



NATIONAL PHYSICAL LABORATORY

(Council of Scientific & Industrial Research)

Dr. K. S. Krishnan Marg, Near Pusa Campus,
New Delhi -110 012.

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Global/Open Tender Notice No: 10/2011

Director, NPL invites tenders from reputed Indian / foreign manufacturers for the supply of the following item(s) under two bid systems:

SN.	TENDER NO.	ITEM	QTY	EMD (In ₹)
1.	14-VII/PP(2317)11-PB/ T-160	Steady State Photoconductivity Setup (Modular Type Spectral Response Measurements Systems)	One Unit	3.00 Lacs
2.	14-VII/SK(2323)11-PB/ T-161	Constant Photocurrent Method (CPM) Setup & Spectral Response Setup	One No.	2.00 Lacs
3.	14-VII/SK(2324)11-PB/ T-162	Steady state Photo-Carrier Grating (SSPG) Measurement Set-up	One No.	1.00 Lac.
4.	14-VII/SK(2325)11-PB/ T-163	Stylus based Thickness Profiler	One No.	1.50 Lacs
5.	14-VII/G(2326)11-PB/ T-164	Cells for Evaporation	As per specs.	2.00 Lacs

The detailed Tender Documents with complete terms & conditions with technical specifications are available on our website <http://www.nplindia.org>.

Last date of receipt of complete tender(s) is **March 02, 2012 up to 12.00 Noon. (IST)**.

The date of opening of technical bid(s) is **March 02, 2012 at 02.30 P.M. (IST) onwards**.

Stores & Purchase Officer



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Global/Open Tender Notice No.- 10/2011

February 03, 2012

Director, NPL invites tenders in closed/sealed covers with wax/cello tape/ company seal from the reputed Indian/foreign manufacturers or sole authorized dealers/distributors for the supply of the following item(s):

S. No.	Tender Number	Name of the Item	Qty.	EMD (In ₹)	Tender Fee (In ₹)	TB/SB*
1.	14-VII/PP(2317)11-PB/T-160	Steady State Photoconductivity Setup (Modular Type Spectral Response Measurements Systems)	One Unit	3.00 Lacs	300/- (If buy from NPL)	TB
2.	14-VII/SK(2323)11-PB/T-161	Constant Photocurrent Method (CPM) Setup & Spectral Response Setup	One No.	2.00 Lacs	300/- (If buy from NPL)	TB
3.	14-VII/SK(2324)11-PB/T-162	Steady state Photo-Carrier Grating (SSPG) Measurement Set-up	One No.	1.00 Lac.	300/- (If buy from NPL)	TB
4.	14-VII/SK(2325)11-PB/T-163	Stylus based Thickness Profiler	One No.	1.50 Lacs	300/- (If buy from NPL)	TB
5.	14-VII/G(2326)11-PB/T-164	Cells for Evaporation	As per specs.	2.00 Lacs	300/- (If buy from NPL)	TB

Interested parties may download the tender documents directly from the website free of cost & submit them without depositing any tender fee. Both the bids i.e. the Technical & Price bids must be **submitted** on or before **March 02, 2012 up to 12.00 Noon.** along with EMD.

Alternatively, the same may be **purchased** from Room No. 227-A, Purchase Branch up to **February 24, 2012**, against a request letter along with Draft of ₹ 300/- in Indian Rupees or in equivalent Foreign Currency in favour of The Director, NPL, New Delhi towards the non refundable & non- transferable tender fee.

All the bids except the price bids of two bid system will be **opened** on **March 02, 2012 at 02.30 P.M.** onwards in the presence of the bidders, who wish to be present. The Director, NPL, reserves the right to accept/reject any offer in part or full without assigning any reason.

*TB – Two Bid Tender System

SB – Single Bid Tender System

STORES & PURCHASE OFFICER



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Global/Open Tender Notice No.- 10/2011

February 03, 2012

TENDER DOCUMENT FOR OPEN/ GLOBAL TENDER

(TERMS & CONDITIONS INCLUDING INSTRUCTION TO BIDDERS AND CONDITIONS OF CONTRACT)

1. **GENERAL:** Quotations in closed cover are invited on behalf of the Director, National Physical Laboratory, New Delhi from the reputed Indian and foreign manufacturer. **The offer/ quotation must be strictly as per required specifications and the tender terms & conditions.**

ELIGIBILITY CRETERIA: *The Bidders should comply fully with the Technical Specifications in the tender documents.*

