

TENDER (E - PROCUREMENT MODE)

FOR

SUPPLY & INSTALLATION OF COMPACT REACTIVE ION ETCHING (RIE)

SYSTEM IN SCHOOL OF COMPUTING & ELECTRICAL ENGINEERING

AT IIT MANDI



Tender No.: IITMANDI/S&P/PUR- 172/2016-17/7624-25

Tender date: 15th November, 2016

Last Date of submission: 07th December, 2016

Indian Institute of Technology Mandi

IIT Mandi, Administrative Block at Bamboo Hut, Near Director Office,

Kamand - 175005

Ph. No.: 01905-267134 email: tenders@iitmandi.ac.in & satinder@iitmandi.ac.in

Indian Institute of Technology Mandi, Kamand invites online Bids for supply, erection, installation, commissioning, testing, demonstration and training of **Compact Reactive Ion Etching (RIE) System**, 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 CPP Portal (<http://eprocure.gov.in/eprocure/app>)

& Institute website <http://iitmandi.ac.in/administration/tenderseoi.php>.

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.

Preparation and submission of bids:

1. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender publishing on the CPP Portal.
2. Bidder should take into account any corrigendum published on the tender document before submitting their bids.
3. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
4. The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app>. In the Technical Bids, the bidders are required to upload all the documents in .pdf format. All quotation (**both Technical and Financial should be submitted in the E-procurement portal**).
5. Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through <http://eprocure.gov.in/eprocure/app>. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web site <https://eprocure.gov.in/eprocure/app> under the link “Information about DSC”.
6. Technical & Financial Bids should be submitted in PDF format.

7. **In case of Financial bids**, a standard BOQ format has been provided in PDF format. Bidders are required to download the BoQ PDF file and fill their financial offer on the same BOQ format. After filling the same, submit it online in PDF format, without changing the financial template format. If the BoQ format file is found to be modified by the bidder, the bid will be rejected.
8. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid documents may be scanned with 100 dpi with black and white option.
9. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
10. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
11. **Kindly add scanned PDF of all relevant documents in a single PDF file like, compliance sheet, OEM/Principle Certificate etc.**
12. Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
13. Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
14. 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.
15. The technical and financial bids should be submitted online through portal <http://eprocure.gov.in/eprocure/app> 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.
16. Each bidder should be marked with the following reference on the top bids submitted online: **"IITMANDI/S&P/PUR-172/2016-17/7624-25/Item Name. dated 15th November, 2016"**.
17. 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 in .pdf format.
18. 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.
19. **Assistant To Bidders:** Any queries relating to the tender document and the terms & conditions contained therein should be addressed to tender Inviting Authority for a tender or relevant contact person indicated in the tender.

20. Any bids received after **1:00 P.M. on 07th December, 2016** shall not be considered
21. The Technical Bids will be opened on **07th December, 2016 at 03:00 P.M.** The date & time for opening of Financial Bids will be informed later on to the technically qualified bidders.
22. 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 .pdf format. In case the firms do not give this undertaking, their rates will not be considered.
23. If the supplier/firm is original equipment manufacturer (OEM)/authorized dealer/sole distributor of any item, the certificate to this effect should submit in .pdf format.
24. The quantity shown against the item is approximate and may vary as per demand of the Institute at the time of placing order.
25. The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app>. All tender documents received after the specified date and time shall not be considered.

For any correspondence regarding tenders is on below address:

**“Assistant Registrar, Stores and Purchase”
Indian Institute of Technology Mandi (IIT Mandi),
Near Director Office, Kamand Distt. Mandi – 175005 (H.P), India”**

26. 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.
27. The place of arbitration and the language to be used in arbitral proceedings shall be decided by the arbitrator.
28. All disputes shall be subject to Mandi Jurisdiction only.
29. All tenders in which any of the prescribed conditions is not fulfilled or any condition is putforth by the tenderer shall be summarily rejected.
30. All items listed below may not be necessarily ordered and the quantities mentioned in the tender document are also approximate. Items and their numbers to be ordered will be decided by the committee later at the time of ordering. Hence, **the vendor should quote for unit item /smallest pack available for all items”**

- 31.** 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 intimated only to the technically qualified bidders. In exceptional situation, an authorized committee may negotiate price with the qualified bidder quoting the lowest price before awarding the contract.

32. Clarifications:

In case the bidders requires any clarification regarding the tender document, they are requested to submit their queries on the e-mail i.e satinder@iitmandi.ac.in & tenders@iitmandi.ac.in on or **before 23/11/2016**.

