

TENDER
FOR
SUPPLY & INSTALLATION OF
INSTRUMENTS FOR CHARACTERIZATION LAB
SCHOOL OF BASIC SCIENCES, IIT MANDI



Tender No.: IITMANDI/SBS/TEN/2011-12/CHRLAB/6

Tender date: October 7th, 2011

Last Date of submission: October 31st, 2011

Indian Institute of Technology, Mandi

Transit Campus: Mandav Hotel, 2nd Floor (Near Bus Stand), Mandi – 175001 (H.P)

Tel.: 01905-237917/7926/7931 **email:** sbs_office@iitmandi.ac.in

Indian Institute of Technology Mandi, Mandi invites tender for supply, erection, installation and commissioning, testing, demonstration and training of a number of instruments, as per specifications given in the Schedule attached to the Tender form annexed hereto. All offers should be made in English and should be written in both figures and words. Tender forms can be downloaded from the website (<http://iitmandi.ac.in/administration/tenderseoi.html>) of the Institute.

The bidders are requested to read the tender document carefully and ensure compliance with all specifications/instructions herein. Non-compliance with specifications/instructions in this document may disqualify the bidders from the tender exercise.

The Director, IIT Mandi, reserves the right to select the item (in single or multiple units) or to reject any quotation wholly or partly without assigning any reason.

Incomplete tenders, amendments and additions to tender after opening or late tenders are liable to be ignored and rejected.

Terms and Conditions:

1. The technical and financial bids should be quoted separately and put in different sealed envelopes marked “**Technical bid**” or “**Financial bid**” as applicable. These separate bids envelopes are to be put in an outer envelope which should also be sealed.
2. The technical and financial bids should be submitted in original. The financial bid should include the cost of main equipment/item and its accessories. If there is any separate cost for installation etc. that should be quoted separately.
3. Each individual sealed envelope as well as the outer envelope should be marked with the following reference on the top left hand corner:
“**IITMANDI/SBS/TEN/2011-12/CHRLAB/6/item no. /name of the item**”
4. The printed literature and catalogue/brochure giving full technical details should be included with the technical bid to verify the specifications quoted in the tender. The bidders should submit copies of suitable documents in support of their reputation, credentials and past performance.
5. The rates should be quoted in figures (typed or printed) and cutting should be avoided. The final amount should be in figures as well as in words. If there are cuttings, they should be duly initialled, failing which the bids are liable to be rejected.
6. The technical and financial bids should be addressed to “The Director, Indian Institute of Technology Mandi, Mandi-175001 (H.P)”
7. Any bids received after **4.00 p.m. on 31st October, 2011** shall not be considered.
8. While sending rates, the firm shall give an undertaking to the effect that “*the terms/conditions mentioned in the enquiry letter/Tender Notice against which the rates are being given are acceptable to the firm.*” In case the firms do not give this undertaking, their rates will not be considered.
9. If the supplier/firm is original equipment manufacturer (OEM)/authorized dealer/sole distributor of any item, the certificate to this effect should be attached.

11. The quantity shown against the item is approximate and may vary as per demand of the Institute at the time of placing order.

12. All tender documents should have to be sent through courier, speed post or registered post only. All tender documents received after this specified date and time shall not be considered. The postal address is:

**“The Head, School of Basic Sciences”
Indian Institute of Technology Mandi (IIT Mandi),
Academic Block (Vallabh Degree College Campus),
Mandi – 175001 (H.P)”**

13. In the event of any dispute or difference(s) between the vendee Institute (IIT Mandi) and the vendor(s) arising out of non-supply of material or supplies not found according to specifications or any other cause whatsoever relating to the supply or purchase order before or after the supply has been executed, shall be referred to “The Director, IIT Mandi”, Mandi who may decide the matter himself or may appoint arbitrator(s) under the arbitration and conciliation Act 1996. The decision of the arbitrator shall be final and binding on both the parties.

14. The place of arbitration and the language to be used in arbitral proceedings shall be decided by the arbitrator.

15. All disputes shall be subject to Mandi Jurisdiction only.

16. All tenders in which any of the prescribed conditions is not fulfilled or any condition is put forth by the tenderer shall be summarily rejected.

The date and time for opening of the technical bid will be notified separately. The bidders or their authorized representative may also be present during the opening of the Technical Bid, if they desire so, at their own expenses.

Price bids of only those bidders will be opened whose technical bids are found suitable by the committee appointed for the purpose. Date and time of opening of price bids will be decided after technical bids have been evaluated by the committee. Information in this regard will be posted on Institute’s web site / Notice board. In exceptional situation, an authorized committee may negotiate price with the qualified bidder quoting the lowest price before awarding the contract.

1. Clarifications:

In case the bidder requires any clarification regarding the tender documents, they are requested to contact our office (e-mail: sbs_office@iitmandi.ac.in) on or before 20/10/2011.

2. Tender Cost:

A Demand draft of Rs. 1,000/- (Rupees One Thousand only) towards non-refundable tender fee, for each instrument being quoted, drawn in favour of “The Registrar, IIT Mandi” payable at Mandi should accompany the Technical bid documents. If the same firm is submitting bids for more than one instrument, they should submit the same in separate envelopes along with respective tender cost for each.

3. Earnest Money Deposit (EMD):

If the cost of the equipment/item is more than Rs. 5 lakhs, a refundable amount @ 2% of the quoted price as earnest money deposit (EMD) in the shape of DD drawn in favour of "The Registrar, IITMandi" payable at Mandi should accompany the bid documents. The EMD should be kept in a separate sealed envelope, should be marked clearly and put in the outer envelope that contains the technical and financial bid envelopes.

4. Pre – Qualification Criteria:

a. Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed.

b. An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.

c. Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.

5. Prices:

a) The Prices quoted should be inclusive of all taxes or duties, packing, forwarding, freight, insurance, delivery and commissioning etc. at destination site (IIT Mandi, Mandi). IIT Mandi is registered with DSIR, Govt. of India and is exempted from Custom / Excise Duty. Exemption Certificate to this effect will be issued by IIT Mandi. **Hence, Customs/Excise Duty exempted price should be quoted.** The rates shall be firm and final. Nothing extra shall be paid on any account.

b) In case of imported equipment(s)/item(s), the agency commission, if any, payable in Indian rupees should be mentioned separately. For imported equipment, the Letter of Credit will be opened for the amount excluding agency commission in Indian Rupees. The firm should clearly mention the address of foreign bank in the financial bid. The breakup of price such as ex-works, FOB, FOR should clearly be mentioned.

