Built in requirement voltage stabilizer with automatic shut off beyond 170 – 270 V range.
Handling Housing	Portable and as sleek as possible Sturdy aluminium cabinet consists of blower, filter case assembly, time totalizer, real time timer, flow meter, flow controller & flow measurement device. RSPM should be collected on filter paper and coarse dust should be collected in a cup under cyclone.
Flow Measurement	Glass Manometer tube accurately graduated directly in M <sup>3</sup> /Min and calibrated across orifice.

### **Gaseous Sampling Attachment**

Flow Rate	0.3 to 3 lpm, 2% accuracy
Flow Control	Four inlet and one outlet manifold with built in needle valve for flow control of each inlet.
Sampling Train	4 nos. of 35 ml. Borosilicate glass impingers kept in ice tray. Dimension as per IS: 5182 Part V

## **STACK MONITORING KIT**

The In – Stack monitoring Kit (USEPA Method 17) should be Portable, Compact, Light Weight and user Friendly. Control Module, with Multi – Function Electronic Unit, Digital Electronic Manometer, Programmable Start and Stop facility for Sampling Pump, Digital Display for Stack Gas & Dry Gas Meter Temperatures, Light Weight Sampling Pump and Impinger Module Design Complies with Specifications, recommended by USEPA. The facility for mounting of thermocouple, pitot tube and probe together to keep all the components functional during the period of sampling is mandatory.

Stack Velocity range	:	3 to 30 m/sec
Stack temperature range	:	0 to 600 °C and 500°C to 1000°C [shall be quoted separately]
Particulate Sampling	:	At 6 to 60 lpm
Gaseous Sampling	:	At 0.6 to 6 lpm collection on a set of impingers, containing selective reagents.

**Pitot Tube:** Modified S- type pitot shall be fabricated from SS 304 or equivalent. The construction features should be as per USEPA method 1 to 4 & 17 (or) CPCB Doc. No. Emission Regulation [Dec. 1985] Part – III.

**Sampling Probe:** Fabricated from SS 304 tube of suitable diameter [not less than 15mm ID]. The lengths of the pitot tube and the sampling probes shall be decided by the users. The supplier have to quote separately for all sizes available.

**Nozzles:** A set of nozzles (min. 04 nos.) fabricated from SS 304 or equivalent material with internal diameter suitable to cover the full range of stack velocities. The leading edge of the nozzle should be sharp and tapered. The minimum internal diameter of the nozzle should not be less than 4mm

**Thimble Holder:** Filter holders fabricated from SS 304 suitable to hold cellulose/ glass fibre or other thimbles.

### **Thermocouple:**

1. Thermocouple sensor with digital display capable of measuring temperature from 0 to 600 °C covered with acid resistant proper casing and appropriate length ( same as length of pitot tube)

2. A separate suitable thermocouple with digital display capable of measuring temperature from 500 °C to 1000 °C covered with acid resistant proper casing and appropriate length ( same as length of pitot tube)

**Stack Gas Sampling Module:**

The stack sampling console shall contain the following:

- Timer ( Stop Watch)  
Range 0 to 60 minutes  
Minimum resolution - one second  
Residual Battery Backup facility
- Temperature sensor at metering point (0 to 50 °C)
- Temperature displays with select toggle switches for display of ambient, Stack ( Flue Gas) and temperature at metering point
- Rotameter ( separate for Particulate and Gas)
  - a) 6 to 60 lpm for particulate monitoring and
  - b) 0.6 to 6 lpm for gaseous monitoring
- Vacuum gauge Digital or Analog, Dual Scale, range 0 to 30 psi & 0 to 1552 mmHg
- Dry gas meter should be in built. The minimum resolution of digital Dry Gas Meter should be 1 L
- A cold box with a capacity to hold at least 6 to 8 impingers shall be provided with glass impingers.
- Control panel ( Console) shall have the facility for leak check with orifice or other type of control knobs.

**Stack Gas Velocity Module:**

**For velocity measurements the module should have provision for housing of:**

- Digital manometer ( capable to measure in the range 0 to 1300 mm of H<sub>2</sub>O)
- Digital pyrometer suitable for measuring ranges ( 0 to 600°C and 500°C to 1000 °C)

**Vacuum pump:** Compatible, portable, light weight, heavy duty pump capable to ensure 60 lpm effective gas flow with single phase motor, 220 ± 10 V AC, 50 Hz ± 3%.

Sample Collection Tubes ( Hose) : All the sample collection hose / conduits should have push fit system to prevent leakages. The hose should be flexible and protected from outer shocks and aberrations. The length of the hoses is user selectable. Two separate sizes (10 m and 30 m) shall be quoted.