33. Tender Cost:

The bidder should submit 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 in a sealed envelope super-scribed as **“Tender fee & NIT No. IITMANDI/S&P/PUR-172/2016-17/7624-25/Item Name. dated 15th November, 2016”** on or before last date & time of submission of bids. In the absence of tender cost, the tender will not be accepted.

34. Earnest Money Deposit (EMD):

Bidder should furnish an EMD of a refundable amount of **Rs 1,80,000/-** in the shape of DD from a scheduled bank in India drawn in favour of **“The Registrar, IIT Mandi” payable at Mandi**. This EMD should be submitted in sealed envelop super-scribed as EMD & NIT No. **“IITMANDI/S&P/PUR-172/2016-17/7624-25/Item Name. dated 15th November, 2016”**. 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.** In the event of the awardee bidder backing out, EMD of that bidder will be forfeited.

- **Note: Both (tender fee & EMD) envelops should be placed in another sealed envelope and address to:**

**“Assistant Registrar, Stores and Purchase”
Indian Institute of Technology Mandi (IIT Mandi),
Near Director Office, Kamand Distt. Mandil – 175005 (H.P), India”**

This envelop having tender fee & EMD should reach on or before last date & time of submission of bid.

35. EMD Exemption:

The Institute may accept bids without EMD from those bidders who are registered with the Central Purchase Organization, National Small Industries

Corporation (NSIC) or the concern Ministry or Department **as Manufacturer**. To claim the exemption, the bidder must be offering goods manufactured by themselves. Exemption will not be granted in case the bidder is acting as an agent for some other vendor.

36. Pre – Qualification Criteria:

- 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.
- 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.
- 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.
- OEM should be internationally reputed Branded Company.
- 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.
- **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.**

37. Prices:

- 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/Kamand). 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 case of imports/foreign supplier, the price should be quoted on ex-work price/FOB/FCA basis only. Under special circumstance (e.g. perishable chemicals), when the item is imported on CIP/CIF, please indicate CIF/CIP charges separately upto Delhi indicating the mode of shipment. IIT Mandi will make necessary arrangements for the clearance of imported goods at the Airport/Seaport.**
- In case of imported equipment(s)/item(s), the agency commission, if any, payable in Indian rupees should be mentioned separately. **IAC shall be paid after satisfactory installation & commissioning of the goods at the destination.** 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.

- **In case of indigenous item, the vendor should clearly mention the final FOR IIT Mandi, Kamand Campus Price, as applicable in their bid.**

38. 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.

39. 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.

40. Installation, Training & Demonstration:

Bidders need to provide adequate training to the nominated persons of IIT Mandi at their cost. IIT Mandi will not bear any training expenditure. The supplier is required to done the installation and demonstration of the equipment within **one month** of arrival of materials at the IIT Mandi site of installation, otherwise the penalty clause will be the same as per the supply of material.

41. 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.

- 42. 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.

- 43. 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 irrevocable 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. All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.
- In case of required item quoted in INR, 80% payment will be made through E-payment after receipt of material in good condition and Remaining 20% will be released on successful installation of the instrument and on 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.

44. 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.

45. 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.

46. Return of EMD:

- The earnest money of unsuccessful bidders will be returned to them without any interest within 15 working days after awarding the contract.
- The earnest money of the successful bidder will be returned to them without any interest within 15 Days after supply of material.

47. 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.

48. The IIT Mandi reserves the right to cancel the tender at any stage (point of time) without assigning any reason.

49. 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 :

Ref:- ENQUIRYNO:-IITMANDI/S&P/PUR-172/2016-17/Compact Reactive Ion Etching (RIE) System

VLSI Lab IIT Mandi is looking for a complete standalone REACTIVE ION ETCHING System for etching silicon, silicon dioxide, silicon nitride, photoresists and other polymers, with the option to upgrade it for other semiconductors, compound semiconductors, ceramics, dielectrics; oxides and Nitrides by incorporating suitable MFCs for toxic and non-toxic precursors.

Specification for Compact Fully-automated PC Controlled RIE System, designed to handle wafers up to the size of 150mm (6 inches) in diameter are as following. Vendors are required to quote for a complete working system with all required accessories.

