Sl. No. /ICB

TENDER NOTICE

No.C-47011/01-57/2010-11/ICB/Mat. Dt.30.09.2010

CENTRAL POLLUTION CONTROL BOARD
'PARIVESH BHAWAN'
C.B.D. CUM OFFICE COMPLEX
EAST ARJUN NAGAR
DELHI - 110 032.

Website:www.cpcb.nic.in e-mail:cpcb@alpha.nic.in

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CENTRAL POLLUTION CONTROL BOARD
(MINISTRY OF ENVIRONMENT AND FORESTS)
'PARIVESH BAHWAN'
C.B.D. CUM OFFICE COMPLEX
EAST ARJUN NAGARR, DELHI-32.

TENDER NOTICE NO.C-47011/01-57/2010-11/ICB/MATERIALS
DATED.30.09.2010

TENDER DOCUMENT FOR THE SUPPLY OF
LABORATORY INSTRUMENT/EQUIPMENTS.

Price of Tender Document

i)	By Hand	:	Rs. 800.00 or US $ 20.
ii)	By Post	:	Rs. 1000.00 or US $ 25.

Date of Sale of Tenders : 30.09.2010 to 26.10.2010 on all working days between 11.00 AM to 5.00 P.M.

Last date & time for submission of Tenders : Up to 2.00 P.M. on 27.10.2010

Opening of Tenders : 27.10.2010 at 3.00 P.M.

DELHI
30.09.2010
DELHI –110 032

(M. Varghese)
Administrative Officer (M)

TELEPHONE : 22308202, 43102030 Extn.243
FAX : 011-22308202, 22307078,22307079,22304948
e. mail : cpcb@alpha.nic.in
Website : www.cpcb.nic.in

Central Pollution Control Board
(Ministry of Environment & Forests)
"Parivesh Bhawan" East Arjun Nagar.
Delhi – 110032. India
Tel. Nos. 22308202, 43102030 – Extn. 243

TENDER NOTICE

No.C-47011/01-57/2010-11/ICB/Materials. **Dated. 30.09.2010**

Sealed tenders are invited on behalf of the Member Secretary, Central Pollution Control Board from the manufacturer/supplier in India & abroad for the supply of various Laboratory Instruments/equipments as listed below.

Analyzer SO2, NO-NO2-NOX,O3 & CO 1, Automatic Analyzer (On line) CO,SO2,O3, PM10, PM2.5, 2 SET, Automatic Analyzer (Online)NH3 with NOX 4 , AAS (Flame, GTA & HG), 2, Accelerated Solvent Extraction Unit 1 Auto Sampler for HPLC) 1, AOx Analyzer with Auto-Titration Unit 1, ATD Tube Conditioner 1, Air flow Sampling Pump 15, Balance precision 1, Balance Analytical 2, Balance Moisture 2, Bomb Calorimeter 2, Binocular (Compound Microscope with Digital Camera) 1, BTX analyzer 3, Combustion Gas Analyzer (Flue gas analyzer) 8, CO/HC Analyzer (Exhaust) 2, Dissolve Oxygen Meter 1, Elemental (CHNS) Analyzer 1, Filter for Spectrophotometer 4, Gas Generator Combined N2 and Zero air for GC & GC - MS 1, GC - ECD & FPD Optional FID/ TCD/NFD 5, GC – MS Optional Purge and Trap System 6, GC – MS FID/ ATD 1, Gradient System for HPLC System 2, High Volume PUF Sampler 12, High Precision Gas Flow Calibrator 4, High Precision Pressure cum Vacuum guage 8, ICP 1, Ion Chromatograph 1, Ion Meter 3, Isokinetic Stack Sampling assembly with Volatile Organic Sampling Train (VOST) 2, Low flow pump for personal sampler 2, Mercury Analyzer (Digital) 1, Mass Flow Controller 4, Multi Calibration System 4, Multi Print Recorder 4, Meteorological System (W/S W/D Temp. RH, Solar Radiation) 4, Microbial Identification System 1, Noise Level Meter 5, Ozone Generator & Permeation System 4, Oil Sealed Mechanical Vacuum Pump 4, Optimized HPLC Post-Column Derivatization System 1, Ozone Precursor Monitor 1, PAH and VOC standards 1, Peristaltic Pump 2, $PM_{2.5}$ Sampler (US-EPA approved) 17, Re-circulating Chiller 2 Rotary Vacuum Evaporator with Pump 4, Stack Monitoring Kit (USEPA methods 5, 23, 26 and 29) 3, Standard Weight for Analytical Balance 4, TKN Assembly 3, TOC Analyzer 3, Water Bath (Thermostatic) 1, U V Visible Spectrophotometer 4, Water Purification System 2, Zero Head Space Extractor 1.

03. The Tender Document with detailed terms & conditions can be obtained in person or through authorized representative on production of authority letter of the firm, or by post from the office of the Administrative Officer (Material), Central Pollution Control Board. The cost of Tender Document may be paid through pay order/ Demand Draft in favour of "Central Pollution Control Board" payable at Delhi.

04. The following are the schedule governing this tender

Sale of Tender Document	**-**	**From 30.09.2010 to 26.10.2010 on all working days between 11.00 AM to 5.00 PM**
Cost of Tender Document	**-**	**By hand ₹-800.00 or US Dollar 20. By post ₹-1000.00 or US Dollar 25**
Last date & time for submission	**-**	**27.10 .2010 (Wednesday) up to 2.00 PM**
Opening date of Technical bids	**-**	**27.10.2010 (Wednesday) at 3.00 PM**

The request for Competitive Bidding Document sent by post will be accepted strictly up to 15.10.2010. CPCB will not be responsible for any delay in receipt of tender document sent by post.

Please visit our website at www.cpcb.nic.in for further the details of this Tender.

(Member Secretary)

CENTRAL POLLUTION CONTROL BOARD
(Ministry of Environment and Forests)
"Parivesh Bhavan" East Arjun Nagar,
Delhi – 110 032, INDIA

DETAILS OF TENDER NOTICE

NO.C-47011/ 01-57/2010-11/ICB/MATERIALS: Dated: 30.09.2010

FOR SUPPLY OF LABORATORY INSTRUMENT/EQUIPMENTS

Sealed Tenders are invited on behalf of the Member Secretary, Central Pollution Control Board from Manufacturer/Suppliers in India and abroad for the supply of various Laboratory Instrument / equipments as listed below:

Analyzer SO2, NO-NO_2-NOX,O_3 & CO 1, Automatic Analyzer (On line) CO,SO_2,O_3, PM_{10}, $PM_{2.5}$ 2 SET, Automatic Analyzer (Online)NH3 with NOX 4, AAS (Flame, GTA & HG) 2, Accelerated Solvent Extraction Unit 1 Auto Sampler for HPLC) 1, AOx Analyzer with Auto-Titration Unit 1, ATD Tube Conditioner 1, Air flow Sampling Pump 15, Balance precision 1, Balance Analytical 2, Balance Moisture 2, Bomb Calorimeter 2, Binocular (Compound Microscope with Digital Camera) 1, BTX analyzer 3, Combustion Gas Analyzer(Flue gas analyzer) 8, CO/HC Analyzer (Exhaust) 2, Dissolve Oxygen Meter 1, Elemental (CHNS) Analyzer 1, Filter for Spectrophotometer 4, Gas Generator Combined N2 and Zero air for GC & GC - MS 1, GC - ECD & FPD Optional FID/ TCD/NFD 5, GC – MS Optional Purge and Trap System 6, GC – MS FID/ ATD 1, Gradient System for HPLC System 2, High Volume PUF Sampler 12, High Precision Gas Flow Calibrator 4, High Precision Pressure cum Vacuum guage 8, ICP 1 Ion Chromatograph 1, Ion Meter 3, Isokinetic Stack Sampling assembly with Volatile Organic Sampling Train (VOST) 2, Low flow pump for personal sampler 2, Mercury Analyzer (Digital) 1, Mass Flow Controller 4, Multi Calibration System 4, Multi Print Recorder 4, Meteorological System (W/S W/D Temp. RH Solar Radiation) 4, Microbial Identification System 1, Noise Level Meter 5, Ozone Generator & Permeation System 4 Oil Sealed Mechanical Vacuum Pump 4, Optimized HPLC Post-Column Derivatization System 1, Ozone Precursor Monitor 1, PAH and VOC standards 1, Peristaltic Pump 2, $PM_{2.5}$ Sampler (US-EPA approved) 17, Re-circulating Chiller 2 Rotary Vacuum Evaporator with Pump 4, Stack Monitoring Kit (USEPA methods 5, 23, 26 and 29) 3 Standard Weight for Analytical Balance 4 TKN Assembly 03 TOC Analyzer 3 Water Bath (Thermostatic) 1, U V Visible Spectrophotometer 4, Water Purification System 2, Zero Head Space Extractor 1

02. The Tender Documents along with detailed specifications of the instruments can be obtained in person on Production of authority letter of the Firm or by post from the office of the Administrative Officer (Material), Central Pollution Control Board or by the authorized representative with prescribed tender fee in the form of DD/Payorder drawn in favour of Central Pollution Control Board, Delhi

03. The Bid must be submitted in English, by the principal / their authorized suppliers.

04. The Earnest Money as indicated in Bid document must be submitted by the Bidder along with the Tender in the form of Demand Draft only drawn in favour of "CENTRAL POLLUTION CONTROL BOARD" payable at Delhi (India). It should be either in Indian Rupees or in bid currency (equivalent amount as per the exchange rate prevailing). The Indian agent/ representative should furnish an authorization letter from their foreign Principal supplier authorizing to deposit the EMD on their behalf.

05. The request for Competitive Bidding Documents sent by post will be accepted strictly Up to 15.10.2010. CPCB will not be responsible for any delay in receipt of tender document sent by post. Request received by post after above mentioned date will not be entertained at any cost. Other details are as follows:

Sale of tender document - From 30 .09.2010 to 26.10.2010 on all working days between 11.00 am to 5.00 pm.

Cost of tender document	-	By hand ₹-800.00 or US Dollar 20. By post ₹-1000.00 or US Dollar 25
Earnest Money along with Tenders	-	As indicated in the Tender Document
Last date & time for submission	-	Up to 2.00 PM on 27.10.2010
Date of opening of tender	-	At 3.00 P.m. on 27.10.2010

06.Bidders using downloaded tender forms must submit separate tender fee by Demand Draft along with technical bid drawn in favour of Central Pollution Control Board, Delhi

(MEMBER SECRETARY)

COMMITTED FOR CLEAN ENVIRONMENT

1.0 GENERAL TERMS AND CONDITIONS

1.1 This document contains the following:

i) Copy of the Competitive Bidding Notice
ii) General Terms and Conditions of Bid
iii) Terms and Conditions for Submission of Bid
iv) Payment Terms
v) Settlement of Dispute
vi) Application Form
vii) Undertaking
viii) Bid Form
ix) Schedule of Earnest Money to be deposited alongwith Tender
x) Quantity of Instruments and Locations of delivery and installation.
xi) Detailed specification of the instruments.
xii) Check List.

1.2 The Tender Document is not transferable by the purchaser. The bid form in the tender Document at Annexure-II may be used for bidding. Documents /forms downloaded from the net can also be used. Bids made on photocopy etc. will not be considered. However, the additional sheets containing the same proforma may be used for each item. Each sheet including that provided by the Board with this document must be signed by the bidder. The price bid must be in the form provided herewith at Annexure-II.

1.3 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 with out tender fee will not be accepted.

1.4 The Board takes no responsibility for delay or non receipt of Tender Document sent by post either way and also reserves the right to accept; or reject any or all the tenders in part or full without assigning any reason thereof.

1.5 No bid document will be sold after the last date of sale of Tender Document or between the extended period of opening date, if any.

1.6 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 or 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 it's bid.

1.7 This call of tenders does not bind the Central Board to place order. The Tenders submitted in response to this invitation be rejected without assigning any reason.

The bidder should be a manufacturer or their authorized Indian supplier. This tender notice, Tender forms, Schedule of requirement's , Specification etc are also available on CPCB's website www.cpcb.nic.in bidders using down loaded tender forms must submit a Separate tender fee by Demand Draft alongwith the technical part of the bid. The tender without requisite tender fee will be rejected.

1.8 The Board at its discretion may extend the last date of submission of tender and opening of tenders. The final authority for acceptance of a Tender will rest with the Chairman, Central Pollution Control Board who does not bind himself to accept the lowest tender and is vested with the authority to reject any or all of the tenders received without assigning any reason.

1.9 Documents, literature, diagrams/leaflets, samples etc., enclosed in the Tender shall become the property of the Central Board without any payment.

1.10 The warranty period for item Sl. No. 1,2,3,4,5,6,7,15,19,22,23,24,25, 27,29, 30,32,35,36,38,39,41,,43,44,47,50,52 and 56 will be for thirty six months starting from the date of successful commissioning of the instrument and for the rest of the item warranty will be for a period of twelve months. Under this warranty upon the receipt of such notice supplier/agent shall within the period specified, repair/replaced the defective instrument or spare parts thereof at the ultimate destination. The supplier/agent shall take over the replaced parts/goods, in the event of any correction of defects or replacement of defective material. In such cases, the warranty for the corrected/replaced materials shall be extended till the left over period of warranty.

1.11 The Tender would be regarded as turned down, if no award of contract has been obtained till the expiry of the Tender validity. No separate communication will be made in this regard.

1.12 The items have to be supplied in standard packing.

1.13 If the last date for sale, submission and opening of Tenders falls on any Government declared holidays, the next working day at the same time will be considered last dates of the same.

1.14 The bid shall contain no interlineations, erasures or overwriting words except as necessary to correct errors made by the bidder, in such case, correction shall be initialed by the person or persons signing the bid.

1.15 Late and delayed tenders will not be considered and shall be returned unopened to the Bidder.

1.16 It is advised that the outside suppliers should send the Tender through Registered Post. However, the local supplier may drop their Tenders in Tender Box kept in Central Board for the purpose. In no case, Tender should be handed over to any employee of the Board.

1.17 Canvassing in any form will disqualify the Bid.

1.18 Request for the Tender Document for bidding through Telex, Telegram, Telephone, Money Order and Tele-fax shall not be entertained.

1.19 The Tender Notice No.C-47011/01-57/2010-11/ICB/Materials dated. . .2010 alongwith the item code number. (The item code number is given in the specification sheet against each items) must invariably be quoted in the bid and for further correspondence in this regard.

1.20 All the Tenders should be addressed to:
The Administrative Officer (M)
CENTRAL POLLUTION CONTROL BOARD
'PARIVESH BHAWAN'
EAST ARJUN NAGAR, DELHI - 110032, INDIA

2.0 SUBMISSION OF BID

2.1 The bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the bidder and the purchaser, shall be written in English language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by English translation of its pertinent passages in such case, for the purpose of interpretation of the bid, English translation shall govern.

2.2 The bid must accompany Annexure-I with Techno Commercial part of Bid & tender fee incase of down loaded Document. Annexure-II & III along with 'Price' part of the Bid duly filled in and signed by the Bidder along with the seal of the Firm.

2.3 The Bidders are requested to quote the rates item-wise on FOB basis including total price of each instrument separately indicating the Govt. levies, and other expenditure item-wise. The freight charges and insurance will be borne by the buyer in the case of foreign suppliers quoted in fpreign currency.

For the authorized Indian suppliers, supplying foreign origin / manufactured items, they are allowed to quote in Indian Rupees on FOR destination basis. The Board will not enter into any Trade Agreement such as high See Sale Deed etc. The concessional custom duty and excise duty exemption certificate will be supplied. In that case, the normal custom duty applicable should borne by the supplier. The entire responsibility / charges upto destination should be borne by the supplier. Therefore excise duty and custom duty excluded price should be quoted. Taxes, other levies, insurance, freight etc if any should be indicated separately. No C/D form will be issued against VAT / CST.

Bidder is expected to examine the bidding Documents carefully and are deemed to have received and read all documents. It shall be the responsibility of the bidder to request copies of any missing documents. Failure to do so will be at bidders risk.

2.4 It may be noted that mere quoting lowest rates will not entitle any firm to get the order. The quality of the item being offered, the past performance supply etc will also be taken in to consideration. Prior to award of purchase order the buyer can call any details, explanation, regarding technical & financial aspect.

2.5 **IMPORTANT**: - BIDDER CAN QUOTE THE RATES FOR ALL THE INSTRUMENTS OR SOME OF THE INSTRUMENTS AGAINST ONE TENDER DOCUMENT. HOWEVER, SEPARATE PRICE BID AND TECHNICAL BID SHOULD BE SUBMITTED FOR EACH ITEM CLEARLY MENTIONING THE ITEM CODE NUMBER, ITEM NAME ON THE TOP OF THE ENVELOPES WITH SENDERS NAME AND ADDRESS. THE CENTRAL POLLUTION CONTROL BOARD RESERVES THE RIGHT TO ACCEPT THE TENDER IN FULL OR IN PART. THE BID FOR EACH ITEM SHOULD BE IN SEPARATE SHEETS/PAGES AND FOR THE SAKE OF IDENTITY, COMPILATION, INSTRUMENT/ITEM CODE NUMBER AND DESCRIPTION OF ITEM SHOULD BE WRITTEN ON THE TOP OF EACH BID. EMD SHOULD SUBMIT SEPARATELY AGAINST EACH ITEM. ITEMS-WISE TECHNICAL SPECIFICATION AND PRICE SHOULD BE IN SEPARATE SHEETS i.e. THERE SHOULD BE SEPARATE ENVELOPE FOR EACH ITEMS CONTAINING TECHNCIAL, PRICE BID & ITEMS WISE EMD, INCASE, BIDDERS DESIRES TO QUOTE MORE THAN ONE ITEM.

2.6 The Tender is to be submitted "single stage-3 envelope system" i.e. the first sealed envelope will contain the earnest money, second sealed envelope will contain full information required to judge pre-qualification, omplete details and specification of the instruments offered including the leaflets and catalogues, list of credentials with documentary evidence i.e., purchase/work order etc., Income Tax Clearance Certificate, PAN Number, VAT/Sales Tax Registration No., Affidavit for not being black listed, Commercial Terms & Conditions etc. It shall be marked "Pre-qualifications, technical and commercial Bid No.C-47011/ 01-57/ICB/2010-11 dated 30.09.2009 due on 27.10.2010 for Instrument/Equipments. The third envelope will contain only price quoted by the bidder in the form given at Annexure -II of this document and shall be clearly marked "Price Bid No.C-47011/01-57/2009-10/ICB/Materials dated.30.09.2010 for Instrument / Equipments. All the above envelopes must be separately sealed and shall be kept in one envelope bearing the address of Central Pollution Control Board and super scribed with bold letter "TENDER FOR Instrument/Equipments - NOT TO OPEN BEFORE 27.10.2010 AT 3.00 P.M. The senders address should be mentioned in all envelopes. Item Code Number(s) should be mentioned invariably on all envelopes. Separate bids for separate item should be submitted. The combined bids will not be considered.

2.7 Technical & Commercial part of the tender will be opened on due date i.e. at 3.00 P.M. on 27-10-2010 in the office of the Central Board, in presence of the representative of the Tenderers who would like to present. Sealed Price part of technically and commercially acceptable tenders will be opened on a later day which will be communicated by the Board on the same day or on a later date.

2.8 The bidder shall furnish, as part of its bid, bid security for each instrument/equipment separately for the amount mentioned in schedule IV of this tender. Execution of Bid Security by the bidder's Bank on the basis of prevailing exchange rate shall be used for arriving at the amount of bid security in the Bid Currency.

a) The bid security shall be in the form of Demand Draft only in favour of "CENTRAL POLLUTION CONTROL BOARD" payable at DELHI. No Earnest Money shall be accepted in any form. It should be either in Indian Rupees or in bid currency. The Indian agent/representative should furnish an authorization letter from their foreign Principal suppliers to deposit the EMD on their behalf. The Earnest Money shall be forfeited if a bidder withdraws or amends the tender in any respect within the period of validity of his tender or fails to supply the instruments within the specified period in the tender document. Tender shall not entertained where a Tenderer has not furnished adequate earnest money in the prescribed and acceptable Form. In case, the instrument supplied is found defective and not attended by the supplier / authorized agent, the Earnest Money deposited by the supplier /their authorized Indian agent will also be forfeited.

2.9 The Firm who seek exemption from depositing earnest money being small scale industry, being registered with NSIC, DGS&D and other Government agencies which entitles them for exemption must submit the valid Registration Certificate - cover the instrument offered by them along with the permissible value. The copy of Government Notification granting exemption from deposit of EMD must be submitted along with the Techno-commercial part of tender alongwith the bid. (EMD Exemption will be granted only to those items specified in the certificate of Registration).

2.10 Unsuccessful bidders bid security will be discharged/ returned without any interest in the same form after the concerned purchase is finalized or within four months whichever is earlier and that of successful bidders will be discharged without interest within one month of the successful installation and commissioning of the instrument and on furnishing the Performance Bank Guarantee.

2.11 The validity of Tender would be for a minimum period of 180 days from the date of opening of Tenders. A Bid valid for a shorter period may be rejected by the Board as non responsive. 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.

2.12 The rates should be quoted both in words and figures.

2.13 Arithmetical error will be rectified on the following basis:- If there is discrepancy between the unit price and total price that is obtained by the multiplying the Unit Price and quantity, the unit price shall prevail and the total price shall be corrected. If there is discrepancy between words and figures, the amount in words will prevail.

2.14 Tenders not in proper sealed cover or received through tele-graphically or E-mail fax/telex will not be entertained.

2.15 Conditional Tenders will be rejected without assigning any reason.

2.16 The Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person duly authorized to the Contract. The letter of authorization should bear the signatures of only the authorized person of the firm. All pages of the Bid, except for un-amended printed literature shall be initialed by the person or persons signing the bid.

2.17 To assist in the examination, evaluation and comparison of bids the buyer may, at its discretion, ask the Bidder for a clarification of its bid. However, no change in the price or substance of the bid shall be sought, offered, re-permitted.

2.18 Eventual suggestions for modification or subsidiary Tenders are principally not admissible.

2.19 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. BIDS CARRYING THE STATEMENT LIKE "SPECIFICATION AS PER TENDER DOCUMENT" SHALL NOT BE ENTERTAINED. THE PRODUCT SPECIFICATIONS SUPPORTED BY TECHNICAL LITERATURE AND LIST OF USERS, MUST BE ENCLOSED.

2.20 The placement of work order/purchase order will be according to technical evaluation of the Tender and after consideration of its price worthiness.

2.21 The price to be given in the Tender are fixed prices, irrespective of rise in Materials prices and increase in taxes etc., till the delivery of the overall consignment. No request in regard to increase in the price of instruments or in taxes etc., will be entertained after the submission of the tender.

2.22 The Supplier should attach a copy of financial bid/Proforma Invoice of the Instrument quoted (without cost/price figures) alongwith the technical bid to assess the item/components quoted in the bid.

2.23 The nomenclature of the instruments and spares will be invariably same in Proforma Invoice, Invoice, Packing list and all other relevant papers incase the Bidder is awarded with the purchase order for supply against its offer.

2.24 With the submission of his Tender the Bidder accepts the conditions of the Tender.

2.25 If the instrument supplied is not in conformity with the specification other than asked for, it will have to be replaced at the risk and cost of the supplier. No Freight and other charges for export and re-shipment will be paid by the Board.

2.26 **The authorized Indian agent/Representative/ Indian supplier should have minimum two years continuous agency /partnership/joint venture/participation or collaboration with their principal foreign supplier. The documentary proof of such agency ship /authorization/MOU should submit alongwith the technical part. The bid of the firm does not contain the proof of such nomination/authorization as Indian agent will be rejected.**

2.27 The installation of the instruments is the entire responsibility of the supplier. It must be done either by the principal/supplier or their authorized agents within one month of the receipt of the instruments by the Board. The supplier or their authorized Agent should be in touch with the Material Section of the Board to know the exact day of receipt of stores supplied/dispatched by them.

2.28 The list of instruments/equipment, their approximate quantity and point of delivery is given at Annexure -V and the detailed specification of the instrument are given in the tender document (pages 21-181). The quantity mentioned in the tender document may be increased or decreased at the discretion of the Competent Authority in the Central Board without assigning any reason.

2.29 Each and every folio of the Tender must be signed by the Bidder.

2.30 Bidder can quote the rates for all the instruments or some of the instruments. The Bid shall be considered only for those instruments for which the rates have been specifically quoted. The Board further reserves the right to accept the Tender for all the instruments or some of the instruments for which the Tenderer has quoted the Bid. The bidder should attach a separate list for the consumable/spares required for smooth operation of the instrument at least for three years (as optional items)and two copies of trouble shooting manuals, electric circuits etc. alongwith the bid. Combined EMD and consolidated bids will be rejected. (EMD, technical bid and commercial bid against each item quoted should be on separate sheets).

2.31. The bidder should provide a complete list of spares and consumables required for operation and maintenance of the instruments separately alongwith the price list.

2.32 Annual maintenance contract: The bidder should quote the charges for annual maintenance contract after the warranty period for the instrument listed in annexure -IV of this tender document at item Sl. No1,2,3,4,5,6,7,15,19, 22,23, 24,25, 27,29,30,32,35,36,38,39,41,,43,44,47,50,52 and 56

2.33 The instrument for which Tenders are invited will have to be supplied within 90 days from the date of L.C. opening in the case of foreign suppliers. A period of 30 days will be allowed from the date of purchase order in the case of Indian manufacturers/suppliers.

2.34 The after sales service is most important to be considered for comparison of the bids. Bid of those firms who do not have Indian Agents or sufficient infrastructure facilities to provide after sales service during warranty period will not be considered.

2.35 The bidder can quote either in Foreign suppliers, the price quoted should be on FOB basis. The agency commission will be paid in Indian Rupees. The charges on accounts of agency commission should be mentioned clearly. Indian suppliers, the price shold be quoted in Indian Rupees. However, the authorized agency Indian supplier should have minimum two years of continues partnership/joint venture /participation or collaboration with their principal foreign supplier.

2.36 The foreign bidders must indicate the following information in their proforma invoice alongwith the Price Bid separately for each instrument/equipment.

a) Country of Origin.
b) Port of Shipment.
c) Name & Address of beneficiaries Bank, Branch name with Account No. & SWIFT No.
d) Minimum delivery period.
e) Whether transshipment/partner shipment is required or not.
f) Agency commission, if any payable to the Indian Agent, their Complete address, telephone & fax number.

2.37 The items have to be supplied in standard packing. The foreign supplier should use the minimum possible packets and should reduce the size of the packing in volume to avoid extra demurrage in the bonded warehouse in India, if any.

Important - Bank charges: Three months time for shipment and further 21 days for negotiation will be given. All Bank charges inside the country (in India) will be buyers account and all Bank charges outside the country should be borne by the supplier / beneficiary. The bidders may note this and quote the price of the instrument/ equipment accordingly. In the case of Foreign Suppliers, they will have to ensure shipment of the consignment as per the validity of the letter of credit established in this regard. In case of extension of supply date is sought, the bank charges towards the amendment of L.C. should be borne by the Beneficiary/Supplier.

2.38 Foreign Principals/their authorized Indian Agent shall intimate the buyer regarding the date of shipment well in advance. A copy of the invoice documents, air way bill, packing list, certificate of country of origin may be forwarded to the purchaser by fax immediately after shipment of the consignment to clear from custom authorities so as to avoid demurrage charges.

2.39 At any time prior to the deadline for submission of bids the buyer may for any reason whether at it's own initiative or in response to a clarification requested by a prospective Bidder, modify the bidding documents by an amendment.

2.40 The Amendment if any, will be brought to the notice in writing or by fax to all concerned Bidders who have purchased the bidding documents and will be binding on them.

2.41 In order to afford prospective Bidder reasonable time in which to take the Amendment into account in preparing their bids, the purchaser may at its discretion, extend the deadline for the submission of bids.

2.42 The prices must be quoted item wise i.e. basic price, taxes, packing forwarding, handling installation and training charges etc. The charges must be quoted clearly and not in vague terms like "As Actual" "Approx" etc.

2.43 If according to the Bidder, the Tender Documents contain unclear points which could influence price calculations, the bidder has to inform the authority who is issuing the call of Tenders before submission of its Tender, either in writing or by fax, even if he has pointed out this earlier in any other form/reference.

2.44 The Packing, Forwarding, charges must be quoted according to the place of delivery as mentioned in the schedule at Annexure-V. The supplier shall be liable for any damage, theft or loss during transit. In the case of Indian suppliers, the instruments are to be dispatched to the respective places directly and to be installed there, by the supplier under intimation to, CPCB Office at Parivesh Bhawan, Delhi-32.

2.45 The delivery of stores in case of foreign suppliers shall be taken at New Delhi or other locations mentioned in "annexure-V" of this tender documents, subject to facilities of port and customs clearance in the designated locations (will be mentioned in the purchase order). The price indicated should be on FOB basis. Please note that Proforma Invoice must be separate for each instrument/item.

2.46 The warranty/guarantee of the instrument/equipment should be clearly mentioned in the Bid.

2.47 MOST IMPORTANT
PLEASE NOTE THAT ANNEXURE-I OF THIS DOCUMENT MUST BE ENCLOSED WITH THE FIRST PART OF BID i.e. "TECHNICAL AND COMMERCIAL BID" AND ANNEXURE-II AND III WILL BE KEPT IN THE SECOND PART OF BID i.e. PRICE BID.

2.48. PLEASE NOTE THAT THERE IS NO NEED TO ENCLOSE THE ENTIRE TENDER DOCUMENT (SUPPLIED BY THE BOARD) WITH YOUR BID. ONLY ANNEXURE-I, II AND III NEED TO BE ENCLOSED AS PER INSTRUCTION STIPULATED IN PARA 2.6 AND OTHER RELEVANT PARAGRAPHS OF THIS BID.

2.49 Prior to placing purchase order, incase the buyer desires to inspect the stores/instrument-equipment including demonstration, the same should be arranged by the supplier or their authorized Indian agent in the premises of the Central Pollution Control Board on free of charges.

3.0 PAYMENT CONDITIONS

For Foreign Bidders:- The foreign bidders should quote the price in foreign currency. Incase, they have components and services of Indian agent, the same may be quoted in Indian Rupees.

100% payment will be released through irrevocable Letter of Credit in the name of foreign bidders for stores of foreign origin.

80% payment will be made on shipment of the instrument/Equipments and on furnishing Performance Bank Guarantee for 10% of the purchase order, valid till warranty period.
20% will be released on satisfactory commissioning of Instrument/Equipment.

For Indian bidders 100% payment will be released on satisfactory supply, installation / commissioning of the instrument and on furnishing performance security/Bank Guarantee for 10% of the purchase order value valid till warranty period.

The Performance Security / Bank Guarantee be furnished by the principal supplier or their authorized Indian agent from any Nationalized Bank. No Proposal for advance payment will be allowed i any case. In the case of Indian suppliers advance payment, document and payment through bank will not be considered.

The defective, substandard and contrary to the specification of instruments supplied have to be replaced by the supplier at their cost and responsibility. Incase of indigenous instrument/ equipment quoted by Indian firms/ representatives/ Indian agents of foreign supplier / manufacturers in rupee terms the payment will be made in Indian rupees directly after supply and satisfactory installation.