6. Validity:

The bid should be valid for acceptance up to a period of 180 Days. The Bidders should be ready to extend the validity, if required without any additional financial implications.

7. Delivery:

The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within 16 weeks of the issue of purchase order unless otherwise prescribed. If the bidder fails to deliver and place any or all the Equipment or perform the service by the specified date, penalty at the rate of 2 % per week of the total order value subject to the maximum of 10% of total order value will be deducted.

8. Training:

Bidders need to provide adequate training to the nominated persons of IIT Mandi at their cost. IIT Mandi will not bear any training expenditure.

9. Warranty Declaration:

Bidders must give the comprehensive onsite warranty as required from the date of successful installation of Equipment against any manufacturing defects and also give the warranty declaration that *“everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document.”*

Any deviation in the material, and the specifications from the accepted terms may liable to be rejected and the bidders need to supply all the goods in the specified form to the satisfaction / specifications specified in the order / contract and demonstrate at the their own cost.

If the cost of an equipment is above Rs. 25 lakhs, a performance bank guarantee for an amount equal to the price for the duration of the warranty period will be taken from the supplier or Indian agent.

10. Terms of Payment: Payment will generally be made only after delivery and satisfactory installation, testing, commissioning etc. This must be specified in the tender/quotation.

- In case of Imported supplies, payment (excluding Indian agency commission, if any) will be made through Letter of Credit.

11. Tender expenses and documents: All costs incurred by the bidder in the preparation of the tender shall be at the entire expense of the bidder.

12. Tender Evaluation Criteria: The technical bids will be opened and evaluated by a duly constituted committee. After evaluation of the technical bid, the financial bid for only those offers which have qualified in the evaluation of technical bid will be opened.

13. Return of EMD:

- The earnest money of the successful bidder will be returned to them without any interest after completing the successful contract.

- The earnest money of unsuccessful bidders will be returned to them without any interest within fifteen working days after awarding the contract.

13. Manual and documentation: All the manuals necessary for operating and servicing the equipment (including details of electronic circuits) will have to be provided along with the instrument.

14. Bidders should go through the tender terms, conditions and specifications carefully and fill in the attached compliance statement accurately and unambiguously. They should ensure that all the required documents are furnished along with the bid.

(Head, School of Basic Sciences)

BID PARTICULARS

1. Name of the Supplier :
2. Address of the Supplier :
3. Availability of demonstration of equipment : Yes / No
4. Tender cost enclosed: : Yes/No if yes

D.D. No. _____ Bank _____ Amount _____

5. EMD enclosed : Yes / No if Yes

D.D. No. _____ Bank _____

6. Name and address of the Officer/contact person to whom all references shall be made regarding this tender enquiry.

Name :

Address :

Telephone No. :

Fax No. :

Mobile No :

e-Mail :

Web :

Annexure A

Specifications

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.1 / Optical-cum-polarising microscope with hot stage, cold stage and camera

Microscopic Frame

Frame / stand for both transmitted and reflected light, Ergonomic dedicated design

Illumination

Halogen bulb – 12V or better and 100Watts or better, Facility for interchangeable stager. Lamp housing for Transmitted Light with adjustable lamp mount for halogen lamp 12V 100W or better. Lamp housing for Reflected Light with adjustable lamp mount for halogen lamp 12V 100W or better. Reflected & Transmitted Light illumination, Filters – Daylight filter, All other important filters, Optical System, Infinity corrected Optical System, UIS2 or better

Turret

Four position centrable objective turret or better

Focusing

Coarse and fine focusing knobe. Three Geared Focus drive with adjustable height focus knob and integrated focus stop and torque adjustment and field aperture diaphragm adjustment.

Magnification range

25x to 1000x or better

Eyepiece Tube

Tube FOV 22 or better, Beam splitter 100/50/0, mechanical documentation Pol tube, with fixed viewing angle 30°, field of view 25 variable beam splitters, at least three 3 beam splitter positions: 100% eyepieces, 50% eyepieces: 50% documentation port, 100% documentation port and quartz plate. Tube adapter for mounting on documentation with ports for 2 documentation devices, with fix beam splitter 50% documentation port 1 : 50% documentation port 2

Intermediate Tube

Advance conoscopy/orthoscopic module with a focusable, centrable Bertrand lens and quartz depolarizer or better

Stage

Top grade Circular rotatable stage (360°), with Micrometer for Reflected and transmitted light. Graticule 10mm=100 divisions or better

Eye piece

Plan Achromat Eyepiece pair 10x/25 – both focusable and adjustable; one with reticule for Pol application.

Compensator

Lambda-plate (wave plate), Quarter-Lambda-plate, Quartz Wedge, Berek Compensator for compensator slot

Objective Set

Plan Achromat / Plan neo-fluor 2.5x, 5x, 10x, 40/50x, 100x(oil) or better for Thin section study and for reflected light, Plan Achromat Objectives – 10x,20x and 50x or better, Long working distance objectives–20x, 50x, 100x or better

Polarizer & Analyzer

Pol Universal Condenser – dedicated, strain free with swing out facility. Multi position condenser disc for various applications such as BF, DF, PH, DIC etc. Condenser head for thicker specimen slides and heating stage applications. Polarizer 360° rotatable – both for transmitted & reflected light and Analyzer – 360° (*minimum reading angle 0.1 degree or better*).

Specification for heating stage

Heating / Cooling stage

Should have the provision to be used with transmitted or reflected light and fully compatible with the microscope

Temperature range

-25°C to 120°C

Cooling system

Peltier cooling.

Temp. stability & Accuracy

Heating rate range : 0.1°C / min to 20° C/min. or better, Temperature accuracy $\pm 0.1^\circ\text{C}$ or better

Software and image

Online temperature, time and image plot

Capturing

Image capturing with full temp. programmer data. Single software to control and program temperature and Camera functions.

Sample Stage

Sample area of approximately 35mm x 32 mm or more. Sample holder for standard. Mounts directly to microscope table or substage.

Other features

Gas tight chamber for atmospheric control. RS-232 and USB interfacing options. Minimum objective working distance 0.1mm, Minimum condenser working distance 5mm

Camera

Digital Color CCD Sensor or CMOS camera or better. Pixel Size 4.65 micron x 4.65 micron or better. Resolution 1.4 mega pixel or more. Camera Speed – Frame Rate 10fps (min) at full resolution or better. Proper synchronization with heating stage to get real time temp. & image information.

