

TENDER

FOR

SUPPLY & INSTALLATION OF CHEMICAL VAPOR DEPOSITION (CVD)  
FOR SCHOOL OF ENGINEERING,

IIT MANDI



**Tender No.: IITMANDI/Admin/PUR-152/2014-15/7533-34**

**Tender date: 12<sup>th</sup> February, 2015**

**Last Date of submission: 4<sup>th</sup> March, 2015**

Indian Institute of Technology, Mandi

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

**Tel.:** 01905-237929

**Email:** [viswa@iitmandi.ac.in](mailto:viswa@iitmandi.ac.in)

Indian Institute of Technology Mandi, Mandi invites tender for supply, erection & installation, of **Chemical Vapor Deposition (CVD)**, as per specifications given in the Annexure attached to the Tender form. 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, Kamand 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 Vendors who have earlier supplied the equipment to any of the IITs, IISc, IISERs and other Scientific Institute of National Repute may only tender. The details of such institutions and the cost with name of equipment may also be supplied with the bids.
3. 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.
4. Each individual sealed envelope as well as the outer envelope should be marked with the following reference on the top left hand corner: **“IITMANDI/Admin/PUR-152/2014-15/7533-34/Item Name.\_\_\_\_\_ dated 12.02.2015”**
5. 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.
6. 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 initialed, failing which the bids are liable to be rejected.
7. Any bids received after **1:00 P.M. on 4<sup>th</sup> March, 2015** shall not be considered
8. The Technical Bids will be opened on **4<sup>th</sup> March, 2015 at 03:00 P.M.** The date & time for opening of Financial Bids will be informed later to the technically qualified bidders.
9. 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.
10. 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 the specified date and time shall not be considered.

The postal address is:

**“Assistant Registrar, Stores and Purchase”  
Indian Institute of Technology Mandi (IIT Mandi),  
Administrative Block (Mandav Hotel,  
Near Bus Stand), Mandi – 175001 (H.P), India”**

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”, Kamand 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.
17. The bidders or their authorized representatives may also be present during the opening of the Technical Bid, if they desire so, at their own expenses.

**Note:** 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.

**18. Clarifications:**

In case the bidder requires any clarification regarding the tender documents, they are requested to contact our office (e-mail: [viswa@iitmandi.ac.in](mailto:viswa@iitmandi.ac.in) & [arosp@iitmandi.ac.in](mailto:arosp@iitmandi.ac.in)) on or **before 02/03/2015**.

**19. Tender Cost:**

A Demand draft of **Rs. 1,000/- (Rupees One Thousand only)** towards non-refundable **tender fee, drawn in favour of “The Registrar, IIT Mandi”** payable at Mandi should accompany the Technical bid documents. In the absence of tender cost, the tender will not be accepted.

**20. Earnest Money Deposit (EMD):**

A refundable amount of **EMD Rs. 1,00,000/-** as earnest money deposit (EMD) in the shape of DD from a scheduled bank in India (**valid for a minimum period of 3 months from the date of submission of tender**) should accompany the bid documents. The DD drawn in favour of “The Registrar, IIT Mandi” 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. The bidders should enclose a pre-receipted bill for the EMD to enable us to return the EMD of unsuccessful bidders. Failure to deposit **Earnest Money** will lead to rejection of tender.

**21. 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) OEM should be internationally reputed Branded Company.
- d) The Vendors who have earlier supplied the equipment to any of the IITs, IISc, IISERs and other Scientific Institute of National Repute may only tender. The details of such institutions and the cost with name of equipment may also be supplied with the bids
- e) 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.
- f) Furnishing of wrong/ambiguous information in the compliance statement may lead to rejection of bid and further black listing of the bidder, if prima-facie it appears that the information in the compliance statement was given with a malafide/fraudulent intent.**

## **22. 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. **In the price bid/financial bid, the vendor should clearly mention the final price breakup i.e. ex-work price/FCA price, FOB price, CIP/CIF price & FOR IIT Mandi, Kamand Campus price, as applicable in their bid.**
- 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.