**Calibration Certificates:** Third party (any Nationally or Internationally Accredited Calibration laboratory) Calibration Certificates for Manometer, Rotameter, Pitot Tube,

Nozzles, Thermocouple and Dry Gas Meter etc. with a validity of at least one year should be provided along with the supply.

**Impingers:** Four numbers of 120 ml and two numbers of 250 ml capacity Borosilicate glass impingers. Facility should be there for keeping ice at the bottom of impinger box.

**Tools:** A kit containing the essential tools required for connecting various components and routine maintenance shall be provided with the equipment.

**Spares and consumables:** The supply shall include spares and consumables for at least three years trouble free operation.

**Warranty:** All the components and whole kit will be under warranty for three years

## **SAFETY & PERSONAL PROTECTIVE EQUIPMENTS**

- 1. Chemical Resistant Hand Gloves:** Nitrile glove with tight grip in wet and oily environment, absorption resistant, blade cut resistant, tear resistant, puncture resistant. Butyl gloves, highly chemical resistant, protection against mustard agents, nerve gases, acids, alkalis, dioxins etc. Resistant to oxygenated solvents and most oxidizing chemicals, highest permeation resistance to gases and vapours.
- 2. Chemical Boot:** Water Proof, built-in sponge insole, heavy canvas lining, steel toe cap, steel mid sole, heel tendon protection, electric shock resistant, heat and oil resistant sole, ozone and UV resistant.
- 3. Chemical Protection Clothing:** Soft, light weight, suitable for working in static charge and explosive environment, liquid tight with ultrasonically welded seams, chemical resistant, flexible and abrasion resistant, Hood with acrylic visor, Colour – Yellow.
- 4. Chemical Suit (level A & B):** Fully encapsulated Suit, Single piece, air and liquid-tight designed to work with SCBA, fully sealed hood with visor and exhalation valve, attached booties, chemical resistant. Colour – Green
- 5. Safety Goggles:** Full vision goggle, can be worn over most prescription spectacles, wide and fully adjustable headband, optical polycarbonates lens, easy lens replacement, foam surround, flame retardant PVC, maximum IV protection, resistant to chemical splash, dust particles, molten metals and solids.
- 6. Safe Escape Hood**
- 7. Chemical Agent Detection Paper**
- 8. Emergency Blankets**
- 9. Eye Wear and Ear muffs combo**

## SMOKE DENSITY METER

Sl. No.	Specifications	Requirement
1.	Result compatibility	Measurement results should be fully compatible with Hartridge Smoke Unit (HSU)
2.	<b>Range/Accuracy/Resolution</b>	
	<b>(A) OPACITY</b>	
	Measuring Range	0 – 100%
	Accuracy & repeatability	$\pm 1\%$ of full scale
	Resolution	0.1 %
3.	<b>(B) ABSORPTION</b>	
	Measurement Range	0 – 99.00 M <sup>-1</sup>
	Accuracy & repeatability	Better than 0.10 M <sup>-1</sup>
	Resolution	$\pm 0.01$ M <sup>-1</sup>
4.	<b>(C) RPM</b>	
	Measurement Range	400 – 6000 rpm
	Accuracy & repeatability	$\pm 10\%$
	Resolution	$\pm 1$ rpm
5.	<b>(D) OIL TEMPERATURE</b>	
	Measurement Range	0 – 150°C
	Accuracy & repeatability	$\pm 2$ °C
	Resolution	$\pm 1$ °C
6.	Application	For free acceleration test only
	Calibration	Automatic (self calibration immediately after switch – on or at the press of a key.
	Approval (India)	ARAI
	Display	Digital
	Standard	LED (7 segment) 4x 15 mm)
	Linearity Check	48.4% - 53.1 % / 1.54 M – 1.76 M of measurement range (manual) should be in – built.
	Probes	Set of probe of three different size (10,16 and 27 mm internal diameter) to cater all size of exhaust pipe.
	Trolley	Should be trolley mounted
	Operating unit	LED Remote (with 5 m connecting cable)
	Computer interfacing	Data communication to a computer or terminal or other compatible devices is possible through built in Serial in /Out

		socket (RS – 232 Interface). Start of operation and its remote controlling is also should be via computer or Terminal or other Compatible devices.
	Automatic Calibration	Calibration should be automatic at the time of switch on along with physical calibration system with standards.
	Compliance Standard	MORTH/CMVR/TAP-115/116 issue No. 2, Part VIII



## **TOTAL KJELDAHL NITROGEN ANALYSER (TKN Analyzer)**

The analyzer should be fully automatic / semiautomatic system consisting of a digestion unit, a scrubber unit, and a distillation unit.