Software

software for image analysis. Modules for interactive measurements. extended annotations and multi view

Automatic Image analyzer S/w

Computer

Compatible branded PC with licensed Windows based operating system and Monitor are to be supplied.

Optional additional camera to be used without heating stage

Digital CCD Camera. CCD Resolution 7 Mpixel or more. CMOS sensor Typically 25 frames per sec or more. Shading correction applicable to live and captured images, Live display of colour images on PC screen, PCI interface with PC, Firewire connection, Supporting software with latest Windows based OS, Dual Adaptor to attach both cameras simultaneously.

Available Input power: 220 V one phase/three Phase, 50 Hz

All the equipment and parts should be CE compliant.

The quoted system should be certified as complete for carrying out the following experiments

Imaging lyotropic liquidcrystals

Imaging lyotropic liquid crystal under varying temperature

Imaging lyotropic liquid crystals under varying temperature while simultaneously imaging crystal growth of materials.

All necessary accessories are included in the quotation .

Three year on-site extended warranty on all parts.

Annual Maintenance Contract may be quoted as optional

Compliance statement for the tender specifications

**INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175001**

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ ITEM No.1 / Optical-cum-polarising microscope with hot stage, cold stage and camera

Instructions

1. You have to fill in all columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as we have specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column

		Bidder Specification	Remarks
S.No.	Check List of Documents/undertakings		
1.	Is Tender fees attached?		
2.	Is EMD attached? (if applicable)		
3.	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
4.	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
5.	Undertaking from OEM regarding technical support & extended warranty present		
6.	Validity of 180 days or not?		
7.	Undertaking from bidder regarding acceptance of tender terms & conditions		
8.	List of reputed users for the past three years specific to the instrument		
9	Technical Specifications		
a	Microscopic Frame		
a.1	Frame / stand for both transmitted and reflected light		
a.2	Ergonomic dedicated design		
b	Illumination		
b.1	Halogen bulb – 12V or better and 100Watts or better,		
b.2	Facility for interchangeable stager		
b.3	Lamp housing for Transmitted Light with adjustable lamp mount for halogen lamp 12V 100W or better.		
b.4	Lamp housing for Reflected Light with adjustable lamp mount for halogen lamp 12V 100W or better.		
b.5	Reflected & Transmitted Light illumination		
b.6	Filters – Daylight filter, All other important filters		
c	Optical System		
c.1	Infinity corrected Optical System,		
c.2	UIS2 or better		

d	Turret		
d.1	Four position centrable objective turret or better		
e	Focusing		
e.1	Coarse and fine focusing knobe.		
e.2	Three Geared Focus drive with adjustable height focus knob and integrated focus stop and torque adjustment and field aperture diaphragm adjustment.		
f	Magnification range		
f.1	25x to 1000x or better		
g	Eyepiece Tube		
g.1	Tube FOV 22 or better		
g.2	Beam splitter 100/50/0, mechanical documentation Pol tube, with fixed viewing angle 30°, field of view 25		
g.3	variable beam splitters, at least three 3 beam splitter positions: 100% eyepieces, 50% eyepieces: 50% documentation port, 100% documentation port and quartz plate.		
g.4	Tube adapter for mounting on documentation with ports for 2 documentation devices, with fix beam splitter 50% documentation port 1 : 50% documentation port 2		
h	Intermediate Tube		
h.1	Advance conoscopy/orthoscopic module with a focusable, centrable Bertrand lens and quartz depolarizer or better		
i	Stage		
i.1	Top grade Circular rotatable stage (360°), with Micrometer for Reflected and transmitted light. Graticule 10mm=100 divisions or better		
j	Eye piece		
j.1	Plan Achromat Eyepiece pair 10x/25 – both focusable and adjustable; one with reticule for Pol application.		
k	Compensator		
k.1	Lambda-plate (wave plate)		
k.2	Quarter-Lambda-plate		
k.3	Quartz Wedge		
k.4	Berek Compensator for compensator slot		
l	Objective Set		
l.1	Plan Achromat / Plan neo-fluor 2.5x, 5x, 10x, 40/50x, 100x(oil) or better for Thin section study and for reflected light		
l.2	Plan Achromat Objectives – 10x,20x and 50x or better		
l.3	Long working distance objectives–20x, 50x, 100x or better		
m	Polarizer & Analyzer		
m.1	Pol Universal Condenser – dedicated, strain		

	free with swing out facility.		
m.2	Multi position condenser disc for various applications such as BF, DF, PH, DIC etc.		
m.3	Condenser head for thicker specimen slides and heating stage applications.		
m.4	Polarizer 360° rotatable – both for transmitted & reflected light and Analyzer – 360° (<i>minimum reading angle 0.1 degree or better</i>).		
10	Specification for heating stage		
a	Heating / Cooling stage		
a.1	Should have the provision to be used with transmitted or reflected light and fully compatible with the microscope		
b	Temperature range		
b.1	-25°C to 120°C		
c	Cooling system		
c.1	Peltier cooling system		
d	Temp. Ramp		
d.1	Up to 100 ramp per temperature profile programming.		
e	Temp. stability & Accuracy		
e.1	Heating rate range : 0.1°C / min or less to 20° C/min. or more,		
e.2	Temperature accuracy ± 0.1°C or better		
f	Software and image		
f.1	Online temperature, time and image plot		
g	Capturing		
g.1	Image capturing with full temp. programmer data		
g.2	Single software to control and program temperature and Camera functions.		
h	Sample Stage		
h.1	Sample area of approximately 35mm x 32 mm or more.		
h.2	Sample holder for standard mounts directly to microscope table or substage		
i	Other features		
i.1	Gas tight chamber for atmospheric control		
i.2	Swing out lid for easy sample loading		
i.4	Highly conductive material for improved heat transfer		
i.4	Objective lens minimum working distance 0.1 mm or better		
i.5	Condenser lens minimum working distance 5 mm or better		
i.6	RS-232 and USB interfacing options		
j	Camera		
j.1	Digital Color CCD Sensor or better		
j.2	Pixel Size 4.65 micron x 4.65 micron or		

