

Tender Notification for the Procurement of Multisource Thermal Evaporator with Glovebox Integration (Last Date for Submission: November 12, 2020; 5:00 PM IST)

Kindly send your best quotation for a multisource thermal evaporator with integrated glovebox system with the following technical specifications on C.I.P. Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, E.D., and payment terms. The tender should be submitted in two separate sealed envelopes - one containing the technical bid and the other containing the commercial bid.

Bid expected only from Indian supplier

Important dates

1. Release of tender: **27 October, 2020**
2. Last date for sending queries: **November 2, 2020**. Queries may be sent to Dr Rajamalli (rajamalli@iisc.ac.in)
3. Pre-bid clarification meet: **November 6, 2020 at 11 AM** over Video Conference (to be announced to interested parties). No queries will be entertained after pre-bid clarification meet.
4. Release of corrigendum to the tender based on the queries, if necessary: **November 8, 2020**.
5. Submission of the bid: **November 12, 2020; 5PM IST**

Please enclose a compliance statement along with the technical bid. Bids with no statement of compliance will be considered invalid.

The bids should be addressed to:

*The Chairman,
Materials Research Centre
Indian Institute of Science (IISc)
Bengaluru, India - 560012.*

ELIGIBILITY CRITERIA

Prequalification criteria:

Bidders who are qualifying/meeting following Technical and Financial capabilities are eligible to participate in the bid for High Vacuum Chamber, Pumping system, Control panel and glove box. Bidder shall furnish all the details with documentary proof and submit the same along with quotation. Bids of the parties which are not meeting the following criteria will not be considered for evaluation and will be rejected without seeking any further clarifications. Bidder shall furnish the details of their resources in factory like manpower, machinery, quality system etc., for department to assess their capability.

Technical Qualification Requirements:

The bidder should meet the following technical qualifying requirements and shall submit relevant certificates/data to establish his credentials along with the technical bid

- 1) The Bidder should be an organization with previous experience of more than 15 years in having executed contracts for high vacuum system engineering, manufacture, supply, testing for following applications
- 2) The bidder should have experience in making multi source thermal evaporator (minimum 6 number of sources for organic materials and metals) and more accurate masking for organic and metal layers. They should have experience in changing the organic/metal mask under vacuum by manual/automatic
- 3) High vacuum pumping system design with above mentioned process with turbo molecular pump/cryo pump as a high vacuum pump.
- 4) High vacuum system more than 500X500X500 mm dimension rectangular or square type chamber.
- 5) High vacuum system with material high temperature (i.e. Aluminium and LiF evaporation) and low temperature (50-600 °C)
- 6) The Bidder shall have dedicated qualified design team for high vacuum chamber design and manufacturing team, and system control and automation team.
- 7) If the Bidder is a local distributor/dealer/Agent, it is mandatory to attach authorization certificate along with the bid from the original equipment manufacturer.
- 8) The Bidder must not have been blacklisted/banned/suspended or have a record of any service related dispute with any organization in India or elsewhere.

9) The vendor must provide 3-5 references where they have carried out supply, installation and maintenance of evaporator with minimum 6 sources (organic and metal) and manual/automatic mask changer in the past 5 years to IISc, IITs, IISERs, NITs. IISc shall independently obtain inputs from the provided referees before arriving at a final decision.

10) The bidder must have average annual turnover of minimum 10 crores.

11) The bidder should sign and submit the declaration for Acceptance of Terms and Conditions.

TERMS AND CONDITIONS

A) Submission of Tender:

1. All documentations in the tender should be in English.

2. Tender should be submitted in two envelopes (two bid system).

a. Technical Bid (Part-A) – Technical bid consisting of all technical details, check list for conformance to specifications, format in which the price bid is quoted without the actual prices (suppliers who include any indication of prices in the technical bid will be automatically disqualified).

b. Commercial Bid (Part-B) – Commercial bid indicating item wise price for the items mentioned in the technical bid, as per the format of quotation in section 6 provided in tender and other commercial terms and conditions.