3.2 Single bills against one order as per supply order mentioning item code and other details will be accepted.

4.0 SETTLEMENT OF DISPUTE, ARBITRATION

4.1 All disputes or difference arising out of or in connection with the contract and supply of any item/equipment assigned under the same (whether during the progress of the works or after their completion, determination, abandonment or breach of the contract) shall be Settled in accordance with the arbitration and conciliation Act, 1996. the Arbitral Tribunal shall consists of three (3) arbitrators appointed by the Chairman, Central Pollution Control Board. The decision of the arbitrators shall be final. It will not be an objection to any such appointment that the arbitrators are the Government servants and had any interest in the Board or the contract entered into directly or indirectly. In all cases, the arbitrator shall state reasons in their decision in writing, if the amount of claim in dispute is Rupees one Lakh and above, subject as aforesaid the provision of the Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. Arbitration proceedings shall be held at Delhi/New Delhi, India and the language of arbitration proceedings and that all documents and communication's between the parties shall be in English. The party invoking Arbitration clause shall bear the cost of arbitrator mutually agreed upon.

4.2 It is a term of the contract that the party invoking the arbitration shall specify the dispute or disputes to be referred to the arbitration under this clause together with the amount or amount claimed in respect of each such dispute.

4.3 It is also a term of the contract that if the supplier (s) do not make any demand for arbitration in respect of any claim (s) or dispute in writing within 90 days of submission of the final bill for payment, the claim of the supplier will be deemed to have been waived and absolutely barred and the Board will be discharged and released of all liabilities under the contract in respect of these claims.

4.4 LAWS AND REGULATIONS

The formation, validity and performance of this Contract shall be governed as to all matters by and under the laws and regulations of India and courts of Delhi shall have exclusive jurisdiction in all matters arising under this Contract.

The Supplier shall respect and abide by all laws and regulations of India and shall make its best effort to ensure that the personnel of the Supplier and their dependents, while staying in India, shall respect and abide by all laws and regulation of India.

The Supplier shall protect, absolve and indemnify the Board, and their representatives from any claim, loss or damage arising from any non compliance alleged or proved, without claiming them for payment.

4.5 FORCE MAJEURE

Vendor shall not be considered in default if delay in delivery occurs due to causes beyond his control such as acts of God, natural calamities, civil, wars, strikes, fire frost, floods, riots and acts of usurped power. Only those causes which have a duration of more than 7 calendar days shall be considered cause of force majeure. A notification to this effect duly certified by the Local Chamber of Commerce/Statutory Authorities shall be given by the Vendor to the buyer by registered letter. In the event of delay due to such cases a length of time equal to the period of force majeur or at the option of the buyer, the order may be cancelled. Such cancellation would be without any liability whatsoever on the part of buyer. In the event of such cancellation the vendor shall refund any amount advanced by the Purchaser and deliver back any material issued to him by the Purchaser and release facilities, if any, provided by the Purchaser.

5.0 INJURY AND DAMAGE

5.1 Injury or Death of Persons

The Supplier shall be liable for and shall indemnify the Board against any liability, loss claim or proceedings whatsoever arising under any statue or law in respect of personal injury death or any disability caused by the carrying out the Works unless due to any act or neglect of the Board, or of any person for whom the Board is responsible.

5.2 Damage to Property

The Supplier shall be liable for and indemnify the Board against and insure and cause any Manufacturers and subcontractors to insure against any expense, liability, loss claim or proceedings in respect of any damage whatsoever to any real or personal property for any one occurrence in so far as such damage arises out of or in the course of or by reason of he carrying out of the Works and is due to any negligence, omission or default of the Supplier or any person for whom the supplier is responsible or any Manufacturers and subcontractors or person whom the Manufacturers and subcontractors are responsible.

6.0 ROYALTY AND PATENTS

6.1 The Supplier shall pay all royalties and licenses fees for the use of any patented item, whether it may be an invention, method, arrangement, article, process or appliance used in connection with the performance of the Contract. The supplier shall indemnify and save harmless the Board against any and all costs, damages

and expenses of any nature or kind whatsoever which may arise out of or result from a claim by any person, firm or corporation that the manufacture, purchase, use of sale of any of the inventions, methods, arrangements, articles processes or appliances used in connection with the performance of this Contract infringes any patent of such other rights. The Supplier shall, at the request of the Board, defend the Board against any suit brought to enforce any such claim at the Suppliers expense.

6.2 In case any such patented item used on or in conjunction with the Works is in suit held to constitute and infringement of its use enjoined, the supplier shall either secure for the Board the right to continue using the said item by suspension of the enjoinment, by procuring for the Board a license or otherwise, or will replace such items with a non-infringing item or modify it so that it becomes non-infringing or with the Board's approval remove the said enjoined item and refund to the Board the sums paid thereof.

7.0 EFFECTIVENESS

This Contract shall come into force and effect on the date of the Letter of Award and shall be in force until the Works have been completed and all the payments have been made to the Supplier, except the obligation of the warranty period by the Supplier.

Annexure - I

S. No. /ICB
APPLICATION FORM
(To be filled by the bidder)

1) Name and full address of the Bidder including Telegraphic Address/Telex No. and Fax No. :

2) Name and Designation of the Head of the Firm/supplier and his Telephone No. :

3) i) In case the supplier is located out of Delhi; specify the Address/ Authorized Distributor's or Agent's Address in Delhi, if any. :

ii) Name, Designation, Address Telephone & Fax Numbers of the Authorized Person who may be contacted during the process of the purchase concerned under this document (Applicable for all the suppliers) :

4) Item Code Number(s) quoted for :

5) Whether Earnest Money Deposited (Amount: Rs./US Dollar/ - bid currency :

6) If yes, Demand Draft No, Date and Name of issuing Bank. :

7) Validity of Tender :

8) If the tender documents are accepted in full (Yes or No) :

9) Income Tax Clearance Certificate attached (Latest) (Yes or No) with PAN Number. :

Place:
Date : Legally Binding Signature with stamp

BID FORM

ANNEXURE - II

No. /ICB

Details showing quantity, specification and other details of the instruments offered (to be filled by the bidder and must be kept in "Price Bid" part of the Tender)

Sl.No and Item code Number of instruments as per our tender Document	Name of Instrument	The Specification offered by the Bidder	Difference in Specifications of tender document and that of Bid, if any	Quantity	Unit Price (in Rupees excluding rates at col. no. 7)	Taxes and other expenditures (Sales Tax/VAT, C.S.T, freight, cost of installation & training (in case of indigenous items)etc.	Total Amount (FOB Value in case of imported and FOR CPCB for indigenous in Rupees)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**

NOTE:- If this sheet is not sufficient to accommodate the bid the additional sheets containing the same proforma but all such sheets including this one must be signed by the Bidder along with the seal. This Annexure must enclose in the Proforma Invoice price bid for item wise. Separate Bid form should be attached against each item, quoted for. Administrative Officer (Material) Signature with date & stamp of the bidder

Annexure – III

UNDERTAKING

DATE_____
TENDER NOTICE NO_____

TO

THE CHAIRMAN
CENTRAL POLLUTION CONTROL BOARD
(MINISTRY OF ENVIRONMENT & FORESTS GOVERNMENT OF INDIA)
C.B.D. CUM OFFICE COMPLEX
EAST ARJUN NAGAR DELHI - 110 032.

Sir,

Having examined the conditions of Tender Document and specifications of the instruments, the receipt of which is hereby acknowledged. We, the undersigned, offer to supply, delivery and install the following:

1.
2.
3.
4.
5.
6.
8.
9.
10.
11.
12.

(Please add additional pages, if required). The above supply, installation shall be in conformity with the specifications and conditions of supply.

We undertake if our bid is accepted to deliver the instruments quoted by us, we shall deliver and install within the period indicated by us in our offer.

We agree to abide by this bid for a period of 180 days from the date fixed for Bid opening and it shall remain binding upon us and may be accepted at any time before expiration of that period.

We are submitting a Demand Draft for Rs...../in bid Currency in favour of "Central Pollution Control Board", Delhi towards the Earnest Money.

This Bid, together with your written acceptance thereof in your notification of award shall constitute a bidding contract between us.

We understood that you are not bound to accept the lowest or any bid you may receive.

Dated this.....day of.....2010

Signature of authorized Person, Name with Stamp & full Address.

ANNEXURE -IV

SCHEDULE OF EARNEST MONEY

Sl No.	Item Code No.	Instrument / Equipment Name	QTY	EMD
1.	1.	Analyzer SO_2,NO-NO_2-NO_X,O_3 & CO	01	100000.00
2.	2.	Automatic Analyzer (On line) CO,SO_2,O_3, PM_{10},PM $_{2.5}$	02	1,57,500.00
3.	3.	Automatic Analyzer (Online)NH3 with NOX	04	1,40,000.00
4.	4.	AAS (Flame, GTA & HG)	02	2,00,000.00
5.	5.	Accelerated Solvent Extraction Unit	01	1,25,000.00
6.	6.	Auto Sampler for HPLC	01	25000.00
7.	7.	AOx Analyzer with Auto-Titration Unit	01	1,00,000.00
8.	8.	ATD Tube Conditioner	01	10,000.00
9.	9.	Air flow Sampling Pump	15	3,75,000.00
10.	10.	Balance precision	01	7500.00
11.	11.	Balance Analytical	02	25000.00
12.	12.	Balance Moisture	02	25000.00
13.	13.	Bomb Calorimeter	02	25000.00
14.	14.	Binocular (Compound Microscope with Digital Camera)	01	10,000.00
15.	15.	BTX analyzer	03	1,80,000.00
16.	16.	Combustion Gas Analyzer(Flue gas analyzer)	08	1,60,000.00
17.	17.	CO/HC Analyzer (Exhaust)	02	40,000.00
18.	18.	Dissolve Oxygen Meter	01	5000.00
19.	19.	Elemental (CHNS) Analyzer	01	1,25000.00
20.	20.	Filter for Spectrophotometer	04	10,000.00
21.	21.	Gas Generator Combined N2 and Zero air for GC & GC - MS	01	3000.00
22.	22.	GC - ECD & FPD Optional FID/ TCD/NFD	05	5,00,000/-
23.	23.	GC – MS Optional Purge and Trap System	06	7,50,000.00
24.	24.	GC – MS, FID/ ATD	01	2,75,000.00
25.	25.	Gradient System for HPLC System	02	1,25,000.00
26.	26.	High Volume PUF Sampler	12	2,60,000.00
27.	27.	High Precision gas flow calibrator	04	2,40,000.00
28.	28.	High Precision Pressure cum vacuum guage	08	26,000.00
29.	29.	ICP	01	200000/-
30.	30.	Ion Chromatograph	01	125000.00
31.	31.	Ion Meter	03	45,000.00
32.	32.	Isokinetic Stack Sampling assembly with Volatile Organic Sampling Train (VOST)	02	1,00,000.00
33.	33.	Low flow pump for personal sampler	02	5000.00
34.	34.	Mercury Analyzer (Digital)	01	15,000.00
35.	35.	Mass flow controller	4 set	2,20,000.00
36.	36.	Multi Calibration System	4 set	1,60,000.00
37.	37.	Multi Print Recorder	04	20,000.00
38.	38.	Meteorological System (W/S, W/D, Temp., RH, Solar Radiation)	04	1,40,000/-

39.	39.	Microbial Identification System	01	175000.00
40.	40.	Noise Level Meter	05	87500.00
41.	41.	Ozone Generator & Premeation System	04	1,00,000.00
42.	42.	Oil sealed Mechanical Vacuum Pump	04	40,000.00
43.	43.	Optimized HPLC Post-Column Derivatization System	01	125000.00
44.	44.	Ozone Precursor Monitor	01	90000.00
45.	45.	PAH and VOC standards	01	15000.00
46.	46.	Peristaltic Pump	02	15000.00
47.	47.	$PM_{2.5}$ Sampler (US-EPA approved)	17	680000.00
48.	48.	Re-circulating Chiller	02	40000.00
49.	49.	Rotary Vacuum Evaporator with Pump	04	80000.00
50.	50.	Stack Monitoring Kit (USEPA methods 5, 23, 26 and 29)	03	1950000.00
51.	51.	Standard weight for Analytical Balance	04	40,000.00
52.	52.	TKN Assembly	03	90,000.00
53.	53.	TOC Analyzer	03	225000.00.
54.	54.	Water Bath (Thermostatic)	01	10,000.00
55.	55.	U V Visible Spectrophotometer	04	10,000/-
56.	56.	Water Purification System	02	1,00000.00
57.	57.	Zero Head Space Extractor	01	15,000.00

ANNEXURE -V

LOCATION OF DELIVERY AND INSTALLATION OF INSTRUMENTS/ EQUIPMENT

Item code No.	Item Code No.	Instrument / Equipment Name	QTY	Location
1.	1.	Analyzer SO_2, NO-NO_2-NOX,O3 & CO	01	Vadodara
2.	2.	Automatic Analyzer (On line) CO,SO_2,O_3, PM_{10},$PM_{2.5}$	02 SET	HOD (Air) – 2
3.	3.	Automatic Analyzer (Online)NH3 with NOX	04	HOD (Air) – 2
4.	4.	AAS (Flame, GTA & HG)	02	HOD (Air) - 2
5.	5.	Accelerated Solvent Extraction Unit	01	HOD (Air) – 2
6.	6.	Auto Sampler for HPLC	01	HOD (Air)
7.	7.	AOx Analyzer with Auto-Titration Unit	01	HOD (Air)
8.	8.	ATD Tube Conditioner	01	HOD (Air)
9.	9.	Air flow Sampling Pump	15	ZO – Lucknow ZO-Bangalore ZO- Varodara ZO – Kolkata
10.	10.	Balance precision	01	ZO – Bangalore
11.	11.	Balance Analytical	02	ZO – Bangalore HOD (Inst.)
12.	12.	Balance Moisture	02	HOD (Inst.)-1 ZO – Kolkata-1
13.	13.	Bomb Calorimeter	02	HOD (Inst.) – 2
14.	14.	Binocular (Compound Microscope with Digital Camera)	01	HOD (Treat.)
15.	15.	BTX analyzer	03	HOD (Air) – 3
16.	16.	Combustion Gas Analyzer(Flue gas analyzer)	08	HOD (Air)-2 HOD (TOL)-1 ZO – Lucknow-1 ZO – Bhopal-1 ZO-Bangalore-1 Zo-Varodara-1 ZO- Kolkata - 1
17.	17.	CO/HC Analyzer (Exhaust)	02	ZO – Bangalore-1 ZO - Kolkata - 1
18.	18.	Dissolve Oxygen Meter	01	ZO – Kolkata
19.	19.	Elemental (CHNS) Analyzer	01	HOD (Inst.)
20.	20.	Filter for Spectrophotometer	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
21.	21.	Gas Generator Combined N2 and Zero air for GC & GC - MS	01	HOD (Air)

22.	22.	GC - ECD & FPD Optional FID/ TCD/NFD	05	ZO – Shillong-1 HOD (Treat)-1 ZO – Lucknow-1 ZO – Bhopal-1 ZO - Varodara-1
23.	23.	GC – MS Optional Purge and Trap System	06	HOD (TOL)-2 ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
24.	24.	GC – MS, FID/ ATD	01	HOD (Air)
25.	25.	Gradient System for HPLC System	02	HOD (Air)
26.	26.	High Volume PUF Sampler	12	ZO – Bangalore-2 ZO – Kolkata-2 ZO – Lucknow-2 ZO – Bagalore-2 ZO – Bhopal-2 HOD (Air)-2
27.	27.	High Precision Gas Flow Calibrator	04	ZO – Lucknow ZO-Bangalore Zo- Varodara ZO – Kolkata
28.	28.	High Precision Pressure cum Vacuum guage	08	ZO – Lucknow-2 ZO-Bangalore-2 Zo-Varodara-2 ZO – Kolkata-2
29.	29.	ICP	01	ZO – Bangalore
30.	30.	Ion Chromatograph	01	HOD (Water Lab)
31.	31.	Ion Meter	03	ZO – Bhopal-1 ZO – Vadodara-1 ZO – Kolkata-1
32.	32.	Isokinetic Stack Sampling assembly with Volatile Organic Sampling Train (VOST)	02	ZO – Bangalore ZO – Kolkata
33.	33.	Low flow pump for personal sampler	02	HOD (Air) - 2
34.	34.	Mercury Analyzer (Digital)	01	HOD (Inst.)
35.	35.	Mass Flow Controller	04	2,20,000.00
36.	36.	Multi Calibration System	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
37.	37.	Multi Print Recorder	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1

38.	38.	Meteorological System (W/S, W/D, Temp., RH, Solar Radiation)	04	HOD (Air)-1 ZO-Kolkata-1 RO-Agra-1 ZO-Bhopal-1
39.	39.	Microbial Identification System	01	HOD(Treat)
40.	40.	Noise Level Meter	05	ZO – Bangalore-3 ZO – Lucknow-1 PO- Agra-1
41.	41.	Ozone Generator & Permeation System	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
42.	42.	Oil Sealed Mechanical Vacuum Pump	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
43.	43.	Optimized HPLC Post-Column Derivatization System	01	HOD (TOL)
44.	44.	Ozone Precursor Monitor	01	HOD (Air)
45.	45.	PAH and VOC standards	01	HOD (Air)
46.	46.	Peristaltic Pump	02	HOD Treat) -2
47.	47.	$PM_{2.5}$ Sampler (US-EsPA approved)	17	ZO – Vadodara-2 ZO – Bangalore-2 ZO – Kolkata-2 ZO – Lucknow-2 ZO – Bhopal-2 RO- Agra - 2 ZO- Sillong-2 HOD (Air)-3
48.	48.	Re-circulating Chiller	02	ZO – Kolkata - 2
49.	49.	Rotary Vacuum Evaporator with Pump	04	ZO- Bhopa-1l ZO – Kolkata-1 ZO – Vadodara-1 HOD(Air)-1
50.	50.	Stack Monitoring Kit (USEPA methods 5, 23, 26 and 29)	03	HOD (Air) - 2 ZO – Kolkata-1
51.	51.	Standard Weight for Analytical Balance	04	ZO – Lucknow-1 ZO-Bangalore-1 Zo-Varodara-1 ZO – Kolkata-1
52.	52.	TKN Assembly	03	ZO – Bhopal-1 ZO – Kolkata-1 HOD(Water)-1
53.	53.	TOC Analyzer	03	ZO – Bangalore-1 ZO – Vadodara-1 ZO – Kolkata-1
54.	54.	Water Bath (Thermostatic)	01	HOD (Treat.)

55.	55.	U V Visible Spectrophotometer	04	ZO – Vadodara-1 ZO – Bhopal-1 ZO – Kolkata-1 ZO – Bangalore-1
56.	56.	Water Purification System	02	ZO – Bhopal-1 ZO – Bangalore-1
57.	57.	Zero Head Space Extractor	01	ZO – Bangalore

Item Code No.01

Automatic Ambient Air Quality Monitoring Analyzers

(SO_2, NOx, CO ,O_3 Analyzer and Computer, Data Acquisition & Analytical Software) – {Package}

General Specifications for all Analyzers

1.1 The analyzers should be 19" rack mounting model with facilities for fixing the analyzers from front side.

1.2 The ON / OFF switch and display of the entire important status signal viz. Sample flow, temperature, concentration, range switch, manual / auto mode, zero / span mode should be on front panel.

1.3 The analyzers should operate at operating voltage 230 volts $\pm$ 10volts AC and 50 Hz $\pm$ 3%. The power supply input to be protected against spikes from and to the analyzer by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.

1.4 The analyzers must function properly in Indian conditions without any defect between 0 – 50 ^{o}C ambient temperature, 10 – 95% relative humidity and in high ambient dust levels. The data capture rate should not be less than 90%.

1.5 The manufacturer / suppliers should assure the service / maintenance. The Manufacturer shall provide minimum of 2 weeks of operational, preventive maintenance and troubleshooting training for atleast two persons per calibration lab at installation site.

1.6 The analyzers should be complete with calibration system. The calibration system should be delivered along-with respective permeation tubes/ span gas cylinders. The analyzers should be equipped with built in permeation oven at 40 degree Celsius with temp and flow control for permeation tubes. The span gas concentration should be within 60 – 90% of first measuring range. The analyzers must have zero point internal calibration system. The ozone analyzer also must have built in zero and span calibration. The calibration procedures are to be integrated into the software system for automatic calibration.

1.7 The permeation tube and the calibration gases provided with the system shall have traceability to NIST.

1.8 The analyzers shall be supplied with all ancillaries necessary for operation including gas cylinders, stainless steel double stage regulators, external pump (if any) and any other items such as charcoal scrubber, Teflon air sample intake filter, drier, Teflon tubing suitable for connection to air sampling manifold. All such items are to be itemised. Dust filter in all the analyzers should be provided before solenoid valve to protect frequent chocking of solenoid valve.

1.9 The connector systems for out going signal for recording and the computer terminal should be on back panel with screw type connecting pins.

1.10 All ambient gas analyzers shall conform to the USEPA automated reference or equivalent method designation as required by the specification for individual equipment. All analyzers shall be micro – processor controlled having digital display with automatic calibration using an internal as well as external calibration standards. All analyzers and sensors should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the specifications.

1.11 The manufacture shall provide 03 years warranty for the entire system. Annual Maintenance charges after the warranty period should be specified.

1.12 The manufacture shall provide price list of the spares and ensure their availability for the next atleast 5 years.

1.13 The manufacturer shall specify the cross sensitivity of measurement for all the analyzers.

1.14 Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details in three parts:

Parts (I) should comprise installation, operational and trouble shooting details;

Parts (II) should have details about preventive, routine and corrective maintenance; and

Parts (III) should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, Catalogue No. etc. and details of each electronic card / PCB's.

Part (IV) Schematic diagram for possible repair and maintenance.

1.15 Digital Output

Multi drop RS 232 port shared between analyzer and computer for data, status and control.

1.16 Analog output 0-1 V, 0-10V, 0-20mA, 4-20mA, and 2-20mA.

(I) AMBIENT SULPHUR DIOXIDE (SO_2) ANALYSER (Conforming to USEPA Automated Federal Equivalent Method (FEM) Designation)

01.	Principle	Pulsed UV Fluorescence
02.	Measurement	Sulphur Dioxide in Ambient Air
03.	Lower Detectable Limit	1 PPB
04.	Ranges	Auto ranging 500 PPB
05.	Display	Digital
06.	Noise Level	0.50 PPB or 1% of the reading
07.	Zero Drift	< 1 PPB/24 Hrs. With automatic zero compensation
08.	Span Drift	< 2 PPB full scale in 15 days
09.	Calibration	Please see calibration section in general specification
10.	Consumables and spares	Recommended requirements of 3 years operation
11.	Linearity/ Sample Flow Rate	$\pm$ 1% / 1 SLPM
12.	Precision	0.5 ppb or 1% reading whichever is greater
13.	Analog Output	0 – 1 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA
14.	Digital Output	Multi drop RS 232

(II) AMBIENT OXIDES OF NITROGEN ($NO-NO_2-NOx$) ANALYSER (Conforming to USEPA Automated Federal Reference Method (FRM) Designation)

01.	Principle	Chemiluminscence
02.	Measurement	NO / NO_2 / NO_x in Ambient Air
03.	Display	Digital
04.	Ranges	Auto ranging 0-2000 PPB.
05.	Minimum Detectable Limit	1 PPB
06.	Noise Level	0.5 PPB
07.	Zero Drift	< 1 PPB/24 Hrs.
08.	Span Drift	< 2% in 15 days of full scale
09.	Response Time	30 seconds or earlier
10.	Linearity	$\pm$ 1% of full scale
11.	Calibration	Please see calibration section in general specification
12.	Consumables and spares	Recommended requirements of 3 years operation
13.	Sampling Flow Rate	0.5 slpm (minimum)
14.	Rise / fall Time 95% of the final value	< 30 Sec
15.	Precision	0.5 ppb or 1%
16.	Analog Output	0 – 1 V, 0 – 10 V, 0 – 20 mA, 4 – 20 mA
17.	Digital Output	Multi drop RS 232 port

(III) AMBIENT CARBON MONOXIDE (CO) ANALYSER (Conforming to USEPA Automated Federal Reference Method (FRM) Designation)

01.	Principle	Non Dispersive Infra-Red (NDIR) with Gas Filter Correlation
02.	Measurement	Carbon Monoxide in Ambient Air
03.	Display	Digital
04.	Ranges	At least four ranges Auto ranging 0 - 100 PPM.
05.	Minimum Detectable Limit	0.1 PPM
06.	Zero Noise	0.05 PPM with time constant $\pm$ 30 seconds
07.	Zero Drift	< 0.2 PPM/7 days
08.	Span Drift	< 1% full scale in 24 hrs.
09.	Calibration	Calibration gas (CO) portable cylinder with known concentration has to be provided alongwith the instrument for calibration purpose. It should also have pressure gas valve for Zero and Span gas. Please see also calibration section in general specification. .
10.	Consumables and spares	Recommended requirements of 3 years operation
11.	Linearity	Continuous $\pm$ 1%
12.	Sample Flow Rate	1 slpm (approx.)
13.	Analog Output	0 – 1 V, 0 – 10 V, 0 – 20 mA, 4 – 20 mA
14.	Digital Output	Multi drop RS 232 port

(IV) AMBIENT OZONE (O_3) ANALYSER (Conforming to USEPA Automated Federal Reference Method (FRM) Designation)

01.	Principle	UV Photometric
02.	Measurement	Ozone in Ambient Air
03.	Display	Digital
04.	Range	Auto ranging 0 - 500 PPB
05.	Minimum Detectable Limit	1.0 PPB
06.	Noise	Less than $\pm$ 1.0 PPB
07.	Zero Drift	< ½% per month
08.	Span Drift	< 1% per month
09.	Flow Rate	1-3 Liters / Minute
10.	Calibration	Please see calibration section in general specification
11.	Consumables and spares	Recommended requirements of 3 years operation
12.	Linearity	Continuous $\pm$ 1%
13.	Analog Output	0 – 1 V, 0 – 10 V, 0 – 20 mA, 4 – 20 mA
14.	Digital Output	Multi drop RS 232 port

(V) Computer System (compatible with analyzers for data acquisition and display)

01.	Make	IBM/Dell/Compaq/HP
02.	Pentium IV	Intel – Core 2 Duo original mother board
03.	RAM	3 GB DDR RAM upgradable
04.	Hard disk	320 GB SATA
05.	DVD RW	8X
06.	Monitor	19" LCD TFT
07.	Port	2 serial, 1 parallel & 2USB with LAN
08.	Keyboard	104 keys keyboard Microsoft
09.	Mouse	Optical Scroll Mouse + Pad
10	Software	Window Vista OS, MS-Office 2007, Anti Virus with 1 year validity (Pre-installed with certificate)
11.	Network Card	Network card with remote booting facility
12.	Energy Star	Energy Star compliance

(VI) LASER PRINTER (COLOUR):

01.	Speed (pages per minute)	At least 16 Black & White and 12 Colour pages output per minute
02.	Resolution	Minimum 600 x 600 dpi
03.	RAM	Minimum 32 MB or more
04.	Main tray Capacity	At least 250 sheets
05.	Interface	Parallel & USB
06.	Operating System	Windows 95,98, XP, Vista, Win 7
07.	Power supply	230V AC, ± 10 V AC, 50 Hz, ± 3%

(VII) DATA ACQUISITION SYSTEM &SOFTWARE

The Data Acquisition System (DAS) should be able to collect and store meteorological data and air quality data from all instruments listed above. The DAS should be designed to acquire, transmit, process and store data. DAS should include following minimum features:

- "Multi drop" RS232 Communication enabling Digital and Analog communication with all supported monitoring and meteorological equipment.
- Supports remote communication through radio, switched telephone, cellular telephone, as well as short haul modems.
- Data storage space for minimum 30 days of 5 minute historical data.
- Captures minimum, maximum, average values and standard deviations.
- Lightning & surge protection facilities.
- Full control over calibration cycle periods.
- Password Protection.
- DAS should be designed for unattended use.
- DAS should have 6 to 8 line fully pixilated graphic display (LCD) for data and set up parameters to be viewed.

(VIII) ANALYTICAL SOFTWARE

The supplier should provide Windows XP Professional (Latest Version)/ Windows Vista based software for data acquisition from the DAS and for statistical analysis and reporting of the monitored parameters mentioned above. Analysis and reporting software should posses following minimum features:

- Windows XP Professional (Latest Version)/Windows Vista compatible.
- File format conversion.
- Statistical analysis of data for maximum, minimum, average and standard deviation for various time intervals using the monitored data.
- Tabular and graphical format for report production.
- Wind rose graphs.
- File export facility.
- Windows based printer support.

Item Code No.02

Automatic Analyzer –(On-line) (CO, SO_2, O_3, BTX, PM_{10} and $PM_{2.5}$ Analysers)

1.1 The analysers should be 19" rack mounting model with facilities for fixing the analysers from front side.

1.2 The ON / OFF switch and display of the entire important status signal viz.

Sample flow, temperature, concentration, range switch, manual / auto mode, zero / span mode should be on front panel.

1.3 The analysers should operate at operating voltage 230 volts ± 10 volts AC and 50 Hz ± 3%. The power supply input to be protected against spikes from and to the analyser by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.

1.4 The analysers must function properly in Indian conditions without any defect between 0 – 50° C ambient temperature, 10 – 95% relative humidity and in high ambient dust levels. The data capture rate should not be less than 90%.

1.5 The Manufacturer shall provide minimum of 2 weeks of operational & preventive maintenance hands-on training for at least one person per station at the installation site.

1.6 The analysers should be complete with calibration system. The calibration system should be delivered along-with respective span gas cylinder / permeation tubes. The span gas concentration should be within 60 – 90% of first measuring range. The analyser must have zero point internal calibration system and in agreement with minimum detection limit of each analyser. The calibration procedures are to integrated into the software system for automatic calibration.

1.7 The permeation tube and the calibration gases provided with the system shall have tractability to NIST.

1.8 The analysers shall be supplied with all ancillaries necessary for operation including external pump (if any) and any other items such as charcoal scrubber, Teflon air sample intake filter, drier, Teflon tubing suitable for connection to air sampling manifold. All such items are to be itemized. Dust filter in all the analysers should be provided before solenoid valve to protect frequent chocking of solenoid valve.

1.9 The connector systems for out going signal for recording and the computer terminal should be on back panel with screw type connecting pins.

1.10 All ambient gas analysers shall conform with the USEPA automated reference or equivalent method designation as required by the specification for individual equipment. All analysers shall be micro – processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analysers and sensors

should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the specifications.

1.11 The manufacturer shall specify the cross sensitivity of measurement for all the analyzers.

1.12 Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details in three parts:

Parts (I) should comprise installation, operational and trouble shooting details;

Parts (II) should have details about preventive, routine and corrective maintenance; and

Parts (III) should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, Catalogue No. etc. and details of each electronic card / PCB's.

Parts (IV) Schematic diagram for possible repair & maintenance.

1.13 Digital Output:

a) Multi drop RS 232 port shared between analyser and computer for data, status and control.

b) All analysers should be equipped with any of the Protocol (as per Annexure – I) and compatible with Easycomp data downloading software.