CHAMBER UNIT

1. The system should have a 'clam-shell type' chamber, optimized for anisotropic etching, and maximized for uniformity.
2. MOC (Chamber Body): SS304 or Al6061 anodized Aluminum or any other compatible material.
3. Chamber Size: 250mm (OD) x 250mm (H) or larger preferred
4. 200mm (OD) Shower Head Port
5. Gas Feeding & vent Ports should be included
6. 50mm (OD) View Port made of sapphire or Quartz with UV shielding to view plasma.
7. Top / front Door made of SS304, Al6061 anodized aluminum or any other compatible material.
8. The sample being etched should be placed on the RF-powered bottom electrode (substrate on bottom configured).
9. System should also have an annular exhaust port behind the RF-powered bottom electrode to minimize gas turbulence.
10. System should have a water-cooled cathode for maintaining substrate temperature to prevent sample being etched from overheating, effectively reducing the possibility of a distorted resist mask when patterning a substrate.

SUBSTRATE & PLASMA UNIT

11. Max. Wafer Size: 6-inch, should be capable of accommodating substrates of thickness 15 mm or more
12. 600W, 13.56MHz RF Power with Auto Matching Network. The power supply should be continuously adjustable in the range 0 to 600 Watts.
13. Anodized Aluminum Covered Electrode
14. Water-cooled, 6mm (OD) Flexible Hose
15. Plasma Shield Assembly & Teflon Insulator
16. Plasma density must be 10^{10} ions/cc or higher (Test by Langmuir probe)

GAS SHOWER HEAD UNIT

17. The system should design for laminar flow of process gases covering the entire substrate assembly to minimize turbulence and redeposition of particles. The process gas should be injected through a shower head on the top shell and exit through the annular port at the base of the chamber. Other designs ensuring laminar flow are also acceptable.
18. ¼" Gas Feeding Port & 2mm (OD) Gas Feeding Hole
19. ¼" Purge Port for Venting Chamber

VACUUM & PUMPING UNIT

20. 250 liters/min Dry Vacuum Pump or more
21. Turbo-Molecular Pump having capacity of 450 l/s or more
22. Vacuum Gauge
23. Vacuum Sensor Controller
24. 10 Torr Capacitance Manometer, Motorized Throttle Valve & Controller
25. Automatic Pressure Controller System should be equipped with automatic vacuum control, which consists of a motorized throttle valve and capacitance manometer for precise control of working process pressure
26. Flexible Exhaust

GAS SUPPLY UNIT

27. Four (4) Mass Flow Controllers
 - (i) Oxygen (O₂)
 - (ii) Sulfur Hexafluoride (SF₆)
 - (iii) Argon (Ar)
 - (iv) CHF₃ or CF₄
28. Two (more preferred) Open Mounting Bay for Additional MFCs. The upgradation should be compatible with flammable gases such as H₂, CH₄, C₂H₆ and toxic & corrosive as SiCl₄, Cl₂, BCl₃ etc
29. ¼" Pneumatic Gas Valves
30. 6 (more preferred) Channel MFC Controller

ELECTRICAL CONTROL UNIT

31. Safety Controls: Water and Air with Pressure Switch.
32. Warning alarm in case of gas leakage.
33. Auto Shut down in case of leak is must.
34. Pneumatic Valve Control

Others:

35. MS Windows 7Pro or higher version Embedded PC
36. Intel Core2Duo E5700 3.0G
37. National Inst. LabVIEW User Front End
38. 21" LCD Monitor
39. Preloaded recipe for etching silicon, silicon oxide and silicon nitride (higher recipes are preferred) and standard photo resists and possibility of upgradation of user define recipes.
40. Chiller for circulating chill water for control the temperature 5^o to 90^oC.

41. The vendor should provide the test masks for 15 nm to 5 micron patterns etching using the supplied masks.

Optional:

42. Complete dry exhaust system with compatible scrubber unit
43. PECVD upgradation for two or more gas precursors
44. ICP upgradation near future
45. The vendor should include offer for an operator to be deputed at IIT Mandi to operate RIE system for two years. The selection of the operator will be done with the consent of IIT authorities.