3. The technical bid and price bid should each be placed in a sealed cover, superscripting on both the envelopes the tender no. and the due date and Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscripted with the Tender No & Due Date.

4. The SEALED COVER superscripting tender number / due date & should reach The Chairman, Materials Research Centre, Indian Institute of Science, Bangalore – 560012, India on or before due date mentioned in the tender notice. In case due date happens to be holiday the tender will be accepted and opened on the next working day. If the quotation cover is not sealed, it will be rejected.

5. All communications are to be addressed to- P. Rajamalli (rajamalli@iisc.ac.in), Materials Research Centre, Indian Institute of Science, Bangalore – 560012, India.

6. GST/other taxes, levies etc., are to be indicated separately. The BIDDER should mention GST Registration and PAN in the tender document.

7. If price is quoted in Technical Bid as provided in tender document the bid is liable to be rejected.

8. The Institute reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders.

9. Incomplete bids will be summarily rejected.

B) Cancellation of Tender:

Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the right:

- a. To accept OR reject lowest tender or any other tender or all the tenders.
- b. To accept any tender in full or in part.
- c. To reject the tender offer not confirming to the tender terms.

C) Validity of the Offer:

The offer shall be valid 90 Days from the date of opening of the commercial bid.

D) Evaluation of Offer:

1. The technical bid (Part A) will be opened first and evaluated.
2. Bidders meeting the required criteria as stated in this document shall only be considered for Commercial Bid (Part B) opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
3. Pre-qualification of the bidders shall not imply final acceptance of the Commercial Bid. The agency may be rejected at any point during technical evaluation or during commercial evaluation. The decision in regard to acceptance and / or rejection of any offer in part or full shall be the sole discretion of IISc Bangalore, and decision in this regard shall be binding on the bidders.
4. The award of contract will be subject to acceptance of the terms and conditions stated in this tender.
5. Any offer which deviates from the vital conditions (as illustrated below) of the tender is liable to be rejected:
 - a. Non-submission of complete offers.
 - b. Receipt of bids after due date and time and or by email / fax (unless specified otherwise).
 - c. Receipt of bids in open conditions.
6. In case any BIDDER is silent on any clauses mentioned in these tender documents, IISc Bangalore shall construe that the BIDDER had accepted the clauses of the tender and no further claim will be entertained.
7. No revision in the terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.

E) Pre-requisites:

The bidder will provide the prerequisite installation requirement of the equipment along with the technical bid.

F) Warranty:

The complete system is to be under warranty period of 5 years including free supply of spare parts and labour from the date of functional installation. If the instrument is found to be defective, it has to be replaced or rectified at the cost of the bidder within 20 days from the date of receipt of written communications from IISc, Bangalore. If there is any delay in replacement or rectification, the warranty period should be correspondingly extended.

G) Lifetime service:

Lifetime services should be given

H) Purchase Order:

1. The order will be placed on the bidder whose bid is accepted by IISc based on the terms & conditions mentioned in the tender document.
2. The quantity of the items in tender is only indicative. IISc, Bangalore reserves the right to increase /decrease the quantity of the items depending on the requirement.
3. If the quality of the product and service provided is not found satisfactory, IISc, Bangalore reserves the right to cancel or amend the contract.

I) Delivery and Installation:

The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order.

The system should be delivered, installed and made functional within 120 days from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period.

J) Statutory Variation:

Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.

K) Disputes and Jurisdiction:

Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in a court of competent jurisdiction located within the city of Bangalore, India. The purchase shall be governed by the laws of India.