2. **PREPARATION AND SUBMISSION OF OFFERS:**

- a) Quotation should be submitted directly by the original manufacturer/supplier or its sole authorized distributor/dealer/Indian Agent. In case of bid by authorized dealer/distributor/Indian Agent, the manufacturer authorization should be attached with the technical bid as per **Annexure-'F'**.
- One Indian Agent can participate in a tender on behalf of one manufacturer. No offer will be entertained if the same Indian Agent is representing another manufacturer.*
- b) In case a bidder is not doing business within India, it shall furnish the certificate to the effect that the bidder is or will be represented by an agent in India equipped and able to carry out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period or ensure a mechanism at place for carrying out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period.
- c) The bidder shall bear all costs associated with the preparation and submission of its bid irrespective of the conduct or outcome of the bidding process.
- d) The bidder should not indulge in any corrupt, fraudulent, collusive, coercive practices during the entire process of procurement and execution of contract/order.
- e) Before the deadline for submission of the bid, NPL reserves the right to modify the bidding document and to extend or not to extend the date of submission. Such amendment/modification will be notified to bidders receiving the bidding document in writing or by cable/fax/ email and will also be hosted on NPL website.
- f) Conditional tenders will be summarily rejected.
- g) A bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice signed by the authorized signatory before the date of submission of the bid. Any re-submission or modification in the bid should be submitted before the date & time of submission of bid as originally conveyed in the invitation of bid.
- h) No bid may be withdrawn, substituted or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid Form or any extension thereof.
- i) First envelope marked "WITHDRAWAL" shall not be opened, but returned to the Bidder subject to submission of valid authorization to request the withdrawal. In case of substituted and modified bid, only the substituted bids and modified bids will be opened subject to production of authorization from the bidders.
- j) The quotation should be addressed to the Director, National Physical Laboratory, New Delhi and sent to the Stores & Purchase Officer.
- k) Each offer/quotation should be kept in separate envelope against each item of the tender notice.
- l) For items covered under Two-Bid -Tender System, quotation/offer should be submitted in two separate envelopes containing Techno-Commercial bid and Price bid and these put in one envelope.

m) The outer cover containing the offer/quote should be super-scribed with our Tender No. (Not the Open/ Global/ Tender Notice No.), Due date and Date of opening of tender.

n) **The offers must contain** the following documents :-

(A) Techno-commercial offers must contain:

- i. Manufacturer authorization (as per clause 2(a)) as per **Annexure –‘F’**.
- ii. Certificate by bidder not doing business in India as per clause 2(b).
- iii. Technical literature/ leaflets and complete specifications of quoted model(s) along with commercial terms and conditions.
- iv. Compliance statement/questionnaire of tender terms and conditions as per **Annexure-‘A’**
- v. Compliance statement of specifications as per **Annexure- ‘B’**
- vi. Bid Security/EMD (as per clause -4) as per **Annexure- ‘C’**
- vii. In case of exemption from submission of Bid security, proof of registration with DGS&D/NSIC as per clause (4(a)).
- viii. Copies of previous supply orders (as per clause 9(c) and clause 24) as per **Annexure –‘G’**.
- ix. Details of supplies of similar equipments as per clause 9(d).

(B) Price Bid offers must contain: (Only in case of two bid system)

- i. Bid price as per clause 5 in format enclosed as **Annexure- ‘D’** or **Annexure- ‘E’** as applicable.
- ii. Certificate of price reasonability as per clause 9(b).

3. **DUE & OPENING DATES:** The Offer/Quotations must **reach** at NPL on or before **March 02, 2012 up to 12.00 Noon**. The tenders will be **opened** at **02.30 pm Onwards on March 02, 2012** in the presence of bidders, who wish to present themselves at the time of opening of tender. In case opening date happens to be a holiday, the tender will be opened on next working day at the same time & location. The price bids of two bid tender system shall be opened after technical evaluation of technical bids. The date of opening of price bids shall be informed to the bidders found suitable in technical evaluation. No request for extension in the date of submission & opening of tender will be entertained. However NPL, may at its discretion, extend the deadline for submission of bids under intimation to bidders.

4. **EARNEST MONEY DEPOSIT (EMD):**

- a. EMD in the form of Bank guarantee (**As per format enclosed as ANNEXURE- ‘C’**) or Term Deposit Receipt/FDR or Bank Draft of a scheduled bank pledged in the name of Director, National Physical Laboratory, New Delhi **valid for 180 days** from the date of opening of the tender for the required amount as mentioned in the tender notice separate for each item must be submitted along with the quotation (with the techno-commercial quotation in case of two-bid system and photocopy of the same enclosed with the price bid **and for foreign manufacturers they should furnish the EMD in foreign currency equivalent to Indian rupees**, otherwise quotation may not be considered. The firm registered with DGS&D/NSIC as manufacturer for the supply of the same category of item for which the party is submitting quotation will be exempted from submission of EMD. Intended parties will have to give proof of registration along with their quotation. EMD of the unsuccessful bidders shall be refunded without any interest at the earliest after finalization of the purchase of concerned item. The party must therefore, submit a pre-receipted Bill in triplicate along with the quotation (in case of EMD sent in form of Bank Draft) to enable us to refund their EMD.
- b. The bid security /EMD may be forfeited if a bidder withdraws or amends or impairs or derogates its bid during the period of bid validity.