Terms & Conditions:

- (i) Quoted price should be FOR IIT Mandi at Kamand
- (ii) **Warranty: 2 years**
- (iii) Training: **First training (5 days)** immediately after installation and **3 day second training** as and when required within next one year.
- (iv) The vendor should demonstrate the capability of the system by etching graphene, SiO₂, SiN_x, and photoresist having features from 1 micron to 15 nm with good aspect ratio.
- (v) The vendor should provide the test masks for above mentioned demonstration.
- (vi) Provide list of users with their contact details
- (vii) Vendor must **guarantee the regular supply of spares for atleast next 10 years** after installation.
- (viii) IIT Mandi competent authority reserves the right to disqualify any vendor or considering vendor's capabilities or cancel the bid at any stage of the tendering process, without assigning any reason.
- (ix) IIT Mandi competent authority reserves the right to procure RIE, PECVD, ICP, combine, or single or dual as per requirement or none of them.
- (x) Furnish AMC charges after completion of two years warranty
- (xi) The compliance sheet as per attached format must be included in the technical bid. All details must be filled highlighting the non-compliance items.

COMPLIANCE STATEMENT FOR THE TENDER SPECIFICATIONS
INDIAN INSTITUTE OF TECHNOLOGY MANDI
HIMACHAL PRADESH-175005

Ref:- ENQUIRY NO:-IITMANDI/S&P/PUR-172/2016-17/Compact Reactive Ion Etching (RIE) System

Compliance Statement		
Sr. No.	Required Specifications	Complied / Not Complied. Provide details. Non complied items should be highlighted
1	Fully-automated PC Control RIE System for etching silicon, silicon dioxide, silicon nitride photoresist and other polymers.	
2	Should be upgradable for etching other semiconductors, compound semiconductors, ceramics, dielectrics; oxides and Nitrides by incorporating suitable MFCs for toxic and non-toxic precursors.	
3	Designed to handle wafers up to the size of 150mm (6 inches) and other substrates of thickness 15mm or more.	
4	MOC (Chamber Body): SS304 or Al6061 anodized Aluminum or any other compatible material.	
5	Chamber Size: 250mm (OD) x 200mm (H) or larger	
6	Suitable Electrode Port	
7	Suitable Pumping Port- KF25	
8	Shower Head Port- 200mm (OD)	
9	View Port- 50mm (OD) made of sapphire or Quartz with UV shielding to view plasma	
10	Should have annular exhaust port behind the RF-powered bottom electrode	
11	should have a water-cooled cathode to prevent sample from overheating	
	Provision for two or more Mounting Bay for Additional MFCs	
12	600W, 13.56MHz RF Power with Auto Matching Network. Continuously adjustable power in the range 0-600 W	
13	Plasma density atleast be 10^{10} ions/cc	
14	Plasma Shield Assembly & Teflon Insulator	
15	System should have gas showered designed for laminar flow of process gases covering the entire 6" substrate assembly	
16	Rotary Vacuum Pump (Dry)-250 liters/min or better	
17	Turbo Vacuum Pump- 450 l/s or better	
18	10 Torr Capacitance Manometer,	
19	Motorized Throttle Valve & Controller	
20	Automatic Pressure Controller	
21	Four (4) Mass Flow Controllers	

	<ul style="list-style-type: none"> ○ Oxygen (O₂) ○ Sulfur Hexafluoride (SF₆) ○ Argon (Ar) ○ CHF₃ or CF₄ 	
22	Two (or more) open Mounting Bay for Additional MFCs. The upgradation should be compatible with flammable gases such as Ha, CH ₄ , C ₂ H ₆ and toxic & corrosive as SiCl ₄ , Cl ₂ , BCl ₃ etc	
23	6 (more preferred) Channel MFC Controller	
24	Safety Controls: Water and Air with Pressure Switch	
25	Warning alarm in case of gas leakage.	
26	Auto Shut down in case of leak is must	
27	MS Windows 7 Pro or higher Embedded PC Intel Core2Duo E5700 3.0G	
28	National Instruments LabVIEW User Front End	
29	21" LCD Monitor	
30	Preloaded recipe for etching silicon, silicon dioxide, silicone nitride and standard photo resists.	
31	Facility to store user developed recipes.	
32	Chiller with sufficient capacity for circulating chill water for control and keep the temperature in the range 5° to 90°C.	
33	The vendor should demonstrate the capability of the system by etching graphene, SiO ₂ , SiN _x , and photoresist having features from 1 micron to 15 nm with good aspect ratio using the supplied masks.	
34	Warranty: 2 years	
35	Training: First training of Five days after installation and another for 3 days whenever required	
36	AMC Charges after warranty period	
37. Optional		
a.	Complete dry exhaust system with compatible scrubber unit	
b.	PECVD upgradation for two or more gas precursors	
c.	ICP upgradation near future	
d.	The vendor should include offer for an operator to be deputed at IIT Mandi to operate RIE system for two years . The selection of the operator will be done with the consent of IIT authorities.	