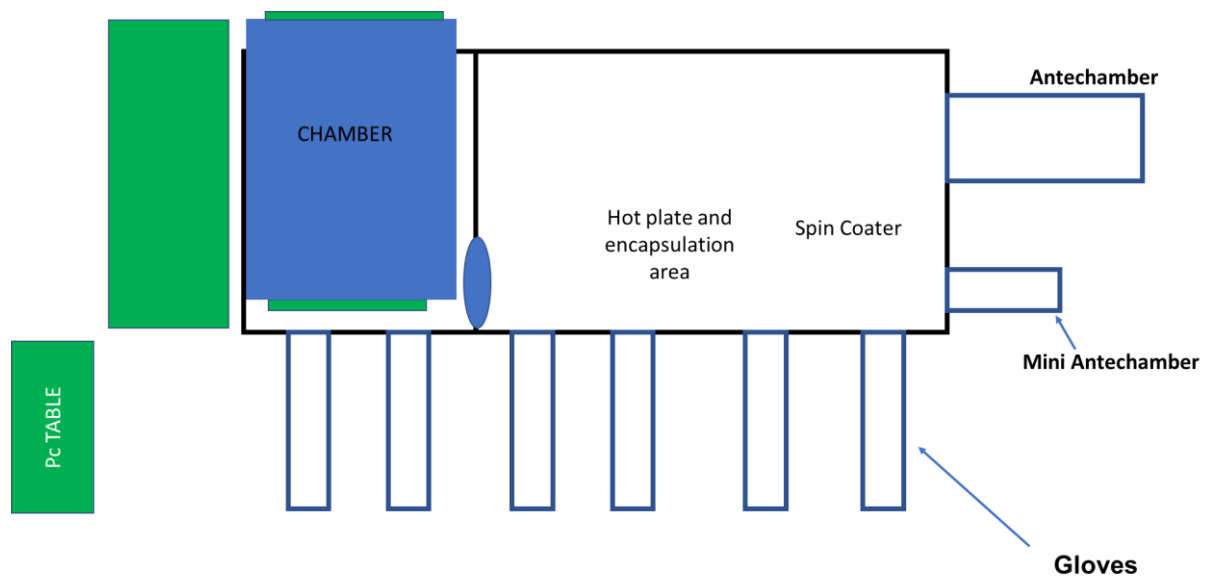
L) General:

1. All amendments, time extension, clarifications etc., within the period of submission of the tender will be communicated electronically. No extension in the bid due date/time shall be considered on account of delay in receipt of any document(s) by mail.

2. The bidder may furnish any additional information, which is necessary to establish capabilities to successfully complete the envisaged work. It is however, advised not to furnish superfluous information.
3. The bidder may visit the installation site before submission of tender, with prior intimation.
5. Any information furnished by the bidder found to be incorrect, either immediately or at a later date, would render the bidder liable to be debarred from tendering/taking up of work in IISc, Bangalore.

Technical Specification for Modular Glove Box System Integrated with Evaporator

The scope of work includes Modular Glove Box with Vapor Deposition Chamber (for metal and organic) and integrated with Glove Box (6 port) System and complete with humidity controlled, gas purification system and accessories.



1. Glovebox

- ✓ Inner dimension of 2400 -2800 mm (W) x 700-800mm(D) x 900-1000mm(H)
- ✓ Glove box Chambers built from Stainless steel with brushed finish (SS 1.4301)
- ✓ Stand with height of 900-1100 mm; inclusive of castors and machine feet which are height adjustable
- ✓ Partition wall with anodized wall with anodized door.
- ✓ Integrated high vacuum feed-throughs with minimum 8 numbers.
- ✓ Internal mains power board (MIN 6 outlet) and 220V
- ✓ Electrical feed through
- ✓ International Standard power supply
- ✓ 3-tier Movable Stainless-Steel Shelf