(A) AMBIENT ON LINE AUTOMATIC SULPHUR DIOXIDE (SO_2) ANALYSER Conforming to USEPA Automated Federal Equivalent Method (FEM) Designation

01.	Principle	:	Pulsed UV Fluorescence
02.	Measurement	:	Sulphur Dioxide in Ambient Air
03.	Lower Detectable Limit	:	1 PPB
04.	Ranges	:	Auto ranging 0 - 500 PPB
05.	Display	:	Digital
06.	Noise Level	:	0.50 PPB or 1% of the reading
07.	Zero Drift	:	< 1 PPB/24 Hrs. With automatic zero compensation
08.	Span Drift	:	< 2 PPB full scale in 15 days
09.	Calibration	:	Please see calibration section in General Specifications
10.	Linearity Sample Flow Rate	:	$\pm$ 1% 1 SLPM
11.	Precision	:	0.5 ppb or 1% reading whichever is greater
12.	Output Signals or Analog Output	:	3 Analog output 0 – 1 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA
13.	Digital Output	:	Multiple drop RS 232
14.	Consumables and spares	:	Recommended requirements of 3 years operation

(B) AMBIENT ON LINE AUTOMATIC OZONE (O_3) ANALYSER Conforming to USEPA Automated Federal Reference Method (FRM) Designation

01.	Principle	:	UV Photometric
02.	Measurement	:	Ozone in Ambient Air
03.	Display	:	Digital
04.	Range	:	Auto ranging 0 - 500 PPB
05.	Minimum Detectable Limit	:	2.0 PPB
06.	Noise	:	± 1.0 PPB
07.	Zero Drift	:	< ½% per month
08.	Span Drift	:	< 1% per month
09.	Flow Rate	:	1-3 Liters / Minute
10.	Calibration	:	Please see calibration section in General Specifications
11.	Linearity	:	Continuous ± 1%
12.	Output Signals or Analog Output	:	3 Analog output 0 – 1 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA
13.	Digital Output	:	Multiple drop RS 232
14.	Consumables and spares	:	Recommended requirements of 3 years operation

(C) AMBIENT ON LINE AUTOMATIC CARBON MONOXIDE (CO) ANALYSER CONFORMING TO USEPA AUTOMATED FEDERAL REFERENCE METHOD (FRM) DESIGNATION

01.	Principle	:	Non Dispersive Infra-Red (NDIR) with Gas Filter Correlation
02.	Measurement	:	Carbon Monoxide in Ambient Air
03.	Display	:	Digital
04.	Ranges	:	At least four ranges Auto ranging 0 - 100 PPM.
05.	Minimum Detectable Limit	:	0.1 PPM
06.	Zero Noise	:	0.05 PPM with time constant $\pm$ 30 seconds
07.	Zero Drift	:	< 0.2 PPM/7 days
08.	Span Drift	:	< 1% full scale in 24 hrs.
09.	Calibration	:	Calibration gas (CO) portable cylinder with known concentration has to be provided along-with the instrument for calibration purpose. It should also have pressure gas valve for Zero and Span gas. Please see also calibration section in General Specifications.
10.	Linearity	:	Continuous $\pm$ 1%
11.	Sample Flow Rate	:	1 slpm (approx.)
12.	Output Signals or Analog Output	:	3 Analog output 0 – 1 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA
13.	Digital Output	:	Multiple drop RS 232
14.	Consumables and spares	:	Recommended requirements of 3 years operation

(D) AMBIENT ON LINE AUTOMATIC PM_{10} MONITOR CONFORMING TO USEPA AUTOMATED FEDERAL EQUIVALENT METHOD (FEM) DESIGNATION

Based on the principle of β-ray attenuation by particulate sampled through the instrument and collected on fiberglass filter tape. Before and after sampling β-ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of SPM.

01.	Principle	:	Continuous measurement of PM_{10} in ambient air
02.	Particle Size Cut Off	:	0 - 10 Microns
03.	Measuring Range	:	0 to 2000 $\mu g/m^3$
04.	Resolution	:	1% of the concentration
05.	Minimum Detectable Limit	:	2 $\mu g/m^3$
06.	Detector	:	Plastic Scintillator / GM Counter, Silicon Semiconductor Beta Detector
07.	Air Flow Rate	:	At - least 1.5 m^3 / hrs. (Adjustable to 1 m^3/hr)
08.	Filter Material	:	Glass Fiber Filter
09.	Display	:	LED / LCD
10.	Sampling Head	:	Suitable heated sampling head for measurement of PM_{10}, with adjustable temperature 20 – 70 ^0C
11.	Calibration	:	Separate calibration standards must be provided with the instrument.
12.	Printer	:	Built Printer
13.	Roll Length	:	Approximately 30 meters
14.	Measurement Result	:	1 hr average or shorter
15.	Consumables and spares	:	Recommended requirements of 3 years operation

(E) AMBIENT ON LINE AUTOMATIC $PM_{2.5}$ MONITOR CONFORMING TO USEPA AUTOMATED FEDERAL EQUIVALENT METHOD (FEM) DESIGNATION

Based on the principle of β-ray attenuation by particulate sampled through the instrument and collected on fiberglass filter tape. Before and after sampling β-ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of SPM.

01.	Principle	:	Continuous measurement of $PM_{2.5}$ in ambient air
02.	Particle Size Cut Off	:	0 – 2.5 Microns
03.	Measuring Range	:	0 to 1000 $\mu g/m^3$
04.	Resolution	:	1% of the concentration
05.	Minimum Detectable Limit	:	2 $\mu g/m^3$
06.	Detector	:	Plastic Scintillator / GM Counter, Silicon Semiconductor Beta Detector
07.	Air Flow Rate	:	At - least 1.5 m^3 / hrs. (Adjustable to 1 m^3/hr)
08.	Filter Material	:	Glass Fiber Filter
09.	Display	:	LED / LCD
10.	Sampling Head	:	Suitable heated sampling head for measurement of $PM_{2.5}$ with adjustable temperature 20 – 70 ^0C
11.	Calibration	:	Separate calibration standards must be provided with the instrument.
12.	Printer	:	Built Printer
13.	Roll Length	:	Approximately 30 meters
14.	Measurement Result	:	1 hr average or shorter
15.	Consumables and spares	:	Recommended requirements of 3 years operation

(F) BTX MONITOR / ANALYSER

1.0 GENERAL

A compete monitor / analyser system including **automatic sampling** (pump etc.), detector, calibrator, computer hardware and **software for data display, acquisition, 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 ± 10 volts AC and 50 Hz ± 3%). Continuous unattended measurement of individual BTX samples. System should work without cryogenic cooling. System should have **protocol compatible to communicate & transfer data to main computer through modem.** Raw data storage capacity without erase minimum for three month or more.

2.0 TECHNICAL SPECIFICATIONS

2.1 AUTOMATIC SAMPLING (MONITOR)

Analytical instruments/pump (single stage membrane) monitoring for 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).

Sample flow range may be 20 -100 ml/min or more (adjustable). Sample volume should be between 400 ml – one liter or more of ambient air over a 10-15 min sampling cycle. All sample transfer tubing's should be in stainless steel flow / pressure sensor to be preferred with digital display.

2.2 SAMPLE TRAP

Light weight stainless steel mini trap containing selective adsorbents (activate charcoal or carbotrap or tenax G.R. or chromosorb 106), integrated heating element and temperature sensing by thermocouple, operating temperature range 40-200^{o}C.

2.3 HEATING OVEN

Metal oven having space for installation of wide bore capillary column, precolumn and temperature sensor. Operating temperature 40 – 100 ^{o}C or more.

2.4 COLUMNS

Approx **5 m precolumn** (for back flushing) and approx. **10 m - 50 m 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 WAX52 / DB5 / 624 or equivalent), film thickness between 1 and 2 μm.

2.5 DETECTOR

Photo Ionisation Detector **(PID)**	:	
PID Lamp eV		**10.6 eV**
lowest detector limit		**0.1 μg/m^3 (0.03 ppb) for Benzene**
Detector Diagnostics	:	PID sensitivity sensor / check facility

2.6 OPERATING CONDITIONS

Temperature Range	:	**5-35^{o}C or more**
Concentration Range	:	**1-1000 ug/m3**
		(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 leve**l 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 valves 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). **System stability** (temperature and sample flow). **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's:

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 microgram / m^3 or ppb (selectable) & averaging etc). **Data presentation / graphical & statistical processing & data transfer** to Excel / Lotus / d-Base facility. **Communication software with protocol compatible to communicate & transfer data from BTX monitor to central computer through modem** (preferably including sample chromatogram**).** System should have **remote access to BTX monitor**.

Resident programme 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 indications. **Updation of response factors automatically after calibration run. Updation of retention times after every sample analysis. Auto tune facility.** Raw data storage capacity without erase minimum for three month or more.

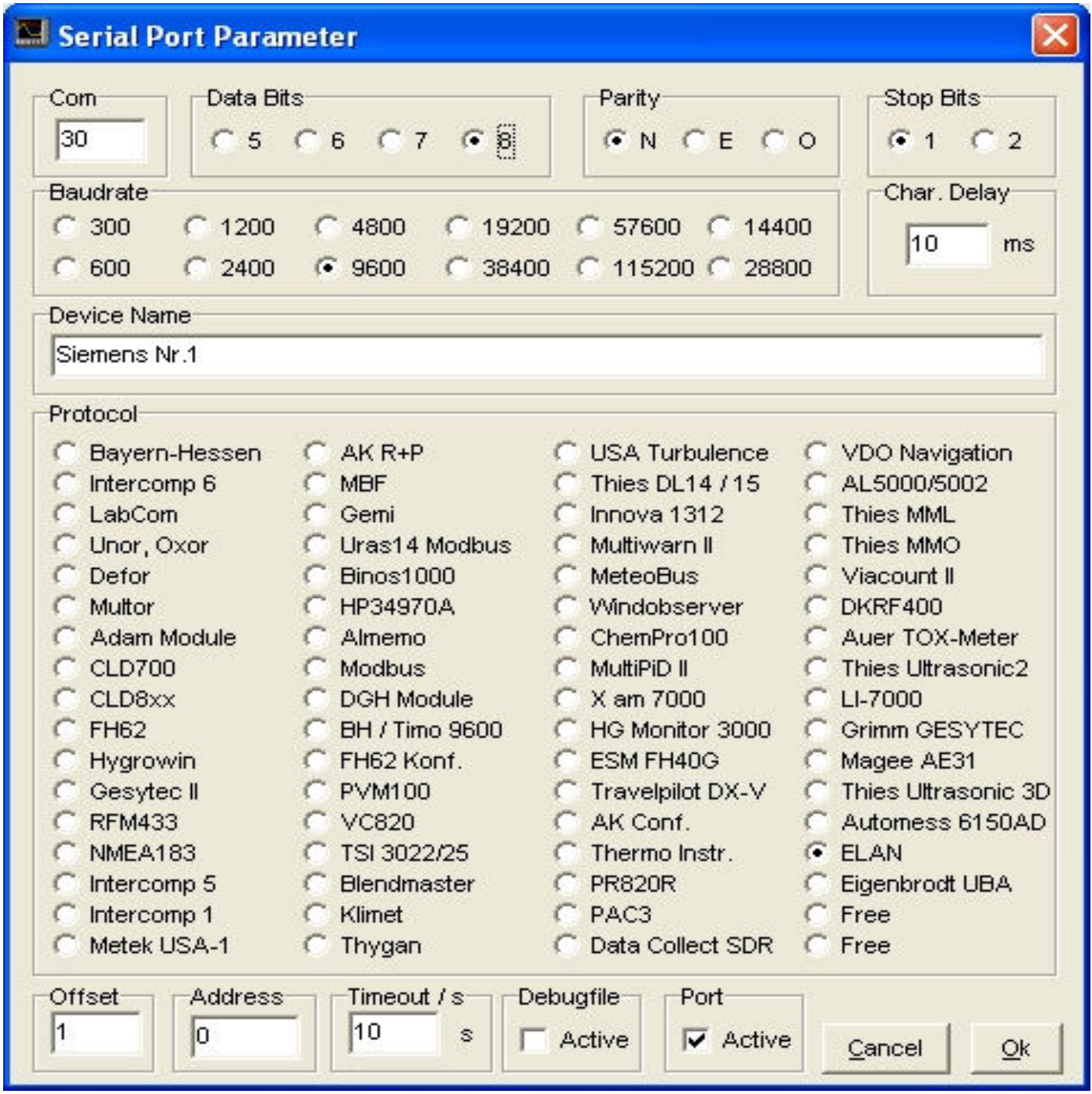
4.0 SPARES FOR 3 YEARS

One set of each including columns, filters / traps for removal of dust & unwanted impurities (moisture / hydrocarbon); **spare parts** / electronic cards and sufficient septas, ferrules, dust filters, teflon tubing etc & other **consumables** usually get exhausted during first 3 years of operation apart from one set as essential part with main instrument.

ANNEXURE 1

LIST OF PROTOCOLS SUPPORTED BY EASYCOMP FOR THE SERIAL COMMUNICATION

1. Following Protocols are supported by existing Data Acquisition System called EASYCOMP.



2. The new software to be supplied to CPCB should support data acquisition through existing software EASYCOMP.
3. Present system for Bayern – Hessen protocol, no intermediate device is required, while for other protocols their communication hardware would be required which can fit into Intercomp 6 module.
4. For any clarification please contact CPCB

Item Code No.03

Automatic Analyzer (On-line)- (NO_x, Analysers)

1.3 The analysers should be 19" rack mounting model with facilities for fixing the

analysers from front side.

1.4 The ON / OFF switch and display of the entire important status signal viz.

Sample flow, temperature, concentration, range switch, manual / auto mode, zero / span mode should be on front panel.

1.3 The analysers should operate at operating voltage 230 volts ± 10 volts AC and 50 Hz ± 3%. The power supply input to be protected against spikes from and to the analyser by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.

1.4 The analysers must function properly in Indian conditions without any defect between 0 – 50° C ambient temperature, 10 – 95% relative humidity and in high ambient dust levels. The data capture rate should not be less than 90%.

1.6 The Manufacturer shall provide minimum of 2 weeks of operational & preventive maintenance hands-on training for at least one person per station at the installation site.

1.6 The analysers should be complete with calibration system. The calibration system should be delivered along-with respective span gas cylinder / permeation tubes. The span gas concentration should be within 60 – 90% of first measuring range. The analyser must have zero point internal calibration system and in agreement with minimum detection limit of each analyser. The calibration procedures are to integrated into the software system for automatic calibration.

1.8 The permeation tube and the calibration gases provided with the system shall have tractability to NIST.

1.8 The analysers shall be supplied with all ancillaries necessary for

operation including external pump (if any) and any other items

such as charcoal scrubber, Teflon air sample intake filter, drier,

Teflon tubing suitable for connection to air sampling manifold.

All such items are to be itemized. Dust filter in all the analysers

should be provided before solenoid valve to protect frequent chocking of solenoid valve.

1.9 The connector systems for out going signal for recording and the computer terminal should be on back panel with screw type connecting pins.

1.10 All ambient gas analysers shall conform with the USEPA automated reference or equivalent method designation as required by the specification for individual equipment. All analysers shall be micro – processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analysers and sensors should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the specifications.

1.11 The manufacturer shall specify the cross sensitivity of measurement for all the analyzers.

1.12 Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details in three parts:

Parts (I) should comprise installation, operational and trouble shooting details;

Parts (II) should have details about preventive, routine and corrective maintenance; and

Parts (III) should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, Catalogue No. etc. and details of each electronic card / PCB's.

Parts (IV) Schematic diagram for possible repair & maintenance.

1.13 Digital Output:

a) Multi drop RS 232 port shared between analyser and computer for data, status and control.

b) All analysers should be equipped with any of the Protocol (as per Annexure – I) and compatible with Easycomp data downloading software.

(A) AMBIENT OXIDES OF NITROGEN ($NO-NO_2-NOx-NH_3$) ANALYSER Conforming to USEPA Automated Federal Reference Method (FRM) Designation

01.	Principle	:	Chemiluminiscence
02.	Measurement	:	NO / NO_2 / NO_x / NH_3 in Ambient Air (**With built – in NH_3 – NO converter for ambient level NH_3 monitoring)**
03.	Display	:	Digital
04.	Ranges	:	Auto ranging 0-2000 PPB.
05.	Minimum Detectable Limit	:	1 PPB
06.	Noise Level	:	0.5 PPB
07.	Zero Drift	:	< 1 PPB/24 Hrs.
08.	Span Drift	:	< 2% in 15 days of full scale
09.	Response Time	:	30 seconds or earlier
10.	Linearity	:	± 1% of full scale
11.	Calibration	:	Please see calibration section/ General Specifications
12.	Output Signals or Analog Output	:	3 Analog output 0 – 1 V, 0 – 10 V, 0 – 20 mA or 4 – 20 mA
13.	Digital Output	:	Multi drop RS 232 port
14.	Consumables and spares	:	Recommended requirements of 3 years operation

Item Code No.04

ATOMIC ABSORPTION SPECTROPHOTOMETER (GTA/FLAME/GA)

S. No.	Specification	Requirement
1.0	**INSTRUMENT COMPOSITION**	
	Atomic Absorption Spectrophotometer (GTA/FLAME/VGA)	
	Unit for Flame (Air-acetylene and nitrous oxide-acetylene)	
	Graphite tube atomizer (GTA)	
	Chiller/Water circulating unit	
	Autosamplers for GTA and flame	
2.0	**TECHNICAL SPECIFICATIONS**	
	Atomic Absorption Spectrophotometer	Computer controlled with built-in flame emission mode
	Wave length range	190-800 nm wavelength
	Sensitivity	Sensitivity atleast 0.35 abs for 5 µg/ml aqueous copper standard solution with air-acetylene flame
2.1	**Optics**	Double beam dual blazed/holographic Monochromator
	Focal Length	Atleast 250 mm focal length
	Resolution	1800 lines/mm
	Width	Automatic bandwidth of 0.2 to 2.0 nm.
2.2	**Flame Atomizer**	All titanium or equivalent burner with impact bead / Flow spoiler, Premix Design
	Movement	Automatic movement into the sample compartment
	Affect from Acids/Organic solvent	Unaffected from attacks by acid solutions or organic solvents (e.g. Methyl isobutyl Ketone i.e. MIBK
	Flame Alignment in liquid beam	Fully automatic, optimized with motorized burner mount for vertical and horizontal burner adjustment

	Nebulizer	High precision able to provide manually adjustable uptake rates material of the nebulizer and related Venturi should be inert to acid solutions and organic solvents, such as MIBK.
2.3	**Flame Control**	Computer controlled ignition
2.4	**Gas Control**	Computer controlled with oxidant and fuel gases monitoring to monitor constant fuel/oxidant ratio ignition
2.5	**Safety Function**	Interlocking system to prevent ignition
2.6	**Essential Interlock Monitors**	Burner type as well as its presence in position, air selector, flame sensor, liquid trap level, gas supply pressures and air supply any where in the network of gas tubings in the system
2.7	**Automatic Lamp Selection Function**	Computer controlled Hollow cathode lamp selection and alignment,
	Lamp Holder	Atleast 8 lamp holder with built-in power supplies for hollow cathode lamps and electrode-less discharge lamps or equivalent
	Operating Parameter setting	Automatic setting
2.8	**Read Out / Display**	Display facility for absorbance as well as concentration, Display of errors or error codes, absorbance range atleast upto 2.0 Abs
	Scale expansion	Scale expansion atleast upto 100x,
	Integration time	Integration time should cover atleast 0.2 to 50 seconds range
	Measurement	Measurements of mean, RSD and CV, Background only mode, integration of peak height and peak areas
2.9	**Accessories/Spares with the Flame AA System**	
2.9.1	**Vapour generation assembly**	Should be continuous flow based hydride/mercury vapour generator with option of using with or without a programmable auto sampler.
	Precision	Precision of better than or atleast 1% at ppb levels of mercury, arsenic etc.
	Absorption Cell	The absorption cell's material should have no effect of the high heat of the flame, and the cell for the analysis of mercury should be of a closed cell design
	Flame Arrestor	Flame arrestor should be provided in the tube which connects the assembly to the absorption cell
	Cell design holder	The design of the cell holder should give a firm and easily adjustable (for alignment) mounting on the burner head.
	System accessories	Complete with necessary reagent bottles, connectors etc.
2.9.2	**Hollow Cathode Lamps**	16 Hollow cathode lamps. One lamp for each of the elements - arsenic, antimony, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, tin, vanadium and zinc. Equivalent coded lamps will also be acceptable.

2.9.3	**Air Compressor with Air Filter or equivalent Air Service Unit**	Complete with pressure regulator quite in operation, necessary tubing and connectors and should meet the air supply requirements of AAS operation.
	Oil free pump	Oil-free pump and moisture trap
	Corrosion resistant	Resistant to acidic vapour and the drain value (if any) should be made of stainless steel or equivalent corrosion resistant material.
2.9.4	**Gas Regulators**	
	Nitrous-oxide gas regulator	Nitrous-oxide gas regulator (two stage) with heater, with necessary tubings and connectors. Necessary transformer should be provided to transform this supply to the requirements of the heater The heater should work on 230 $\pm$ 10 volts 50 Hz AC power supply.
	Acetylene gas regulator	Acetylene gas regulator (two stage) with necessary tubing and connectors
	Nitrogen gas regulator	Nitrogen regulator (two stage) with necessary tubings and connectors
2.10	**Graphite Furnace System**	
	(a) Graphite Tube Atomizer	Should be computer controlled fully enclosed graphite tube system consisting of stabilized temperature/total pyrolytic graphite platform.
	Gas supplies	Provision of two gas supplies (programme selectable) with independent control over the gas supply through the furnace
	Heating Rate	Heating rate of atleast 2000 ^{0}C per second
	Cooling time	Cooling time 20 seconds
	Temperature range	Temperature range ambient to 2600 ^{0}C or more in 1 ^{0}C increments
	Feed ack system	Feed back system for furnace temperature control, interlocks for water, gas, temperature, furnace door, graphite tube damage and mains power
	Temp. Programming	Atleast eight steps temperature programming facility with flexibility of programme selection, ramp time, gases, gas flow, and read trigger for each temperature step
	Control	Computer controlled with appropriate provision for print out of the furnace and sample parameters,
	Display	Calibration data/graphs, temperature profiles, signal graphics and the instrument status
	Memory	Memory should be able to store atleast ten nonvolatile programmes

	(b) Chiller/Cooling Water Re-circulation Unit	Refrigerating water circulation unit of appropriate capacity. No discharge of water from this water circulation unit.
3.0	**DATA WORK STATION**	
3.1	**Application Software**	Programme facility with multitasking software.
		Should provide complete control of instrument with instrument status display and its various accessories
		Provide accurate and reproducible time averaged, integration, non-averaged integration, multi level calibration
		Software should handle instrument linear absorbance reading, concentration, or emission intensity, integration time, built in statistics, calibration equation control, slope of analytical curve using operator selective calibration standard
		Built in interface for computer connection and use of optional accessories
		Comprehensive quality control protocols facility including blank, multiple quality control standards, QA/QC audit trail and calibration failure.
3.2	**Computer System**	
	Make	Reputed brand 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, 1VGA integrated Port1line in/out port,
	Key board	104 Key IBM Compatible
	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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
3.3	**Operation Softwares**	Pre-loaded Windows XP Professional operating system with Licensed CD
		MS Office 2000 Standard with media, manual and Licensed CD
		Preloaded Antivirus with latest version along with Licensed CD

4.0	**ADDITIONAL ITEMS**	Following item to be supplied:
	Operation kit	Manufacturers Standard Operation Kit including all required items, tubings, fittings for start up /regular operation of instrument
	Operation / maintenance manual	Operation and Maintenance manual for each unit
	Analytical manual	Analytical Manual including applications for Flame, VGA and graphite system
	Service manual	Service Manual with one set of required tools for each system / unit
	Trouble shooting charts	Trouble shooting charts
	Spare parts catalogue	Spare parts catalogue
	Application notes	Application notes for trace metal analysis in environmental, biological, geological, metallurgical and industrial samples.
	Dust Cover	One for each unit.
	Consumables	For three years operation for each of the following units: ▪ Flame AAS (basic unit, burner system) ▪ Vapour generation assembly ▪ Graphite Furnace Atomizer ▪ Autosampler
5.0	**OPERATION AND MAINTENANCE TRAINING**	Two weeks training to be provided to two scientists on software training, operation, maintenance and trouble shooting aspects of instrument at its application laboratory in India.
6.0	**GENERAL CONDITIONS OF SUPPLY**	1. 1.The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 5. 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 atleast 2 years as on the date of bid opening. 6. The bidder should furnish the information on past supplies and their satisfactory performance. 7. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above.

Item Code No.05

ACCELERATED SOLVENT EXTRACTION UNIT

1 . 0	**Accelerated Solvent Extraction (ASE)**	For air particulate samples collected on glass fiber filter papers & PUF , soil/ sediment / sludge samples for analysis of volatiles & semi volatiles An automated extraction system that uses liquid solvents and/or multi-solvent mixtures to extracts solid or semisolid samples .Temperature/Pressure Range- temperatures (40–200 °C) and pressures (500–3000 psi). (medium size wide mouth containers/vessels to contain samples)
2 . 0	**Automated sequential solvent extraction system**	Automated sequential solvent extraction system with a carousel that holds up to 24 samples and can automatically extract up to 24 samples
3 . 0	**Extraction Tray**	24 cell positions Two rinse positions Automatic home position sensing Can perform multiple extractions per cell
4 . 0	**Collection Vials**	60 mL or 250 mL; vial lids have solvent-resistant septa (TFE-coated on solvent side) 26 position tray insert for 60 mL vials and 19 position tray for 250 mL bottles bottle positions plus two bottle position for rinse/waste collection tray compatible with 250 mL bottles
5 . 0	**Oven**	Auto-seal actuator places cell into oven and returns cell to tray after extraction. Temperature control: up to 200 °C. Vertical cell orientation with flow from top to bottom.
6 . 0	**Cell sizes**	Accommodates 10, 50 and 100 mL cell sizes
7 . 0	**Integrated solvent controller**	Integrated solvent controller allows mixing and delivery of up to three solvents
8 . 0	**Uniform heating and temperature control**	Specialized oven design ensures uniform heating and control of temperature for the extraction cell. This ensures uniform extraction from cell-to-cell and batch-to-batch.
9 . 0	In-line filtration and in-cell clean-up	Flow-through technology allows in-line filtration and in-cell clean-up.

10.0	Pump	Fluid delivery pressure: 10 MPa (1500 psi). Pump flow: 70 mL minute Automatic pressure sensor and pressure relief during heat-up.
11.0	Extrctn Fluid /Sensor	Compatible with a wide range of organic and aqueous solvents ,IR sensors detect fluid level during extract collection.
12.0	Display & Keyboard	Menu operated LCD, 8 × 45 character display method and schedule editor and storage
13.0	Power Requirement	Consumption: 500 VA max. Voltage: 100–120 or 220–240 Vac Frequency: 50/60 Hz
14.0	Pneumatic Requirement	Air at 400–827 kPa (60–120 psi) N_2 at 1034x–1340 kPa (150–200 psi)
15.0	**Installation & Hands on Training**	Installation & Hand on training should be arranged by the supplier on free of cost.

Item Code No.06

AUTOSAMPLER FOR HPLC

1.0	**GENERAL FEATURES**	
1.1	Compatibility with HPLC	Autosampler should compatible with Agilent HPLC model No Agilent Series 1100, with all spares and consumables
1.2	Injection Mode	flushed loop, partial loop and micriliter pickup for excellent reproducibility and no sample loss when dealing with limited sample availability
1.3	Automated derivatization and diluting capability	Flexible format for sample preparation
1.4	Peltier sample temperature control	Integral heating and cooling of sample racks
1.5	Automatic vial sensor system	Detector for vial presence and size
2.0	**ANALYTICAL**	
2.1	Sample Capacity	Standard vial tray: 80 positions for 4.0 ml vials 40 positions for 10 ml vials
2.2	Dispenser Syringe	100 µl, 250 µl, 500 µl, or 1000 µl
2.3	Loop volume	1-5000 µl (interchangeable)
2.4	Headspace Pressure	Built- in compressor
2.5	Wash Solvent	External wash solvent bottle
2.6	Wetted parts in flow path	PTFE, TEFZEL, VESPEL, Glass, Teflon
2.7	Sample temperature control	Built – in – peltier control, 5-50^{0}C, 5-95% relative humidity, non condensing
2.8	Power Requirement	230 ± 10V AC selectable on rear panel
2.9	Communication output	Injection Marker, vial marker, 4 auxiliary outputs, programmable alarm output (relay), stop I/O
2.10	Communication Input	Next injection marker, vial marker, programmable alarm input
3.0	**PROGRAMMING**	
3.1	Methods	10 programmable methods
3.2	Injection modes	Full lop injection, partial loop fill injection, µl pick-up injection

3.3	Injection volumes	1 µl-5000 µl, with 1 µl increments
3.4	Injections per vial	Maximum 10 injections
3.5	Programmable needle wash	Wash between injections, between vials
3.6	Reproducibility	RSD <0.35 for full loop injections RSD <0.5% for partial loop fill injections
3.7	Carry over	< 0.05% with programmable needle wash
4.0	**SPARES & CONSUMABLES**	
4.1	Sample needle assembly	01 No.
4.2	Dispenser syringe 100 µl 250 µl 500 µl	 01 No. 01 No. 01 No.
4.3	Sample Vial with Teflon coated septum	1000 Nos.

Item Code No. 07

ADSORBABLE ORGANIC HALOGEN (AOX) / TOTAL ORGANIC HALOGEN (TOX) ANALYZER

S. No.	Specification	Requirement
1.0	**INSTRUMENT COMPOSITION**	
	Main AOX Module	
	EOX Module	
	POX Module	
	Furnace	
	Scrubber	
	Titration Cell	
	Data Work Station	
2.0	**TECHNICAL SPECIFICATION**	
2.1	System Application	The system should be capable for measurement of AOX, POX, EOX, TX in solid, liquid or gaseous samples.
2.2	System operation	The windows based software should offer easy to use menu control for all vital parts and complete the functions of analyzer i.e. movement of quartz boat, stirrer speed, temperature control etc.
2.3	Operating Gases	Oxygen: 99.996%
		Argon: 99.996%
2.4	Furnace	Tubular Furnace with Heater Capacity of 600-900 watt heating temperature range ambient to 1000 ^{0}C
		Optimum temperature should reach in less than 45 minutes.
		Furnace cooling by continuous fan assisted.
		It should work in controllable temperature range with ± 5 ^{0}C / set temperature.
2.5	Gas Flow Control Meter	System should be equipped with gas flow control meter capable for controlling maximum flow rate 500 ml/min.
2.6	Power Requirement	The complete unit should operate on electric power of 230 ± 10 V AC, 50 Hz.
2.7	Scrubber	Scrubber should be capable of cleaning and drying the gaseous steam coming from the combustion tube to the titration cell.
2.8	Titration Cell	Titration cell should comprise of generator electrode and measuring electrodes.
		The cell should reach full stability within 30 minutes.