5. **PRICES**

Bid prices should be filled in the appropriate format enclosed as **Annexure ‘D’ and ‘E’**.

ALL THE BIDDERS SHOULD QUOTE PRICES FOR EACH AND EVERY ITEM SEPERATELY ALONG WITH THE CONSOLIDATED PRICES APPLICABLE FOR BOTH INDIGENOUS AND IMPORTED ITEMS.

A. For goods manufactured in India:

- (i) The price of goods quoted Ex-Works including taxes already paid.
- (ii) VAT and other taxes like excise duty etc. which will be payable on the goods if the contract is awarded.
 - (a) The charges for inland transportation, insurance and other local service required for delivering the goods at the desired destination as specified in the price schedule form.
 - (b) The installation, commissioning and training charges including any incidental services, if any.

B. For goods manufactured abroad:

- (i) The price of the goods, quoted on FCA (Named place of delivery abroad) or FOB (Named port of shipment), as specified in the schedule form.
- (ii) The charges for insurance and transportation of the goods to the port/place of destination.
- (iii) The agency commission charges, if any.
- (iv) The installation, commissioning and training charges including any incidental services, if any.

C. We are exempted from payment of Excise Duty under notification number 10/97 dated 01.03.1997 and Customs Duty under notification No.51/96 dated 23.07.1996. **Hence Excise Duty and Customs Duty, if any, should be shown separately. No other charges than those mentioned clearly in the quotation will be paid.**

D. **Sales Tax:** We are not authorized to issue any Sales Tax Form 'C' & 'D'. However, being R&D Organization concessional Sales Tax Forms can be issued, if it is applicable in your states from where the material is being supplied.

6. VALIDITY OF OFFER :

The prices must be valid at least for a period of **90 days for indigenous supplies & 180 days for imports** from the date of opening of the Tender. No changes in prices will be acceptable in any condition after opening of tender till the validity of the offer or execution of the order whichever is later.

7. EVALUATION OF BIDS: Before submission of bid, the bidder is expected to examine all the instructions, forms, terms and specifications in the bidding document and should ensure that the following conditions are fulfilled:

- a) Bidder Information form as per **Annexure-'H'**.
- b) The price schedule should be enclosed and must be signed.
- c) The bid validity should not be shorter than required.
- d) The manufacturer's authorization should be enclosed in case the bidder is authorized dealer/ distributor.
- e) The bidders should agree to provide the Performance Security.
- f) The quoted goods should be as per required specifications.
- g) In case the bid is substantially responsive, the purchase may request that bidder may submit the necessary information, documentations, within a reasonable period of time, to rectify, non-material, non-conformities or omission in the bid related to documentation requirements. Failure of the bidders to comply with the request may result in the rejection of its bids. But in case of the material deviation/reservation or omission which limits or is inconsistent with the bidding documents and the Purchaser's Rights or Bidders obligation under the contract or which if rectified, would unfairly affect the other bidders, the bid will be rejected.
- h) The Purchaser shall correct arithmetical errors on the following basis:
 - (i) If there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected.
 - (ii) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
 - (iii) If there is a discrepancy between words & figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (i) and (ii) above.
- i) Selling exchange rate/equivalent to Indian currency will be as on the date of bid opening in the case of single bidding and the rate on the date of opening of the priced bids in the case of two-part bidding.
- j) The bids shall be evaluated on the basis of final landing cost as per **Annexure -'D'** in case of import and **Annexure -'E'** in case of indigenous items.
- k) The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF/CIP basis respectively. However the CIF/CIP prices quoted by any foreign bidders shall be loaded further as under :
 - (a) Towards customs duty and other statutory levies-as per applicable rates.
 - (b) Towards custom clearance, inland transportation etc. – 2% of the CIF/CIP value.
- l) Where the price quoted on FOB/FCA and CIF/CIP basis are the same, the Contract would be made on CIF/CIP basis only.

- m) The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of goods and services originally specified in the tender document without any change in unit price or other terms and conditions. Further, at the discretion of the purchaser, the quantities in the contract may be enhanced by 30% within the delivery period.