	better		
j.3	Resolution 1.4 mega pixel or better		
j.4	Camera Speed – Frame Rate 10fps (min) at full resolution or better		
j.5	Proper synchronization with heating stage to get real time temp. & image information.		
k	Software		
k.1	software for image analysis		
k.2	Modules for interactive measurements		
k.3	extended annotations and multi view		
k.4	Automatic Image analyzer S/w		
l	Computer		
l.1	Compatible branded PC with licensed operating system, Monitor to be supplied.		
m	Optional additional camera to be used without heating stage		
m.1	Digital CCD Camera		
m.2	CCD Resolution 5 Mpixel or more		
m.3	CMOS sensor		
m.4	color filter RGB		
m.5	live image size selectable, typically 25 frames per sec. or more		
m.6	Live display of colour images on PC screen		
m.7	shading correction		
m.8	PCI interface with PC		
m.9	Firewire connection		
m.10	Supporting software with latest Windows based OS		
m.11	Dual Adaptor to attach both cameras simultaneously.		
11	Available Input power: 220 V one phase/three Phase, 50 Hz		
12	All the equipment and parts should be CE compliant.		
13	The quoted system should be certified as complete for carrying out the following experiments		
a	Imaging lyotropic liquidcrystals		
b	Imaging lyotropic liquid crystal under varying temperature		
c	Imaging lyotropic liquid crystals under varying temperature while simultaneously imaging crystal growth of materials.		
14	All necessary accessories are included in the quotation or not?		
15	Three year on-site extended warranty on all parts.		
16	Annual Maintenance Contract may be quoted as optional		

Annexure B Specifications

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.2 / Automated Digital Polarimeter

Automated digital polarimeter should have the following specifications:

1. Measuring Mode: Optical Rotation, Specific Rotation, Concentration, °Z International Sugar Scale (ISS) (and others as optional)
2. Measuring scales: Angle of rotation [°], sugar scale [°Z]. concentration [g/100 ml], user defined scales (and others as optional).
3. Wavelength: 589 nm
4. Operating Temp Range: 10° to 40 °C or better
5. Light Source: Tungsten-Halogen Lamp (The average life of lamp should be 2000 hrs or more)
6. Measuring Range: $\pm 89^\circ$ or better, ± 225 °Z or better.
7. Resolution: 0.001° or better, 0.01 °Z or better, for the entire measuring range.
8. Accuracy: $\pm 0.005^\circ$ or better, ± 0.05 °Z or better, for the entire measuring range.
9. Reproducibility: 0.002° or better, for the entire measuring range.
10. Response time: 12 seconds or better.
11. Display: LCD screen/Touch screen option.
12. Optical cell: Glass cell of 100 mm length standard. Other sample cells (made up of glass and stainless steel) may be quoted optionally. The instrument should be capable of accommodating sample cells from 2.5 mm to 100 mm or more.
13. Dark samples measurements: Optical Density (OD) upto 4.0 or better at 589 nm
14. The supplier should be able to demonstrate the capability of the instrument with our samples, if needed.
15. After sales support: The supplier should provide prompt after sales support in terms of instrument service as well as application support.
16. Training: The supplier of the instrument will provide hands on operational as well as application training at the time of installation. Supplier should mention their training facilities in India.
17. Manuals: The user manual should be provided along with the instrument in the form of hard copy as well as electronic copy.
18. Connectivity: External PC or a display unit, keyboard, mouse, bar code reader, memory stick, Printer via USB or Ethernet.
19. Input power: 220V, 50/60 Hz.
20. Warranty: Three year on-site extended warranty on all parts.
21. We may need to shift the polarimeter to a new campus in the near future. Offer your estimate for

shifting and re-installation of the polarimeter.

22. The quoted system should be certified as complete for carrying out the measurements like optical rotation, specific rotation, concentration etc. for various optically active materials like chemicals, sugars etc.

23. Any necessary accessories should be included in the quotation

24. Annual Maintenance Contract may be quoted as optional

25. A permanent calibration standard may be quoted as optional.

Compliance statement for the tender specifications
INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175001

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.2 / Automated Digital Polarimeter

Instructions:

1. You have to fill in all columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as we have specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column

Name of the bidder and address:			
S. No.	Checklist	Bidder specification	Remarks
1.	Is Tender fees attached?		
2.	Is EMD attached? (if applicable)		
3.	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
4.	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
5.	Undertaking from OEM regarding technical support & extended warranty present		
6.	Validity of 180 days or not?		
7.	Undertaking from bidder regarding acceptance of tender terms & conditions		
8.	List of reputed users for the past three years specific to the instrument		
Technical Specifications			
	The system is a automated digital system		
	Measuring Mode: Optical Rotation, Specific Rotation, Concentration, °Z International Sugar Scale (ISS) (and others as optional)		
	Measuring scales: Angle of rotation [°], sugar scale [°Z]. concentration [g/100 ml], user defined scales (and others as optional).		

	Wavelength: 589 nm		
	Operating Temp Range : 10 to 40 °C or better		
	Light Source : Tungsten-Halogen Lamp (The average life of lamp should be 2000 hrs or more)		
	Measuring Range: $\pm 89^\circ$ or better, $\pm 225^\circ\text{Z}$ or better.		
	Resolution: 0.001° or better, 0.01°Z or better, for the entire measuring range.		
	Accuracy: $\pm 0.005^\circ$ or better, $\pm 0.05^\circ\text{Z}$ or better, for the entire measuring range		
	Reproducibility: 0.002° or better, for the entire measuring range.		
	Response time: 12 seconds or better.		
	Display: LCD screen/Touch screen option.		
	Optical cell: Glass cell of 100 mm length standard. Other sample cells (made up of glass and stainless steel) may be quoted optionally. The instrument should be capable of accommodating sample cells from 2.5 mm to 100 mm or more.		
	Dark samples measurements: Optical Density (OD) upto 4.0 or better at 589 nm		
	Connectivity: External PC or a display unit, keyboard, mouse, bar code reader, memory stick, Printer via USB or Ethernet.		
	Available Input power: 220 V one phase/three Phase, 50/60 Hz		
	The quoted system should be certified as complete for carrying out the measurements like optical rotation, specific rotation, concentration etc. for various optically active materials like chemicals, sugars etc.		
	Any necessary accessories are included in the quotation		
	Three year on-site extended warranty on all parts		
	We may need to shift the polarimeter to a new campus in the near future. Offer your estimate		

	for shifting and re-installation of the polarimeter.		
	Manuals: The user manual should be provided along with the instrument in the form of hard copy as well as electronic copy.		
	Training: The supplier of the instrument will provide hands on operational as well as application training at the time of installation. Supplier should mention their training facilities in India.		
	After sales support: The supplier should provide prompt after sales support in terms of instrument service as well as application support.		
	The supplier should be able to demonstrate the capability of the instrument with our samples (if needed).		
	Annual Maintenance Contract may be quoted as optional		
	A permanent calibration standard may be quoted as optional.		