		Titration cell capacity not less than 20 ml.
3.0	**DATA WORK STATION**	
3.1	Application Software (Features)	Capacity of regulating / control of all AOX analysis methods (Column or batch method) EOX & POX determinations through computer.
		Software should monitor all system parameters and acquires measurement data and titration curve, allow data and results to be assessed with precision and accuracy.
		Capable of evaluating results concentrations in ppm and ppb or less (ppt).
		Storage of complete analysis data for future reference.
4.0	**COMPUTER SYSTEM**	
	Make	Reputed brand such as HP/Compaq/IBM/Dell
	Processor	Intel Core 2 Duo processor 3.0 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 (Digital)
	CD ROM	52x CD-ROM
	DVD-CDRW	DVD-ROM and CDRW-Combo Drive Max speed 48x24x48
	Ports	2 Serial, 1 parallel and 2 USB front 6 Rear USB2 PS/2 Port, 1VGA integrated Port1line in/out port,
	Key board	104 Key IBM Compatible
	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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
5.0	**Softwares**	Pre-loaded Windows 7.0 Professional operating system with Licensed CD
		MS Office 2000 Standard with media, manual and Licensed CD

		Preloaded Antivirus with latest version along with Licensed CD
6.0	**ANALYTICAL SPECIFICATIONS**	
	Measuring Principle	Combustion and colorimetric titration.
	Parameters	AOX, EOX, POX, TX
	Measuring Range	0.1 to 50 µg Chlorine absolute
	Confirmation of legislation / Protocols	DIN, ISO, EPA, ASTM, CEN, SCAN, NEN, APHA
	Methodology Package	Comprehensive DIN, EPA, SCAN, ISO, ASTM methodology package (CD-ROM) for AOX, EOX, TX in liquid, solid, soil & sludge and other environmental analysis.
	Inaccuracy	Less than 5%
	Average analysis time	5-10 minutes
	Sample Matrix	Liquids, Particulated Samples, Semi Solids and Solid samples.
	Electrolyte	75% HAC.
7.0	**ADDITIONAL ITEMS**	
	Bench Top Shaker	Shaker with Shake table of 18" x 12" to permit agitation of 9-12 flask (250 ml capacity) and load capacity up to 15 kg. Simultaneously giving their contents a circular motion.
		RPM should be between 0 to 300 with digital display and controlled by a knob.
		Attached with a timer can be set 5 minutes interval up to 1 hour or infinite.
	Filtration Assembly	Consisting of complete glass of components like holder funnel, 25 mm base with 25 mm sintered disc, spring clamp, 1 L vacuum flask.
		Consisting of complete glass of components like holder funnel, 47 mm base with 47 mm sintered disc, spring clamp (Steel), 2 Ltr vacuum flask.
	Vacuum / Pressure Pump for Filtration assembly	One Vacuum / pressure pump, material of construction pump head and housing made of cast aluminium, chemically resistant head and diaphragm, oil free, moulded PTFE diaphragm, PTFE/Ryton head, with vacuum / pressure gauge, separate regulators for vacuum and pressure and simple switching, vacuum capacity 24" Hg (610 mm), 30 l/min trace air displacement and pressure capacity 35 psig, free air capacity 0.5 cfm, 230 Volts / 50 Hz AC operated.
	Oxygen & Argon Gases Cylinders	High pressure seamless steel cylinder filled with High purity 99.999% Argon gas, and another oxygen gas with having gas capacity $7m^3$ water capacity 47 liters, cylinders should be ISI marked, conforming to IS:7285. Specification, flat bottom fitted with valve as per

		IS:3224, complete with neck ring and cap, painted as specified under Gas Cylinders Rules, 1981 along with Hydraulic test certificate, ISI Inspection / Test certificate, Explosive certificate from Chief Controller of Explosives, Nagpur India as per BIS Standard with 47 liter cylinder: Oxygen – One cylinder filled Argon – One cylinder filled.
	Gas regulator for Oxygen & Argon	Oxygen and Argon gas regulators: Best quality double stage, Static pressure regulators fitted with two pressure gauges, having inlet range 0-280 kg/cm^2, Outlet range 0-16 kg/cm^2, made of stainless steel Oxygen – One Argon – One.
	Polycarbonate Membrane Filters for AOX	10 Packets of polycarbonate membrane filters (100 membrane in each packet) with 0.4 µm pore size) for 25 mm with no or least chloride content.
		10 Packets of polycarbonate membrane filters (100 membrane in each packet) with 0.4 µm pore size) for 47 mm with no or least chloride content.
	Quartz frits of various diameter for filtration	Optional
	Activated Carbon GR Grade	Suitable for batch method with 100-200 mesh size, having no or very low apparent halide background (6 x 10 gm).
	p-chlorophenol Standard Solution	200 ppm
	Potassium Chloride	200 ppm
	Manual	Operation and Maintenance Manual for each unit.
	Electrodes	Two sets of generating electrode and two sets of measuring electrodes with necessary wire and connectors.
	Septa Kit	One set
	Tool Kit	One set
	Gas Purifier	High capacity carrier gas purifier for Oxygen and Argon
	Temperature Sensor Probe	4 Nos. With each furnace
	Micro Pipette	50 µl fixed volume - two
		100 µl fixed volume – two
		1000 µl fixed volume - two
	Syringe	1 to 5 µl – 5 numbers
		1 to 10 µl – 5 numbers
		1 to 25 µl – 5 numbers
	Quartz Boat and Combustion	Two quartz boat and two combustion tube (one each for

	tube	AOX & EOX) in addition of one each to be provided with the system.
	Scrubber	One additional set.
8.0	**WARRANTY**	The supplier or the Indian representative should give performance warranty for three years from the date of the completion of the satisfactory installation of the instrument. AMC amount for next two years also to be quoted after warranty.
9.0	**OPERATION AND MAINTENANCE TRAINING**	One week of informal on-site training on the use and operation of instrument completion of installation followed by compulsory one week training to two scientists on software training operation maintenance and trouble shooing aspects of the instrument at its application laboratory in India. The supplier has to impart on-site operation training at the time of installation followed by Complimentary (all expenditure inclusive) one week training to two scientists on application, Routine maintenance and software training at their application laboratory in India.
10.0	**GENERAL CONDITIONS OF SUPPLY**	1. 1.The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The principal should provide a certificate that they will provide the spares in future for at least ten years. 5. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 6. 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. 7. The bidder should furnish the information on past supplies and their satisfactory performance.

Item Code No.08

ATD TUBE CONDITIONER

1.	General	Specially Designed Microprocessor based Thermal Desorber Tubes Conditioning Oven to remove any pollutants / impurities remaining in it before or after analysis for use in Perkin Elmer Thermal Desorber System (Turbo matrix ATD). Its specifications are as under
2	Provision for Tube	It should be microprocessor based. Provision to condition total eighteen extraction tubes (18 no) at a time should be provided. Its design should be such that six stainless steel adaptors to be provided for one single stainless steel bar. Total three bars are provided
3	Compatibility to the Tubes	There should not be any conventional nut-ferrules arrangement for these adaptors, but with the help of 'O' ring & nut, Perkin Elmer Thermal Desorber Tubes should get fitted to adaptors. It means that there should not any damage to tubes while fitting
4.	pneumatics	Necessary pneumatics which includes single inlet miniature pressure regulator and separate flow controller for each bar (total three flow controllers) should be provided
5	Temperature limit	Temperature limit upto 350°C with temperature protection & Control should be provided
6	Separate provision for conditioning single packed column	The Separate provision for conditioning single packed column (S.S./Glass) / capillary column including separate miniature pressure regulator with flow controller to be provided.
7	Stand for Capillary Column mounting	Stand for Capillary Column mounting, necessary adaptors for 1/8", ¼" columns to be supplied.
8	Spares Kit	Spares Kit with Extra Nuts (25 nos.), 'O' rings (50 nos.) to be supplied with the system.
9	Warranty ,Installation training & operational Manual/literature	2 Year Warranty & operational Manual/literature , Free of Cost Installation & on job training to use the system to the CPCB official

Item Code No.09

D. **Air Sampling Pump**

Diaphragm pump/sampling pump operated on 12V DC with suitable adopter for gaseous sampling. The operational flow range is 0 to 3 litre/min.

Item code No.10

Balance Precision

Readability	0.01 mg in the range of 40 to 60 grams. 0.1 mg upto at least 200 grams
Weighing Range	60 grams for 0.01 mg and 200 grams for 0.1 mg
Tarring Facility	Entire range
Repeatability	0.02 mg upto 60 grams, less than 0.1 mg upto 200 grams for 0.1 mg accuracy weighing
Sensitivity Drift	Maximum ± 2 ppm / ^{0}C
Display	LCD
Calibration adjustment	Built in Motorized weight
Power Supply	Should operate on 230 ± 10 volts, 50 Hz, AC
Optional	Standard weight of E1 Class traceable to National / International Standards (50 grams & 100 grams)

The instrument should be supplied with Instruction / operation / maintenance manual and dust cover.

Item Code No.11

BALANCE ANALYTICAL (Single pan)

S. No.	Description	Requirement
1.	Readability	0.01 mg in the range of 40 to 60 gm and 0.1 mg up to at least 200 gm.
2.	Weighing range	60 gm for 0.01 mg and 200 gm for 0.1 mg.
3.	Taring facility	Entire range
4.	Reproducibility	0.015 mg up to 50 gm, less than 0.05 mg up to 200 gm for 0.1 mg accuracy.
5.	Sensitivity drift	Max. ± 0.00015%
6.	Display	LCD
7.	Calibration	Built in and 2 ×100 gm weight
8.	Power supply	Should operate on 220 ± 10 Volts, 50 HZ AC
9.	Other requirements	Should be provided with operational manual and dust cover
10.	Optional calibration	E-1 class stainless steel weights with tolerance ±5 weights PPM at 1 kg level
11.	Weights required	0.1 mg, 1 mg, 10 mg, 100 mg, 1 gm, 5 gm, 10 gm, 50 gm, 100 gm and 200 gm.
12.	Other requirements	The instrument should be supplied with instruction / operation / maintenance manual and dust cover
		Calibration certificate from NIST certified (or equivalent) Laboratory should accompany the analytical balance.

Item Code No.12

BALANCE MOISTURE

S. No.	Description	Requirement
1.	Weighing capacity	Upto 80 gm or more
2.	Accuracy	0.1 mg
3.	Readability	0.0001 gm / 0.001%
4.	Reproducibility	± 0.1% up to 5 gm and ± 0.02% for above 5 gm
5.	Sample Heating Module Temperature range	30 – 200^{o}C
6.	Temperature control	1 ^{o}C increments
7.	Access to sample changer	Motorized cover
8.	Display modes	% Moisture, % dry weight, % ratio, residue (g or g/kg), weight loss etc
9.	Calibration	Built in and also external calibration with 50 gm ASTM Class 1 weight
10.	Power supply	Should operate on 220 ± 10 Volts, 50 HZ AC
11.	Data Interface	RS 232 interface
12.	Optional accessories	Printer, RS232 cable, RS232 to USB converter kit, Data transfer software with original CD, temperature adjustment kit, and disposable Aluminium dishes (2000 Nos.).
13.	Other Requirements	Dust cover to be supplied
		To be supplied with Instruction / operation / maintenance manuals.
		Original Calibration Certificate from NIST certified (or Equivalent) Laboratory should accompany the moisture balance.
14.	Warranty	**3 years Comprehensive Warranty from the date of installation.**

Item Code No.13

BOMB CALORIMETER FOR DETERMINATION OF CALORIFIC VALUES OF FUELS AND SOLID WASTE

S. No.	Description	Requirement
1.	Bomb Calorimeter Method	Isoperibol
2.	Range	Up to 8300 calories per charge
3.	Precision	<0.05% RDS
4.	Resolution	1BTU/lb; 0.1 cal/gm; 0.001 MJ/Kg; 0.1 Kcal/100gm
5.	Analysis time	8 mins(approx.)
6.	Corrections	Acid, sulphur, ash, fuse wire, cotton thread, moisture etc
7.	Temp. measuring resolution	0.01^0C
8.	Gas requirements	Oxygen 450 PSI (31 bar) max.
9.	Electrical requirements	230 ± 10 Volts, 50Hz , AC single phase
10.	Other requirements:	Calorimeter should be equipped with inbuilt printer
		Provision should be there to safely handle waste materials
		To be provided with service manual and dust cover
		Digital bomb calorimeter shall be supplied complete with following components
		S.S. Bomb with Test Certificate, Calorimeter Vessel with Bomb Support, Water Jacket with Calorimeter Vessel support with proper Insulation, Combined Lid for Water Jacket & Calorimeter Vessel, Connecting Wires (Electrical), Connecting Tubes for filling Oxygen in the Bomb vii. Spanner set for Oxygen Tube Connection, Pressure Gauge on stand & Bomb Lid stand, Safety Device, Electronic Firing Unit & Digital Beckmann Thermometer(along with calibration certificate) with Printer, Ignition Wire 50 meters, Cotton Reel 50 meters, Bomb 'O' Ring, Valve Body 'O' Ring, Stirrer Belt, Schrader Valve, Benzoic Acid of Known Calorific Value(along with calibration certificate), Pellet Press , Valve Key , Gas Releasing Pin, Gas Releasing Valve, Oxygen Control Valve, Crucible (quartz or Stainless Steel), Bursting Discs for Safety Device, Stirrer Motor, Hook for Lifting Bomb etc.

Item Code.14

Binocular Compound Microscope with Digital Camera Specification

Objectives:	Parfocalled, parcentered, achromatic
Functions:	Count, capture, measure, record, amalgamate, Internet meeting
Illuminator:	20 W halogen with rheostat
Stage dimensions:	145 mm x 135 mm, 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:	230 VAC, 50 Hz

Item Code No.15

BTX MONITOR / ANALYSER

1.0 GENERAL

GENERAL	A compete monitor / analyser system including **automatic sampling** (pump etc.), detector, calibrator, computer hardware and **software for data display, acquisition(in excel format), data processing and instrument control** for selective determination of volatile compounds in ambient air optimised for **Benzene, Toluene, Ethyl benzene and o, m, p -Xylenes**. Compatible to power supply (voltage 230 volts ± 10volts AC and 50 Hz ± 3%). Continuous unattended measurement of individual BTX samples. **Software** should have inbuilt facility for customized averaging period(1hr/4hr/8hr/12hr/24hr/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.

2.0 TECHNICAL SPECIFICATIONS

2.1	**Automatic Sampling (Monitor)**	Analytical instruments/pump (single stage membrane) monitoring for 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 liter 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	**Sample Trap**	Light weight stainless steel mini trap containing selective adsorbents (activate charcoal or carbotrap or tenax G.R. or chromosorb 106), integrated heating element and temperature sensing by thermocouple, operating temperature range 40-200^{o}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 ^{o}C or so that high resolution, stability and reproducibility is obtained for analyte of interest (BTEX).
2.4 Columns	Approx **5 m precolumn** (for back flushing) followed by an approx. **10 m - 50 m 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 WAX52 / DB5 / 624 or equivalent), film thickness between 1 and 2 μm . Should guarantee high resolution, stability and reproducibility.

2.5 Detector

Photo Ionisation Detector **(PID)**

PID Lamp eV	**10.6eV**
lowest detector limit	**0.1 μg/m^3 (0.03 ppb) for Benzene**
Detector Diagnostics	PID sensitivity sensor / check facility

2.6 OPERATING CONDITIONS

Temperature Range	**5-35^{o}C or more**
Concentration Range	**1-1000 ug/m3** (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 leve**l 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 valves 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). **System stability** (temperature and sample flow). **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	**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 microgram / m^3 or ppb (selectable) & averaging etc). **Software** should have following features In-built facility for customized averaging period(1hr/4hr/8hr/12hr/24hr/monthly/annual mean values), **Data presentation / graphical & statistical processing & data transfer & storage facility to Excel** / access. **Communication software with protocol compatible to communicate & transfer data**

	from BTX monitor to central computer /website through modem (preferably including sample chromatogram**).** System should have **remote access to BTX monitor**. Resident programme 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 indications. **Updation of response factors automatically after calibration run. Updation of retention times after every sample analysis. Auto tune facility.** Raw data storage capacity without erase minimum for three month or more.
4.0 SPARES FOR 3 YEARS	**One set of each** including columns, filters / traps for removal of dust & unwanted impurities (moisture / hydrocarbon); **spare parts** / electronic cards and sufficient septas, ferrules, dust filters, teflon tubing etc & other **consumables** usually get exhausted during first **3 years** of operation apart from one set as essential part with main instrument.
5.0 Installation & Training	Free of cost Installation & 0ne week Training to concerned Scientists at CPCB

Item Code No.16

COMBUSTION GAS ANALYSER (flue gas analyser)

1.	Gases to be measured	:	CO, O_2, CO_2, SO_2, NO, NO_2, HC and combustion efficiency
2.	Sensors	:	IR or Electro-chemical Sensors with high accuracy and life span of 3 to 5 years
3.	Gas Flow	:	1 to 2.5 litre /min
4.	Temperature Measurable	:	600^{o} C
5.	Operating Temperature	:	0-50 ^{o}C
6.	Power Supply	:	Battery operated along-with built in charger on Mains 230 V $\pm$ 10 VAC, 50 Hz $\pm$ 3%
7.	Flue Gas Probe	:	Stainless Steel Shaft with rubber handle
8.	Pre Programming	:	For Natural Gas, light Oil, heavy Oil, LPGs, Propane, Butane, Coke, Coal etc.
9.	Parameter wise Specification		Please see Annexure - 'A'
10.	Software/Operator	:	Easy to handle Key Board operated and user friendly. Data format transferable to user software.
11.	Weight	:	Light Weight / Portable
12.	Certificate	:	Calibration and certificate of approval from recognized agency like EPA, TUV be provided.
13.	Documents	:	Instruction manual for operation. Circuit details for each electronic card for repair and maintenance.

ANNEXURE - 'A'

Parameter	Resolution	Accuracy	Range
Temperature Measurement Flue Temperature	0.1°(C/F)	0.1° C ± 0.3% of reading	0.1°C Use high temperature probe for gases > 600° C/1112° F
Inlet Temperature	0.1°(C/F)	0.1° C ± 0.3% of reading	0-600 °C
Gas Measurement Oxygen (O_2)	0.1%	-0.1% + 0.2%	0-25%
Carbon Monoxide (CO)	1 ppm	±20 ppm < 400 ppm 5% of reading < 2000 ppm ±10% of reading >2000 ppm	0-10,000 ppm
Carbon Monoxide (CO)	0.01%	±5% of reading from 0.1% to 10%	0-10%
Nitric Oxide (NO)	1 ppm	± 5 ppm < 100 ppm ± 5% of reading >100 ppm	0-5,000 ppm
Nitrogen Dioxide (NO_2)	1 ppm	± 5 ppm < 100 ppm ± 5 ppm < 100 ppm	0-1,000 ppm
Nitrogen Dioxide (NO_2)	5 ppm	± 10 ppm < 500 ppm ± 5% of reading >500 ppm	0-10,000 ppm
Sulphur Dioxide (SO_2)	1 ppm	± 5% of reading >100 ppm	0-10,000 ppm
Pressure	0.01 mbar/kpa	±0.05% Full Scale	0-150 mbar
Carbon Dioxide (CO_2)	0.1%	±0%	0-Fuel Value
Efficiency	0.1%	±1%	0-100%
Hydrocarbon (HC)	0.01	±5% of reading	0 – 10,000 ppm

Item Code No.17

CO- HC ANALYZER (EXHAUST)

01.	Measuring method	:	Non Dispersive Infrared (NDIR) method
02.	Measurable components	:	Carbon monoxides (CO) and Hydrocarbons (HC) in Automobile exhaust gases
03.	Measuring range	:	CO 0 - 5% and 0 - 10% HC 0 - 500 ppm , 0 - 2000 ppm, and 0 - 10,000 ppm (as normal hexane)
04.	Reproducibility	:	within 1% of full scale
05.	Stability	:	within 1% of full scale/ hour at constant temperature
06.	Instrument deviation	:	within 1% of full scale
07.	Accuracy for range selection	:	CO measurement within 1% of full scale HC measurement within 2% of full scale
08.	Accuracy	:	Within 2% of scale at constant temperature
09.	Response time	:	90% response within 10 second with 5 meter sampling line
10.	Drift	:	Zero & span drift ± 3% FS (3 Hr) or less
11.	Calibration	:	By span gas. Built in calibration check
12.	Accuracy of span	:	Within ±1-2% of the concentration stated
13.	Warming up time	:	Within 30 minutes
14.	Interference effect from other gas	:	Less than 0.2 unit
15.	Ambient Conditions a) Temperature b) Humidity	:	0 - 50°C Less than 95% R.H
16.	Display	:	Bright LED / LCD
17.	Printer	:	Built in or separate
18.	Power supply	:	220 ± 10 V AC; 50 Hz ± 3%
19.	Accessories	:	For two years: filter paper for fine and course Particles (two packets of 100 each), calibration gas (two Cylinders), spares and consumable.

Item Code No.18

DISSOLVED OXYGEN METER (HANDHELD TYPE)

Features	:	Water tight, impact resistant and corrosion resistant housing. Mains (230 ± 10 volts/50 Hz AC) through charging transformer and battery (rechargeable) operated, Built-in storage pocket for Dissolved Oxygen cell, stand / carrying handle and shoulder strap.
Control	:	Microprocessor with functions automatically controlled
Modes	:	mg/l - % - ^{0}C
Display	:	mg/l, % : LCD 3½ digit; ^{0}C: 3½ digit, both atleast 10 mm high.
Measuring range	:	0.0 to 50 mg/litre; % saturation 0 to 600%
Accuracy	:	0.5% ± 2 digit of measuring value (0.01 level)
Temperature compensation	:	0 to 50 ^{0}C
Atmospheric correction pressure	:	Automatically by integrated pressure sensor
Salinity Correction	:	0 to 40% salinity
Temperature measurement range	:	0 to atleast 50 ^{0}C
Accuracy	:	0.2 K ± 2 digit.
Ambient temperature	:	upto 50 ^{0}C
Calibration	:	Should be automatic and precise in water vapour saturated air / in water, saturated with oxygen.
Oxygen Electrode	:	Should be a membrane covered amperometric oxygen electrode, suitable for the measurement of DO upto 2 m depths, should be zero current free and pressure resistant. Should be provided with calibration and maintenance kit and storage holder.

Additional item : System should be complete in all respects for D.O. measurements, and should be provided with Funnel set, stirring accessory, Fixing ring, operational manual, dust cover, power cable, 2 meter electrode cord, charger for Battery (230 ± 10) V 50 Hz and plug with spare and maintenance parts for 2 years of continuous operation

Item Code No.19

ELEMENTAL (CHNS) ANALYZER

Sl. No.	Specification	Requirement
1.0	**MACRO ELEMENTAL ANALYZER SYSTEM**	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	Application	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 capable to analyze solids, liquid, liquid volatile samples and gases.
1.2	Selectable operation mode	Measurement of CHNS, CHN, CNS, CN, N, S, Traces sulphur and O-TCD, O-IR, Cl separately.
1.3	Sample Combustion System	Should have atleast two furnaces with independent temperature control up to 1200 ^{0}C for each furnace.
		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.
		The furnace system should have 10 years warranty with certificate from manufacturer.
1.4	Analytical range	0 – 100% for all elements with the capability of measuring following absolute weight:
		Carbon (C) 0 – 50 mg or better
		Hydrogen (H) 0 – 3 ng or better
		Nitrogen (N) 0 – 15 mg or better
		Sulfur (S) 0 – 6 mg or better
		Oxygen (O) 0 – 6 mg or better
		Chloride (Cl) 1 – 50 µg or better
1.5	Minimum Detection Limit	<50 PPM with TCD
1.6	Standard Deviation	<0.1% of absolute
1.7	Analysis time	Self optimizing depending on element content and weight, but less than 8 minutes in any case.
1.8	Separation system	Adsorption desorption principle for separation of gases using multiple columns with independent temperature control for each column.
1.9	Analytical Gases	Instrument should run with Nitrogen, Argon and Helium as carrier gas. Microprocessor control for gas flow control.
1.10	Detector system	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
2.0	**AUTO SAMPLER**	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.
3.0	**CONSUMABLES**	Consumables to be supplied should be sufficient for 3000 sample analysis.
4.0	**REFERENCE STANDARDS**	Pure chemical reference standard must be supplied with the system.
5.0	**COMPUTER SYSTEM**	
	Make	Reputed brand such as HP/Compaq/Dell/IBM
	Processor	Intel Core 2 Duo processor 3.0 GHz or above
	FSB	800 MHz or above
	RAM	4 GB (upgradeable to 8 GB)
	HDD	500 GB ultra DMA or higher HDD (7200 RMP),
	Monitor	21" TFT – LCD Flat Panel Colour Digital
	DVD-Writer	32X DVD +/- RW Dual Layer Write capabilities
	Ports	2 Serial, 1 parallel, 2 front USB, 6 Rear USB, 2 PS/2 Port, 1VGA integrated Port, 1 line in/out port
	Key board	104 Key IBM Compatible
	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 LaserJet Colour Printer 1200 x 1200 dpi 12 PPM color
5.1	Software	Pre-loaded Windows XP Professional or latest operating system with Licensed CD compatible with application software
		MS Office 2007 Professional with media, manual and Licensed CD compatible with application software

		Preloaded Antivirus with latest virus definition code along with Licensed CD compatible with application software
5.2	Application Software	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.
6.0	**SAMPLE PACKING**	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.
7.0	**OPTIONAL ITEM (Microbalance)**	Microbalance capable of direct transferring the data to the analyzer
	Operation	Balance opération through bright touch screen
	Control	Hands free infrared controlled opening and closing of draft should:
	Weigh range	Weighing range : upto 6100 mg
		Resolution: 0.001 mg
		Repeatability: 0.8 to 0.9 microgram
		Linearity: ± 2 – 4 µg
8.0	**ADDITIONAL ITEMS**	Oxygen analysis kit.
		Chlorine analysis kit.
		Kit for trace sulfur analysis using IR detector
9.0	**OPERATION AND MAINTENANCE TRAINING**	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.

10.0	**WARRANTY**	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.
11.0	**GENERAL CONDITIONS OF SUPPLY**	1. The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The principal should provide a certificate that they will provide the spares in future for at least ten years. 5. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 6. 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. 7. The bidder should furnish the information on past supplies and their satisfactory performance. 8. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above.

Item Code No.20

I. Certified filters (for spectrophotometer)

Absorbance filters (0.25, 0.5, 1.0, 1.5 A) and Wavelength filters (Holmium and Didymium) with certificate traceable to national/international agency.

Item Code No.21

GAS GENERATORS (COMBINED N2 & ZERO AIR) FOR GC/GC-MS

PRINCIPLE SPECIFICATIONS	N2 SPECIFICATIONS	ZERO AIR SPECIFICATIONS
Application & Purity	For Use in GC, GC-MS for analysis of PAHs/BTX /NMHC & other VOCs in Environmental Samples	For Use in GC, GC-MS for analysis of PAHs/BTX /NMHC & other VOCs in Environmental Samples
General & Purity	~99.999% pure, GC grade Almost free of most reactive anthropogenic pollution (NO, NO2, SO2,CH4& Non-Methane hydrocarboné, etc.),	~ 99.999% pure , GC grade Almost free of most reactive anthropogenic Pollution (NO, NO2, SO2, CH4& Non-Methane hydrocarbons, etc.),),
Capacity	200ml/min at 5 kg/cm2	1500ml/min at 5 kg/cm2
Capacity (Optional)	500ml/min at 5kg/cm2	4000ml/min at 5 kg/cm2
Moisture	< 2 ppm	<2 ppm
Oxygen	< 5 ppm	
Total Hydro Carbon (THC)	< 0.3 ppm	<0.3 ppm
CO & CO2	< 2 ppm	<2 ppm
Micron particulates	< 0.01µ	<0.01µ
Method of Purification	Pressure Swing Adsorption (PSA) & Depressurisation	Pressure Swing Adsorption (PSA) & Depressurisation
Room Temperature	5°C-25 °C	5°C-25°C
Start up time	2 hr/ programmable by timer	10 min
Electrical requirements	230 V AC, 50 Hz, 1 ph , 5 Amp	
Size of Generator without compressor (in mm) (approx)	740 H x 415W x 600 D or more compact	

Net weight of generator (in kg) (without compressor) (approx)	Upto 50 kg or less	
Net weight of generator (in kg) (with compressor) (approx)	Upto 60 kg or less	
Sound Proof Compressor Box	Built in compressor Economy mode option - Enabling the Compressor to switch off when nitrogen supply is not required	With oil free air compressor preferably with heat resistant & silencing cabinet. Noise level for Air Compressor should be ~ 65 dBA with a max pressure of 120 psi and max current 7.5 A.
Alarm/Indicator	Audible and visual maintenance indicator	
Accessories - Operation & maintenance Manuals, Toolkit	Should be provided with a list & quantity of item	
Spares & Consumable – for two year trouble free Operation & maintenance	Should be provided with a list & quantity of items	
Warranty	Minimum for two years free of cost repair maintenance including spares consumables necessary for operation/working of the gas generator trouble free without down time.	
Installation & Training	Free of cost at CPCB	

Item Code No.22

GAS CHROMATOGRAPH - ECD-FPD

(OPTIONAL FID/TCD/NPD)

1.0	**INSTRUMENT COMPOSITION**	
	Gas Chromatograph	One set
	Capillary Column with accessories	One set each of specified columns
	ECD Detector	One set
	FPD Detector	One set
	FID Detector	One set
	GC Data Station	One set
	Auto Sampler	One set
2.0	**TECHNICAL SPECIFICATION**	
2.1	GC System	Computer controlled Data Workstation based computer compatible (GC). Built in Diagnostics and Comprehensive Self-Testing
2.2	Oven temperature programming ramps	At least 6 ramps and seven plateau
2.3	Heated zones	At least six including Oven, Two Injectors, Two Detectors and One Auxiliary; if FID, then three Injectors, two Detectors.
2.4	Display	Functional keyboard with four line alphanumeric display
		Display include temperature and pressure / flow parameters, type of carrier gas, carrier gas column pressure, flow rates, split flow, detector gas flow rates and all detector parameters including method and Auto sampler information.
2.5	Memory protection	Power fail memory protection,
2.6	Storage facility	Unlimited methods and automated sequences.
2.7	Networking and data communication	LAN interface
2.8	Method editing facility	Non-active methods should have editing facility
2.9	System leak check	Unattended and automated system leak simultaneous check

2.10	Injector / Detector mounting	2 Injectors and 2 detectors simultaneous mounting and capable to hold 100 µm to 530 µm different diameter capillary to mega bore columns
2.11	Purge system	Effective Gas Saver and Septum Purge System
2.12	Injection facility	Automatic and Manual Injection both
3.0	**COLUMN OVEN**	High performance, large capacity oven accommodating at least two capillary column
	Volume	More than 10 Litres
	Operating temperature	Maximum 4 °C above ambient to 450 °C
	Temperature set point	± 1°C
	Temperature Stability	± 0.01°C for 1°C ambient change
	Ramp rate	Upto 120°C / minute
	Heating time	Maximum 8 mins (50 – 400 ^{0}C)
	Cooling time	Maximum 5 mins (400 – 50 ^{0}C)
	Facility for	Column bleed compensation
	Vent temperature control	Microprocessor control in automatic sequence and fast
4.0	**FLOW / PRESSURE CONTROLLER**	
4.1	Electronic Pneumatics Control (EPC) channels	Inlets, detectors, or auxiliary gases through Data Processor with Screen display of pressure / flow
4.2	Pressure adjustment	0.01 psi increment
4.3	Compensation (pressure/temp.)	Atmospheric pressure compensation for altitude and ambient temperature variations
4.4	Pressure / flow programming ramps	Two or more
4.5	EPC setting facility	Computer work station system
4.6	EPC sensor	Inlets and detectors for all gases (carrier gas, make up gas and support gas in detectors, and carrier and split vent gas in inlets)
4.7	Flow/pressure set points	On each inlet on detector parameter screen
4.8	Flow sensor for control and storage of	Split ratio in split / splitless and PTV injector