- ✓ Butyl Rubber Gloves (0.4 mm thick) with O-rings-6 number and one pair extra
- ✓ Total Number of Glove Ports: 6 Glove port feed throughs round, d=220 mm
- ✓ Front mounted yellow Glove Box lighting clean room standard
- ✓ Automatic box pressure (inside) control with PLC in adjustable range between -15 to +15 mbar with sensor
- ✓ Automatic box purging with flow control 200 l/m or more
- ✓ Positive pressure regulation without vacuum pump
- ✓ Should include Oil Free based pressure relief valve
- ✓ System should include additional water proof foot pedal
- ✓ Main valves: electro-pneumatic valves, PLC-controlled
- ✓ Attainable purity <0.1ppm Moisture, <0.1ppm Oxygen
- ✓ 2 pieces HEPA H14 dust filter inside the box for gas inlet and outlet should be provided
- ✓ Scratch and corrosion resistant glass/Polycarbonate panel with hard coating which is resistant to scratches and many harsh chemicals
- ✓ Chamber, gloves, panels, valves, gauges and electronics all should be chemically resistant
- ✓ Internal glove port cover (2 number) should be provided
- ✓ PLC controlled Sensor set for H₂O and O₂
- ✓ Solid state Oxygen sensor, 0 - 1000 ppm, PLC controlled, operated via PLC
- ✓ Solid state Moisture sensor, 0 - 3000 ppm, PLC controlled, operated via PLC
- ✓ Internal glove port cover
- ✓ N₂ Gun
- ✓ 7 inch Siemens touch screen HMI with PLC controller
- ✓ All door locks should be easy to operate
- ✓ Glove box should have 1 purifier filter column system.
- ✓ Filter capacity: Minimum 40 liters of O₂ (Oxygen) and Minimum 1400 g H₂O (Moisture)
- ✓ Circulation blower unit with minimum 85m³/h or higher
- ✓ PLC controlled Purifier.
- ✓ Box must have an independent solvent absorption unit with future auto regeneration upgradation option.

1.1 Main Antechamber

- ✓ Antechamber size: 380-400mm (D) x 600-700mm(L)
- ✓ Analogue thermocouple vacuum/ pressure gauge
- ✓ Sensitivity (1mBar)
- ✓ With stainless steel sliding tray fixed to rail removable
- ✓ Leak rate <10⁻⁵ mbar l/s
- ✓ Manual Valve 3 way operation

1.2 Mini Antechamber

- ✓ Antechamber 140-160mm(D) x 390-410mm(L)
- ✓ Analogue thermocouple vacuum/ pressure gauge
- ✓ Sensitivity (1mBar)
- ✓ With stainless steel sliding tray fixed to rail removable
- ✓ Leak rate <10⁻⁵ mbar l/s
- ✓ Manual Valve 3-way operation

- ✓ 1 vacuum gauge

1.3 Vacuum System

- ✓ 20 m³/h rotary vane vacuum pump with oil mist filter

1.4 Control System

- ✓ Programmable Logic Controller System with Touch Screen System interface
- ✓ Automatic pressure control to maintain set pressure limits for each glove box
- ✓ Automatic adjustable regeneration control (purifier column)
- ✓ Adjustable Circulation control
- ✓ H₂O /O₂ readings and password protection for user level and admin level.
- ✓ Glove boxes and their functions can be operated from control panels
- ✓ Water proof Foot pedal operated operator pressure control (+/- 15 mbar)
- ✓ Electrical requirements: 230V 50-60Hz

2. Thermal Evaporator

- ✓ Thermal evaporator should be integrated with specified glovebox
- ✓ Chamber with double door: Inside / outside glovebox with manual closing mechanism
- ✓ Both Front door and Side door should provide with a DN100 viewport with shutter
- ✓ Inside: Horizontal or vertical sliding door with locking system on both sides.
- ✓ Outside: Hinged door for service / maintenance. Hinged door should provided at the side of the chamber in order to allow access to the inside of the chamber for maintenance purposes without disturbing the glove box atmosphere.
- ✓ Material chamber body: Stainless Steel inside, protective custom-made SS shielding covers for easy cleaning (for all walls & doors)
- ✓ Light inside which can be controlled via PLC for viewing inside while evaporation is going on
- ✓ In- Situ masking/shutter for each substrate for gradient deposition.
- ✓ Organic to metal mask should be changed without breaking vacuum.
- ✓ The SS (2-3 mm light weight) detachable shields should be compatible Aluminum foil wrapping to minimize the chamber contamination preventive maintenance cycle
- ✓ Substrate rotation
- ✓ Shutter for each substrate
- ✓ Common shutter for substrate holder
- ✓ Shutter for each source
- ✓ These accessories should be controlled via the touch screen display
- ✓ A separate console panel for all electrical components and controls.
- ✓ Comprehensive safety interlocks for maximum operator safety should be provided.
- ✓ Emergency stop button