**1. Digestion unit:** Automated with integrated programmable control, Should have electrically heated ( $230 \pm 10$  Volts, 50 Hz AC) metal blocks. It should be capable of providing a temperature range from  $100^{\circ}\text{C}$  -  $440^{\circ}\text{C}$  With  $\pm 10^{\circ}\text{C}$  repeatability. Should have inbuilt temperature controller with digital display and LED display along-with manual temperature adjustment. Heating time setting with steps from 1- 150 minutes should have the capacity to accommodate at least eight numbers of digestion tubes each of at least 250ml capacity, should have leak proof integrated condensers (fumes carriers) made up of glass, fixed on a movable panel along-with adopter for outlet to the scrubber unit. Proper digestion exhausts system.

**2. Scrubber unit**

Should be an oil free centrifugal suction type, with manual vacuum adjustment facility. Corrosion and impact resistant provided with condensate and acid fumes collection vessels. Should operate on  $230 \pm 10$  Volts, 50 Hz, AC power supply

**3. Distillation unit**

Fully programmable distillation unit including sample dilution, alkali and receiver addition, distillation and tube draining facility. Validated procedure/ certification for TKN distillation like AOAC, EPA, DIN, ISO etc, Should be made-up of standard quality borosilicate glass. Should possess a steam generator made-up of borosilicate glass along with heater and have 3 step manual control facility i.e. standby, water inlet and distillation. Should have inbuilt bellows pump for accurate reagent ( alkali / acid ) dispensing. Should have ventilation valve. Should have timer for 5 - 15 minutes with audio signal. Steam inlet tube should be of PTFE. Unit should have quick clamping device for digestion tube with adaptor. Should operate on  $230 \pm 10$  Volts, 50 Hz, AC power supply. Complete unit should provided with one set of digestion tubes along-with the servicing, operating and maintenance manuals. Can able to monitor and measurement of distillate temperature. Self adjusting cooling water control facility  
Safe feature for safe distillation. Can be upgradeable whenever required

**Accessories:** 2 set of digestion tubes, Digestion tube stand, Spillage tray for the condensers, Tube removing device

**Spares:** Spares and accessories for its 2 years of continuous use. Digestion tablet 1000 nos.

### **TOP LOADING ELECTRONIC BALANCE**

- **Weighing Range** : At least Up to 2200 gms
- **Minimum Display** : 0.01 gm
- **Repeatability** :  $\leq 0.01$  gm
- **Standard Deviation** :  $\leq 0.01$  gm
- **Linearity** :  $\pm 0.02$  gm
- **Response Time** : 10 sec. approx.
- **Ambient Temperature** : 5 to 40 Deg.C
- **Temperature Coefficient of sensitivity** :  $\pm 3$ ppm/Deg.C
- **Pan Size** : 160 X 124 mm
- **Power Requirement** : Should operate on  $220 \pm 10$  volts 50 Hz AC Power supply.

### TOC Analyzer

<b>General</b>	The analyzer should possess aqueous sample for analysis of the Total Organic Carbon [TOC], Total Inorganic Carbon [TIC] and Non- Purgeable Organic Carbon [NPOC] contents of the sample.
<b>Technology</b>	Method TC: Acid and Per sulphate reaction Method TIC: Acidification with Phosphoric Acid and sparging Method TOC: NPOC by heated per sulphate oxidation or TC - TIC
<b>Standard compliance</b>	USEPA, Standard methods, ASTM, DIN/ISO/CEN, USP and EU
<b>Measuring Ranges</b>	2 ppb C to 30000 ppm C
<b>Heating</b>	Adjustable up to 100°C in 1°C increments
<b>Analysis Time</b>	From 3 minutes
<b>Oxidation Technique</b>	Wet chemical heating persulphate, liquid sample
<b>Option Availability</b>	EPC, A <sub>TOC</sub> , data management graphic software, Windows brand PC software
<b>Particulate Handling</b>	Up to 750 µm
<b>High Salt tolerance</b>	Up to 26%
<b>Reproducibility</b>	1.5% Or 2 ppb whichever is greater
<b>Calibration stability</b>	30+ days variable with programmable auto – validation
<b>Sample Pathway</b>	Color coded Teflon with automatic cleaning in all injection modes
<b>Sample injection</b>	Manual syringe, sipper, auto sampler or on line
<b>Sample Handling</b>	Automatic syringe with an isolation loop to prevent contamination
<b>Sample Injection Volume</b>	10 µl to 10ml
<b>IC treatment</b>	Should be With auto sampler
<b>Certification</b>	CE, EMC: EN 61326 / Safety : IEC 61010-1: 2001
<b>Operation Modes</b>	Windows CE or networked via PC software ( Windows 2000 Pro or XP Pro or better)
<b>Operating Interface</b>	Touch screen LCD or windows PC
<b>Basic Software</b>	Single instrument operation and simple data transfer to PC
<b>A<sub>TOC</sub> Software</b>	Network LAN/LIMS operation, data management, custom reports, 21 CFR 11 compliance [optional]
<b>PC Specifications</b>	Pentium 4, 512 MB RAM, 40 GB (1 GB HD for TOC), 1024 X 768, CD – ROM
<b>Reagent Purge</b>	Yes