8. The Vague terms like “packing, forwarding, transportation..... etc. extra” without mentioning the specific amount/percentage of these charges will not be accepted. Such offers shall be treated as incomplete and rejected.

9. REASONABILITY OF PRICES :

- a) Please quote best minimum prices applicable for a premiere Research Institution, **leaving no scope for any further negotiations on prices.**
- b) **The quoting party should give a certificate to the effect that** the quoted prices are the minimum and they have not quoted the same item on lesser rates than those being offered to NPL to any other customer nor they will do so till the validity of offer or execution of the purchase order, which ever is later.
- c) Copies of **at least last three supply orders of the last 3 years** received from other customers along with details of such supply orders preferably in India for the same item/model **may be submitted with the offer** giving reasons of price difference of their supply order & those quoted to us, if any. (As per **Annexure –‘G’**).
- d) The party must give details of identical or similar equipment, if any, supplied to any CSIR lab during last three years along with the final price paid and Performance certificate from them.

10. **ANNUAL MAINTENANCE CHARGES:** The party **must** mention in the quotation, the rate/amount of annual maintenance charges, if we opt for maintenance contract after expiry of the warranty period. This is mandatory to mention.

11. SPECIFICATIONS:

- A. Specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that merely copying our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with the printed technical leaflet/literature of the quoted model of the item by the quoting party/manufacturer and the specifications mentioned in the quotation must be reflected/supported by the printed technical leaflet/literature. Therefore the model quoted invariably be highlighted in the leaflet/literature enclosed with the quotation. Non-compliance of the above shall be treated as incomplete/ambiguous and the offer can be ignored without giving an opportunity for clarification/negotiation etc. to the quoting party
- B. **The technical bid shall be evaluated for acceptability by the technical committee and may call the tenderers for discussion. If necessary, the committee may modify the technical specification to suit the NPL requirement. In such case the opportunity shall be given to the participating bidders for submitting the revised bid as per modified specifications, if any.**

12. COMPLIANCE STATEMENTS:

- a. **Bidders must furnish a Compliance Statement of each and every required Specification of our tender in the format at ANNEXURE –‘B’.** The deviations, if any, from the tendered specifications should be clearly brought out in the statement. Technical literature/leaflet showing the compliance of the specification may also be attached with the quotation.
- b. Similarly, **the Compliance Statement/questionnaire for Terms & Conditions of the tender may be furnished, as per the enclosed format at Annexure –‘A’**, along with quotation (with techno- commercial bid in case of two bid tender system).
- c. The firms are advised to submit both the compliance statements essentially along with their quotation failing which their offer may not be considered.

- 13. PERIOD & MODE OF DELIVERY:** **The delivery period is the essence of supply; hence** it must be indicated specifically in the quotation. Mode of delivery, tentative size and weight of consignment may also be indicated in the quotation.
- 14. PERFORMANCE SECURITY:** All the successful bidders will have to submit the Performance Bank Guarantee or establish a Standby Letter of Credit (SLOC) or a Bankers cheque / or FDR pledged in favour of DIRECTOR, NPL for required amount as per payment terms mentioned at clause **15** below except where supplier opts for release of amount equivalent to PBG after expiry of warranty period. The PBG format shall be provided to the successful bidder later on along with the purchase order.
- 15. PAYMENT CONDITION:**
- A. FOR INDIGENEOUS SUPPLIES:**
Payment on Bill Basis after supply: For local supplies the payment will be made only after satisfactory installation, commissioning and performance of the equipment at National Physical Laboratory, New Delhi and after certification by our technical expert/scientist. However, supplier will be required either to submit performance bank guarantee for **10%** amount of the total value of equipment, after installation of the material, valid up to 60 days after the expiry of warranty period or the equivalent amount shall be released after expiry of the satisfactory warranty period.
- B. FOR IMPORTS:**
The payment against imports shall be made through irrevocable L/C. **L/C will be opened for 100% FOB value. 90% of L/C** amount shall be released on presentation of complete and clear shipping documents and remaining **10%** shall be released after installation/demonstration/commissioning, subject to submission of PBG of equivalent amount to cover the warranty period. The PBG should remain valid up to 60 days after the expiry of warranty period. **In case of non-submission of PBG after installations/demonstration/commissioning, remaining payment i.e. 10% will be released only after the completion of warranty period.**
- 16. COMMENCEMENT OF WARRANTY PERIOD:** The warranty period of an item shall commence from the date of receipt of the item in good working condition and satisfactory installation/commissioning/demonstration at the project site in National Physical Laboratory, New Delhi. The warranty period and validity of Performance Guarantee shall be extended for the period of delay in satisfactory installation and delay in warranty services.
- 17. NO ADVANCE PAYMENT:** No advance payment will be made to any supplier.
- 18. INSTALLATION:** **The equipment should be installed/commissioned and demonstrated, by the supplier at the lab immediately** but in any case within **TWO MONTHS** after receipt of the item in the lab and the same will be put under operation to the satisfaction of our technical expert/Scientist who will test the performance of the equipment. No separate charges for installation etc. will be paid to the party beyond the quoted prices.
- 19. GUARANTEE/WARRANTEE:** The equipment/instrument must be guaranteed/warranted for a period of at least one year, if not specifically mentioned otherwise in the specifications sheet, from the date of its satisfactory installation/commissioning against all manufacturing defects. If the equipment is found defective during this period the whole equipment or part thereof will have to be replaced/repared by the supplier free of cost at the lab. or at site of the supplier for which 'to and fro' expenses will be borne by the supplier. However, if the items are guaranteed for a period of more than one year, it may be specifically mentioned in the quotation.
- 20. SPARE PARTS:** Availability of spare parts of the equipment/instrument must be guaranteed for a period of at least seven years from the date of supply.
- 21. AFTER SALES SERVICES:** It should be clearly mentioned in the quotation whether the after sales services during and after the completion of warranty shall be provided directly by the supplier or their authorized agent/representative. Terms of the after sales services, if any, may be mentioned in the offer. However, in both the cases the original supplier shall be responsible for poor performance/services.