5.0	**INJECTOR**	Two injectors mounting, one split / splitless injector one PTV (Programmable Temperature Vaporizer)
5.1	Protection	Heater, Temperature Sensor and protection from overheating
5.2	Capacity	To hold all types and all sizes of capillary columns and mega bore columns as well
5.3	Purge adjustment	Efficient Septum Purge system, purge time adjustable
5.4	Compatibility	Solid Phase Micro Extraction (SPME) system
6.0	**SPLIT / SPLITLESS INJECTOR**	Forward inlet pressure programming with an optimized modular, uniform thermal profile for split / splitless injections
6.1	Flow control	Electronic pressure / flow control
6.2	Temperature control	Upto 400°C for split/splitless injector with 1°C increment
6.3	Solvent / backflush facility	Solvent Rejection and backflush
7.0	**PTV INJECTOR**	
	Injection volume	Large volume splitless injections
	Pressure/flow control	Electronic pressure/flow control
	Operating temperature	Upto 400 °C
	Programme ramps	Atleast 3 temperature programme ramps
	Solvent Back flush facility	Solvent rejection and back flush
8.0	**DETECTORS (COMPULSORY)**	Detector combination would be ECD-FPD
	Temperature range	Upto 400 °C
	Detector mounting	Two detectors should be mounted; one detector to be standby.
	Pressure control	EPC and electronic on/off facility for all detector gases
	Auto zero & protection	Detector with make up gas and automatic zeroing facility and overheat protection
8.1	**ECD Detector**	Coaxial design based on Ni^{63} Source
	Linear Dynamic Range should be	Better than 10^4
	Departure from linearity should be	Less than ±1% for the entire range

	Operating temperature (maximum)	400 °C
	Pressure / Flow control	Electronic pressure/flow control
	Minimum Detection Limit (MDL)	Less than 10 fg/sec of Lindane
	Makeup Gas	Argon / 5% Methane or Nitrogen
8.2	**FPD Detecto**r	Electronic pressure control, Wavelength version with detector of phosphorous & sulfur with filter change.
	Temperature operating limit	Upto 400 ^{0}C
	Dynamic range	Better than 10^6
9.0	**Optional Detecto**rs	Optional detectors (TCD / NPD / FID) to be selected as per requirement.
9.1	**Thermal Conductivity Detector**	Thermal conductivity detector with excellent sensitivity to all compounds excluding the carrier gas, capillary column compatible, filament with automatic protection.
	Minimum Detectable limit	400 pg tridecane / ml with helium carrier
	Sensitivity	9 µV / ppm nonane at 160 mA at the bridge with detector temperature of 100 ^{0}C.
	Maximum temperature	400 ^{0}C in 1 ^{0}C increment.
	Linearity	>10^5 ± 5% entire range
	Make up gas	0 to 12 ml / min
	Reference gas	0 to 100 ml / min
	Standard EPC	For He, H_2, Ar or H_2 matched to carrier gas type.
9.2	**NPD Detector (FTD Detector)**	NPD detector with direct heating with induction current.
	Minimum Detection limit	< 0.4 pg N/S, < 0.2 pg P/S with Azobenzene / Malathion / Octadecane mixture
	Selectivity	25000 to 1 g N/g C, 75000 to 1g P/g C with Azobenzene / Malathion / Octadecane mixture
	Dynamic range	>10^5 N, > 10^5 P with Azobenzene / Malathion mixture
	Operational Temperature Range	~ 400 ^{0}C in 1 ^{0}C increment
	Standard EPC	Standard EPC for three gases Air – 0-200 ml/min; Hydrogen 0-30 ml/min; Makeup gase 0-100 ml / min

9.3	**FID Detector**	Electronic pressure control
	Temperature operating limit	Operating temp. (maximum) should not be less than 450 ^{0}C
	Detection	Flame out detection facility
	Ignition	Auto Ignition facility
	Dynamic range	Linear dynamic range < ± 10%; 10_7 with N_2
10.0	**AUTOSAMPLER**	
	No. of sample vial	Capable of accommodating minimum 100 nos. vials.
	Syringe capacity	Upto six different syringe capacity
	Washing solvent	Upto four different washing solvents in 4 ml vials
	Injection port access	Access three injection ports without requiring an additional tower
	Internal standard calibration	Automated internal standard calibration and "sandwich" technique
	Programming	Completely programmable from Workstation software
11.0	**COLUMNS**	Bonded phase, fused silica capillary column with (one each)
		DB-1701 or equivalent 30 m x 0.25 mm ID having x 0.25 µm film thickness Film - 14% cyanopropyl phenyl and 86% dimethyl polysiloxane co-polymer column
		Ultra-125 m x 0.2 mm ID having 0.33 µm film thickness Film - 100% dimethyl polysiloxane
		HP-5-MS 60 m x 0.25 mm ID with 0.25 µm film thickness ultra low bleed column Film - 5% di-phenyl and 95% dimethyl polysiloxane copolymer column
		Ultra-225 m x 0.2 mm ID having 0.33 µm film thickness, Ultra low bleed column Film - 5% diphenyl and 95% dimethyl polysiloxane co-polymer column
12.0	**DATA STATION**	
12.1	**Licensed Application Software**	With basic programming facility, Accurate and Reproducible Integration
	Data acquisition	Atleast three simultaneous chromatograms and data acquisitions Reintegration Report Multilevel Calibration Baseline Correction Area Calculation Background Subtraction and Custom/tailored report format facility should be in-built
	Memory Protection	Battery back up for memory protection

	Data export / import	Data Export/Transformation to data base software i.e., Excel and Access should be supplied with the system
	Quality control	Software for Quality Control Protocols
	Data display / handling	Software for data display, handling, data export/import and reporting
12.2	**Computer System**	
	Make	Reputed brand such as HP/Compaq/IBM/Dell
	Processor	Intel Core 2 Duo processor 3.0 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 (Digital)
	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, 1VGA integrated Port1line in/out port,
	Key board	104 Key IBM Compatible
	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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
12.3	**Softwares**	Pre-loaded Windows 7.0 Professional / Windows XP Professional latest version operating system with Licensed CD should be compatible with operational software.
		MS Office 2000 Standard with media, manual and Licensed CD
		Preloaded Antivirus with latest version along with Licensed CD
13.0	**ACCESSORIES**	
	Operation / maintenance manual	Operation and maintenance manual
	Application Notes	Application notes in (CD) for pesticides, PAHs, PCBs, PCPs, VOCs, THMs, Dioxins & Furans in environmental samples
	Service manual	Service manual
	N_2 Gas Regulator	N_2 gas complete stainless steel regulator (2 stage) with necessary tubing and connectors (1 No.)
	Hydrogen gas regulator	H_2 gas complete stainless steel regulator with (2 stage) with necessary tubing and connectors (1 No.)
	Zero air regulator	Zero air complete stainless steel regulator (2 stage) with necessary tubing and connectors (1 No.)

	Tool kit	One set of required tools
	Gas Cylinders	H_2, N_2 and Zero Air with purifier and moisture trap
		High pressure stainless steel cylinder filled with high purity 99.999% gases. Gas capacity 7 m^3, water capacity 47 liters. Cylinder should be ISI marked conformed to IS-7285 specifications, Flat bottoms fitted with valve cap pointed as specified under gas cylinder as per IS-3224 complete with neck ring and cylinder cap: Hydrogen - one Nitrogen - one Zero - one
14.0	**SPARES & CONSUMABLES**	Spares and consumables sufficient for two years trouble free operation should be included in the offer and supplied with each system
	Column nut	2 Nos.
	Washer	2 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 (5 µl)	4 Nos.
	Micro syringes for manual injection (10 µl)	4 Nos.
	Copper tube cutter	1 No.
	Auto sampler vials (2 ml)	500 Nos.
	Auto sampler septa and caps	2000 Nos.
	Auto sampler spare syringes	1.0 µl – 5 Nos. 5.0 µl – 5 Nos. - additional
15.0	**WARRANTY**	Comprehensive warranty with spares for three years from the date of installation of the instrument should be covered. AMC amount for next two years also to be quoted after warranty.

16.0	**OPERATION AND MAINTENANCE TRAINING**	The supplier has to impart on-site operation training at the time of installation followed by Complimentary (all expenditure inclusive) one week training to two scientists on application, Routine maintenance and software training at their application laboratory in India.
17.0	**GENERAL CONDITIONS OF SUPPLY**	1. 1.The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application software's to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 5. 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 atleast 2 years as on the date of bid opening. 6. The bidder should furnish the information on past supplies and their satisfactory performance. 7. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above. 8. Notwithstanding anything stated above the purchaser 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 purchaser. 9. 80% amount of the bill will be released at the time of shipment. The balance 20% will be released after satisfactory commissioning of the instrument. This amount will be released and bank guarantee of equivalent amount has to be provided by the supplier till end of warrantee period.

Item Code No.23

GAS CHROMATOGRAPH WITH MASS SPECTROMETER (GC-MS)

1.0	**INSTRUMENT COMPOSITION**	
	Gas Chromatograph with accessories	One Set
	Injectors	Two Sets, one for manual injections and another with Auto sampler
	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
	ECD Detector with accessories	One set
	Auto Sampler	One set
2.0	**TECHNICAL SPECIFICATIONS**	
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 Keyboard of the Instrument
2.5	Injector / Detector mounting	2 Injectors and ECD Detector.
2.6	Capillary Column mounting	Capable to hold two capillary columns of different diameter (100 µm to 530 µm)
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
3.0	**INJECTOR-1**	Split/splitless Injector (for Manual Injection)
3.1	Constituents	Modular Injector with Heater, Temperature and Pressure Sensors
3.2	Modes of Injections	Splitless and Split Injections
3.3	Column compatibility	100 to 530 mm ID Capillary Columns
3.4	Provisions for	Overheat Protection , Septum Purge and Gas Saver
3.5	User Settings	User adjustable setting of Split Ratio, Purge Flow and Purge Time
3.6	Temperature Range	Ambient to 400°C
3.7	Temperature Increments	Minimum 1°C in the entire operating range
3.8	EPC Pressure Range	0 to 100 psi
3.9	Operation Modes	Constant Pressure, Ramped Pressure, Constant Flow and Ramped Flow
3.10	Total Flow setting range	N_2: 0 to 200 ml/min, H_2: 0 to 1000 ml/min
3.11	Maintenance	Quick and easy maintenance provisions
4.0	**INJECTOR-2**	Multimode Injector (for use with Autosampler)
4.1	Constituents	Modular Injector with Heater, Temperature and Pressure Sensors
4.2	Inlet Options	Split/splitless, temperature programmable, Large Volume Injection and Cool on column injections
4.3	Modes of Injections	Hot or cold split/splitless, Pulsed split/splitless, 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 Ratio, Purge Flow and Purge Time
4.7	Temperature Range	Ambient to 450°C
4.8	Temperature Increments	Minimum 1°C in the entire operating range
4.9	Temperature Ramp	From 0.1 to 200°C/min

	Rate Range	
4.10	Pressure programming capability	Yes
4.11	EPC Pressure Range	0 to 100 psi
4.12	Operation Modes	Constant Pressure, Ramped Pressure, Constant Flow and Ramped Flow
4.13	Total Flow setting range	N_2: 0 to 200 ml/min, H_2: 0 to 1000 ml/min
4.14	Maintenance	Quick and easy maintenance provisions
5.0	**OVEN**	
5.1	Volume	More than 10 Litres; should have provision to accommodate minimum two nos. Capillary columns or more at a time.
5.2	Column Compatibility	Capillary (0.05 / 0.10 / 0.20 / 0.32 / 0.53 mm ID)
5.3	Temperature Range	Ambient ± 4 °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	Temperature Programming	Minimum six Ramps and seven Plateaus
5.9	Programming Rate Range	0.1 to 120 °C/min
5.10	Heat Up Time	Less than 2.0 min (50°C or lower to 250°C)
5.11	Cool Down Time	Less than 5.0 min (450°C to 50°C)
5.12	Resetting of Program	Automatic by user defined sequence
5.13	Maximum Run Time	Minimum 650 minutes
5.14	Injector Compatibility	Split / Splitless Injector and Multimode Injector
5.15	Detector Compatibility	Mass Spectrometer (MS) and ECD
6.0	**ELECTRONIC PNEUMATICS CONTROL (EPC) SYSTEM**	
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 and 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	60 m x 0.25 mm x 0.25 µm
7.2	Uncoated deactivated Silica Column	5m x 0.25 mm
8.0	**MASS SPECTROMETER (DETECTOR)**	
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	50°C to 350°C
8.4	Electron Source	Easy access heated inert Filament
8.5	Mass Source	Should have EI, CI, Positive CI, Negative CI facility with automatic tuning and acquire both SIM and scan data from single injection.
8.6	EI / CI Source Changeover	Easy & Quick changeover by user
8.7	Source Temperature Range	125°C to 300°C
8.8	Analyser Type	Transmission Quadrupole with pre-filter
8.9	Noise Reduction	Heated Quadrupole Pre-filter / Entrance lens
8.10	Analyser 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	Ionisation Modes	Electron Ionisation, Positive / Negative Chemical Ionisation
8.14	Electron Ionisation Voltage	10 – 100 eV

8.15	Vacuum Pump	250 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
9.0	**SENSITIVITY (DETECTION LIMITS)**	
9.1	EI Full Scan	1 pg of OFN at S/N of 350:1 RMS (2:1 peak to peak)
9.2	EI SIM Scan	100 fg of OFN at S/N of 25:1 RMS (5:1 peak to peak)
9.3	Positive CI Full Scan	100 pg of benzophenone at S/N of 100:1 RMS (2:1 peak to peak)
9.4	Positive CI SIM Scan	1 pg of benzophenone at S/N of 10:1
9.5	Negative CI Full Scan	1 pg of OFN at S/N of 300:1 RMS (4:1 peak to peak)
9.6	Negative CI SIM Scan	1 fg of OFN at S/N of 10:1
10.0	**MASS SPECTRAL LIBRARIES**	
10.1	NIST Mass Spectral Library	Preloaded on Data Station and backup Licensed CD latest version compatible with operation software
10.2	NIST Chemical Structures Database	Preloaded on Data Station and backup Licensed CD latest version compatible with operation software
10.3	Wiley Library	Preloaded on Data Station and backup Licensed CD latest version compatible with operation software
10.4	Stan Pesticides Library	Preloaded on Data Station and backup Licensed CD latest version compatible with operation software
10.5	Pesticides and endocrine disrupters, volatiles, PCBs, toxicology, organotin compounds, hazrdous chemicals, indoor air toxics and	Preloaded on Data Station and CD

	environmental semi-volatiles	
11.0	**ADDITIONAL CAPABILITIES**	
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
12.0	**ECD Detector**	Coaxial design based on Ni^{63} Source
12.1	Linear Dynamic Range should be	Better than 10^4
12.2	Departure from linearity should be	Less than ±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
13.0	**AUTOSAMPLER**	
13.1	Number of Sample Vials	Capable of accommodating 100 Vials
13.2	Syringe capacity	Capable of accommodating up to six different syringe capacity
13.3	Injection volume	Selectable between 1 and 10 microlitre 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 workstation software
14.0	**OPERATING CONDITIONS**	
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
15.0	**DATA STATION**	
	Application Software	Multitasking software with programming facility
	Capabilities	Accurate and Reproducible Integration
		Reintegration / Replot
		Baseline Correction
		Multilevel Calibration
		Background Subtraction
		Library Search
		Quantitative Analysis
		Customisable 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
16.0	**COMPUTER SYSTEM**	
	Make	Reputed brand such as HP/Compaq/Dell/IBM
	Processor	Intel Core 2 Duo processor 3.0 GHz or above
	FSB	800 MHz or above
	RAM	4 GB (upgradeable to 8 GB)
	HDD	500 GB ultra DMA or higher HDD (7200 RMP),
	Monitor	21" TFT – LCD Flat Panel Colour Digital
	DVD-Writer	32X DVD +/- RW Dual Layer Write capabilities
	Ports	2 Serial, 1 parallel, 2 front USB, 6 Rear USB, 2 PS/2 Port, 1VGA integrated Port, 1 line in/out port

	Key board	104 Key IBM Compatible
	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 LaserJet Colour Printer 1200 x 1200 dpi 12 PPM color
	Softwares	Pre-loaded Windows 7.0 Professional or latest operating system with Licensed CD
		MS Office 2007 Professional with media, manual and Licensed CD
		Preloaded Antivirus with latest virus definition code along with Licensed CD
17.0	**SPARES & CONSUMABLES**	Spares and consumables sufficient for two years trouble free operation should be included in the offer and supplied with each system
	Column nut	2 Nos.
	Washer	2 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 (5 µl)	4 Nos.
	Micro syringes for manual injection (10 µl)	4 Nos.
	Copper tube cutter	1 No.
	Auto sampler vials (2 ml)	500 Nos.
	Auto sampler septa and caps	2000 Nos.
	Auto sampler spare syringes	1.0 µl – 5 Nos. 5.0 µl – 5 Nos. - additional
18.0	**ACCESSORIES**	
18.1	Operation and 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	Dust Cover	One set
18.8	Consumables for three years operation	One set
18.9	Operation Kit	One set containing all essential accessories and spares such as column nut, washers, inlet septa, O-rings, copper tubing with connector, micro-syringes, copper tube cutter, column cutter brass / stainless steel nuts, brass / stainless steel ferules.
19.0	**ADDITIONAL ITEMS (Optional)**	
19.1	Purge and Trap System	Latest model compatible Purge and Trap system for integrating with GC-MS to be proposed with detailed technical specifications.
20.0	**WARRANTY**	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.
21.0	**TRAINING**	The principal supplier has to impart on site operation 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
22.0	**GENERAL CONDITIONS OF SUPPLY**	1. The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent

		to provide after sales service. 4. The principal should provide a certificate that they will provide the spares in future for at least ten years. 5. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 6. 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. 7. The bidder should furnish the information on past supplies and their satisfactory performance. 8. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above.

Item Code No.24

GAS CHROMATOGRAPH WITH MASS SPECTROMETER, FID AND ATD System

(With & Without ATD buy Back System)

1.0	**INSTRUMENT COMPOSITION**	
	Gas chromatograph	One set
	Mass Detector	One set
	FID	One set
	ATD	One set (preferably under buy back)
	Injectors	Two
	Capillary Column with Accessories	One set
	Data Processing / Automatic Data Station	One set
	Application Notes for VOCs Carbonyls, Alcohols, Alkanes & Alkenes /Operational Mannuals /Troubleshooting – maitenance Manuals	One set of each
	Calibration standards for VOCs, Carbonyls, Alcohols, Alkanes , Alkenes & PAHs of reputed make	One set of one ml ampoules of each standard with high purity preferably NIST traceable
	Solid Phase Micro Extraction System	One set
2.0	**TECHNICAL SPECIFICATIONS**	
2.1	GC System Type	Computer controlled, Data workstation compatible Gas Chromatograph (GC) with built in diagnostics and comprehensive self test

	Temperature programming	At least seven or more ramp oven temperature programming.
	Heated Zones	At least five heated zones (2 inlets, 2 detectors and one auxiliary) in addition to the oven.
	Functional Display	Functional keyboard with two or more line alphanumeric display. Display should include temperature and pressure / flow parameters, type of carrier gas, carrier gas column pressure, flow rates, split flow, detector gas flow rates and all detector parameters. Ist hould have unattended and automated system leak check facility.
	Memory Protection	Power fail memory protection. Storage of atleast 5 methods and automated sequences.
	Interface	RS-232 interface and LAN
	Injector / Detector mounting	System should be compatible for 2 injectors and 2 detectors simultaneous mounting. System should be compatible for automatic / manual injection.
	Column Mounting	Capable to hold 110 µm to 530 µm different diameter capillary / mega bore columns.
	Purge System	Effective gas saver and septum purge system.
	Start / Stop facility	Remote start / stop facility.
2.2	Column Oven	High performance, large capacity oven accommodating capillary column and mega bore column
	Volume	More than 10 litres
	Operating temperature	Maximum 4 ^{0}C above ambient upto 450 ^{0}C Cryo cooling option with LN_2 –80 ^{0}C or below if required in future.
	Temperature set point	$\pm$1 ^{0}C
	Temperature stability	± 0.01 ^{0}C for 1 ^{0}C ambient change

	Ramp rate	100 ^{0}C /minute or more
	Heating time	Maximum 8 mins for (50 – 400 ^{0}C)or less
	Cooling time	Maximum 5 mins for (400 – 50 ^{0}C) or less-+
	Column bleed compensation facility Vent temperature control	Computer control in automatic sequence and fast.
2.3	Flow / Pressure Controller	Sufficient Electronic Pneumatics Control (EPC) Channels for inlets, detectors, or auxiliary gases through Data Processor with Screen display of pressure / flow.
	Pressure adjustment	Pressure may be adjusted by increment of 0.01 psi.
	Pressure programming	2 or more pressure / flow programming ramps.
	EPC Setting	EPC setting facility should be included in computer work station system.
	EPC Sensor	EPC sensor should be provided in inlets and detectors for all gases (carrier gas, make up gas and support gas in detectors, and carrier and split vent gas in inlets).
	Flow / Pressure set points	Flow/pressure set points on each inlet on detector parameter screen.
	Flow Sensor	Flow sensor for control and storage of split ratio in split / splitless .
2.4	**Injector Mounting**	Two injectors mounting split / splitless and one Gas phase sample injection system.
	Injector accessories	With heater, temperature sensor and protection from overheating.
	Injector capability	Should be capable to hold all types and all sizes of capillary columns and mega bore columns
	Purge System	Efficient septum purges system, purge time adjustable.

2.5	**Injectors** Split/Splitless Injector with back flushing facility(two port one for direct liquid injection into capilaary column & another for ATD Transfer line)	Injectors should have forward inlet pressure programming with an optimised modular, uniform thermal profile for split / splitless injections.
	Flow Control	Electronic pressure/flow control.
	Operating temperature	Upto 400 ^{0}C operating temperature for split/splitless injector with 1 ^{0}C increment
2.6	Gas Phase Injector(Additional Item)	Gas phase should have a single 10-port GC sample injection valve (with auxillary EPCand heating upto 325^{0}C or a group of valves sufficiently fitted with a sample loop (1 ml, 2 ml – 2 each in number) and back flush facility compatible to on column injection.
	Pressure / Flow control	Electronic pressure/flow control.
2.7	**Swafer Inlet Switching**	For switch over inlet injection material from two injector to single column whichever is required one by one.
3.0	**DETECTORS**	Detector combinations would be MS AND FID.
	Temperature range	Temperature range upto 400 ^{0}C
	Pressure control	All the detectors should have Electronic Pressure Control (EPC) and electronic on/off facility for all detector gases.
	Detector	*Detector with make up gas and automatic zeroing facility and over heat protection.*
3.1	FID	*Programmable Electronic Pressure/Flow Control*
	Operating temperature	Operating temperature (maximum) should not be less than 400 ^{0}C (1.0 ^{0}C step)
	Minimum detection limit	=/< 3 pgC/sec or better
	Linear dynamic range	10^6 or better
	MASS DETECTOR	Quadurpole Transmission Type

3.3	**Mass Spectrometer Detector** with EI & in built NCI/PCI ion meter gauge	with Software to accurately identifying and trace components that coelute with other analytes and Peak Integration facility
	Mass range	upto 1000 Da or Better
	Mass stability	**+ / -** 0.1m /z mass accuracy over 48 hours or more
	Ionization	Sealed Electron Ionization system
	EI voltage	10-95 ev or more
	Single Turbo Vacuum pumps	>250 L / second or better., Air cooled Turbomolecular Pump
	Ion volume temperature	50 Deg C to more than 300Deg C independently heated
	Scan rate -	Continuously variable scan rate upto 10000 Da / sec. or higher with 0.1 amu step size
	EI full scan detection limit	1 ul injection of 1 pg/ul of octafluoronaphtalene scanning from 50-300u should give min. signal: noise ratio of 400 :1 or better
	SENSITIVITY (DETECTION LIMITS)	
	EI Full Scan	1 pg of OFN at S/N of 10:1 RMS (2:1 peak to peak)
	EI SIM Scan	100 fg of OFN at S/N of 25:1 RMS (5:1 peak to peak)
	Positive CI Full Scan	10 pg of benzophenone at S/N of 10:1 RMS (2:1 peak to peak)
	Positive CI SIM Scan	1 pg of benzophenone at S/N of 10:1
	Negative CI Full Scan	1 pg of OFN at S/N of 20:1 RMS (4:1 peak to peak)
	Negative CI SIM Scan	1 fg of OFN at S/N of 10:1
	Number of SIM Groups / Run	Minimum 30 Groups
	Number of Ions / Group	Minimum 30 Ions
	LIBRARIES	

	NIST Mass Spectral Library	Preloaded on Data Station and CD
	NIST Chemical Structures Database	Preloaded on Data Station and CD
	Wiley Library	Preloaded on Data Station and CD
	Stan Pesticides Library	Preloaded on Data Station and CD
	Weber Library	Preloaded on Data Station and CD
	ADDITIONAL CAPABILITIES	
	Acquisition	Simultaneously for Full Scan as well as SIM Scan
4.0	**SPECIAL FEATURE**	It should have the controlled splitting facility of the sample so that it can be splitted in a single run to both Mass and FID detector if desired .
5.0	**COLUMNS**	HP-VOC or J&W DB1 or equivalent: 60 m x 0.20 mm x 1.00 µm
		HP 624 , 30 m x 0.25 mm ID having 0.25 µm film thicknesses or equivalent
		DB5/ HP– Ultra2 , 30m – 60 m X 0.22 – 0.25 mm ID with 0.25 – 0.33 µm film thickness (5% phenyl and 95% dimethyl polysyloxene) or equivalent
		Rxi®-5 Sil MS, 30m, 0.25mm ID, 0.25µm or equivalent

		It should have automated sampling of up to 50 tubes, incorporating programmable pneumatic control. Supports pressure, flow and velocity control of the carrier gas through the GC column. It should also incorporate loading of internal standard into clean tubes to provide sample-integrity validation and to improve precision (repeatability) of the analysis. It should allow the ability to condition tubes during chromatography to minimize downtime and enhance productivity and also includes a separate trap-clean-and-test function which saves time and protects the GC column and detector. **Hardware** Sample tube : Single industry-standard sample tube capacity with 50 industry-standard sample tubes Sample tubes: The glass-lined stainless steel sample tubes to be quoted (Pred filled with Tenax TA & Chromosorb 106 , 20 each =Total 40 Tubes . Each tube should be etched with a unique serial number for traceability. Stainless steel tubes should also be fitted with clips that accept adhesive labels for identification. Tubes should be pre-packed with a variety of adsorbents as per our application. Desorption's Up to 98 or continuous. PPC/APC Provides control of carrier pressure, desorbs flow rate, inlet split flow rate, outlet split flow rate. Tube and trap Provides more efficient moisture removal. Sample split Allows sample re-collection on same or different tubes to enable repeat analysis. Primary desorption oven with Temp range 50 °C to 400 °C; Desorption time 1.0 min to 999.0 min Quartz cold trap : Low temp range -30 °C to +150 °C (Peltier cooling – standard); -100 °C to +150 °C (LN2 cooling – optional)

6.	**<u>Automated Thermal Desorber (ATD) System</u> (With sample re-collection facility on same(parent) or different tubes to enable repeat analysis)**	High temp range -30 °C or -100 °C to 400 °C Time at high temp 0.0 to 999.0 min Heating rates 5 °C/sec, 20 °C/sec, 40 °C/sec and ballistic Gas-flow direction Back flush flow for optimal use of traps with multiple adsorbents during trap heating Heated Transfer line to GC : long Temp range: 50 °C to 300 °C Sulfinert™ deactivated tubing (standard),also allows direct connection of the column or fused silica tubing Pneumatics Carrier gas:**Programmable Pneumatic control** Pressure: 0 to 60 psig (0 to 400 kPa); Split flow: 0 to 200 mL/min; A composite measure of fraction of original sample transferred to GC column should be displayed; Desorb flow setting range from 0 to 200 mL/min; Carrier gas flow: 0-2 mL/min; Velocity: 0 to 200 cm/s. Pneumatic valve need an external supply of dry (dew point -50 °C or below) compressed air in the pressure range actuation of 70 to 90 psig (480 to 620 kPa). Consumption rate: 0.5 L/min (TD), 0.7 L/min (ATD). Sample protection : Initial check for adequate carrier gas pressure prior to tube loading. Sequence leak and pressure test completed on sample tube and cold trap before tube desorption. Ambient temperature carrier gas purge of sample tube to remove air prior to desorption. Purge effluent is routed through the cold trap to avoid loss of volatile compounds.

	ATD Tubes and Thermal desorber Starter kit	It should also includes the packed conditioned sample tubes 25 nos. each Tenax GR 60/80 & Chromasorb 60/80 and Thermal desorber Starter kit with empty tubes about 50 with required packing to work with the existing upgradation system.
	Long Heated Transfer line to GC	Fused silica deactivated tubing (standard), with o.53 mm capillary of 1800mm length or so that allows direct connection of the GC capillary column to fused silica tubing.
	ATD Software control package :	Thermal desorber should be a Stand-alone, self-contained and should have controlled operation through a color graphical touch-screen user interface with • Simple, one-touch operation • Single-method operation • Sequence-based, multi-method operation of up to eight methods • Password protection • Ten operating methods can be stored in the instrument
	Functional features :	It should be available to operate ATD instruments from a Microsoft® Windows environment. The control software should offer graphical representation offer graphical representation of instruments and parameters with intuitive interaction.
	System Software control package	Calibration & Internal standard used to introduce a known quantity of a gaseous/liquid standard into the sample tube for internal-standard addition calibration and quality assurance.
7	**Calibration & Internal standard/ Mass Tuning Standard**	one ml ampoule oe each high purity Calibration standards for VOCs, Carbonyls, Alcohols, Alkanes , Alkenes & PAHs of reputed make and PFTBA (FC-43), BFB, DFTPP etc

8.0	**DATA STATION**	
8.1	**Software** (with Basic Programming facility with retention time locking software	Provide accurate and reproducible integration & multi calibration & storage facility
		Compatible for at least two simultaneous chromatograms
		Data acquisition. Reintegration report, multilevel calibration, baseline correction, area calculation, background subtraction and custom/tailored report format facility
		Battery backup for memory protection is required.
		Facilities for data Export/Transformation to data base software i.e. Excel and Access
		Software for Quality Control Protocols
		Software for data display, handling, data export/import and reporting
		Software for data display, handling, data export/import and reporting
8.2		
	Make	Repute make Intel Pentium IV processor 2.8 GHz or above
	Processor	533 MHz or above
	FSB	
	RAM	1 GB (upgradeable to 4 GB)
	FDD	1.44 MB FDD
	HDD	120 GB ultra DMA or higher HDD (7200 RMP),
	Monitor	19" SVGA Flat Colour (Digital)
	VRAM	32 MB or more
	CD ROM	52x CD-ROM
	DVD-CDRW	DVD-ROM and CDRW-Combo Drive Max speed 48x24x48
	Ports	2 Serial, 1 parallel and 2 USB front 6 Rear USB2 PS/2 Port, 1VGA integrated Port1line in/out port,
	Key board	104 Key IBM Compatible
	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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
	Softwares	Pre-loaded Windows XP Professional operating system with Licensed CD
		MS Office 2000 Standard with media, manual and Licensed CD
		Preloaded Antivirus with latest version along with Licensed CD

9.0	**ACCESSORIES**	Manufacturers Standard accessories, start up kits including tools, Digital gas flow meter (0.1 ml/min to 1000 ml/min)Operation and maintenance manual 1 No.
	Application note	Application notes (in CD) for VOC's,PAH, PCB's, PCP's, THM's, pesticides, Dioxins & Furans in environmental samples 1 No.each
	Operation /maintenance manual Service manual	
	Air purifier	High capacity carrier gas purifier 4 Nos.
	Carrier gas purifier	High capacity H_2 gas purifier 2 Nos.
	H_2 gas purifier	High capacity H_2 gas purifier 2 Nos.
	Moisture trap	Moisture Trap (Silica Gel – Molecular Sieve 50:50; length 10"2 Nos.
	Hydrocarbon trap	Activated charcoal filter for Hydrocarbon removal length 10"2 Nos.
	Oxygen trap	High Capacity Oxy trap capacity more than 125 cc 2 Nos.
		To be supplied for two years trouble free operation
10.0	**SPARES AND CONSUMABLES**	2 Nos.
	Column nut	2 Nos.
	Washer	20 Nos.
	Graphite / vespel ferrules	200 Nos
	Inlet Septa (self sealing for injectors)	25 Nos.
	O ring	50 mtrs.
	Copper tubing with connectors	4 Nos.
	Micro syringes for manual injection (5 µl)	4 Nos.
	Micro syringes for manual injection (10 µl)	4 Nos
	Gas tight syringe (100 µl)	2 No.
	Copper tube cutter	1 No.
	Column cutter	1/8 inch – 10 Nos.
	Brass/Stainless Steel Nuts	1/8 inch – 10 Nos.
	Brass/Stainless Steel Ferrules	1/8 inch – 10 Nos.
	Tees	
11.	**Installation & Training**	Free of Cost Installation in CPCB Lab in Delhi & operational Training at CPCB as well as one week training to concerned 2-3 Scientists with Principals training institute

12.	**Warranty**	Three year comprehensive warranty: routine maintenance, breakdowns including all spares parts & accessories necessary to make the whole system operational .
13.	**OPTIONAL ITEMS**	

14.	**On-line sampling System**	A convenient portable sequential 24 tubes sampler to be used for continuous monitoring (24 hours) of atmospheric concentrations of volatile organic compounds with variable sampling times (minutes to hours). It should be housed in a compact weatherproof box and can be operated by a 12 V battery or 240V mains electricity. The sampler should include cables, jack plug connectors to be connected with monitoring pump plus the maintenance kit, accessories and relevant "air monitoring, On-line sampling System for on-line sampling of ambient air, gas streams or canisters. Includes mass flow controller for sample control, Nafion drier and dry air purge control. Stream selector to switch automatically between sample and calibrant. Thermal desorber should be used for tube desorption.
15.	**Solid Phase Micro Extraction System**	Solid Phase Micro Extraction System for extraction/clean-up of air particulate samples collected on filter papers, soil/ sediment/sludge samples for analysis of volatiles & semi volatiles
16	**Liquid nitrogen**	Liquid nitrogen for operation of the cold trap to -100 °C. Quote pressurized liquid nitrogen dewar with pressure cooling release valve set to 25 psi (180 kPa).