2.1 Vacuum System for Evaporator

- ✓ Edwards/ Leybold/ Pfeiffer make dry scroll pump (dry) with 20 m³/hr or more.
- ✓ Edwards/ Leybold/ Pfeiffer make High vacuum turbo molecular pump with minimum 800 lit/sec throughput or more including controller.
- ✓ Obtainable ultimate vacuum : < 1 × 10⁻⁶ mbar within 30 min
- ✓ Suitable size electro pneumatically operated high vacuum gate valve to be integrated between evaporation Chamber and Turbo molecular pump.

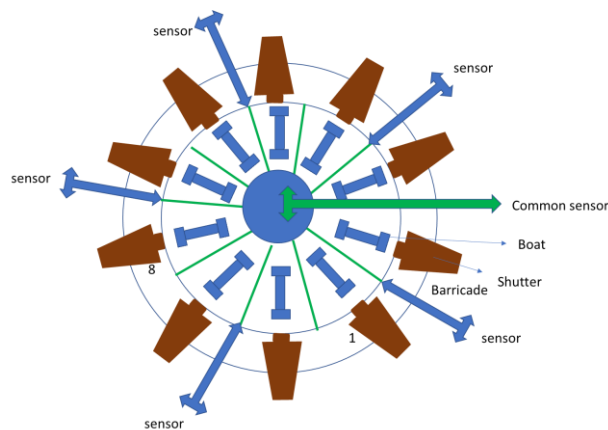
- ✓ Pump should be connected side of evaporator chamber.

2.2 Vacuum Measurement for evaporator

- ✓ Edwards/Pfeiffer/Leybold make pirani gauges (No. 2) and one spare should be given.
- ✓ Edwards/Pfeiffer/Leybold make Penning gauge (No.1) and one spare should be given

2.3 Evaporation Sources (organic and metal)

- ✓ Single type thermal resistance evaporator (8 for organic materials evaporation (it needs fine control required at low temperature (~50 to 600 °C or more)) (DC power supply))
- ✓ 2 for metal evaporation (Aluminum and LiF etc) (AC power supply).



- ✓ Minimum 5 power supply for organic sources to operate the four sources simultaneously ((transformer and thyristor controller))
- ✓ Minimum one power supply for metal evaporation. ((transformer and thyristor controller))
- ✓ Precision 10-turn VR fine adjustment, silicon controlled rectifier output
- ✓ Shutter for each source and shutter should cover the whole source.
- ✓ Easily removable thin (1-2 mm) metal barricade should be kept in between the sources to avoid cross contamination
- ✓ PLC integrated manual/automatic control

2.4 Organic Sources (No.8)

- ✓ Volume : 0.5-1 cm³



- ✓ Crucible : alumina straight walled/Quartz crucible for organic
- ✓ Temperature range : 50 °C to 600 °C or more
- ✓ Thermocouple : Type K
- ✓ PLC integrated and automatic/manual control
- ✓ Easily cleanable or exchangeable source shutter for each source to avoid contamination
- ✓ Each source should have an individual power supply with thyristor controller

2.5 Metal sources (No.2)

- ✓ Boat for aluminum evaporation



- ✓ Boat for LiF evaporation

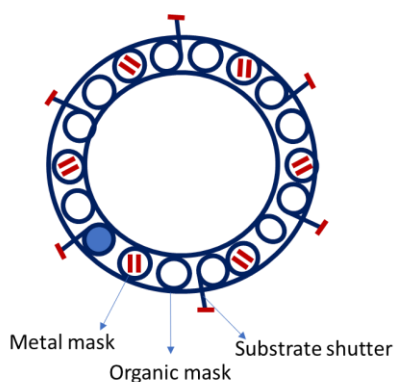


2.6 Temperature Control Units (Optional)

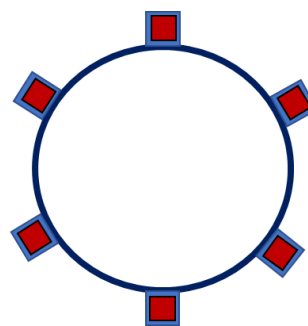
- ✓ Based on Eurotherm® PID temperature controller
- ✓ Temperature resolution: 0.1 K
- ✓ Temperature sensor: type K