22. INSPECTION :

- a) The inspection of the system will be done by our technical expert /Scientist in the presence of firm's representative.
- b) 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 pending the settlement of the insurance case wherever applicable on FOR at the lab. or CIF basis till satisfactory installation of the system.
- c) 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 effected, the supplier/its representative/Indian agents must remain in touch with the lab/instit. to ascertain the date of arrival of consignment.

23. AUTHORIZATION OF INDIAN AGENTS & INDIAN REPRESENTATIVE:

- a) In case there is involvement of an /Indian agent/representative in any form as mentioned at (b) below, an authority letter / copy of agreement from the principal manufacturer must be submitted with the quotation.
- b) Where quoting party/Indian representative claims to be the subsidiary or branch office or an authorized representative of the principal foreign manufacturer/supplier in India, then a copy of approval from RBI/Ministry for operating business in India as Subsidiary/Branch/Liaison office or Joint-Venture may be submitted with offer.
- c) The details of all supplies involving the foreign exchange shall be furnished to the Enforcement Directorate, New Delhi as per rule. It may be noted that only the quoting parties & their principals shall be responsible for violation of Foreign Exchange Management Act (FEMA) for not declaring the actual bilateral mutual interests, if any.
- d) Indian agency commission shall be paid only to the Indian Agents in Indian Rupee out of the quoted FOB/Ex-works prices, after receipt of goods in good working condition & satisfactory installation/demonstration/commissioning of the items.

24. USERS LIST :

- a. The list of users specifically for the same model/make of the quoted item (not the list of general users) along with the complete name, address & contact numbers of the user organizations/persons may be submitted with the quotation along with the performance certificates from all/some of them.
- b. **If you have supplied identical or similar equipment to other CSIR Labs./Instts., the details of such supplies for the preceding three years shall be given together with the prices finally paid.**

25. PENALTY CLAUSE FOR LATE DELIVERY & LATE INSTALLATION:

- a) **Subject to operation of Force Majeure, time for delivery and acceptance is the essence of this contract. The supplier shall arrange to ship the ordered materials within the delivery period mentioned in the order unless extended with/without penalty.**
- b) In case of delay in supply and/or late installation of the equipment/instrument on part of the supplier, a penalty @ 0.5% per week of Order/FOB value will be charged for delayed period subject to a maximum of 10% of order/FOB value.
- c) If the delay in the shipment of the ordered materials attributable to the supplier exceeds agreed time period from the date of original agreed upon date of shipment and extended with/without penalty, the National Physical Laboratory, New Delhi shall have the right to cancel the contract/purchase order and recover the liquidated damages from other dues of the party or by legal means. It will also affect the other/future business dealings with such suppliers.

26. 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.

27. NON-SUBMISSION OF TENDER: In case you are unable to submit your quotation against our tender enquiry we would appreciate and expect a note of regret from your side giving in brief, reasons for not quoting.

28. DELETION OF NAME : Names of bidders, backing-out/defaulting after opening of tenders will be recommended for deletion from the list of suppliers in addition to forfeiture of EMD submitted by them, if any.