17.	**<u>Automated Thermal Desorber (ATD) System</u> (With sample re-collection facility on same(parent) or different tubes to enable repeat analysis)** Under Buy Back System	AS per above specs & accessories etc Under Buy Back System of old Perkin Elmer Turbomatrix ATD available in CPCB will be prefered

Item Code No.25

GRADIENT SYSTEM for HPLC SYSTEM

1.	**General**	Microprocessor based Modular HPLC, completely made of non-metallic, preferably inert material like PEEK (polyetheretherketone), corrosion resistant System. Designed for reliable, precise and specific measurement of Carbonyls (aldehydes & ketones) and PAHs in air samples. The system should have Power failure memory protection. Built in diagnostics for self-testing. The system should be PC based with data acquisition and system control through software. The system should be of modular in nature with following Specifications along with requisite columns & all accessories.
2.	**Binary HPLC system** **(2 Independent Pump**	• Each pump Should be based on reciprocating piston design with Serial mixing, precise linear, concave and convex gradients and pulse less flow. • The pump must have a flow precision of typically +/-0.1% RSD typically at 1ml/min with water. Flow Accuracy: ± 1.0% . • The flow rate range must be **0.01 – 10.00mL/min or more** in increments of 0.001 ml/min **with** Operating pressure range at all flow rates **0- 6,000 psi** for precise analytical analysis. • Compositional accuracy for the system should be typically 0.5% or better. • The pump must be controlled from own keyboard and MS software • Pump seal should be guaranteed for long run with any aqueous buffer, organic / non-polar solvents. • On line Vacuum degasser multi channel (atleast 3 channel) should be built –in the system to remove the dissolve air in the Pumping System as well as in Autosampler wash solution. • With Gradient Mixer • User Interface: LCD
3.	**Manual Injector** **(Rheodyne) and Syringes**	• with built in 20ul loop with auto switch and gas tight 100ul syringe. Addl. 20 ul & 10ul loop one each. • Manual Injector for anylytical Semiprep with 10, 20, 50,100ul Loops with syringes of 25 ul, 100ul

4.	**UV-VIS Detector** • Detection Type • Wavelength range • Bandwidth • Wavelength accuracy • Drift • Noise • Flow Cell • Sensitivity Range	• Dual beam optics • 190-700 nm or better (D_2 & Tungsten lamp) • 5 nm or better • +/- 1nm • 1x 10^{-4} AU/hr • < +/- 0.75 x 10^{-5} AU, 210 -280nm & 1ml/min standard flowing conditions • Standard 12 ul, 10mm pathlength • 0.0005 - 3.000 AUFS
5.0	**Fluorescence Detector**	• Fully Time programmable – up to 100 wavelength steps per method for complex samples • Outstanding sensitivity for trace analysis • Light Source Xenon lamp • Flow cell (Preferably or optional 5-µL volume) • Measurement Range 0.0001 (at EUFS to 100,000 EU • Excitation Wavelength 200 to 850 nm • Emission wavelength 210 to 900 nm • Wavelength reproducibility ± 0.5nm or less • Sensitivity S/N ratio 500 : 1 (tangent method), 700:1 (Baseline method) • Flow cell volume 12ul • Flow cell Pressure 150psi • Display 2lines with 40 characters with backlit LCD • Auto zero range 0 to 1000 • Time programmable Up to 100 steps total for 9 programme • Spectrum memory Up to 4 spectra • Should have Maintenance logbook to see the early maintenance feedback of lamp energy, accuracy of excitation wavelength, xenon lamp (hours on) etc.

6.0	**Column Oven**	• Peltier cooling for Temperature 7°C - 60°C or more with temperature accuracy ± 1°C over entire range, Should able to hold min. 3 column of 4.6mm X 30cm 25cm//20cm/15cm/10cm , 2.1mm X 5cm, * for GPC/SEC analysis of proteins of different molecular weights, leakage sensor, with provision for column selection valve capacity with 6 switching positions
7.	**Guard Column**	• Guard Column of suitable length (5 cm or so) -2 nos
8.	**Analytical Column for PAH & Carbonyl analysis in environmental samples**	• Vydac C18 , 3.0mm*250mm*5um or equiv. • Eclipse PAH, 4.6mm*100mm*1.8um or equiv. • Eclipse PAH, 2.1mm*50mm*1.8um or equiv. • Stable Bond C18, 4.6mm*150mm*3.5um or equiv. • Allure@ AK Column, 4.6mm *200mm*5um or equiv or SUPELCOSIL™ LC-18 ,25cm x 4.6mm ID, 5µm . (One each)
9.	**Chromatography Software & Data Station:**	• Single keyboard control of entire system • Full 32 bit Architecture, Compatibility with Uv-Vis, FLD and Diode array detector, • Compatibility to import and export the data, Online help, GLP compliance, Flexible report publisher. • Windows 2000/XP environment • Data reports, Trials, Template saving & Auto run of templates • Calibration curves: 140 or more curves facility • Single point control of the entire HPLC system without adding multiple software
10.	Data workstation	• Data workstation with latest configuration with dual core, 3 Ghz,512 MB RAM, 1 GB Cache, 80GB HDD, • 17" TFT Screen, Optical mouse, Mouse Pad, USB ports, Serial & Parallel ports, • Windows Software and • laser Jet Printer

11.	**Autosampler :**	• Should have the facility to hold 96 X 2 format well plate, 384 micro titre plate arrangement for low volume injection, with standard 2 – 3ml vial capacity for micro and macro volume injection • Auto dilution and derivatization facility should be built-in. • Lowest carry over of sample 0.02% through out the entire sample range is must to get absolute reproducibility of the results • Operating temperature range 4^{o}C to 35^{o}C • Capability to inject 0.1ul to 100ul range
10.	**Installation & Training**	Free of Cost Installation in CPCB Lab in Delhi & operational Training at CPCB as well as one week training to concerned 2-3 Scientists with Principal,s training institute
11.	**Warranty**	Three year comprehensive warranty: routine maintenance, breakdowns including all spares parts & accessories necessary to make the whole system operational.
	OPTIONAL ITEM	
12.	**Photo Diode Array Detector:** • Light Source • Wavelength range • Bandwidth • Wavelength accuracy • Drift • Linearity • Noise • Measurement / Sensitivity range • Data Rate	Light Source: Deuterium Lamp Wavelength Range: 190-800nm or more Bandwidth: 5 n.m.(or less) Measurement / Sensitivity range: 0.0001 - 2.000 AUFS 1 x 10-3 AU/hour, up to 5% at 2.5 AU 257 nm ± 10 x 10-6 AU or better at 254nm 0.0001 - 2.000 AUFS max 80 Hz

13	**Solid Phase Micro Extraction System**	Solid Phase Micro Extraction System for extraction/clean-up of air particulate samples collected on glass fiber filter papers (8"*10" size after cutting in strips) , soil/ sediment/sludge samples for analysis of volatiles & semi volatiles (medium size wide mouth containers/vessels vessels to contain samples) (Give detailed model wise specs & acessaries)
14	**Sep-Pak Kit Cartridges**	
	• **Sep-Pak Cartridges**	C18 (t Red) Hydrophobic, non-polar , bonded silica phase for Polynuclear aromatic hydrocarbons
	• Syringe	Syringe 10 mL / w needle
	• **SPE vacuum manifold**	for up to 15 – 20 SPE columns or cartridges (give detailed specs)
	• **Cabinets & Vacuum control**	The manifolds consist of rectangular glass cabinets with vacuum gauge and a polypropylene lid, which can hold the columns or cartridges. The replaceable valves on the lid allow individual vacuum control for each solid phase extraction column, if required. The cabinet is fitted with a variable rack with exchangeable partitions, which accept a wide variety of vessels like test tubes,

Item Code No.26

HIGH VOLUME SAMPLER WITH PUF SAMPLER

Description	High Volume sampler for Ambient particulate and volatile / semi volatile organic sampling (VPAH, PCBs, Dioxin / Furan, VOCs etc.)
Regulatory status	Instrument should conform sampling and quality assurance of USEPA Methods TO-4A, TO-9A and TO-13A
Inlet (size cut off)	PM_{10}
Flow controller	Motor speed control /Elapsed Time Indicator
Flow rate	User selectable (200 – 280 LPM)
Elapsed time indicator	Up to 9999 hours with two decimals
Motor Blower	Diaphragm type, brush less motor OR 2 Stage Vacuum Motor Or Equivalent
Timer	Mechanical / Electronic Programmable timer
Power requirement	230 $\pm$ 10 VAC, 50 Hz 0.5 Amp. Max.
Filter Media	4” Dia circular filter attachment / mounting platform
Calibration Unit	Calibration unit to calibrate the flow rate of the instrument
PUF / XAD Holding Cartridges	10 Nos. Stainless steel Cartridges for PUF and 10 Nos. Removable glass cartridges with Stainless steel jacket for XAD. Both these type of cartridges should fit to the system and it should be leak proof. Necessary number of gaskets and other accessories should be included in offer.
Software support (Optional)	Built in software support for flow calibration, audit and leak check
Instrument Housing	The entire assembly is housed in a weather proof metal carrying case / Anodized aluminum cabinet with SS fasteners.
Operation Kit	Manufacturers standard operation kit including all required items, fittings for start up / regular operation of instrument.
Operational Manual	One No.
Repair / Maintenance & Calibration manual	One No.

Additional accessories, Spares and consumables	For two years trouble free operation / sampling at once a week over 52 weeks (provide along with list of items including Glass fiber filters, PUF & XAD sampling at once a week over 52 weeks). 4” Dia PUF Block – 200 Nos. 4” Dia Glass holding cartridge – 10 Nos. Micro quartz filter media 4” round for PUF – 5 Boxes containing 100 Nos. each.

Item Code No.27

High Precision Flow Calibrator (Automatic)

The system should operate on near frictionless graphite piston technology with advanced photo optic sensing.

Measuring range	5 ml/min to 50 lit./min
Accuracy	Volumetric: ±0.25% Standardized: ±0.40%
Display system	LCD Should indicate Flow rate, average flow rate and number of readings, as well as battery charge level
Sensors	For measuring temperature and atmospheric pressure
Power supply	To work on 12V DC from AC to DC converter (230V AC, 50 Hz.) suitable to Indian socket

Item Code No.28

High Precision Pressure cum vacuum gauge (analog) (Master Gauge)

Resolution/Least count	:	0.005 bar
Accuracy	:	0.1% of full scale
Bourden tube	:	Beryllium copper alloy
Socket material	:	316, LSS (Low carbon stainless steel)
Case	:	Aluminum black painted
Dial	:	Aluminum green with black markings and anti-parallax
Dial	:	10” (250mm)
Range	:	-1.0 bar to 1.5 bar

Item Code No.29

INDUCTIVELY COUPLED PLASMA – ATOMIC EMISSION SPECTROMETER (ICP-AES)

1.0	**INSTRUMENT COMPOSITION**	
	RF System	One unit
	Nebulizer & Spray Chamber	One unit
	Peristaltic Pump	One unit
	Plasma Torch	One unit
	Optical System Spectrometer	One unit
	Auto Sampler / Diluter	One unit
	Data Work Station	One unit
2.0	**TECHNICAL SPECIFICATION**	
2.1	**System Application**	Computer controlled fully automatic, data workstation based, ICP-AES System
		Sub-ppb analysis, simultaneous multi-elemental analysis with exceptional sensitivity and stability of diverse range of environmental, biological, geological and industrial samples.
2.2	**System Operation**	Computer Controlled Solid State RF Generator,
		Auto start from Switch or computer keyboard
		Automatic detector system controlled by Multitasking Windows based operating software with built-in diagnostics
		High-speed data acquisition system, quality control protocols, calibration, auto optimization and auto tuning of system with status display
2.3	**RF System**	Solid State, auto start RF generator (27 MHz or more).
	Wattage	Computer controlled from 750 Watt to 1500 Watt in 1 watt increment with auto tuning.
	Power Efficiency	Greater than 75% with < 0.1% variation in output power stability. Should provide high efficiency, superior performance for elements such as As, Se and Hg.

2.4	**Sample Introduction System**	Corrosion resistant to various acids and Aqua Regia. Capillary nozzle tip with guaranteed flow rate of fine aerosol mist and controlled sample uptake flow
2.5	**Micro flow Nebulizer**	Ultrasonic nebulizer
2.6	**Spray Chamber**	Corrosion resistant to most acids including Hydrofluoric acid and Aqua-Regia
	Location	Glass cyclonic spray chamber should be located in a thermally controlled area
2.7	**Plasma Torch**	Easily demountable Quartz Torch for plasma. The. Computer controlled plasma torch adjustment/alignment for optimal analytical positioning relative to ion sampler interface.
	Torch design	Several multiple loops of an induction coil with three concentric tubes. Central tube to inject sample aerosol and carrier gas introduction, middle tube for plasma gas (argon) and outermost tube for Auxiliary gas
	Corrosion Resistance	Torch should be full corrosion resistant to all acids including Aqua-Regia
	Torch Adjustment	Computer controlled plasma torch adjustment / alignment for optimal analytical positioning relative to ion sample interface
	Neutral Plasma	Capable to produce electrically neutral plasma fully controllable through PC
2.8	**Plasma Gas Flow**	Computer Controlled Plasma Gas (Argon) flow controlled by Solenoid valves
	Range	Range 0-20 LPM in 1 LPM increment
2.9	**Safety Interlock**	Monitoring and display the shear gas pressure, plasma gas pressure, sample compartment door closure, water flow, plasma stability, interlock status.
	Automation	Automatic shutdown of plasma, in case any of the features is interrupted.
2.10	**Plasma Ignition**	Computer controlled Plasma ignition. Software should have capability to ignite Plasma automatically at user determined time to warm up the system prior to analysis.
	Power Control	Automatic turn off of plasma after analysis.
2.11	**Cooling System**	Water re-circulating cooling system with appropriate flow & pressure and temperature between 15 to 25 ^{0}C.
2.12	**Peristaltic Pump**	Computer controlled, multi channel pumps.
	Speed	0.2 to 5.0 mL/min in 0.1 ml/min increments

	Pump operation	Should be autofast for rapid rinse out, washout and analysis time
3.0	**SPECTROMETER OPTICS**	High Speed, double (Pre-selection and High Dispersion) optics with excellent resolution in form of compact system. Shock mounted so that vibrations do not affect system performance.
3.1	**Optical System**	The pre-selection and High dispersion optical system
	Grating (Dispersion)	More than 75 lines/mm
	Optical System Enclosure	Enclosed in temperature resistant, purged gas enclosure
3.2	**Spectrometer parameters**	
	Wave length range	160 nm - 900 nm.
	Resolution	Minimum 0.009 nm at 200 nm wavelength or better
	Prism / grating adjustment	Prism and grating should be adjustable to any wavelength for speedy analysis
3.3	**Wavelength Correction**	Wavelength accuracy and reproducibility should be dynamic to allow correction of wavelength position.
3.4	**Plasma Viewing**	Computer Controlled axial and radial plasma viewing
3.5	**Detection System**	Solid-state detection system, one for analytical measurement and other as reference.
	Background correction	Background correction for improved precision and speed
	Housing	Hermetically sealed with dry nitrogen filling to avoid condensation
	Cooling effect	Should have peltier cooling effect to cool down to temperature of –10 ^{0}C or below
4.0	**HYDRIDE GENERATION ASSEMBLY**	Compatible hydride generation assembly for ultra trace analysis of Hydride forming metallic elements such as As, Se, Te, Hg etc.
5.0	**AUTO SAMPLER/DILUTER**	Auto sampler/Diluter compatible with operation along with ICP.
	Capacity	Hold atleast 60 or more 25 ml capacity tubes
	Programming facility	Programmable complete with inert PTFE coated probe with PTFE inner tubing
	Extension tube	Spare extension tube complete with 20 ml syringe for programmed auto dilution
	Auto Sampler Accessories	Complete with all accessories, racks, bottles, tubing assembly, dust cover etc.
6.0	**DATA WORK STATION**	
6.1	**Application Software**	Programme facility with multitasking software displaying method sample and analysis status

	(Features)	Instrument control reintegration/report, multi level calibration
		Calculation of data and report formatting
		External and dilution calibration, automatic correction for interferences and measurement with internal standards
		Measurement of transient signals
		Quality control protocols including preparation blanks, multiple quality control standards, calibration, check samples, spike recoveries, duplicates calibration failure and QC limits
		Storage of complete spectrum of elements for future reference.
		Provision for statistical analysis, printer/plotter function and battery back up for memory protection
		Should control whole ICP system sample introduction, calibration, quantitative analysis, data retrieval data acquisition and reporting
		Auto optimization of plasma parameter and customizable instrument status display
6.2	**Computer System**	
	Make	Reputed brand such as HP/Compaq/IBM/Dell
	Processor	Intel Pentium IV processor 2.8 GHz or above
	FSB	533 MHz or above
	RAM	1 GB (upgradeable to 4 GB)
	FDD	1.44 MB FDD
	HDD	80 GB ultra DMA or higher HDD (7200 RMP),
	Monitor	19" SVGA Flat Colour (Digital)
	VRAM	16 MB
	CD ROM	52x CD-ROM
	DVD-CDRW	DVD-ROM and CDRW-Combo Drive Max speed 48x24x48
	Ports	2 Serial, 1 parallel and 2 USB front 6 Rear USB2 PS/2 Port, 1VGA integrated Port1line in/out port,
	Key board	Cordless 104 Key IBM Compatible

	Mouse	Cordless 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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
6.3	**Softwares**	Pre-loaded Windows XP Professional operating system with Licensed CD
		MS Office 2000 Standard with media, manual and Licensed CD
		Preloaded Antivirus with latest version along with Licensed CD
7.0	**ADDITIONAL ITEMS**	
	Manual	Operation and maintenance manual for each unit.
	Application notes	Application notes (CD-ROM) for elemental analysis in environmental, geological, metallurgical, biological and industrial samples.
	Methodology package	Comprehensive EPA methodology package software (CD-ROM) for environmental application.
	Standards	Multi-elemental and single element standards - One set
	Service manual	Service manual with set of required tools for each system/unit.
	Spare parts catalogue	One set
	Trouble shooting charts	Trouble shooting charts of all sub units
	Dust cover	Dust cover for all sub units
	Operation kit	Operation kit comprising all required items pump tubings, transfer tubings, work coils etc. for start up/regular operation of instrument
	Consumables	Consumables for three years operation of the system for main ICP unit, spare torches, nebulizer, tubings are required
8.0	**OPERATION AND MAINTENANCE TRAINING COMPONENT**	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.

9.0	**GENERAL CONDITIONS OF SUPPLY**	1. The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 5. 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 atleast 2 years as on the date of bid opening. 6. The bidder should furnish the information on past supplies and their satisfactory performance. 7. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above. 8. Notwithstanding anything stated above the purchaser 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 purchaser. 9. Comprehensive warranty with spares for 3 years from the date of installation of the instrument should be covered. 10. 80% amount of the bill will be released at the time of shipment. The balance 20% will be released after satisfactory commissioning of the instrument. This amount will be released and bank guarantee of equivalent amount has to be provided by the supplier till end of warrantee period.

Item Code No.30

ION CHROMATOGRAPH

S. No.	Specifications	Requirement
1.0	**INSTRUMENT APPLICATION:** Measurements of Anions, Cations and transition Metals	
2.0	**TECHNICAL SPECIFICATIONS**	
2.1	Pump	High pressure dual piston type pump Flow rate: 0.001-10 ml/ min Flow accuracy: ± 0.1% Operating pressure: 0-35 Mpa Pulsation: 1%
2.2	Detector	Type: Conductivity detector Conductance display range: 0.01-5000 μS/cm Resolution: 0.1 nS
2.3	Column Oven	Temperature range: ambient to 70 ^{o}C Temperature stability: ± 0.2 ^{o}C Temperature compensation: 0-5% per degree centigrade
2.4	Calibration	The system should have inbuilt system to carry out multilevel calibration system using single/ multiple concentration standards.
2.5	Ion chromatography (IC) columns	IC columns for analysis of anions, cations and transition metals should be individually quoted with respective guard columns.
2.6	Date processor	A PC based data acquisition and processing system along with complete system control should be offered. The necessary software must have latest configurations.
3.0	**Ambient conditions**	Equipment shall be suitable for operation in ambient temperature *i.e.* 0-50 ^{o}C and relative humidity of 2-98%.
4.0	**Spares and consumables**	Should be supplied for two years for trouble free operation.
5.0	**Accessories**	Manufacturer's Standard accessories, start up kit including tools, digital gas flow meter
	Operation/ maintenance manual	Operation/ maintenance manual should be provided
	Application note	Application notes for testing different parameters in environmental samples should be provided.
6.0	**Installation**	Satisfactory installation at CPCB laboratory and hands on training to concerned staff free of cost.

Item Code No.31

ION Meter

S. No.	Specifications	Requirement
	Ion analyzer should be microprocessor controlled splash proof corrosion resistant and impact resistant.	
1.0	**TECHNICAL SPECIFICATIONS**	
1.1	pH measurement	Resolution: 0.001 Calibration: 3 or 5 point by specific calibration solution Specificity: up to three point from decimal
1.2	Ion Concentration measurement	Range: 0.001-19990 ppm or ppb Resolution: 1 count Accuracy: ± 0.5%
1.3	Temperature Measurement	Range: -10 to +140 ^{o}C Resolution: 0.1 ^{o}C ± 0.2 ^{o}C
1.4	Time Recorder	Date and time can be called up and recorded.
1.5	Display	Graphic LCD display/ LCD dot matrix, 128/64 dpi; panel with back light and feather touch keys.
2.0	**Printer**	The equipment should have printer facility.
3.0	**Ambient conditions**	Equipment shall be suitable for operation in ambient temperature *i.e.* 0-50 ^{o}C and relative humidity of 2-98%.
4.0	**Accessories**	Ion selective electrodes with standard electrolyte solution for measurement of Ammonia, Fluoride, Cyanide, Nitrate, Chloride, Phosphate, Sulphate and Calcium.
5.0	**Spares and consumables**	Should be supplied for two years for trouble free operation.

Item Code No.32

ISOKINETIC STACK SAMPLING ASSEMBLY WITH VOLATILE ORGANIC SAMPLING TRAIN (VOST)

Isokinetic Stack sampling assembly to carry out Isokinetic sampling at emission sources, particularly stacks in accordance with USEPA Methods 5, 23 and 29, CEN and ISO protocols for sampling of both particulate phase & gas phase dioxin-furan and other volatile organic compounds.

1.	**ISOKINETIC SAMPLING KIT (One set)**	Manual Stack Train for Isokinetic sampling of Particulate matter and gaseous phase in source emissions conforming to USEPA Methods (5, 23 & 29), ISO (9096 & 12141) and CEN (13284-1 & 1911) protocols, 220VAC/50Hz Power with electrical plugs, Data display in Metric Units,
		Aluminum Housing, Lightweight Polycarbonate Meter Box Console & Pump Case,
		Lightweight heated filter box & impinger ice bath,
		High wattage output heaters for probe & heated filter box,
		Full range of probes, options & accessories,
		Accessories including dioxin kits, additional glasswares, sample recovery equipment,
		Stainless Steel Latches and Handle, Fully Removable Front and Rear Access Doors, Stainless Steel Valves and Quick Connects, Modular Electrical and Plumbing Panels, Individual Fuse Circuitry Located on Easily Accessible Fuse Panel.
		Individual programmable Digital Temperature Controllers for Probe and Filter Oven. Temperature Readout for Thermocouple with Selector Switch, Temperature Range from -100°C to 1,350°C, Auxiliary Thermocouple Jack for Handheld Temperature Readout.
		Provision for ambient temperature, barometric pressure measurement
		Provision for measurement and compensation of pressure drop during sampling to maintain isokineticity
		Switch Controls for Power supply, Suction Pump, Timer,
		Elapsed Digital Timer with reset facility.
		Leak free Quick connections for gas, pressure and vacuum lines with easy leak check facility.
		Lockable transport case with soft foam.

1.1	**Dry Gas Meter (One)**	Direct reading type, Metric Unit display, 10 Liters per Revolutions, 0.1 Liter Resolution, Calibrated to 1.0 ± 0.05 liter, Deviation from average less than 2 %.
1.2	**Manometer (One)**	Dual inclined manometer, 254 mm Vertical Scale, 25.4 mm Incline scale, 0.1 mm Incline Resolution, Protective Shutoff Valves for Transport.
1.3	**Vacuum Pump Assembly (One)**	Fully Enclosed Rotary Vane Vacuum Pump, Leak Free Vacuum Pump, minimum 0.25 HP, Equipped with 2 m Vacuum Hoses and Nonreversible Stainless Steel Quick Connects. Transport case with soft foam inner lining and locking arrangement. 220VAC ± 10V , 50Hz
1.4	**Long Umbilical Cable with Quick Connects (One set)**	Heated sampling lines including umbilical between the impinger train and meter box, 30 meter long (flexible construction with expandable abrasion resistant low friction over braid jacket), complete set of graphite ferrules for use with probe, liner and nozzle unions and adapters,
		One High Vacuum Sample Line (300 psi) with appropriate Quick Connect Couplings,
		Three Pressure Lines, Two for Pitots with appropriate Quick Connect Couplings and One for Orsat Line with appropriate Quick Connect Coupling,
		Type K Thermocouple Lines
		One 5-conductor electrical cable with 4-pin Amphenol connector or equivalent,
		One full length stranded nylon strain relief cable.
1.5	**Short Umbilical Cable with Quick Connects (One set)**	10 meter long (flexible construction with expandable abrasion resistant low friction over braid jacket),
		One High Vacuum Sample Line (300 psi) with appropriate Quick Connect Couplings,
		Three Pressure Lines, Two for Pitots with appropriate Quick Connect Couplings and One for Orsat Line with appropriate Quick Connect Coupling
		Type K Thermocouple Lines
		One 5-conductor electrical cable with 4-pin Amphenol connector or equivalent,
		One full length stranded nylon strain relief cable.
1.6	**Set of Sampling Nozzles (One set)**	Stainless Steel Nozzle Set, includes 5/8” Stainless Steel nuts and ferrules, Nozzles of 7 Sizes from #4 (1/8”) to #16 (½”) with compatible assemblies to be fitted to sampling probes, packed in a Foam Lined Case,
		Additional Glass nozzles set for Dioxin sampling (USEPA

		Method).
1.7	**Short Sample Probe / S Type Pitot tube / Thermocouple Assembly (One)**	Stainless Steel (Grade 316) welded construction - 1 meter effective length (1),
		Stainless steel Type S Pitot Tube (manufactured according to the design specifications and dimensional requirements stated in USEPA Method for Dioxin-Furan) with Pitot calibration certificate,
		K-type thermocouple assembly attached,
		Probe length 1 meter made of SS with inner glass liner,
		Pyrex glass liner with #28 ball with O-ring,
		Removable probe liner heater compatible with 220VAC/50Hz Power
1.8	**Long Sample Probe / S Type Pitot Tube / Thermocouple / Filter Box / Thimble Holder Assembly (One)**	3 meter long Probe consisting of a liner tube (Pyrex glass with #28 ball with O-ring), type K thermocouple and 3 meter long S type Pitot tubes (manufactured according to the design specifications and dimensional requirements stated in USEPA Method for Dioxin-Furan) housed in a smooth stainless steel sheath,
		Provision for data storage and transfer to computer for viewing in tabular or graphical form,
		Heated Filter box / Thimble holder capable to be heated up to 130 °C, the heated sampling oven that fits on the rear of the probe and is connected to the impinge train by an umbilical, the oven should be capable to accommodate up to 4“ filter holders and allowing the cold box to be set on the floor
		Filter holders (for 25 mm, 37 mm and 47 mm filter media) shall be complete with filter support and compression fittings with graphite seals
		Complete kit for sampling dioxins consisting of glass filter housing with PTFE filter support, condensing coil with resin trap
		Removable probe liner heater built into the sheath compatible with 220VAC ± 10V, 50Hz Power
1.9	**Liners, Ball Joint with O-Ring, Glassware Sets and Transport Cases (Two sets)**	Glass/Quartz liners fitted inside the Probe with O-ring sealed ball joints, the heater shall be built into the probe sheath, O-rings shall be made of PTFE (or equivalent for Dioxin sampling) pre-packed in complete sets,
		Unions and Ball & Socket adapters (made of PTFE) to be used to connect up to probe liners, nozzles or umbilicals, to be supplied with O-ring seals,
		Four complete trains of glassware (for conducting isokinetic sampling in accordance with EPA Method 5) including nozzles, liners, filter assemblies, U-tubes, resin traps, condensers, Impinger bottles with stems, associated connecting glassware and impinger clamps,
		Four sets of supplementary glassware accessories required for

		sampling in accordance with USEPA Method 23,
		Ball joints with high-tension spring and knurled locking nut to secure the ball and cup (available in sets of twelve), Sockets Connections, Leak-Free Seal with or without O-Rings
		Lockable transport cases with soft foam to accommodate glassware for shipping.
1.10	**Cold Boxes for Impingers (Two Nos.)**	Insulated and water proof Impinger box hold 6 to 8 impingers,
		Adaptor facilities for XAD-2 and PUF cartridges in sampling train.
1.11	**Umbilical Adaptors (Two Nos.)**	Stainless steel (Grade 316) construction equipped with #28 sockets, compatible thermocouple, appropriate male quick-connect and support arm that inserts in the impinger box slide bracket.
1.12	**Cleaning and Recovery Kit (One)**	The kit including Glass Funnel, Polypropylene Funnel,
		All Teflon
		½" probe brush, ¼" in Teflon Probe brush Extension with 3/8" coupler – 4 meter length,
		Two 1-Liter Polypropylene Wash Bottles,
		Two 500 mL PTFE Wash Bottle,
		1 Nylon Nozzle Brush Set (½", 3/16", 5/16" sizes),
		Teflon-coated Tweezers
2.0	**MODIFIED METHOD 23 SOURCE SAMPLER (One set)**	For Method 23 determination of dioxins and furans (D/Fs) and Method 0010 determination of semi-volatile organic compounds, sampling train with addition of a water-cooled glass condenser and an XAD adsorbent module followed by a knockout impinger (featuring a horizontal condenser and shortened knockout impinger, Borosilicate glass or quartz nozzles and probe liners, PTFE O-rings, heated flexible sample lines. Kit components:
		1. Impinger Box (1),
		2. Horizontal Condenser, ungrounded (1),
		3. Knockout impinger, ungrounded (1),
		4. XAD Trap, #28 Ball & Socket joints, ungrounded (3),
		5. Glass Cap #28 Socket, ungrounded, to seal XAD Trap (3),
		6. Glass Plug #28 Ball, ungrounded, to seal XAD Trap (3),
		7. Keck Clip #29 Plastic Ball Joint Clamp (6),
		8. XAD Thermocouple Assembly (1),
		9. Latex Tubing, 7/16 OD, 5/16 ID, natural color (4 ft).
3.0	**VOLATILE**	36 inch Heated Probe Assembly, 220V

	ORGANIC SAMPLING TRAIN (VOST) SYSTEM (One)	36 inch Pyrex Liner (8mm) with Glass Cup,
		Submersible Coolant Pump, 220V,
		Impinger Box / Insulated Coolant Reservoir,
		Lockable transport cases with soft foam to accommodate glassware for shipping,
		VOST Glassware Set consisting of the following, 1. VOST Charcoal Trap, #15 Threads and Glass Frit, 2. VOST Coil Condenser, 2" Diameter, #15 Threads and Water Jacket Hose Barbs, 3. VOST Water Trap, 40ml with #15 Threads, 45° Offset Exit, 4. VOST Absorption Cartridge, 1/4" Ends, 5. 3-way, 2-way valves and other suitable tubing and seals.
4.0	**SPARES AND CONSUMABLES**	The kit should be supplied with following spares and consumables:
4.1	**Clean up & Recovery Kit**	One TFE Probe Brush Tip (TFE Barrel AND TFE Bristles), 5/8 inch Bristle Diameter
		One Nozzle Brush Set (sizes 3, 5, & 8) in Carrying Tube
4.2	**VOST Sampling System**	SuperVOST Glassware Set (one set): 3-Way Valve w/ TFE Valve Body, #15 Threads Inlet & Purge, 8mm Outlet (1) VOST Charcoal Trap #15 Threads and Glass Frit (1) SuperVOST Coil Condenser, 2" dia., #15 Threads, Water Jacket Hose Barbs (2) SuperVOST Water Trap, 40ml with #15 Threads, 45° Offset Exit (1) VOST Adsorption Cartridge, 1/4 inch Ends (1) PTFE Straight Union, 1/4 inch (1) TFE Seal Ring, 8mm Hole Diameter (2) TFE Seal Ring, 6mm Hole Diameter (7) Bored Cap, #15 Threads (10) Seal Ring for 1/4 inch Tubing, 6mm Hole Diameter (1) TFE Tubing, 1/4 inch, Formed, (5 ft. total, 2 pieces) (5) Surgical Tubing, 3/8 inch, (2 ft.) (3) One No. 36 inch Pyrex Liner (8mm) with Glass Cup (No Ball Joint)

Item Code No.33

LOW FLOW PUMP FOR PERSONAL SAMPLING – LOW RANGE)

Battery operated lightweight pump for personal sampling with built in flow indicator for VOC/SVOC Sampling in Air.