Annexure C Specifications

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.3/ Glove Box

Glove box should come as a complete package including box, antechamber(s), gas purification system and vacuum pump. The system should be capable of removing O₂ and H₂O to levels less than 1 ppm.

Inert working gas: Nitrogen, Argon or Helium

Attainable purity: Less than 1 ppm moisture and less than 1 ppm Oxygen

Detailed Specifications

- 1) Box Dimension- Internal
 - Length 1050 mm or more
 - Height 850 mm or more
 - Depth 650 mm or more
- 2) Box Construction material
 - Stainless steel
- 3) Box Shelves
 - Two or more height adjustable shelves
- 4) Box Window
 - Polycarbonate (LEXAN), 10mm thickness
- 5) Dust filter
 - 0.3 micron filters at both inlet and outlet, class H13 or more.
- 6) Glove ports
 - 2 or more round ports of 220 mm or larger diameter.
- 7) Gloves
 - Suitable gloves
- 8) Box light
 - LED lights/fluorescent lamp
- 9) Gas Purification System
 - Closed Loop Gas Purification System for removal of O₂ and H₂O,
 - Single purifier column,
 - Oxygen removal capacity: 20 L or more
 - Moisture removal capacity: 900g or more
 - Heater: Integrated
 - Attainable purity: O₂<1ppm, H₂O<1ppm
- 10) Main Antechamber
 - Type Cylindrical, 360mm or more diameter,
 - Length 590mm (inside dimensions)
 - Material stainless steel,

Sliding tray stainless steel
Doors Aluminum, anodized, thickness 10mm
Door lock easy to operate
Pressure gauge with analog display

- 11) Circulation Unit / Blower
Integrated blower with speed 20 m³/h or more
- 12) Vacuum/ Refill process
Manual operation via hand valves
- 13) Attainable Purity
O₂<1ppm, H₂O<1ppm
- 14) Working Gas
Nitrogen, Argon or Helium
- 15) Vacuum pump
Adequate to sustain a performance of O₂<1 ppm and H₂O<1 ppm and provision for back up for vacuum pump
- 16) Valves
Main valves: Electro-pneumatic
Control valves: Magnetic
- 17) Piping
Main piping: Stainless Steel/copper piping,
Control piping: Stainless Steel/copper piping,
- 18) System control
Single Programmable Logical control (PLC) unit with touch screen for the whole system
- 19) Mini Antechamber
Mini Antechamber of size 100 mm or more diameter and 300 mm or more length with vacuum gauge, analog display and manually controlled valves for evacuation and refill.
- 20) Oxygen Sensor
Equipped with Oxygen Analyzers for real time feedback of trace O₂ levels to <1ppm
Measurement range: 0-1000 ppm or more
Accuracy ± 1 ppm or more
- 21) Moisture analyzer
Equipped with Moisture Analyzers for real time feedback of trace H₂O levels to <1ppm.
Measurement range: 0-500 ppm or more
Accuracy: ± 1 ppm or more
- 22) Gas option:
Please specify the requirement of purity and no. of cylinders to be used at a time in the line
- 23) Warranty:

3 years extended warranty

24) We may need to shift the Glove box to our new campus in future from the present location. Please quote the shifting charge, if any, as optional.

25) The equipment should be certified to carry out all sorts of polymerization reactions inside the box under the atmospheric condition mentioned above.

26) Annual Maintenance Contract may be quoted as optional.

27) Any necessary accessories are included in the quotation.

Compliance statement for the tender specifications
INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175001

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.3/ Glove Box

Instructions:

1. You have to fill in all columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as we have specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column

Name of the bidder and address:		
Checklist	Bidder Specification	Remarks
Is Tender fees attached?		
Is EMD attached? (if applicable)		
Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
Undertaking from OEM regarding technical support & extended warranty present		
Validity of 180 days or not?		
Undertaking from bidder regarding acceptance of tender terms & conditions		
List of reputed users for the past three years specific to the instrument		
Technical Specifications		
Box Construction material Stainless steel		
Box Shelves Two or more height adjustable shelves		
Box Window Polycarbonate (LEXAN), 10mm thickness		
Dust filter 0.3 micron filters at both inlet and outlet, class H13 or more.		
Glove ports 2 or more round ports of 220 mm or larger diameter		
Gloves Suitable gloves		

Box light LED lights/fluorescent lamp		
Gas Purification System Closed Loop Gas Purification System for removal of O ₂ and H ₂ O, Single purifier column, Oxygen removal capacity: 20 L or more Moisture removal capacity: 900g or more Heater: Integrated Attainable purity: O ₂ <1ppm, H ₂ O<1ppm		
Main Antechamber Type Cylindrical, 360mm or more diameter, Length 590mm (inside dimensions) Material stainless steel, Sliding tray stainless steel Doors Aluminum, anodized, thickness 10mm Door lock easy to operate Pressure gauge with analog display		
Circulation Unit / Blower Integrated blower with speed 20 m ³ /h or more		
Vacuum/ Refill process Manual operation via hand valves		
Attainable Purity O ₂ <1ppm, H ₂ O<1ppm		
Working Gas Nitrogen, Argon or Helium		
Vacuum pump Adequate to sustain a performance of O ₂ <1 ppm and H ₂ O<1 ppm and provision for back up for vacuum pump		
Valves Main valves: Electro-pneumatic Control valves: Magnetic		
Piping Main piping: Stainless Steel/copper piping, Control piping: Stainless Steel/copper piping,		
System control Single Programmable Logical control (PLC) unit with touch screen for the whole system		
Mini Antechamber Mini Antechamber of size 100 mm or more diameter and 300 mm or more length with vacuum		

gauge, analog display and manually controlled valves for evacuation and refill		
Oxygen Sensor Equipped with Oxygen Analyzers for real time feedback of trace O ₂ levels to <1ppm Measurement range: 0-1000 ppm or more Accuracy ± 1 ppm or more		
Moisture analyzer Equipped with Moisture Analyzers for real time feedback of trace H ₂ O levels to <1ppm. Measurement range: 0-500 ppm or more Accuracy: ± 1 ppm or more		
Gas option: Please specify the requirement of purity and no. of cylinders to be used at a time in the line		
Warranty: 3 years extended warranty		
We may need to shift the Glove box to our new campus in future from the present location. Please quote the shifting charge, if any, as optional		
The equipment should be certified to carry out all sorts of polymerization reactions inside the box under the atmospheric condition mentioned above		
Annual Maintenance Contract may be quoted as optional		
Any necessary accessories are included in the quotation		

Annexure D

Specifications

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.4 / Gas Chromatograph

A microprocessor controlled Gas Chromatograph (GC) with Programmable Electronic/pneumatic Controls for complete system. System must be fully software controllable. System should have facilities for the operation of at least two injectors, two detectors simultaneously.