- 29. LATE/ DELAYED /UNSOLICITED QUOTATION:** Late or delayed/Unsolicited quotations/offers shall not be considered at all. These will be returned to the firms as it is. Post tender revisions/corrections shall also not be considered.
- 30. ACCEPTANCE OR REJECTION OF OFFER:** The Director, National Physical Laboratory, New Delhi reserves the right to accept or reject any quotation /tender in part or full without assigning any reason thereof. The successful bidder should submit Order acceptance within 15 days from the date of issue.
- 31. PAGE NUMBERING & SIGNATURES:** Your offer should be a page numbered and signed by an authorized signatory giving his/her name and designation below the signatures.
- 32. INTERIM ENQUIRIES:** No interim inquiries will be attended.
- 33. FORCE MAJEURE:** The Supplier shall not be liable for forfeiture of its performance bank guarantee, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

- 34. DISPUTE SETTLEMENT:** The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

The dispute settlement mechanism/arbitration proceedings shall be concluded as under:

- (a) In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director General, Council of Scientific & Industrial Research and if he is unable to unwilling to act, to the sole arbitration of some other person appointed by his willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
- (b) In the case of a dispute between the Purchase and a Foreign supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.

The venue of the arbitration shall be the place from where the purchase order or contract is issued.

Notwithstanding any reference to arbitration herein,

- (a) The parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and
- (b) The purchase shall pay the Supplier any monies due the Supplier.

(Stores & Purchase Officer)

Encl:

- 1. Format for Compliance of Terms & Conditions.
- 2. Different Forms/ Formats enclosed as Annexure(s)
- 3. Set of Specifications

FORMAT/QUESTIONNAIR FOR COMPLIANCE OF TERMS AND CONDITIONS

Tender No.: _____

Due Date _____

NOTE:

1. **Quotation will not be considered without submission of this format.**
2. **If a particular question is not at all applicable please write NA in compliance part in Col. No. 4 below.**
3. **Kindly see the relevant terms & conditions of the tender document as mentioned in Col. No. 3 in each question before replying to the questions mentioned in Col. 2 below).**

SNo	Terms & condition of Tender document	Relevant Clause No. of the tender terms & conditions of the tender	Whether acceptable (say 'Yes' or 'No' (preferably use different colour ink for 'No')	Deviation from tender terms, if any, with reasons for noncompliance or alternative condition quoted for
1	2	3	4	5
1	a.) Whether quotation is direct from Principal supplier/manufacturer or their own office in India (Please specify)	Clause 2(a)		
	b) Whether quotation is being submitted by Indian Agent/authorized distributor/ dealer	Clause 2(a)		
	c) Whether the agent is registered with DGS&D/NSIC	Clause 4(a)		
2	a) Whether the Techno-commercial and price bids (for two bid tender system only) have been kept in separate envelopes duly marked with "Techno-commercial Bid" and "Price Bids" respectively.	Clause 2(l)		
	b) Whether the tender No., Due date & Opening dates have been written outside all the envelopes.	Clause 2 (m)		
3	Whether techno-commercial Bid contains EMD, technical literature/leaflets, detailed specifications & commercial terms & conditions etc. as applicable.	Clause 2(n)(A)		

4	a) Whether the required EMD is being submitted with the quotation	Clause 4		
	b) Please specify the form of EMD whether in the form of DD/bank guarantee or TDR/FDR (Please mention No., date & amount of EMD documents.) or Bid Security Format at Annexure -‘C’	Clause 4		
	c) Pre-receipted bill for refund of EMD is enclosed (for bank drafts only)	Clause 4		
5	a) If the prices are on Ex-Works basis or FOB (names port of shipment) or FCA (named place of delivery abroad)	Clause 5 (A) & (B)		
	b) Whether specific amounts or percentage of expenses like packing, forwarding, handling, freight, insurance, documentation etc. have been mentioned in quotation separately in clear terms.	Clause 5(B), (C) & (D)		
6	a) Whether prevailing rates of sales tax, excise duty & other govt. levies (for indigenous supplies) have been given in quotation	Clause 5 (A), (C) & (D)		
7	Have you mentioned the validity period of the quotation as per our requirements	Clause 6		
8	a) Whether the Price reasonability Certificate is submitted with quotation	Clause 9 (b)		
	b) Whether copies of last two supply orders of the same item from other customers have been attached with the quotation	Clause 9 (c)		
	c) If there is any difference in prices of last two orders & those quoted to us. If yes, please give reasons for the same	Clause 9 (c)		
	d) Whether supplied in CSIR Labs.	Clause 9 (d)		
9	Whether rates/amount of AMC after the warranty period is over has been mentioned	Clause 10		
10	Have you gone through the specification Clause & complied with the same	Clause 11 (A) & (B)		
11	Whether the Make/Brand, Model number and name of manufacturer has been mentioned in the quotation and Printed technical literature/ leaflets of quoted items have been submitted			