## **23. 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.

## **24. Delivery:**

The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within 24 weeks of the issue of purchase order unless otherwise prescribed. If the bidder fails to deliver and place any or all the Equipments or perform the service by the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted.

## **25. 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.

## **26. Warranty Declaration:**

Bidders must give the comprehensive on-site 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 their own cost.

**27. Performance Bank Guarantee:** A performance bank guarantee from a scheduled bank in India for an amount equal to 10% of the price for duration of two months beyond the expiry of warranty period will be taken from the supplier or Indian agent.

**28. 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 irrecoverable Letter of Credit in two installments. 80 % of the money will be released on submission of shipping of documents. Remaining 20 % will be released after successful installation of the instrument and submission of a performance bank guarantee for 10% of the order value from a nationalized bank, valid for 2 months beyond the expiry of the warranty.

**29. 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.

**30. 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.

**31. Return of EMD:**

- The earnest money of unsuccessful bidders will be returned to them without any interest within 30 working days after awarding the contract.
- The earnest money of the successful bidder will be returned to them without any interest within 30 Days after supply of material

**32. 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.

**33.** 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.

Sd/-  
**Assistant Registrar  
Stores & Purchase**

## 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 1

**Ref:-ENQUIRYNO:-IITMANDI/Admin/PUR-152/2014-15/CHEMICAL VAPOR DEPOSITION (CVD)**

### TECHNICAL SPECIFICATIONS OF CHEMICAL VAPOR DEPOSITION (CVD)

Description and Technical Specifications:

The CVD Furnace system should be fully automatically controlled by computer, it should consist of a fused quartz tube furnace, a precision mass flow gas control station, atmospheric as well as low pressure station, automatic sample loader, metal enclosure with exhaust port, gas leak detector and other safety interlocks, and other assembling parts for the controlled growth of CNT and Graphene (Hot Wall). Maximum temperature of this workstation should be 1100°C or higher. The system should be able to achieve desired vacuum to grow monolayer graphene. The mass flow gas control station should be able to mix two or more different gases together and input the mixed gas into a fused quartz tube inside the furnace. The individual gas flow rates should be precisely controllable. The system should offer wide range of material deposition including aligned CNT (single wall and multi wall), Graphene and other nanowires/2D materials (Optional).

The system should have the following general specifications and accessories.

Sr. No.	Item Specifications	Offered specification with Make & Model No. please specify any deviation if any. Please attach separate sheet if required.
<b>1. Tube Furnace</b>		
a.	Maximum Temperature	Resistance Furnace Max Temp. 1100°C or more Uniform working temperature of up to 1100°C in 150 mm mid zone must be ensured in the quartz tube reactor.
b.	Temperature Accuracy	±1°C in the entire temperature range during both heating and cooling.
c.	Heating Rate	Temp Ramp Up rate(Programmable) 20°C per min
d.	Cooling Rate	Temp Ramp Down rate(Programmable) 20°C per min
e.	Number of Zones	Three
f.	Heating Zone	300 mm or more (constant temp zone 150 mm)
h.	Temperature control	Precision temperature controllers with PID function and 30 segments programmable. One extra temperature monitor should be built in to shut down power when temperature out of control by