OVEN:

Temperature range : Above ambient to 450 Deg C or better

Should have heating rate up to 100 Deg C/ min. or better

Ramps: Atleast 7 or better

Negative/cooling ramps are required

Oven Cool Down : should have fast cooling facility; from highest possible oven temp. to 50 deg C within 5 minutes or better

System must have large volume oven to accommodate at least two columns (one packed + one capillary columns or two capillary columns) simultaneously.

Injectors:

Either one or both of the following injectors should have the facility for manual injection even if auto-sampler/Head space/online GSV are present

1. PTV Injector / Multimode injector or equivalent – 01 No.

Quoted system should provide the flexibility of a standard split/splitless inlet, combined with temperature programmable capabilities which allow for large volume injection. Injector must also support cool injections for improved signal strength. Temperature control with liq. CO₂ facility. Should have Electronic Flow Control (EFC) or equivalent facility.

Pressure range: 0 -100 psi or better

Maximum temperature: 400 Deg C or better

Temperature programming of upto 7 ramps and upto 200 oC /min or better

Suited for columns: Wide bore (0.53 mm id) and narrow bore (0.05 to 0.32 mm id)

Split ratio setting range: 0 – 7500 or better

Turn top sealing system or equivalent feature must be built in standard with inlet for quick, easy injector liner changes.

2. Wide bore/packed column injector Port -01 No

<p>Upto 400 °C or better in 1 °C increments or better Should be able to connect wide bore capillary column (0.53 mm id) and Packed column as and when required Should have Electronic Flow Control facility or equivalent</p>
<p>Electronic Pressure / Flow Control</p> <p>The digital pressure and flow controller must be able to independently control and program pressures and flow upto two independent carrier gas lines. All carrier gases and detector gases flow should be controlled through software only</p> <p>Pressure set points may be adjusted by increments of 1 psi or better</p>
<p>Back Flushing Facility System must be quoted with software controlled back flushing facility</p>
<p>Detectors :</p> <p>1. FID DETECTOR – 01 No.</p> <p>Temperature range : up to 400 Deg C or better in 1 Deg C increments or better Min. detectable Quantity : 3 p g C/sec or better Linearity : 10⁶ or better. Data rate: upto 100 Hz or better Flame out detection, auto re-ignition Should have Electronic flow control or equivalent facility</p> <p>2. TCD detector – 1 No.</p> <p>Operating temperature : 350 °C or better Linearity : 10⁵ or better Electronic Flow Control or equivalent facility</p>
<p>Detector Splitting Accessory Fully software controlled detector splitting accessory to get simultaneous chromatograms from 2 detectors without any manual intervention with single injection.</p>
<p>Auto Injector/ Auto sampler</p> <p>Fully Automated liquid auto injector/auto sampler.</p> <p>The auto samplers/injectors should have provisions for heating/cooling.</p> <p>It should inject from 0.1µl to 100.0µl or better range with variable speed & varying syringe sizes & must operate from software. Should have capacity for 100 or more sample vials.</p> <p>Must include at least 500 sample vials with cap and septa, crimper & decapper</p>
<p>Columns:</p> <ol style="list-style-type: none"> 1. Supelco β-DEX 120 30 m × 0.25 mm, d_f 0.25 µm or equivalent/better 2. Supelco α-DEX 120 30 m × 0.25 mm, d_f 0.25 µm or equivalent/better 3. SUPELCOWAX 10 Capillary GC Column L × I.D. 30 m × 0.53 mm, d_f 0.50 µm or equivalent/better 4. SUPELCOWAX 10 Capillary GC Column L × I.D. 30 m × 0.25 mm, d_f 0.25 µm or equivalent/better 5. Carboxen -1010 PLOT Capillary GC Column L × I.D. 30 m × 0.32 mm, average thickness 15 µm or equivalent/better 6. Carboxen-1010 PLOT Capillary GC Column L × I.D. 30 m × 0.53 mm, average thickness 30 µm or equivalent/better 7. Carbowax Amine Capillary GC Column L × I.D. 30 m × 0.53 mm, d_f 1.00 µm or equivalent/better

8. Mol Sieve 5A PLOT Capillary GC Column L × I.D. 30 m × 0.53 mm, average thickness 30 μm or equivalent/better
9. One general purpose Non-polar capillary column: 30 m length
10. Suitable Packed column(s) for H₂, O₂, CO, CO₂ analysis
11. Suitable Packed Column for the analyses of volatile organic compounds.
12. Suitable guard columns/pre-columns with connectors for EACH capillary columns quoted above

Spares & Consumables:

- Injection Port Septa – 200 Nos.
- Glass Insert for Split & Splitless (4 Each)
- Graphite Ferrule 0.5 mm & 0.8mm (10 each)
- Microliter Manual Syringes 1, 5 & 10 μL (5 each)
- Microliter Autosampler Syringes 10 μL & 50 μL (5 each)
- Gas tight syringes 50 μl, 100 μl, 250 μl, 500 μl, 1 ml and 5 ml – 4 each.
- Standards for gases in ppm level (O₂, H₂, CO, CO₂) – 2 no each.
- Test mix for GC columns including chiral columns
- Capillary column cutter

PC and Software

The necessary software for data acquisition, control, chromatographic data analyses and evaluation, reporting etc. Software should be quoted with part no. The software should be easy to handle and user friendly

GC and all its modules (GC, methanizer, HS, Auto injector/sampler, online GSV etc) should be controllable through single software.

Suitable Branded PC and Laser Printer

Gas Cylinders

- All the required gas cylinders with dual stage regulators
- Complete gas purification system for all the required gases

Headspace Sampler for Volatile Organic Compounds:

- Temperature range for sample up to 200⁰C or better.
- Oven temp range: up to 200 °C or better
- System should have sample capacity of 10 or more vials
- Head space sampler should have built in shaking/splurging/gas purging provision for homogeneously mixing various kind of samples/complex matrix.
- System should have built in Programmable Pneumatic controller (PPC)/equivalent or Gas flow controlled via Electronic Mass Flow Controller/equivalent capable of flow rates and pressure control through software.
- System must be controllable through integrated GC software.