12	Whether compliance statement of specifications has been attached with the quotation.	Clause 12 (a) & annexure- 'B'		
13	a) Whether the delivery period for supply of the items has been mentioned	Clause 13		
	b) Whether mode of delivery & tentative size & weight of the consignment has also been indicated	Clause 13		
14	Do you agree to the submission of Performance Bank Guarantee/Standby L/C and have you mentioned in your quotation about this.	Clause 14		
15	a) Do you agree with the payment terms for indigenous supplies?	Clause 15A		No deviation permitted
	b) Do you agree with the payment terms for imports supplies?	Clause 15 B		
16	Do you agree about the date of commencement of warranty period & its extension is necessary.	Clause 16		
17	a) Who will install/commission and demonstrate the equipment at lab. FREE OF COST	Clause 18		
	b) Will you be able to do it within a month	Clause 18		
18	Have you mentioned the guarantee/warranty period in your quotation and do you agree with guarantee clause?	Clause 19		
19	Spare parts	Clause 20		
20	After Sales service	Clause 21		
21	a) Do you agree that on receipt of material in damaged condition or short supply you will replace the same on CIF basis, free of cost pending the settlement of the insurance claim?	Clause 22 (b)		
	b) Do you agree with the clause of physical inspection?	Clause 22 (c)		
22	For Import Cases only:	Clause 23		
	a) Whether the Indian agent is registered with DGS&D			
	b) Whether the valid DGS& D registration certificate has been enclosed with the offer	Clause 23 (b)		
	c) If the party is a subsidiary or corporate branch office of the foreign supplier, then whether copy of the approval from Reserve Bank of India is attached with the offer	Clause 23 (c)		

23	Whether list of specific user's for the same item & model as quoted along-with performance certificates from the users is submitted with offer	Clause 24		
24	Whether you agree to the penalty clause for late delivery & installation?	Clause 25 (a to d)		
25	Whether training to our scientist/technical person will be given free of cost . If yes, have you specified in quotation whether it will be in our lab? Or at supplier's site in India or abroad.	Clause 26		
26	a) Whether all the pages have been page numbered?	Clause 31		
	b) Whether quotation has been signed and designation & name of signatory mentioned.	Clause 31		
27	Do you agree to settle the issue as per the terms of Clause -34 of tender documents?	Clause 34		

Signatures of the authorized signatory_____

Name of the signatory _____

Designation _____

Name & Seal of the quoting party _____

Dated:_____

FORMAT OF COMPLIANCE STATEMENT OF SPECIFICATIONS

S. N.	Name of specifications/ part / Accessories of tender enquiry	Specifications of quoted Model/ Item	Compliance Whether “YES” Or “NO”	Deviation, if any, to be indicated in unambiguous terms	Whether the compliance / deviation is clearly mentioned in technical leaflet/ literature
1	2	3	4	5	6

BID SECURITY FORM

Whereas (Hereinafter called “the tenderer”) has submitted their offer dated for the supply of (Hereinafter called “the tender”) against the purchaser’s tender enquiry No. _____

KNOW ALL MEN by these presents that WE (Name of bank) of (Name of country), having our registered office at (Address of bank) (Hereinafter called the “Bank”), are bound unto (Name of purchaser) (Hereinafter called “the purchaser”) in the sum of for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this day of..... 20.....

THE CONDITIONS OF THESE OBLIGATIONS ARE:

- 1. If the tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- 2. If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity.
- 3. If the tenderer fails to furnish the Performance Security for the due Performance of the contract.
- 4. Fails or refuses to accept/execute the contract.

WE undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchase will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

The guarantee shall remain in force up to and including forty five (45) days after the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

.....
(Signature of the authorized officer of the Bank)

Name and Designation of the Officer
Seal, Name & Address of the Bank and address of the branch

PRICE SCHEDULE FOR GOODS BEING OFFERED FROM ABROAD

Name of the Bidder _____

Tender No. _____

1	2	3	4	5	6		7		8		9
Sl No	Item Description	Country of origin	Unit	Qty	Unit Price		Total price (5x6)		Charges for Insurance & transportation to port/ place of destination		Total Price (7+8)
					FOB (named port of shipment)	FCA (named place of delivery)	FOB (named port of shipment)	FCA (named place of delivery)	Ocean	Air	CIF

Total Bid price in foreign Currency _____ in words.

Signature of Bidder**Name:****Business Address:****Note:**

- (a) Indian agents name & address _____
- (b) Installation, commissioning & training charges, if any _____
- (c) Cost of Spares _____
- (d) The Indian agent's commission shall paid in Indian Rupees only based on the Exchange Rate prevailing on the date of negotiation of documents.
- (e) The cost of optional items shall be indicated separately.