		accident.
i.	Electrical Power	Single Phase 200-230 V, 50 Hz
<b>2.</b>	<b>Sample Holder</b> System should be capable of handling different substrates such as silicon wafer, quartz wafer and fiber fabrics of given dimensions.	
a.	Reaction Chamber	Quartz Reaction Tube of suitable size to enable laminar flow to achieve controlled CNT and Graphene growth on at least 1 inch X 1 inch specimen. Additional quartz tubes (up to three) may be quoted (optional). Provision for using different size (diameter) quartz tube.
b.	Sample/component size	Variable, but the maximum size can be 100 L x 20 H x 30 W mm and minimum size can be 10 L x 10 H x 2 W mm. Reduction of working zone size should be possible for carrying out coating deposition on small sized samples <b>(Optional)</b> .
c.	Sample Mounting	Automatic Cantilevered Sample loading/unloading <b>(Optional)</b> .
2	<b>High Vacuum Station:</b> High vacuum station should consist of diaphragm pump as backing pump and turbo-molecular pump (Optional) with complete accessories including vacuum gauge, SS vacuum bellows, digital display, ball valves etc. The system should be able to run at both low pressure and atmospheric pressure.	
a	Pump-1	Heavy duty rotary (oil less) pump. 2 stage exhaust with pressure of $10^{-3}$ torr.
b	Pump-2 <b>(Optional)</b>	Turbo Pump with pressure of maximum $10^{-6}$ torr, with needle valve and connecting accessories <b>(Optional)</b> .
c	Cleaning of Chamber (Purge Line)	Pump should enable N <sub>2</sub> or Ar purging for cleaning Process tube (Reaction chamber) after deposition shall be flushed with Ar/N <sub>2</sub> for which separate line should be provided.
c	Accessories	Two Anti-corrosive, gas independent pressure gauge ( $\sim 10^{-3}$ -10 Torr, and 1-1000 torr measurement range), digital display, high accuracy, and reproducibility at atmosphere, easy to exchange plug & play sensor element.
<b>3.</b>	<b>Gas Supply System</b>	
	Gas Supply Chamber	Gas feed system shall be provided with Mass flow controller, Controls, Regulators, Valves, 316 steel corrosion resistance tubing and Flow monitoring devices and digital read out. Gas handling system should be non-corrosive catering to feed and exhaust by products.  Gas cabinet should have the facility for extraction of reactant gases in case of leakage and detection facility. In case of gas leakage, the PLC controller should trigger the alarm and shutdown the valve. Gas Control Panel shall allow pressure and temperature control of feed gas.



	Mass flow Controllers	4 Precision MFCs (Provision for 2 Extras) MFCs should be calibrated for, Ar, H <sub>2</sub> , C <sub>2</sub> H <sub>4</sub> , CH <sub>4</sub> . Optional Gases: C <sub>2</sub> H <sub>2</sub> , N <sub>2</sub> Control Range: 1-1000 sccm Accuracy: $\leq \pm 0.02\%$ of Full Scale Material: Stainless Steel (316L), Non Magnetic. Control Stability: $\leq \pm 0.1\%$ of Full Scale Control Valve: Closed Solenoid (Fast-Response)
	Solid source kit <b>(Optional)</b> .	Solid Source Vapor Delivery Kit for Oxide Nanowire Growth <b>(Optional)</b> .
<b>4.</b>	<b>Control System</b>	
	<ol style="list-style-type: none"> <li>1. Computer control system with Graphical User interface for complete process-related controls such as vacuum level, gas flow rates, gas pressure, process temperature, voltage and current.</li> <li>2. User interface: Fully computer controlled system with window based software for operating the microscope along with keyboard, mouse, control panel including multifunction for control.</li> <li>3. Software should have provision for Manual settings, automated experiment programming, Real time instrument read-out, Alarm display, administration management.</li> <li>4. Preprogramed settings for SW/MW CNT's, Graphene and oxide nanowires <b>(optional)</b> etc.</li> <li>5. Other displays/controls such as those for gas leak detectors, bubbler, status of safety valves, alarms, interlocks etc., process deviation etc. should also be provided on the control panel.</li> <li>6. Remote diagnostics/trouble shooting of the system/process by the supplier through internet /tele-maintenance shall be included.</li> </ol>	
<b>5.</b>	<b>Electrical System</b>	
	Suitable UPS and other accessories required for installation of CVD need to be quoted" and voltage distributor for uniform power supply to all the components of the CVD system.	