HS Accessories :

At least 800 Sample vials of 20/22 ml, 300 septas, hand crimper must be included.

In case of HS with loops technology, should offer sample loops of 1ml, 2ml, 5ml - 10 Nos each.

Test mix for HS

Online Gas Sampling Valve (GSV)

Online GSV and the required accessories for the following application should be quoted.

We would like to analyze catalytic water splitting experiments in reaction vessels of ~20 ml volume in which gas evolution (H₂, O₂) can take place as a result of catalytic splitting of water. Out of the ~20 mL volume of

the reaction vessel, the reagents (in water solutions) may occupy ~10 ml. The remaining ~10 mL volume of the vessel will be de-aerated by purging N₂. The generated gases (O₂ or H₂) as a result of catalysis should be sampled for QUANTITATIVE analysis from this reaction vessel head. We would like to automate this procedure by connecting online GSV directly to this reaction vessel. The amount of gases evolved in these reactions may vary depending on the catalyst – but normally the expected ranges are 0 - 100 µL of pure O₂ or H₂ / ~ 10 mL volume of the reaction vessel head space. Apart from the evolved oxygen or hydrogen, the matrix may contain mainly water vapor and N₂.

All the required GC equipment/accessories/consumables for the above mentioned application must be quoted.

All the required consumables should be quoted for the trouble free operation of the GSV system for a period of at least 2 years.

Gas collection bags for performing offline GSV as and when required– 5 Nos.

Methanizer

The system should be quoted with Methanizer (Ni catalyst) to detect low levels of CO and CO₂.

Warranty and shifting

System must be quoted with Three years of extended warranty

Vendor has to take all responsibilities for shifting and re-installation of full set up from the present temporary location in Mandi to our permanent site in Kamand within a period of approx. 3 years. Accordingly all the terms and conditions remain the same at permanent site. All necessary charges for the same may be quoted as optional in the offer

GC System must be upgradable with MS detector. Vendor should have minimum 20 GC-MS installation in reputed govt. institutions in India. User list with contact details must be provided.

Compliance statement for the tender specifications
INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175001

Ref:-ENQUIRY NO:- IITMandi/SBS/TEN/2011-12/CHRLAB/6/ITEM No.4/ Gas Chromatograph

Instructions

1. You have to fill in all columns and ensure that you furnish all the required information accurately and unambiguously.
2. If our specification contains any values, you have to provide your values against the column in the same unit as we have specified.
3. Deviation in values, materials etc. from our specification may be explained in the remarks column

		Bidder Specification	Remarks
S.No.	Check List of Documents/undertakings		
1.	Is Tender fees attached?		
2.	Is EMD attached? (if applicable)		
3.	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
4.	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
5.	Undertaking from OEM regarding technical support & extended warranty present		
6.	Validity of 180 days or not?		
7.	Undertaking from bidder regarding acceptance of tender terms & conditions		
8.	List of reputed users for the past three years specific to the instrument		
9	Technical Specifications		
A	A microprocessor controlled Gas Chromatograph (GC) with Programmable Electronic/pneumatic Controls for complete system.		
A1	System must be fully software controllable.		
A2	System should have facilities for the operation of two injectors, two detectors simultaneously.		
B	OVEN:		
B1	Temperature range : Above ambient to 450 Deg C or better		
B2	Should have heating rate up to 100 Deg C/ min. or better		

B3	Ramps: Atleast 7 or better		
B4	Negative/cooling ramps are required		
B5	Oven Cool Down: should have fast cooling facility; from highest possible oven temp. to 50 deg C within 5 minutes or better		
B6	System must have large volume oven to accommodate at least two columns (one packed + one capillary column or two capillary columns) simultaneously.		
C	Injectors: Either one or both of the following injectors should have the facility for manual injection even if auto-sampler/Head space/online GSV are present		
C1	1. PTV Injector / Multimode injector or equivalent – 01 No. Quoted system should provide the flexibility of a standard split/splitless inlet, combined with temperature programmable capabilities which allow for large volume injection. Injector must also support cool injections for improved signal strength. Temperature control with liq. CO ₂ facility. Should have Electronic Flow Control (EFC) or equivalent facility.		
C2	Pressure range: 0 -100 psi or better		
C3	Maximum temperature: 400 Deg C or better		
C4	Temperature programming of upto 7 ramps and upto 200 oC /min or better		
C5	Suited for columns: Wide bore (0.53 mm id) and narrow bore (0.05 to 0.32 mm id)		
C6	Split ratio setting range: 0 – 7500 or better		
C7	Turn top sealing system or equivalent feature must be built in standard with inlet for quick, easy injector liner changes.		
C8	2. Wide bore/packed column injector Port -01 No		
C9	UPto 400 °C or better in 1 °C increments or better		
C10	Should be able to connect wide bore capillary column (0.53 mm id) and Packed column as and when required		
C11	Should have Electronic Flow Control facility or equivalent		
D	Electronic Pressure / Flow Control		

D1	The digital pressure and flow controller must be able to independently control and program pressures and flow upto two independent carrier gas lines. All carrier gases and detector gases flow should be controlled through software only		
D2	Pressure set points may be adjusted by increments of 1 psi or better		
E	Back Flushing Facility System must be quoted with software controlled back flushing facility		
F	<u>Detectors :</u>		
F1	1. FID DETECTOR – 01 No.		
F2	Temperature range : up to 400 Deg C or better in 1 Deg C increments or better		
F3	Min. detectable Quantity : 3 p g C/sec or better		
F4	Linearity : 10 ⁶ or better.		
F5	Data rate: upto 100 Hz or better		
F6	Flame out detection, auto re-ignition		
F7	Should have Electronic flow control or equivalent facility		
F8	2. TCD detector – 1 No.		
F9	Operating temperature :upto 350 °C or better		
F10	Linearity : 10 ⁵ or better		
F11	Electronic Flow Control or equivalent facility		
G	Detector Splitting Accessory Fully software controlled detector splitting accessory to get simultaneous chromatograms from 2 detectors without any manual intervention with single injection.		
H	Auto Injector/ Auto sampler Fully Automated liquid auto injector/auto sampler.		
H1	The auto samplers/injectors should have provisions for heating/cooling.		
H2	It should inject from 0.1µl to 100.0µl or better range with variable speed & varying syringe sizes & must operate from software. Should have capacity for 100 or more sample vials.		