Operating flow range	:	20 to 225 mi/min (constant flow/constant pressure mode)
Flow control	:	±5% set point constant flow
Size	:	Approx 12 × 6 × 4 cm^3
Weight	:	Less than 0.5 kg
Battery Assembly	:	Rechargeable NiMH/ NiCd, 230V
Battery capacity	:	Twelve hours minimum
Portability	:	Fits in a shirt pocket
Display	:	Easy-to-read LCD indicator for battery level, flow status & fault and time display
Run Time	:	Adaptor to enable atleast 24-hr continuous sampling
Storage	:	Store run time data in memory
Software	:	Program capable of intermittent sampling
Validity	:	Accurate air volumes & data validity
Other features	:	▪ Provision of sensing maximum charge battery to avoid overcharging ▪ Auto restart after flow fault ▪ Security system for data ▪ Low battery or restricted flow shut-off ▪
Safety	:	Intrinsically safe

Accessories	:	▪ Chargers suitable for both NiCd and NiMH battery with 230V ▪ Replacement NiMH/ NiCd battery pack for low flow pump for personal sampling (20 – 225ml/min) ▪ Replacement inlet filters (2 pack of 10 each) ▪ Single Deluxe kit carrying case with shoulder strap ▪ Operation & maintenance Manuals ▪ Toolkit
Warranty Installation & Hands on Training	:	Mini mum Two year free of cost installation at CPCB HQ Lab. & Hand on Training.

Item Code No.34

MERCURY ANALYZER

S. No.	**Specification**	Requirement
1.0	**DIGITAL MERCURY ANALYZER**	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	**VAPOUR GENERATION SYSTEM**	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	**MERCURY ANALYZER INTERFACE**	RS 232 Interfacing with mercury analyzer:
		Include interface cable and windows based software
4.0	**DATA STATION**	Mercury Analyzer Data Station with mercury software CD & interface cable
4.1	**Computer System**	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,

		1VGA integrated Port1line in/out port,
	Key board	104 Key IBM Compatible
	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 LaserJet Printer 1200 x 1200 dpi 12 PPM black
4.2	**Application Softwares**	Windows based application software capable to fully control the Digital Mercury Analyzer operation data capture, data calculation, quality control protocols etc.
4.3	**Softwares (General)**	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	**ADDITIONAL ITEMS**	
	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	**OPERATION AND MAINTENANCE TRAINING COMPONENT**	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	**GENERAL CONDITIONS OF SUPPLY**	1. The instrument and all its sub units should operate on 230 $\pm$ 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to

		be supplied should be in English language. 3. The main unit and all the sub units of the instrument should be serviced by the supplier. 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. 5. The bidder should furnish the information on past supplies and their satisfactory performance. 6. Bidders shall invariably furnish documentary evidence (client's certificate – atleast two) in support of the satisfactory operation of the equipment as specified above.

Item Code No.35

Mass Flow Controllers

Parameter	SO_2	NO	CO	Air	Air	Air
Flow range	0.1 – 5.0 ml/min	01 – 50 ml/min	10 - 500 ml/min	0.1 – 5.0 l/min	1 – 50 l/min	2-100 l/min
Operating Temp.	25 ˚C (should not exceed 70˚C)	25 ˚C (should not exceed 70˚C)	25 ˚C (should not exceed 70˚C)	25 ˚C (should not exceed 70˚C)	25 ˚C (should not exceed 70˚C)	25 ˚C (should not exceed 70˚C)
Up stream Pressure(Bar g)	1.5	2	2	2	4	4
Down stream Pressure(Bar g)	0	0	0	0	0	0
Pressure Rating (Bar a)	64	10	64	64	64	64
Max. Static Pressure (Bar a)	10	10	64	64	64	64
Material of construction	SS 316 body	SS 316 body	SS 316 body	SS 316 body	SS 316 body	SS 316 body
Supply Voltage	15 – 24V DC	15 – 24V DC	15 – 24V DC	15 – 24V DC	15 – 24V DC	15 – 24V DC
Output Signal	0-5 V DC	0-5 V DC	0-5 V DC	0-5 V DC	0-5 V DC	0-5 V DC
Accuracy	± 1% FS	± 1% FS	± 1% FS	± 1% FS	± 1% FS	± 1% FS
End Connections	Compression type, 1/8” O.D.	Compression type 1/8” O.D.	Compression type 1/4” O.D.	Compression type 1/4” O.D.	Compression type 1/4” O.D.	Compression type 1/4” O.D.
Seals	EPDM (SO_2)	Kalrez (NO)	Viton (CO)	Viton (Air)	Viton (Air)	Viton (Air)

The above mass flow controller in ml range shall be used for gases SO_2, NO,CO etc. and in lit. range for zero air supply.

(ii). Digital Readout and Control system/unit

- The instrument should be 19" rack mounted model with facilities for fixing the instrument from front side.
- The instrument should operate at operating voltage 230 V ± 10% and 50 Hz ± 3%, AC supply and the plug should be adaptable to Indian main socket.
- The model should be for eight (8) channel, suitable for flows control.
- Input 0-5 V DC from mass flow controller (MFC)
- The unit shall be used for the MFC's to be used for gaseous flow as mentioned in specifications of MFC's.

Features:

- Storage of polynomial calibration function (max 8 per channel)
- Internal/external set point control mode.
- Master/slave control mode.
- Set point slope control.

Technical specifications:

- Output/set point signal : 0-5 V DC
- Front : 2 line x 16 Character Backlit LCD
- Connection : Sub-miniature D connector socket for instrumnets
- Accuracy : ± 0.5% of reading + 0 .1% of FS
- Operating temp. range : 0 to + 50˚C
- Configuration : Through key pad on front panel including power supply for MFC's

Item Code No.36

Multi calibration system

The calibration system for air monitoring equipment should incorporate an automatic gas dilution calibrator, calibration gas standard and a high performance zero air generator to calibrate all of the analyser in the system. It should be mounted on standard 19” rack.

The dilution calibrator should be able to perform mixing of source gases from the calibration gas bottles, with zero air from zero air generator, in order to generate a wide range of calibration gases concentration and minimising the no. of calibration gas standard required. The system should include atleast 03 permeation chamber and should accept a permeation tube upto 11cm in total length and 2 cm in diameter. It should also have facility for Gas Phase Titration (GPT), having ozone generator of 6 PPM/Lit and converter efficiency should be 100% for conversion of NO2 concentration to NO.

The system should also include calibration of ozone analyser.

Item Code No.37

Multi Print Recorder

No. of Channels	:	8 Channel
Supply Voltage	:	230 V ±10% , 50 Hz Single Phase AC supply.
Display	:	Alphanumeric LED Display
Communication	:	RS 485 or RS232
Input	:	Isolated Universal Input (T/c, RTD, mV, mA, V)
Relays	:	Should be provided for alarm
Chart Width	:	250 mm
Max. Chart Speed	:	1500 mm/Hr.
Software	:	Review Software
Graphics	:	Bar and Trend Charts, alpha-numeric display through PC
Annotation	:	Clear text printing of time/ date & custom messages
Mounting Type	:	Panel Mounted
Protection	:	IP 54

Item Code No.38

METEOROLOGICAL MONITORING SYSTEM

The meteorological instrumentation should be interfaced directly with the Data Acquisition System after passing through a lightning protection isolation box. A crank – up telescoping meteorological 10 meters tower to be used to mount the meteorological instrumentation. The relative humidity and solar radiation sensors should be mounted on the tower.

(a) WIND DIRECTION

The sensor to provide low starting threshold, fast response and accuracy over a wide operating range in adverse environmental conditions.

Specifications are as follows:

Accuracy	:	± 4%
Wind Direction Operatir Range	:	0 to 360
Starting Threshold	:	0.5 m/s
Distance Constant	:	1.1 m of air maximum
Damping Ratio	:	0.4 at 10 initial angle of attack
Temperature Operatir Range	:	- 10 ^{o} to 60 ^{o} C

(b) WIND SPEED

The anemometer to provide a low starting threshold, wide dynamic response and high accuracy over a wide range of wind speeds and a variety of environmental conditions.

Specifications for the wind speed sensor are as follows

Maximum Operatir Range	:	0 – 50 m/s

Distance constant:

Vinyl	:	1.5 m of air maximum
Stainless Steel	:	2.4 m of air maximum
Heavy Duty	:	3.0 m of air maximum
Temperature Range	:	- 10 ^{o} to 60 ^{o} C
Accuracy	:	0.2 m/s or 1%, whichever is greater
Impedance	:	4.7 k ohm
Power Requirement	:	12 VDC, 4.5 mA or 6 VDC at less than 1 mA

(c) AMBIENT TEMPERATURE

Temperature measurement system specifications are as follows:

Calibrated Temperatu Range	:	-10 ^{o} C to 60 ^{o} C
Response	:	10 seconds in still air
Linearity	:	± 0.1 ^{o} C
Accuracy	:	0.15 ^{o} C

(d) RELATIVE HUMIDITY

Specifications are as follows:

Measuring Range	:	0 to 100% RH
Accuracy	:	± 1.0 % (5 – 95% RH)
Response Time	:	< 2 minutes for RH 10% to 90%
		< 5 minutes for RH 40 – 90%
		Typically 20 seconds
Linearity	:	Better than ± 2%
Reproducibility	:	0.5%
Temperature Range	:	- 10 ^{o} C to 60 ^{o} C

(e) SOLAR RADIATION

The detector should be able to measure short – wave radiation which comprises the direct component of sunlight and the diffuse component of skylight.

Specifications are as follows:

Sensitivity	:	80 micro amps per 1000 W m^2
Temperature dependence	:	0.15% per ^{o} C Max
Response Time	:	10 microseconds
Linearity	:	1 % from 0 to 3000 watts m^2
Cosine Response	:	Corrected up to 80 angle of incidence
Orientation	:	No effect on instrument performance
Calibration	:	Calibrated against an Eppley Precision. Spectral Pyranometer (PSP) under natural day light conditions. Absolute error under these conditions is 5% maximum, typically 3%

(f) RAINFALL

Measuring range	:	0.2 mm to 100 mm / hr
Accuracy	:	≤ 0.2 mm or 1% for ≤ 50 mm / hr, 2% for > 50 mm / hr
Temperature Operating Range	:	- 10 ^{o} C to 60 ^{o} C

(g) TELESCOPING CRANK – UP METEOROLOGICAL TOWER

The wind direction, wind speed, Humidity and temperature sensors are to be mounted on the Meteorological Tower. The tower is to be a free standing four section telescoping tower provided with a hand crank to raise and lower instruments mounted on the top section.

Specifications are as follows:

Extended Height	:	10 meters
Retracted Height	:	2 metres
Wind load Limit	:	0.7896 sq. m. (8.5 sq. ft) at 50 mph
Number of Sections	:	4
Construction material	:	Galvanised steel or aluminium

Note: Humidity and temperature sensors to be supplied with weather and thermal radiation shield made of anodized aluminium and sensor should be supplied with all necessary cables, connector and mounting arrangements as required

(h) SPECIFICATIONS OF DATA LOGGER

Data logger with 8 analog and 24 digital inputs. Ability to log channels at different intervals and should have capability of averaging and displaying real time data and averaged data over a period of 1 min, 10 min, ½ hr, 1 hr, 4 hrs, 8 hrs, 24 hrs, 1 month and year. Communication between data logger and computer using standard multi drop RS 232 Connector. The data logger should have internal battery with charger. The data logger should support PSTN line or GSM modem for data transfer.

(i) SOFTWARE FOR DATA ANALYSIS

Software should be compatible to Window XP. For analysis like averaging for different timings including daily and monthly averages, plotting diurnal variation and daily variation, making wind roses etc.

(j) SPECIFICATIONS OF COMPUTER (MINIMUM CONFIGURATION)

01.	Pentium IV	:	Intel-IV processor 3.0GHZ Original mother board
02.	RAM	:	3GB DDR RAM Up-gradable up to 4.0GB
03.	Hard disk	:	320 GB ultra DMA 100HDD

04.	FDD	:	1.44 MB 3.5”
05.	CD Writer	:	Combo drive, Internal, latest model
06.	Monitor	:	19” LCD / TFT
07.	Port	:	4 bays (2 external & 2 internal) 2 serial, 1 parallel & 3 USB with LAN 1PS, 2 mouse port.
08.	Keyboard	:	Latest multi media (Microsoft)
09.	Mouse	:	Optical / Scroll Mouse + Pad
10.	Software	:	Windows XP professional (latest version) with media documentation and certificate of authenticity, Anti virus with continuous up-gradation
11.	Anti Virus	:	Norton, McAfree or equivalent antivirus (Latest Version)
12.	CD Writer	:	Internal, latest model
13.	Network Card	:	Network card with remote booting facility

14. Energy star compliance, screen blinking, hard disk and system idle mode in power on, set up password power supply surge protected,

(k) SPECIFICATION OF LASER PRINTER

01.	Speed (pages per minute)	:	At least 12
02.	Resolution	:	1200 x 1200 dpi
03.	RAM	:	8 MB expandable to 32 MB
04.	Main tray Capacity	:	At least 250 sheets
05.	Interface	:	Parallel & USB
06.	Operating System	:	Windows 2000, XP
07.	Power supply	:	230V AC, ± 10 V AC, 50 Hz, ± 3%

Item Code No.39

Microbial Identification System (Automatic)

Automatic Microbial identification system for identification of Bacteria, Yeast, fungi and moulds with automatic screen display of name of the species.

- Identication system should be based on carbon source utilization using microplates having different carbon source.

- It should be able to identify Aerobic bacteria (Gram Negative & Positive) in a single Microplate so that No Gram staining is required.

- System should be able to identify Gram negative, gram positive, anaerobic, bacteria, yeast & fungi with the help of large database covering atleast 2000 speicies.

Data processing software , electronic pipettor, turbidity meter , Reader for Reading the Microplates and computer should be supplied .

-for study of Data analysis , Data Management Software should be

Provided for an unprecedented ability for the trending and tracking of microbial

identification for environmental monitoring laboratories. Like for Cluster analysis 0and creation of user database .

Item Code No.40

Noise Level Meter

1.	Measurement range	:	Should cover 20 - 140 dBA
2.	Frequency weighing	:	Switchable to A, Linear, Octave and 1/3rd Octave
3.	Accuracy	:	Min. IEC 804 (BS 6698) Grade I or ANSI Type I
4.	Resolution	:	0.1 dB over Full Range
5.	Display	:	Digital (Leq, SPL, L_{max} and L_{min})
6.	Time weighting	:	Switchable to different time intervals i.e. $^1/_8$ Sec., 1 Sec., 10 Sec. etc. or slow, fast, max.
7.	Power supply	:	Battery system
8.	Computer interface	:	Data logging system with RS 232 interface
9.	Calibration	:	Automatic calibration
10.	Temperature	:	0^O C to 50^oC
11.	Memory	:	Sufficient memory to store atleast 8 hrs. data for all parameters given in modes and octave band analysis.

Accessories Required

1. Calibrator (see specification)
2. Microphone (spare, see specifications)
3. Tripod stand
4. Wind screen
5. Batteries
6. Carrying case or kit
7. Extension cable with pre amplifier

Specifications

1. Calibrator

I	Level (dB)	:	Two - one each in lower and higher range.
II	Frequency	:	1 khz.
III	Accuracy	:	± 0.3 dB at 25^0C
IV	Adaptors	:	25mm, 12.5 mm, 6.25 mm

2. Microphone

I	Type	:	Premacharge air-condenser unit
II	Polarisation Voltage	:	Not required
III	Response Type	:	Free Field `0' degree incidence
IV	Response Accuracy	:	min IEC 651 type I
V	Operating Temperature	:	0 to 55°C
VI	Range	:	20 - 140 dB(A)

3. 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). A compatible software supplied with the data logger shall be able to handle all communication requirement.

4. Further details/information required
   1. Leq in bytes
   2. Built in memory in bytes
   3. Whether data logger in-built in the unit or is a separate system
   4. Details of software, in-built/spread sheet

5. Whether the system is compatible for measurement of other parameters like meteorology

6. Whether octave provided or not

   a) If yes; its range

7. Whether the software has facility for:-

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

Item code No.41

Ozone generator/ Permeation system

- The instrument should be 19" rack mounted model with facilities for fixing the instrument from front side.
- The instrument should operate at operating voltage 230 V ± 10% and 50 Hz ± 3%, AC supply and the plug should be adaptable to Indian main socket.
- The instrument should contain the following components :-

i. An ozone producing module consisting ozone oven and UV lamp with the specifications –

• Ozone Oven	:	Special heatable ozone generator oven with max temp. 70˚C. Oven material should be aluminium, internally PFA coated.
• Temp. of O_3 oven	:	The oven temp. should be set between 63 to 65 ˚C. The LCD should indicate the actual temp. of the ozone generator oven. The temp controller can be set 0-70 ˚C.
• Temp. adjusting pot. temp.	:	A pot. should be to set the ozone generator oven
• UV lamp current	:	0-20 mA LCD The LCD element should show the actual measured lamp current for the UV lamp. The indicated range should be 0-20 mAwith a resolution of 0.01 mA.
• UV lamp current set point	:	UV lamp current adjustable by 10 turn dial otentiometer to generate ozone concentration between 3 -30ppm at flow rate of atleast 1 l/min.
• Length of the UV lamp	:	The Oven should equipped with mercury UV lamp special length about 5" (12.5 cm)
• Gas connection	:	The gas connection arrangement should be on rear side and indicated as "O_3 OVEN IN" and O_3 OVEN OUT". The fitting shall be made of PFA material for ¼" Teflon tubing's.

The Zero air to the Ozone oven should have kept at a constant flow in the range of 0-5 lit. / min. Any change in the flow range should effect the outlet concentration.

ii. A permeation module consisting of the permeation oven for housing atleast two permeation sources with the specifications:

- Permeation oven — Double chamber permeation oven PTFE coated aluminium.
- Permeation oven temp — There should be minimum two operating temp either 40˚C or 50 ˚C with a stability of 0.1 ˚C. The LCD display should indicate the actual temp. of the permeation oven.
- Toggle switch — There should be a toggle switch to select the oven temp. either 40˚C or 50 ˚C.
- Gas connection — The gas connection arrangement should be on rear side and indicated as “PERMEATION IN” and PERMEATION OUT”. The fitting shall be made of S.S (Swagelok type) material for ¼” Teflon tubing’s.

iii. It should contain all necessary power supply and electronic circuitry to operate the module.

Item Code No.42

Oil sealed mechanical vacuum pump (5 to 21 m^3/h)

The pump should be Two Stage Rotary Vane type and operated at 230V 50 Hz Single Phase AC supply

Nominal Pumping Speed 50 Hz	:	9.7m^3/h
Pneurop Pumping speed 50 Hz	:	8.5 m^3/h
Ultimate partial pressure	:	10^{-4} mbar
Ultimate total pressure closed gas ballast	:	2.10^{-3} mbar
Ultimate total pressure open gas ballast	:	10^{-2} mbar
Water vapour capacity	:	125 g/h
Water vapour pressure 50 Hz	:	20 mbar
Weight	:	Appox. 20-30 kg
Max. nominal power rating 50 Hz	:	0.5 kW
Min ambient temperature	:	10^0 C
Max. ambient temperature	:	45^0 C
Oil capacity	:	1.0 L
Inlet flange	:	DN 25 ISO-KF
Exhaust flange	:	DN 25 ISO-KF

Oil Filter

The pump should be equipped with oil filter/ oil mist eliminator

Maintenance Kit

It should include maintenance kit consists of lip seals, shaft sleeves, valves, shaft seals, 'O' rings, vanes, springs and plugs etc for complete overhauling of the vacuum pump.

Oil

Type	:	Paraffin based mineral oil
Vapor Pressure	:	$1.3.10^{-6}$ mbar at 54 ^{0}C
Viscosity	:	118 cst at 40^0C
		12.5 cst at 100^0C
Density	:	0.886
Flash Point	:	260^0C

Item Code No.43

OPTIMIZED HPLC POST-COLUMN DERIVATIZATION SYSTEM FOR HPLC

1.0	**SYSTEM FEATURES**	
1.1	Compatibility	Should be fully compatible with Agilent HPLC
1.2	Software control	**Powerful software control**-For precise control of reagent delivery and conservation
1.3	Reactor	**Flexible reactor**-Quick change reactor cartridge
1.4	Column Heater	**Column heater fast and stable**-to circulate air for consistency of heat and quick cooling, with temperature gradient programming
2.0	**Column Heater and Reactor Controller**	
2.1	Heater	Heater to hold upto 8 mm OD x 50-250L column and guard
2.2	Temperature gradient	Programmable temperature gradient
2.3	Temperature setting	Temperatures hold with in ±0.5^{0}C from the set point. Could be set with 1^{0}C resolution from 5^{0}C above ambient to 75^{0}C
2.4	Column access	Easy column access
3.0	**Dual Reagent Pump**	
3.1	Reagent Pump	True pulse-free pump
3.2	Barrel	Single piece ceramic barrel
3.3	Flow path	Completely inert flow path
3.4	Operating pressure	Maximum operating pressure 500psi
3.5	Flow-rate	Programmable flow-rate Flow range:30 µl to 1500 µl /min
3.6	Wash cycle	Automatic piston wash Automatic reagent flush cycle
4.0	**Reactor**	
4.1	Temperature range	Heated reactor for temperature from 5^{0}C above ambient to 140^{o}C

4.2	Coil cartridge	Easy replacement coil cartridge
4.3	Reactor dwell volume	Range of reactor dwell volume: 0.1 ml to 3.0 ml
4.4	Inlet pressure	Reaction coil withstand up to 40 bar inlet pressure at 140^0C
4.5	Thermal safety	Thermal safety switch limits temperature to 150^0C to prevent damage
4.6	Response	Fast response
5.0	**Display**	Back lit LCD
		Real time temperature and pressure display
		System status icons
		Simple system control interface
6.0	**Safeguards**	In-line-check valve: To prevent reagent back flow in to the column when HPLC pressure drops
		Replaceable filters to prevent column and reagent fouling
		Post-column system over pressure: a pre calibrated relief valve opens at 35 bar to prevent rupture of the post-column reactor tubing in the event of downstream blockage
		Easy access to internal components
		Standard fittings
		Post-column pressure relief valves
		Back pressure regulator to prevent detector noise Integrated reagent reservoir tray
		One liter capacity reagent reservoirs with tubing for reagents
		Voltage:230 ± 10V AC

Item Code No.44

OZONE PRECURSOR (INDIVIDUAL VOLATILE ORGANIC COMPOUND) MONITOR (PPB Range)

General	:	Dual Column , Dual Detector (FID/PID) based Individual Volatile Organic Compound (as per EPA Standard Method TO 15/17) /Ozone precursor Monitor (C2-C5 & C6-C10) required for direct assessment/ monitoring of Ambient air fitted with required capillary column(s), auto sampling/ trapping/ injection facilities ,detectors, and calibration VOC Mixture
Dual Detector System		PID/FID
Dual Column		Suitable Precolumn/Cap.Analyt. Column for Aliphatic HCs ie 5+30m, 0.32 mm ID, 5 µm film or so , and Suitable Cap. Column for Aromatics (i.e. 624) 30m, 0.32 mm ID, 1.8 µm film or so
Accuracy	:	± 5% of reading or ± 1ppb
Low Detection Limit	:	For butadiene 0.05 µg/m^3 , for other hydrocarbons 0.5 –1 µg/m^3 or better and For benzene 0.5 µg/m^3
Resolution	:	0.1 ppb
DRIFT		Zero gas: < 0.1 ppb (as isobutylene) over 24 hours. Span : For 100 ppb isobutylene, < 3 % over 24 hours
Operating Concentration Range	:	up to 300 ppb
PID Lamp		10.6 eV (life span > 6000 hrs)
Sample/Pump Flow Rate	:	0.1– 0.5 L/ min with low flow alarm, auto shut off at low flow conditions
Cycle Time		30 Min
Operating Temperature Range	:	0 – 40°C
Operating Humidity Range	:	0 – 95% relative humidity (non-condensing)
P C, Software & Data Output	:	PC-PIV preloaded with Windows XP & MS Office and antivirus software besides Instrument Control & Data acquisition software Serial Output – RS232 for downloading of data ,CD Rom ,2 x USB, Ethernet, PS2 key/mouse, Laser printer, Direct control via keyboard or mouse, or via remote host (RS232/Ethernet/ modem), data exchange protocols

Data Display, Alarms, Storage & Software	:	Digital Direct read-out of VOC concentration by volume, average, high and low values, Fault, TWA and STEL alarms with auto storage of monitor serial number, user ID, site ID, date and time Data storage of approx. 15000 data points or more with software capability of processing data in various averaging time hourly (1,2,4,8,12,24 hrs) & monthly in the form of min. max. average & std. deviation etc. in excel format
Calibration		Preferably Internal Calibration facility, Calibration of Zero and standard reference gas, calibration memory of > 5 calibration levels gases standards, and calibration date, method storage & reactivation
Calibration Gas Certification	:	NIST Traceable VOC Calibration Mixture One set of each as per EPA Method TO15/17 & a set of Mixutre as per list i.e. (Propane, Propene, n-Butane, n-Pentane, 1-Pentene, 1-Hexene, n-Hexane, Isoprene, Methylpentane,Dichloromethane, Trichloroethane, Benzene, Toluene, m,p-Xylene, Ethylbenzene, o-Xylene, 1,3-Butadiene Trimethylbenzene, Acetonitrile, Acrylonitrile, Chlorobenzene Acetone, , Chloroform, Carbon Terachloride, Vinyl Chloride, Freon, , Butanol, , Chloromethane, Ethyleneoxide, Ethylenedibromide, Dichloroethane, Trichloroethylene, Carbon di-sulphide, Formaldehyde, Styrene)
Power Supply		210-230 VAC, 50/60Hz

I) Accessories/Spares & Consumables II) Calibration Gas Concentration (certified & traceability certificate) I) Addl.PID lamps II) Operation & maintenance Manuals, Toolkit		For uninterrupted Operation of two years(Provide a list of items) Two calibration gas cylinders with100 ppb of VOCs each as per EPA Method TO15/17 and as per given list in Nitrogen, standard volume (NIST traceable) in standard cylinder at specified pressure with dual stage SS regulator 10.6 eV (life span > 6000 hrs) one additional 1 set with each
10.Installation & Training		Free of Cost Installation in CPCB Lab in Delhi & operational Training at CPCB as well as one week training to concerned 2-3 Scientists with Principal,s training institute
11.Warranty		Three year comprehensive warranty: routine maintenance, breakdowns including all spares parts & accessories necessary to make the whole system operational.

Item Code No.45

PAH /VOC STANDARDS

All standards should be of reputed make having at least 2 year self life.

Purity given with each std should be NIST Traceable & be supplied with certificate of purity, analysis & standard chromatogram showing elution sequence with GC /GC-MS & column conditions etc.