#### **6. Safety and other requirements:**

1. The entire system should be thoroughly checked for leak (leak rate should be less than 10<sup>-6</sup> cc/s). This should be shown at the time of inspection.
2. Gas delivery system must shut off the supply in the event of leak rate exceeds the desired limits. The sensors should be interlocked with PLC/PID controllers. PLC system shall also be linked with air delivery system.
3. Suitable audible and visual alarm should be provided in case of malfunction of CVD furnace like temperature shoot-up, high power drawing, vacuum loss and deviation from in water/gas flow rates.
4. Sensors with audible/visible alarms for dangerous gas leakage (H<sub>2</sub>, AlCl<sub>3</sub>, Cl<sub>2</sub>, HCl, SiCl<sub>4</sub> etc.) should be provided.
5. Thermal insulation for minimum heat loss (Less than 5% of the reactor temperature) to the surrounding.
6. Vendor should specify the maximum power rating and weight of the furnace.
7. All the emergency procedures should be outlined and detailed document should be provided to IIT Mandi.

#### **7. Installation and training:**

Two installations (i.e., first time at IIT Mandi, Mandi campus and second time at Kamand

campus) should be done by the supplier and it should be included in the estimated cost. Basic recipe to grow CNTs and Graphene should be provided to demonstrate all the functions of the system. On-site Four days training for operation and application may be given to the users free of cost. IIT Mandi will not bear any training or leaving expenditure in this regard.

#### **8. Warranty and maintenance:**

The complete instrument should be under warranty for a period of at least one year from the date of installation. The vendor should be agreeable to enter into Comprehensive Annual Maintenance Contract with IIT Mandi at a reasonable price, for maintaining the equipment in proper working conditions, after the warranty period is completed. Quote the cost of onsite annual maintenance for two years after warranty period.

The CVD system provider/vendor must have service centre in India. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts, without any liability of cost. Supplier should ensure to provide all spares required for making the instrument operational. The spares recommended for keeping in inventory along with the instrument may also be quoted.

#### **9. Spare parts:**

The supplier should provide the list of accessories required for smooth running of the machine for 3-5 years and should quote all the necessary accessories. The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the model of equipment supplied has been phased out. For frequently required spares, there should be adequate inventory with the Indian agency.

#### **10. Manual :**

One set of operating manual and service manual including detailed drawings and circuit diagrams (in English) should be provided with the instrument

#### **11. User list with contacts:**

Vendor should specify the exact quoted model number and provide the user list in India along with contact details so that IIT Mandi can approach the contact person for any feedback. Also enclose the catalogue for the quoted model number. In case of any doubt about capability of the machine, the vendor will have to arrange demonstration at any site bearing the cost including the travel and other expanses of IIT Mandi representative.

#### **Compliance Statement:**

The supplier must submit technical brochures and proper application notes adequately explaining and confirming the availability of the features in the model of the equipment being quoted. The supplier must submit a table indicating the compliance of the features of the model of the equipment being quoted with those given in the indent. Features not matching – must be clearly indicated. Additional features and Features in the quoted equipment which are better than those in the indent – may be clearly explained

**COMPLIANCE STATEMENT FOR THE TENDER SPECIFICATIONS**  
**INDIAN INSTITUTE OF TECHNOLOGY MANDI HIMACHAL**  
**PRADESH-175001**

Ref:-ENQUIRY NO:-**IITMANDI/Admin/PUR-152/2014-15/ CHEMICAL VAPOR DEPOSITION (CVD)**

**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

<b>S. NO</b>	<b>Check list of documents/ Undertakings ?</b>	<b>YES/ NO</b>	<b>Remarks (Give explanation if answer is No)</b>
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 period		
6	Validity of 180 days or not?		
7	Undertaking from bidder regarding acceptance of tender terms & conditions		
8	Whether list of reputed users (along with telephone numbers of contact persons) for the past three years specific to the instrument attached.		
9	Whether special educational discount for Indian Institute of Technology (IIT) Mandi (H.P) given.		
10	Whether training of operator and research students without any charges offered.		
11	<b>Does the instrument complies with all the specifications from S. no. 1 to 11. Attach a separate sheet showing compliance with the specifications and explanations thereto if the equipments varies from the requested specifications.</b>		
12	Whether free Installation, Commissioning and Application Training offered.		
13	Whether required comprehensive onsite extended warranty offered.		
14	Whether Annual maintenance after expiry of comprehensive onsite warranty quoted separately as optional.		