<b>Reagent Required</b>	Sodium Per sulphate, 5% Phosphoric Acid, rinse water
<b>Automatic Dilution and beginning Point</b>	Serial / auto dilution 1: 1000, over calibration curve
<b>Communications</b>	Parallel and serial communications ( RS 232C), Ethernet
<b>Ana log Out put</b>	Four, 4 to 20 mA/ 0 to 10 V
<b>Input and Output relays</b>	Two users programmable inputs, two users programmable out puts
<b>Relay Out Put</b>	For users programmable out puts
<b>Ambient Temperature Range</b>	10 to 45°C
<b>Humidity</b>	< 90% non condensing
<b>Printer</b>	Serial from analyzer and / or PC from A <sub>TOC</sub> software
<b>Power Supply</b>	Variable voltage inputs, 100 to 240 VAC, 50/60 Hz, 950 W
<b>Gas Supply</b>	<p>High pressure Stainless Steel cylinder fitted with high purity 99.99% analytical gases ( as mentioned ahead) having gas capacity 7 m<sup>3</sup> ( water capacity 47 ltrs). Cylinder should be ISI marked confirming to IS 7285 flat bottom fitted with valve as per IS: 3224 complete with neck ring and cap painted as specified under Gas Cylinder Rules 1981.</p> <p>Gas Cylinder should be supplied with hydraulic test certificate and explosive certificate from Chief Controller of Explosives, Nagpur. Nitrogen ( 99.998% purity or better), zero grade air or Oxygen (99.998%), 345 – 415 kPA, &lt; 700 ml /min</p>

## **WATER BATH**

Double walled inner chamber made of Stainless Steel and Outer wall made of mild steel sheet finished in white enamel. The Gap between outer and inner wall is filled with special grade glass wool insulation. The top cover with 12 holes of 75 mm dia. And concentric rings are made of stainless steel. Electrically operated fitted with suitable best quality heaters and with automatic cut off device when bath goes on dry. With digital temperature display cum temperature controller. On / Off switch card and plug , suitable to operate on 220V, 1Ph, 50Hz AC supply only. Temperature range above room temperature to 90 Deg.C. Size of Chamber 405 X 300 X 100mm (app.)

Water Bath with stirrer for circulation of water with speed control and uniform temperature in water bath.

### **Laboratory Chemicals**

All chemicals should be of Analytical Reagent grade (AR Grade) or above of popular/reputed manufacturers [such as E.merck, Rankem, Qualigens/ Fisher Scientific, SD-fine Chem, Hi-Media (*only for bacteriological tests*)], Thomas Backer, Sigma Aldrich and Certified Reference Material [CRM] should be of popular/reputed manufacturers such as Dr. Ehrenstorfer, Merck, Sigma, LGC Standard, Accu Standard, Thomas Baker.

### **Laboratory Glassware**

All Glassware should be of Borosilicate Glass - Class "A" with certificate of popular/reputed manufacturers (such as Borosil, Rivera, SD-fine, Merck, JSGW, Sigma Aldrich and ASGI). Plasticware should be of popular/reputed manufacturers such as HiMedia, Tarson, Merck, RFCL.

**CHECK LIST**

**[Part-1]**

<b>ENVELOP "A"</b>	Earnest Money of requisite amount and tender cost in case of tender document is downloaded from web site.
<b>ENVELOP "B"</b>	<ul style="list-style-type: none"><li>• Technical compliance details in Annexure "1"</li><li>• Company Profile.</li><li>• Leaf let / brochure of the applied item.</li><li>• Copy of sales tax registration number.</li><li>• Copy of PAN No.</li><li>• Undertaking regarding not being blacklisted.</li><li>• User's List &amp; Performance reports etc.</li><li>• Manufacturer's authorization certificate, in case the offer is not submitted by Manufacturer.</li><li>• Commercial Terms &amp; conditions</li></ul>
<b>ENVELOP "C"</b>	<ul style="list-style-type: none"><li>• Price schedule for Indigenous items in annexure "4"</li><li>• Price schedule for Imported items in annexure "3"</li><li>• Price schedule for AMC in annexure "2"</li></ul>