2.7 Substrate Holder

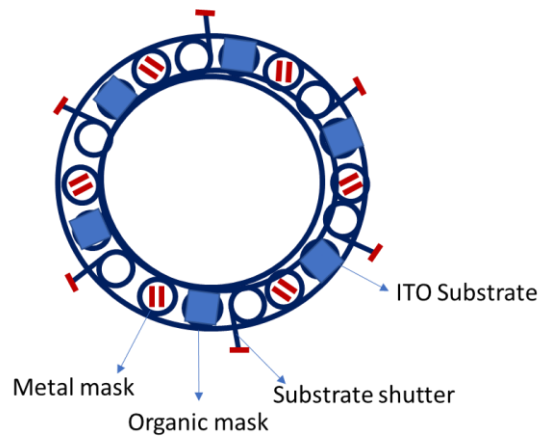
- ✓ The substrate holder should have capability to accommodate small substrates (3x3 cm and 6 number of substrates are preferred (Technical difficulties can be discussed).
- ✓ Substrate rotation with adjustable speed
- ✓ Gap between substrate and mask should be maximum 0.8 mm to get accurate alignment between substrate and mask.
- ✓ Manual/automatic in-situ mask changing option to change the organic mask to metal mask. This should allow convenient mask changing without breaking high-vacuum conditions, during evaporation process.



Bottom view of substrate holder (bottom plate)



Top view of substrate holder (Top plate)



Bottom view of substrate holder (bottom plate)

2.8 Thin Film Deposition Controller

- ✓ INFICON IC6/SQC 310C/ SQM160-S-6-R or Equivalent make thin film deposition controller/monitor for Co-Evaporation facility (4 sources at a time).
- ✓ Front load water cooled sensors- 6 No's
- ✓ Measurement Frequency range: 1 to 6.5 MHz (adjustable)
- ✓ Frequency resolution: +/- 0.012 Hz
- ✓ Frequency stability: +/- 2 ppm total, over 0 to 50° C
- ✓ Rate display resolution: 0.01 Angstrom/sec
- ✓ Minimum four co-evaporation monitor
- ✓ RS232 and USB connectivity with Windows software for operation with PC

2.9 Control Console

- ✓ A stand-alone control console
- ✓ All controller Items to be placed in the long vertical rack including temperature controllers for metal; organic and thin film deposition controllers
- ✓ HMI
- ✓ Emergency stop button

2.10 System Control

- ✓ Visualization by HMI (All functions like vacuum control, source and shutter control, recipes, including graphical interface)
- ✓ Touch panel for evaporation chamber
- ✓ Computer interface and software for the evaporation control/monitor

2.11 Backup power/UPS

- ✓ Suitable back up power/ UPS should also be provided for the system. Backup power should be for more than 30 minutes. This should be consulted with the buyer before finalizing the specifications.

2.12 Recirculation chiller

- ✓ Recirculating chiller Temperature range +5 to +30°C (Setting range). Cooling capacity: 1000 W @ 30°C (ambient temperature). Flow rate (cooling fluid) up to 12 l/min