H3	Must include at least 500 sample vials with cap and septa, crimper & decapper		
I	Columns:		
I1	Supelco β -DEX 120 30 m \times 0.25 mm, d_f 0.25 μ m or equivalent/better		
I2	Supelco α -DEX 120 30 m \times 0.25 mm, d_f 0.25 μ m or equivalent/better		
I3	SUPELCOWAX 10 Capillary GC Column L \times I.D. 30 m \times 0.53 mm, d_f 0.50 μ m or equivalent/better		
I4	SUPELCOWAX 10 Capillary GC Column L \times I.D. 30 m \times 0.25 mm, d_f 0.25 μ m or equivalent/better		
I5	Carboxen -1010 PLOT Capillary GC Column L \times I.D. 30 m \times 0.32 mm, average thickness 15 μ m or equivalent/better		
I6	Carboxen [™] -1010 PLOT Capillary GC Column L \times I.D. 30 m \times 0.53 mm, average thickness 30 μ m or equivalent/better		
I7	Carbowax Amine Capillary GC Column L \times I.D. 30 m \times 0.53 mm, d_f 1.00 μ m or equivalent/better		
I8	Mol Sieve 5A PLOT Capillary GC Column L \times I.D. 30 m \times 0.53 mm, average thickness 30 μ m or equivalent/better		
I9	One general purpose Non-polar capillary column: 30 m length		
I10	Suitable Packed column(s) for H ₂ , O ₂ , CO, CO ₂ analysis (5-10% each component)		
I11	Suitable Packed Column for the analyses of volatile organic compounds.		
I12	Suitable guard columns/pre-columns with connectors for each capillary columns quoted above		

J	Spares & Consumables:		
J1	Injection Port Septa – 200 Nos.		
J2	Glass Insert for Split & Splitless (4 Each)		
J3	Graphite Ferrule 0.5 mm & 0.8mm (10 each)		
J4	Microliter Manual Syringes 1, 5 & 10 μ L (5 each)		
J5	Microliter Autosampler Syringes 10 μ L & 50 μ L (5 each)		
J6	Gas tight syringes 50 μ l, 100 μ l, 250 μ l, 500 μ l, 1 ml and 5 ml – 4 each.		
J7	Standards for gases in ppm level (O ₂ , H ₂ , CO, CO ₂) – 2 no each.		
J8	Test mix for GC columns including chiral GC columns		
J9	Capillary column cutter		
K	PC and Software		
K1	The necessary software for data acquisition, control, chromatographic data analyses and evaluation, reporting etc. should be quoted with part no. The software should be easy to handle and user friendly		
K2	GC and all its modules (GC, methanizer, HS, Auto injector/sampler, online GSV etc) should be controllable through single software		
K3	Suitable Branded PC and Laser Printer		
L	Gas Cylinders		
L1	All the required gas cylinders with dual stage regulators		
L2	Complete gas purification system for all the required gases		
M	Headspace Sampler for Volatile Organic Compounds:		
M1	Temperature range for sample up to 200 ^o C or better.		
M2	Oven temp range: up to 200 ^o C or better		
M3	System should have sample capacity of 10 or more vials		

M4	Head space sampler should have built in shaking/splurging/gas purging provision for homogeneously mixing various kind of samples/complex matrix.		
M5	System should have built in Programmable Pneumatic controller (PPC)/equivalent or Gas flow controlled via Electronic Mass Flow Controller/equivalent capable of flow rates and pressure control through software.		
M6	System must be controllable through integrated GC software.		
M7	HS Accessories : At least 800 Sample vials of 20/22 ml, 300 septas, hand crimper must be included.		
M8	In case of HS with loops technology, should offer sample loops of 1ml, 2ml, 5ml - 10 Nos each.		
M9	Test mix for HS		
N	Online Gas Sampling Valve (GSV) Online GSV and the required accessories for the following application should be quoted. We would like to analyze catalytic water splitting experiments in reaction vessels of ~20 ml volume in which gas evolution (H ₂ , O ₂) can take place as a result of catalytic splitting of water. Out of the ~20 mL volume of the reaction vessel, the reagents (in water solutions) may occupy ~10 ml. The remaining ~10 mL volume of the vessel will be de-aerated by purging N ₂ . The generated gases (O ₂ or H ₂) as a result of catalysis should be sampled for QUANTITATIVE analysis from this reaction vessel head. We would like to automate this procedure by connecting online GSV directly to this reaction vessel. The amount of gases evolved in these reactions may vary depending on the catalyst – but normally the expected ranges are 0 - 100 µL of pure O ₂ or H ₂ / ~ 10 mL volume of the reaction vessel head space. Apart from the evolved oxygen or hydrogen, the matrix may contain mainly water vapor and N ₂ . All the required GC equipment/accessories/consumables for the above mentioned application must be quoted.		
N1	All the required consumables should be quoted for the trouble free operation of the GSV system for a period of at least 2 years.		

N2	Gas collection bags for performing offline GSV as and when required– 5 Nos.		
O	Methanizer The system must be quoted with Methanizer (Ni catalyst) to detect low levels of CO and CO ₂ .		
P	Warranty and shifting System must be quoted with Three years of extended warranty		
P1	Vendor has to take all responsibilities for shifting and re-installation of full set up from the present temporary location in Mandi to our permanent site in Kamand within a period of approx. 3 years. Accordingly all the terms and conditions remain the same at permanent site. All necessary charges for the same may be quoted separately in the offer		
Q	GC System must be upgradable with MS detector.		
R	Vendor should have minimum 20 GC-MS installation in reputed govt. institutions in India. User list with contact details must be provided.		
11	Available Input power: 220 V one phase/three Phase, 50 Hz		
12	All the equipment and parts should be CE compliant.		
13	The quoted system should be certified as complete for carrying out the following experiments		
a	Qualitative and quantitative analyses of gases like H ₂ , O ₂ , CO, CO ₂ etc.		
b	Qualitative and quantitative analyses of volatile organic compounds		
c	Analysis of chiral compounds and determination of enantiomeric excess of a sample		
d	Detection of CO and CO ₂ in low ppm levels using methanizer		
e	Quantitative online gas evolution studies using Online Gas sampling valve set up		
14	All necessary accessories are included in the quotation or not?		
15	Three year on-site extended warranty on all parts.		
16	Annual Maintenance Contract may be quoted as optional		