S.No.	Description	Quantity Required	Remarks
2	VOC Mix Standard (**in Methanol**) about 60 compounds in conc. Range of 200µg/ml.	1ml * 2 nos.	
3	VOC Mix 15 (Mix of 54 compounds) 200ng/µl **in** CS2 or methanol	1ml * 2 nos.	
4	PVOC Mix 3 (Benzene, Ethyl benzene, MTBE, Napthlene, Toluene, TMB, opm Xylene), 100ng/µl **in methanol**	1ml * 2 nos.	
6	VOC GC-MS Tuning Standard (p-bromofluorobenzene), conc. 2ppm approx **in methanol**	1 ml * 1 no.	
7	Calibration PAH Mix 63 (USEPA Meth-16), 1000ng/µl **in Toluene**	1 ml * 2 nos.	
10	CRM-Benzo(a)pyrene	10 mg pk * 2nos.	
11	CRM-PAH Standards as per USEPA list of 16 priority PAH compounds or NIST SRM 1649 with conc.specs.	1g pk * 1no.	
12	Mixture of Duetrated surrogate Internal statndards for PAHs namely acenaphthene-d10, chrysene-d12, phenanthrened10 ,and perylene-d-12. (conc 1000ng/µl)	1 ml * 2 nos.	
13	Mixture of Duetrated surrogate Internal statndards for VOCs namely Chlorobenzene-d5 , 1-Bromo-4-Flurobenzene (4-Bromofluorbenzene) (conc)1000ng/µl	1 ml * 2 nos.	
14	Triphenyl benzene **(**Internal Standard for PAH analysis**)** **(>99.5%)**	10 gm*1no	

Item Code No.46

Peristaltic Pump (Multi Channel Type)

Specification:

Control	:	Manual and digital both
Power	:	100 VA]
Speed	:	1.0 – 200 RPM
Flow	:	5 ml- 300 ml/ minute
Auto	:	control – upto 30 V to 32 mA
Display	:	LED display
Finish	:	Chemical resistant

Reversible preferred

Separate Pump Head and Drive Accessories:

Pump heads:

a) Steel rollers extend tube life
b) 6-8 channel versions
c) Individual cassettes

Tubes:

Teflon Tubing (5 m length each) Tube bore:

a) 0.5 mm
b) 0.8 mm
c) 1.6 mm
d) 3.2 mm

Item Code No.47

$PM_{2.5}$ SAMPLER (US-EPA approved)

Flow rate	:	Fixed, 1m^3/hour (16.7 lpm) controlled by Mass Flow Controller
Elapsed time indicator	:	Up to 9999 hours with two decimals
Vacuum pump	:	Diaphragm type, brush less motor
Flow recorder	:	Chart type/Memory based downloadable to computer and/or manually displayed on screen
Dry gas meter (Volume totalizer)	:	For measuring total volume of air sampled
Volumetric Flow rate compensation	:	Ambient temperature and pressure sensors to control volumetric flow rate
Power requirement	:	230 $\pm$ 10 VAC, $\pm$ 10 50 Hz 0.5 Amp. max.
Size Selective inlets	:	Opposed jet impaction for PM_{10} cut and Cyclonic / WINS impactor for $PM_{2.5}$ Cut off
Special Features	:	The system should have an option to be used for PM_{10} sampling
Calibration Unit	:	Calibration unit to calibrate the flow rate of the instrument
Additional supply	:	Manufacturers standard operation kit including all required items, fittings for start up / regular operation of instrument. Operation and maintenance manual for each unit. Spares and consumables for three year operation.

Following filter papers should be supplied along with each instrument:

1. Pure Nylon membrane (1 µm, 47 mm) developed specially for acidic dry deposition measurements = 10 packets (pack of 100 Nos.).
2. PTFE membrane filter with PMP (poly methyl pentene) support ring (1 µm, 47 mm) = 10 packets (pack of 100 Nos.).
3. Pure Quartz filter (max. operating temp. >1000^o C) 47 mm = 10 packets (pack of 100 Nos.).

Item Code No.48

Re-circulating Chiller For Rotavapor

Specification:

Water Cooling	Preferably Down to about -10 °C (using CFC Free Gas)
Water Re-circulation	Leak Proof Re-circulation of cold water to and from condenser
Distribution	Capable of supplying to two Rotavapor Units
Power Consumption	1500 Watts or less

Item Code No.49

ROTARY EVAPORATOR WITH PUMP

1.1	Rotavapor	One Set
1.2	Heating Bath	One Set
1.3	Vacuum Controller	One Set
1.4	Glass Assembly	One Set
1.5	Vacuum Pump	One Set
1.6	Water Jet Pump (Optional)	One Set
1.7	Re-circulating Chiller (Optional)	One Set
2.0	**General Specifications**	
2.1	Operating Voltage	230 Volts ± 10 Volts AC
2.2	Frequency	50 Hz
2.3	Power Consumption	1500 Watts or less
2.4	Power On / Off Switch	Separate for each component
2.5	Footprint	Less than 0.20 m^2
3.0	**Technical Specifications**	
3.1	**Rotavapor**	
3.1.1	Rotation Speed	Control and digital display
3.1.2	Vapour Temperature	Sensor and Digital display
3.1.3	Jack	For elevation and submersion of evaporating flask,
		Jack operation - electrical by pressing of button as well as manual
3.2	**Heating bath**	
3.2.1	Material	Corrosion resistant stainless steel / coated with PTFE

3.2.2	Capacity	About 4.0 Litres
3.2.3	Heating Element	Under Pan heating element for ease of bath cleaning
3.2.4	Temperature Control and Display	Provision for setting of temperature by user, digital display
3.2.5	Temperature Range	Settable from 20 to 180 °C
3.2.6	Temperature Accuracy	1 °C
3.2.7	Flask Accommodation	50 - 3000 ml
3.3	**Vacuum Controller**	
3.3.1	Vacuum Display	Digital display
3.3.2	Vacuum Control	Capable of controlling vacuum set by user for unattended operation
3.3.3	Programming Facility	Vacuum programming for evaporating mixture of solvents
3.3.4	Programme Storage Facility	Facility to store user customised programmes
3.4	**Glass Assembly**	
3.4.1	Condenser	Vertical, compatible connectivity for vacuum pump & water jet pump
3.4.2	Joint Adapter	Press fit type Adapter for connecting evaporating flask to condenser
3.4.3	Evaporation Flask Volumes	Preferably conical shape, 25 ml, 50 ml, 100 ml, 250 ml and 500 ml
3.4.4	Extension Joints	Adapter Joints for smaller volume evaporation flasks
3.4.5	Receiving Flask (Condensed Solvent)	Spherical 1000 ml with ball joint and clamp
3.4.6	Clips for assembling of Evaporation Flask	Preferably plastic, press fit assembly
3.5	**Vacuum Pump**	
3.5.1	Vacuum Pump Type	Mono Block, PTFE Diaphragm type
3.5.2	Final Vacuum	About 10 mBar

3.5.3	Suction Volume	About 1.5 m^3/hour or more
3.5.4	Communication with Vacuum Controller	Vacuum level communication with vacuum controller
3.5.5	Glass Heads	Inert Glass Heads
3.5.6	Control of Solvent Vapour built-up	Secondary Condenser for minimization of Laboratory Pollution
3.6	**Water Jet Pump (Optional)**	
3.6.1	Type	Solenoid Valve type with quiet operation
3.6.2	Control of Water Flow	Communication with Vacuum Controller for control of water flow
3.6.3	Dual Function	Vacuum and integrated Cold Water Circulation
3.7	**Re-circulating Chiller (Optional)**	
3.7.1	Type	Compact, light weight, bench top model
3.7.2	Water Cooling	Down to about -10 °C (using CFC Free Gas)
3.7.3	Water Recirculation	Leak Proof Recirculation of cold water to and from condenser
3.7.4	Distribution	Capable of supplying water to two Rotavapor Units
3.7.4	Power Consumption	1500 Watts or less

Item code No.50

STACK MONITORING KIT CONFIRMING TO USEPA METHODS 5, 23, 26, 29 AND 0030 .

The sampling system is to carry out isokinetic stack sampling in accordance with USEPA test protocols. Of particular interest is emissions sampling for particulate, dioxins/furans, trace metals, other volatile organics and mercury from industrial sources.

ITEM DESCRIPTION

1. ISOKINETIC SOURCE SAMPLING CONSOLE (1)

- Calibrated Direct Reading Metric Unit Dry Gas Meter, 10 Liter per Revolution, 0.1 Liter Resolution. Calibrated to 1.0 ± 0.05, Deviation from average less than 2%
- Dual Inclined Manometer, 254 mm Vertical Scale, 25.4 mm Incline, 0.1 mm Incline Resolution, Positive Brass Shutoff Valves for Transport
- Individual Programmable, Digital Solid-State Temperature Controllers for Probe and Filter Oven Circuits
- LED Temperature Readout for K-Type Thermocouple with 7-Station Selector Switch, -105°C to 1,372°C to Range
- Auxiliary Thermocouple Jack for Handheld Temperature Readout
- Power, Pump, Timer, Null Solenoids and Orsat Pump Switch Controls
- Individually Fused Circuitry Located on Easily Accessible Fuse Panel
- 4-pin military style am phenol power distribution connector meets AN-3057-6 specifications
- Reset table Elapsed Digital Timer
- Modular Electrical and Plumbing Panels
- Fully Removable Front and Rear Access Doors
- Lightweight 0.090" Aluminum Housing, Stainless Steel Latches, Handle and Hardware
- 220 VAC/50 Hz Power
- Stainless Steel Valves and Quick Connects
- Complete Orsat Option Assembly: Orsat Pump, Rotameter, Valve and Quick Connects
- Leak free Quick connections for gas, pressure and vacuum lines
- Lockable transport case with soft foam

2. VACUUM PUMP ASSEMBLY (1)

- Fully Enclosed Rotary Vane Vacuum Pump or equivalent
- Leak Free Vacuum Pump, 1/4HP, 88LPM @ 2.5 cm Hg, 57 LPM @ 38 cm Hg, 66 cm Hg Maximum Vacuum
- Equipped with 2 m Vacuum Hoses and Nonreversible Stainless Steel Quick Connects to Eliminate the Possibility of Cross Connection
- 220 VAC/50 Hz
- Lockable transport case with soft foam

3. LONG UMBILICAL CABLE WITH QUICK CONNECTS (1)

- 30 meter in length +/- 3 meters
- Flexible Construction with Expandable Abrasion Resistant Low Friction Over braid Jacket
- One High Vacuum Sample Line (300 psi) with appropriate Quick Connect
- Couplings, Three Pressure Lines, Two for Pitots with appropriate Quick
- Connect Couplings and One for Orsat Line with appropriate Quick Connect Coupling
- (5) Type K Thermocouple Lines
- One 5-conductor electrical cable with 4-pin amphenol connector or equivalent
- One full length stranded nylon strain relief cable

4. SHORT UMBILICAL CABLE WITH QUICK CONNECTS (1)

- 10 meter in length +/- 3 meters
- Flexible Construction with Expandable Abrasion Resistant Low Friction Overbraid Jacket
- One High Vacuum Sample Line (300 psi) with appropriate Quick Connect
- Couplings, Three Pressure Lines, Two for Pitots with appropriate Quick
- Connect Couplings and One for Orsat Line with appropriate Quick Connect Coupling
- (5) Type K Thermocouple Lines
- One 5-conductor electrical cable with 4-pin amphenol connector or equivalent
- One full length stranded nylon strain relief cable

5. SET OF ISOKINETIC SAMPLING NOZZLES (1)

- 7 Sizes from #4 (1/8") to #16 (½") packed in a Foam Lined Case
- Stainless Steel Nozzle Set, includes 5/8 " Stainless Steel nuts and ferrules
- Glass nozzles set for Dioxin sampling (EPA 23)

6. SHORT SAMPLE PROBE/S-TYPE PITOT TUBE/THERMOCOUPLE

ASSEMBLY (1)

- 316 Stainless Steel welded construction - 1 meter effective length (1)
- **Stainless steel Type S Pitot Tube manufactured according to the design specifications and dimensional requirements stated in USEPA Method 2**
- K-type thermocouple assembly attached
- Orsat sample tube attached
- Pyrex glass liner with #28 ball with O-ring
- Removable probe liner heater compatible with 220 VAC/50 Hz Power
- Size selective inlets for PM_{10} and $PM_{2.5}$.
- In stack filter holder for asbestos monitoring

7. LONG SAMPLE PROBE/S-TYPE PITOT TUBE/THERMOCOUPLE

FILTER BOX/THIMBLE HOLDER ASSEMBLY (1)

- Heated Filter box/Thimble holder capable to be heated up-to 130 °C.
- 316 Stainless Steel welded construction - 2 meter effective length (1)
- Stainless steel Type S Pitot Tube manufactured according to the design specifications and dimensional requirements stated in USEPA Method 2
- K-type thermocouple assembly attached
- Orsat sample tube attached
- Pyrex glass liner with #28 ball with O-ring
- Removable probe liner heater compatible with 220 VAC/50 Hz Power

8. BALL JOINT WITH O-RING GLASSWARE SETS AND TRANSPORT CASEs (4 SETS)

- **Four** complete trains of glassware including filter assemblies, Impinger bottles with stems, associated connecting glassware and impinger clamps for conducting isokinetic sampling in accordance with EPA Method 5
- Four sets of supplementary glassware accessories required for sampling in accordance with EPA Method 23 or Environment Canada Method RM2
- Glassware is Heavy Wall Borosilicate Glass with Precision Ground #28 Ball with O-Ring and Sockets Connections, Leak-Free Seal with or without O-Rings
- Lockable transport cases with soft foam to accommodate glassware for shipping

9. COLD BOXES FOR IMPINGERS (2)

- Impinger box is insulated and water proof and hold 6 to 8 impingers
- Has stout handle with centering loop and mounting locations for the aluminum slide block on opposing sides for the impinger inlet strain relief and impinger outlet adapter
- Adopter facilities for XAD-2 and PUF cartridges in sampling train.

10. UMBILICAL ADAPTORs (2)

- 316 Stainless steel construction equipped with #28 socket, comapatible thermocouple, appropriate male quick-connect and support arm that inserts in the impinger box slide bracket

11. SUSPENSION RAIL SYSTEMS (4)

- Suspension Rail systems constructed of 16 gauge galvanized steel and 3 meters in length to support the modular sample case and other trains with adjustable hangers to allow safe alignment and maneuvering of the probe into the port
- Includes a dual roller trolley for each rail, snap hooks for quick set-up and dismantling

12. CLEANUP AND RECOVERY KIT (1)

The kit includes;

- Glass Funnel
- Polypropylene Funnel
- All Teflon ½" probe brush
- ¼ in Teflon Probe brush Extension with 3/8 " coupler – 4 meter length
- 2 1-Liter Polypropylene Wash Bottles
- 2 500 mL TFE Wash Bottle
- 1 Nylon Nozzle Brush Set: ½ " , 3/16", 5/16" sizes
- Teflon-coated Tweezers
- Portable balance, 1-2000g with 0.5 g resolution

13. EQUIPMENT CALIBRATION KIT (1)

1 Set of critical orifices for routine dry gas meter/orifice calibration

1 set of calipers for measuring nozzle diameters

14. VOST SAMPLING SYSTEM (2)

- 36 inch Heated Probe Assembly, 220V
- 36 inch Pyrex Liner (8 mm) with Glass Cup
- Submersible Coolant Pump, 220V
- Impinger Box / Insulated Coolant Reservoir
- Lockable transport cases with soft foam to accommodate glassware for shipping
- VOST Glassware Set consists of the following

VOST Charcoal Trap, #15 Threads and Glass Frit

VOST Coil Condenser, 2" Diameter, #15 Threads and Water Jacket Hose Barbs

VOST Water Trap, 40 ml with #15 Threads, 45° Offset Exit

VOST Absorption Cartridge, 1/4" Ends

3-way, 2-way valves and other suitable tubing and seals

The kit will be supplied with spares and consumables for three-year operation

Item Code No.51

Standard Weights (for Analytical balance)

Weight range	:	1 mg to 200g (complete range consisting of 23 pieces)
OIML Accuracy Class	:	E2
Construction	:	Solid single piece
Material	:	Austenitic Stainless Steel
Shape	:	1 mg to 500 mg – SS wire 1 g to 200 g – Cylindrical with knob
Presentation	:	Set of weight packed in polished teakwood box lined with lint free velvet cloth and provided with Teflon tipped forceps and gloves
Optional	:	Calibration certificate traceable to national / international agencies.

Item Code No.52

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 ± 10 Volts, 50 Hz AC) metal blocks. It should be capable of providing a temperature range from 100C - 440oC With ±10C 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 atleast eight numbers of digestion tubes each of atleast 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 exhaust 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 ± 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 value.
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 ± 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.

Condition & Requirements

The supplier shall do installation, commissioning and training in operational use.
At least 5 years of after sale service shall be guaranteed

Item Code No.53

TOTAL ORGANIC CARBON (TOC) ANALYZER

1.0	**INSTRUMENT COMPOSITION**	
	TOC Instrument	One set
	Auto Sampler/ Diluter	One set
	Data Work Station	One set
2.0	**TECHNICAL SPECIFICATIONS**	
2.1	**Basic System**	Computer controlled integrated system with inbuilt diagnostics capable of analyzing Solid/Sludge samples as well as aqueous sample.
		TOC analyzer should be capable for oxidizing all kind of environmental samples and must be controlled through single point, using instrument software without any hardware changes/replacement during changeover from solid to liquid mode or vice-versa. All features of analyzer should be controlled from Computer Keyboard and software.
		TOC analyzer must work on high temperature combustion followed by multi-channel NDIR detection for measurement of the evolved CO_2 and O_2 as carrier as well as oxidant. Analyzer should be capable of inorganic carbon removal in solid samples.
		TOC analyzer with High-speed data acquisition system, quality control protocols, calibration, auto optimization and auto tuning of system with status display.
		TOC analyzer should be with Autosampler provision for range selection (auto and manual both features).
	Application	TOC analysis in Solid / Sludge and aqueous sample with inbuilt Inorganic Carbon removal in solid sample, covering all kind of environmental and industrial samples.
	Operation	Analyzer should be fully automatic with features for even unattended operation for direct measurement of TC, TIC, TOC in both Solid and Liquid samples and upgradeable for the measurement of NPOC, POC and TN_b {Total Nitrogen (bound)}.
	Interference Circumvent	Salinity up to 35 g/l should not interfere in accurate analysis of measurands, and system should be capable to take upto 500 µm of suspended particles size in aqueous samples
2.2	**Measuring Range**	For Solid sample – 5 µg to 30 mg Carbon absolute
		For Liquid sample - 50 ppb to 20,000 ppm (without dilution)
2.3	**Sample Volume**	For Solid sample – upto 1 gram or more
		For Liquid sample – upto 2 ml or more

2.4	**Detector**	Non-dispersive infrared (NDIR) with Mass Flow Controller to ensure constant flow
2.5	**Furnace Temperature**	Furnace temperature should be adjustable / user selectable through software in both liquid and solid mode.
		For Solid samples – up to 900 ^{0}C or more
		For Liquid samples – (catalytic combustion) atleast 680 ^{0}C or more
2.6	**Precision**	± 1% at 100ppm.
2.7	**Reproducibility**	< 2%.
3.0	**AUTO SAMPLER / DILUTER**	Auto sampler / Diluter should be compatible with TOC analyser, with sipper tube, sample delivery system, providing automatic analysis including measurement and rinse time
	Carrousel	Atleast 50 or more positions carrousel with 40 ml capacity tubes, alongwith “Magnetic-Strring-Bits”
	Automation	Automatic acidification for TIC removal, replicate injection, automatic draining of vials, individual Stirring in vials with adjustable stirring speed.
	Auto Diluter	Should be programmable complete with inert PTFE coated probe with PTFE inner tubing, spare extension tube complete with all accessories, racks, bottles, dust cover etc.
	Sample line flushing	Should automatically flush the sample line and prepare sample for injection.
4.0	**DATA WORK STATION**	Programme facility with multitasking software displaying method sample and analysis status.
4.1	**Application Software**	Instrument control reintegration/ report multi level calibration.
		Calculation of data and report formatting. External and dilution calibration, automatic correction for interferences and measurement with internal standards.
		Measurement of transient signals.
		Comprehensive quality control protocols including preparation blanks, multiple quality control standards, calibration, check samples, spike recoveries, duplicates calibration failure and QC limits.
		Provision for statistical analysis. Should control whole TOC system, sample introduction, calibration, data retrieval, data acquisition and reporting. Auto optimization of NDIR, customizable instrument status display.
4.2	**Computer System**	Reputed make such as HP/ Compaq/ Dell/ IBM
	Processor	Intel Core 2 Duo Processor 3.0 GHz or above
	RAM	4 GB (Upgradeable to 8 GB)

	HDD	500 GB Ultra DMA or higher, 7200 RPM
	Monitor	21" TFT - LCD Flat Panel Colour Digital
	DVD Writer	32x DVD +/- RW Dual Layer Write Capabilities
	DVD-CDRW	DVD / CD RW, COMBO DRIVE 48 x 24 x 48 (max speed)
	Ports	2 Serial, 1 Parallel, 2 Front USB Port, 6 rear USB Ports, 2 PS/2 Port, 1VGA Integrated Port, 1 line in/our port
	Graphics	Internet ready with Integrated graphics.
	Audio	Integrated sound Card with inbuilt Stereo speaker.
	Mouse	Optical mouse with Pad and driver software
	Key Board	104 keys IBM compatible
	Ethernet	32 bit Auto selectable 10/100 mbps
	Printer	HP LaserJet Colour Printer; Speed 12 ppm black; Resolution 1200 x 1200 dpi or better
4.3	**Other Softwares**	Preloaded Windows 7.0 Professional or latest operating system with Licensed CD
		Preloaded MS Office 2007 Professional with media, manual and Licensed CD
		Preloaded Antivirus with latest virus definition code along with Licensed CD
5.0	**ADDITIONAL ITEMS**	Manufacturers Standard Accessories
		Operating kit comprising all required items pump, tubing, transfer tubing bottles 500 ml and 250 ml. Samples degassing accessories etc. for start up/regular operation of instrument.
		Operation and maintenance manual for each unit.
		Application notes (CD-ROM) for TOC analysis in environmental, geological, metallurgical, biological and industrial samples
		One set of multi and single Range calibration Standards for TOC analysis
		Service manual with set of required tools for each system/unit
		Spare parts catalogue
		Trouble shooting charts.
		Dust Covers for each unit.
		O_2 Gas Regulator (2 stage) with necessary tubing and connectors.
		Spares and consumables for two years operation of the system for main TOC unit, and other peripheral system including Homogenizor,

		tubing, O-rings etc.
		Micropipettes – one set (a) 10/20 – 100/200 µl, 1 µl increment (b) 50/500 –1 µl increment one set (c) 100/200 – 1000 µl, 1 µl increment one set
6.0	**WARRANTY**	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.
7.0	**OPERATION & MAINTENANCE TRAINING COMPONENT**	The supplier has to impart on site training at the time of installation followed by complimentary (all expenditure inclusive) one week training to two user scientists on operation and maintenance aspect of the instrument including software training at application laboratory of manufacturer.
8.0	**GENERAL CONDITIONS OF SUPPLY**	1. The instrument and all its sub units should operate on 230 ± 10 volts 50 Hz power supply. 2. All the operation and maintenance manuals, circuit diagrams, application notes and application softwares to be supplied should be in English language. 3. The supplier / manufacturer should have Indian agent to provide after sales service. 4. The main unit and all the sub units of the instrument should be serviced by the Indian representative of supplier. 5. 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 atleast 2 years as on the date of bid opening.

Item Code No.54

Water bath (Thermostatic)

Specification:

Temperature range: 5^0 above ambient to 100 ^{0}C

Temperature stability: ±0.25 ^{0}C

Temperature uniformity: ±0.2 ^{0}C

Temperature Control

Primary: PID

Secondary (safety control): hydraulic thermostat

Temperature sensor: 100 Pt RTD

Display: LED, ^{0}C/^{0}F switchable

Wetted materials: 304 SS

Low-level cutoff: yes, adjustable\

Bath Capacity: 10 Liters

Bath Opening: 10¾" x 11¾"

Working depth: 6"

Overall dimension: 15" x 8 1/8" x 15½"

Power: 240 Volt AC, 50 Hz

Item Code No.55

UV - VISIBLE SPECTROPHOTOMETER (PC-Controlled)

SPECIFICATIONS

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 ± 0.2 nm
Wavelength repeatability	:	better than or equal to ± 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 Requirement	:	220 VAC ± 25% , 47 to 53 Hz

Accessories

PC , compactable for operation control and monitoring of UV – Spectrophotometer and accessory modules

Colour monitor

printer

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

Essential spare parts for five year of operation

Voltage stabilizer

Dust cover

Operation manual

Matching cuvettes (2 pairs).

Condition & Requirements

The supplier shall do installation, commissioning and training in operational use.

At least 5 years of after sale service shall be guaranteed.

Item Code No.56

WATER PURIFICATION SYSTEM

Specification:

a) PRE FILTERATION STAGE**: One stage purification step involving 5 micron and 1 micron filter.**

b) ANALYTICAL GRADE WATER SYSTEM:

1.The system should respond favourably to feedwater having

- **Fouling Index greater than 12**
- **Total Chlorine greater than 2ppm.**
- **Feedwater conductivity more than 2000 microS/cm**

2. Four stage purification process:

- **Primary purification by a prefilter(with anti-scaling and activated carbon for bacteriostasis)**
- **Secondary purification through RO membrane to remove impurities with MW >100 daltons**
- **Third purification step should involve a self regenerating Electro deionization module with carbon bead at cathode to avoid de-ionization cartridge replacement and hazardous chemical regeneration.**

3. Conductivity meter present before and after the RO cartridge to monitor RO cartridge efficiency.

4. Product water quality-

Resistivity :typically upto 10-15Megohm-cm
TOC :<30ppb
CONDUCTIVITY :< 0.2uS/cm
Silicate Removal :> 99.9%
Flow rate :3L/hr

c) ULTRAPURE WATER SYSTEM

1. Three stage purification process with initial purification packs tailored for specific feed water, an application specific ultrapure cartridge and an absolute 0.22 micron PVDF membrane final filter in stacked configuration.

2. The resistivity cell should be coaxial with a cell constant of $0.01cm^{-1}$.

3. The system should have automatic re circulation, an alphanumeric backlit LCD display with auto-diagnostic features and alarms.

4. The system should have a provision to connect an Ultra Filtration cartridge to produce RNA's DNA,s free water.

5. The system should have a facility for volumetric dispensing as an option, with flow rate upto 1 litre/min.

6. Product water quality-

Resistivity	:18.2 Meg-ohm
Bacteria	:< 1cfu/ml
TOC	:<10 ppb
Particulates	:<1/ml
Pyrogen levels	:<0.001 EU/ml
Flow rate	:1 l/min

TANK :

1. A blow moulded , cylindrical PE reservoir with a conical bottom and opaque walls with a 50 lt capacity
2. Should possess a sensor rod float switch for determining the level of stored water.

Item Code No.57

Zero Head Space Extractor

For volatile and non-volatile organics

a) Zero Head Space Extractor hazardous filtration system 90mm

(i) Designated by USEPA as suitable for TCLP
(ii) Allows automatic and manual venting for safety
(iii) Cannot be pressurized unless completely assembled
(iv) Entire construction of SS316, no welds, no joints
(v) Unique wiper 'O' Ring continually wipes the barrel free of grit
(vi) double SS sieve mesh support for the filter to protect filter from rupture.

Specifications:

Materials :

316 stainless steel, molded polypropylene hand wheels knobs with brass hand wheel inserts, Viton - A 'O' Rings and Wiper seal. Body smooth machined and electropolished.
Dimension : 159mm dia, 285 mm height

Shipping Weight : 8 Kgs. approx.

Operating Pressure : 50 PSI max

Filter size : 90mm

Filtration Area : 63.6 cm^2

Piston break force : 5-10 PSI (0.35 – 0.7 kg / cm^2)

For inorganic analysis

(b) 142 mm Hazardous waste filtration system 142 mm

(i) Designed for use in EP tox and non volatile testing for TCLP
(ii) All internal contact parts Teflon coated to eliminate heavy metal contamination, vent relief valve PTFE coated.
(iii) Wide entry port for easy sample inlet and fully dismantlable

Material :

316SS, body Teflon coated, Inlet/outlet adaptors Teflon coated, SS legs, molded PP hand wheels knobs Teflon / Silicon 'O' Rings and gaskets. Body smooth machined and electropolished.

Pressure : 125 psig (9 bar) inlet; 75 psi (5.5 bar) differential

Filter size : 142mm dia

(c) Rotary Agitator

Suitable for use in TCLP procedures both for vessel and bottle extraction protocols as per EPA,EP TOX

Four place device provides end over end rotation of upto 4 Millipore ZHE systems or extraction bottles for heavy metal work.,

Agitator incorporates safety shield over rotor as well as motor

The rotor automatically stops when shield is opened.

System provided with emergency brake stop.

Electrical supply 220V / 50 Hz

Motor rating : 1/15 HP

System control box : Microprocessor control with LCD display and facility to programme run time in hours / minutes, realtime data of run time indicated on LCD panel .

Facilities to restart operation / rotation from actual time of power interruption.

Motor
Horse Power : 1/ 15 HP

Speed 30 rpm + or – 2 rpm

Safe Torque : 115 Kg-cm

(**d) Pressure Vessel dispensing system for extraction fluid dispensing**

5 Litre internally electropolished SS pressure vessel for storage and dispensing of extraction fluid.

Material : Type AISI 316L Stainless Steel with Stainless Steel fittings,

Viton O – rings, Molded Styrene Butadiene rubber base.

Pressure : 7 Kg/ cm^2 (100 psig) maximum with safety relief valve

Pressure Vessel with built in Pressure gauge

Temperature : 121 Deg C

Connections: ¼" BSP

Dimensions : 5 Litre capacity, 246mm dia, 245mm H.

Shipping Weight : 4.5 Kg (approximately)

(e) Vacuum / Pressure Pump

Specifications:

Powder coated die cast aluminium body and pump head; Neoprene diaphragm;

Capable of providing 4 bar of pressure or 22" of Hg

Pump internal surface Teflon coated

Pump provided with stainless steel leaf valves and inlet filters

Pump voltage 220V / 50 Hz AC,

Power : 1/3 HP motor

Connections: 3 pronged (grounded) cord and plug

Hose Connector: Tappered 1/8 " BSP inlet and outlet hose connectors.

Dimensions: 235mm L, 150mm W, 275mm H.

Weight: 8 Kg Approx.

(f)Other Accessories included:

(a)Gas tight Syringe,PTFE plunger for leachate extraction from ZHE

(b)Luer Ni- CR, 1/8 " NPTF to male connector,(c) Tubings all pressure rated or all interconnections with swagwlock/quick release/,(d) Filters:

90mm and 142 mm

o CHECK LIST FOR THE BIDDER

1. Bid on original Tender form only.

2. Separate EMD against each item.

3. Earnest money or necessary documentary proof for exemption of earnest money with the part 1 of the bid.

4. Price bid must be Part II of the bid in the form provided at Annexure II of the tender document.

5. The Basic Price, Taxes, Packing, Forwarding, Handling, Transportation Insurance, Installation charges etc. must be quoted clearly. Do not use vague terms like "As Actual, Approximately etc".

6. Do not use the terms As per Specification of Tender Documents' in respect of instruments. There should be proper write up of production quoted for supported with printed leaflets literature.

7. In case the bidders desirous to quote more than one item, separate envelope should be submitted (technical & price bid) for individual item superscribing item code number and name.

8. **With technical bid, the bidder should provide a copy of the price bid format (giving details of the items, accessories, spares etc.) without specifying the price other than one mentioned in annexure-II of this tender document.**