Warranty	5 year comprehensive warranty from the date of commissioning and acceptance of equipment and lifetime service.
Alignment	Whole glovebox should be level aligned and there should be an indicator in minimum 2 places
Utilities	Details to be provided in the offer for space, power supply, gases, etc for system operation
Drawings	<ul style="list-style-type: none"> ✓ Conceptual Drawings (schematic drawing of whole unit) and Technical Brochures must be submitted along with offer ✓ Drawings to be submitted after approval prior to manufacture
Acceptance	Multi-layer dual evaporation thin film deposition must be demonstrated on the provided samples by Evaporation Method.
Manuals	Operation Manual to be given after installation and acceptance of equipment
Installation User Training	Free installation and user Training for users from IISc should be provided to make them well familiar with the operation of various components and successful deposition of the thin films using the given deposition units.
Associated Accessories and parts	<ul style="list-style-type: none"> ✓ Spares (30 numbers) 0.5-1cc Alumina Oxide/quartz crucibles ✓ 50 spare Quartz crystal gold coated monitors 6 MHz ✓ DN 40KF Extra 4 Nos ✓ 1 extra pairs of butyl rubber gloves for glove box 0.4 mm thick ✓ 1 extra pairs O-rings for gloves ✓ Set of glove port covers ✓ O-Rings for Mini and Main antechamber (2) ✓ Extra Carbon and HEPA filters 2 sets (inlet+outlet) ✓ 3 boats for Metal evaporation ✓ Al (100 or 200 g 99% pure) ✓ Maintenance kit (including brush and cleaning tray)

Other Terms and Conditions.

(a) Performance Benchmarks. The technical evaluation committee needs to be provided with an evaluation system to carry out performance benchmarks.

(b) Pre-installation. The Bidder has to state in detail the Electrical Power/UPS requirements, floor Space, head room, foundation needed and also to state whether Airconditioned environment is needed to house the system and to run the tests. i.e. pre-installation facilities required for installation may please be intimated in the technical bid. Subsequently, before the consignment lands in IISc the BIDDER shall confirm that the preinstallation requirements are sufficient for installation of the equipment. In other words, the BIDDER should continuously monitor the pre-installation requirements and see that everything is ready before the consignment is taken to the site for installation.

(c) Installation.

(i) Bidder shall be responsible for installation / demonstration wherever applicable and for after sales service during the warranty and thereafter.

(ii) Installation demonstration to be arranged by the supplier free of cost and the same is to be done within 15 days of the arrival of the equipment at site.

(iii) After successful installation what will be the minimum down time of equipment/instrument in case of breakdown. If the identified firm or person fails to put the system into working condition what is the further alternative course of action suggested by you to adhere to minimum down time.

(d) Inspection.

The inspection of the system will be done by our technical expert /Scientist in the presence of firm's representative. In case of receipt of the material in short supply or damaged condition the supplier will have to arrange the supplies/ replacement of goods free of cost. The supplier should arrange for physical Inspection of the items directly or through their authorized representative within seven days of arrival of the consignment failing which they will be responsible for the losses. After the shipment is affected, the supplier/its representative/Indian agents must remain in touch with the lab/institute to ascertain the date of arrival of consignment.

(e) Training. Wherever needed, Our Scientist/Technical persons should be trained by the supplier at the project site free of cost. In case the person is to be trained at supplier's site abroad or in India it should be mentioned in the quotation clearly. The supplier should bear all the expenses for such training including 'to & fro' fares and lodging & boarding charges.

(f) IISc reserves the right to accept or reject any bid in part or full without assigning any reason whatsoever. The Institute will not hold any responsibility for postal loss or delay of any bid.

(g) Period of validity of bids: Bids shall be valid for a minimum period of 90 days from the date of opening of the Techno-Commercial Bid.

(h) Delivery Period: The required quantities of material have to be delivered and installed within 16 weeks from receipt of the Purchase Order.

Penalty for delayed supply and installation. As time is the essence of the contract, Delivery period mentioned in the Purchase Order should be strictly adhered. If the supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date, the Supplier is liable to pay liquidated damages of 1% of order value per every week of delay subject to a maximum of 10% beyond the due date. Such money will be deducted from any amount due or which may become due to the supplier. IISc reserves the right to cancel the order in case the delay is more than 18 weeks. Penalties, if any, will be deducted from the Security Deposit.

12. Payment Terms.

90% payment shall be made against satisfactory delivery, and balance 10% after successful installation & commissioning of the equipment.

Thank you

P. Rajamalli

Assistant Professor

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