PRICE SCHEDULE FOR GOODS BEING OFFERED FROM INDIA

Name of the Bidder _____

Tender No. _____

1	2	3	4	5	6	7	8	9	10	11
Sl. No.	Item Description	Country of Origin	Unit	Qty	Ex-Works. Ex-Warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid)	Total price Ex-Works. Ex-Warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid) 5x6	VAT & other taxes like excise duty payable, if contract is awarded	Packing & forwarding up to station of dispatch, if any	Charges of inland transportation, insurance up to Lab./Instt.	Installation, Commissioning & training charges, If any.

Total Bid price in foreign Currency _____ in words.

Signature of Bidder

Name:

Business Address:

Note:

- (a) The cost of optional items shall be indicated separately.
- (b) Cost of spares _____

MANUFACTURER’S AUTHORIZATION FORM

[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that re binding on the Manufacturer]

Date: *[Insert date (as Day, month and year) of Bid submission]*

Tender No.: *[Insert number from Invitation for Bids]*

To: *[Insert complete name and address of Purchaser]*

WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[Insert type of goods manufactured]* having factories at *[insert full address of Manufacturer’s factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a bid the purpose of which is to provide the following goods, manufactured by us *[insert name and or brief description of the goods]*, and to subsequently negotiate and sign the contract.

We hereby extend our full guarantee and warranty in accordance with **Clause 19** of the Terms and Conditions of Contract with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of: *[insert complete name of Bidder]*

Dated on _____ day of _____ *[insert date of signing]*

PREVIOUS SUPPLY ORDERS FORMAT

Name of the Firm _____

Order placed by {Full address of Purchaser}	Order No. and Date	Description and quantity of ordered equipment	Value of order	Date of completion of delivery as per contract	Date of actual completion of delivery	Remarks indicating reasons for late delivery, if any and justification for price difference of their supply order & those quoted to us.	Has the equipment been installed satisfactoril y? (Attach a certificate from the Purchaser/ Consigner]	Contact Person along with Telephone no., Fax no. and e-mail address.

Signature and Seal of the Manufacturer/ bidder

Place:

Date:

BIDDER INFORMATION FORM

[The Bidder shall fill in this form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done on the letter head of the firm]

Date: *[Insert date (as day, month and year) of Bid Submission]*

Tender No.: *[Insert number from invitation of bids]*

Page 1 of _____ pages

1. Bidder’s Legal Name *[Insert Bidder’s legal name]*
2. In case of JV, legal name of each party: *[insert legal name of each [arty in JV]*
3. Bidders actual or intended Country of Registration : *[insert actual or intended country of registration]*
4. Bidder’s year of registration: *[insert Bidder’s year of registration]*
5. Bidder’s Legal Address in Country of Registration: *[insert bidder’s legal address in country of registration]*
6. Bidder’s Authorization Representative Information
Name: *[insert Authorization Representative’s name]*
Address: *[insert Authorization Representative’s address]*
Telephone/Fax numbers: *[insert Authorization Representative’s telephone/fax numbers]*
Email address: *[insert Authorization Representative’s email address]*
7. Attach are copies of original documents of : *[check the box(es) of the attached original documents]*
Articles of Incorporation or Registration of firm names in 1 above.

Modular type spectral response measurement system (Steady State Photoconductivity setup):- 01 Unit

The above system should consist of the following:

1. Light Source: Collimated Output beam, 200W-500W, spectral range: lower limit $\leq 200\text{nm}$, higher limit $\geq 1100\text{nm}$ along with power supply: 1 unit

2. Filters: High quality long pass filters with transmission greater than 90% at 200nm, 300nm, 500nm, 900nm and 1100nm

3. Motorized filters wheel: 6 filter positions with RS-232/GPIB or similar computer interface with stepper motor controller

4. Monochromator: Fully computer controlled monochromator of 250 mm Focal Length with 3 grating turret (1200 lines/mm & blazed at 400nm, 1200 lines/mm & blazed at 750nm and 600 lines/mm & blazed at 1600nm) having the specs below:

- Motorized stepper motor direct drive mechanism
- RS-232/GPIB interface or similar computer interface
- Scanning range 100-1600 nm
- Minimum optical resolution: 0.1 nm
- Dispersion at output port: greater than 3 nm/mm
- Minimum wavelength accuracy: ± 0.3 nm
- Minimum wavelength reproducibility: ± 0.1 nm
- Optical plane center height: 3 inches approximately
- Automated motorized Bilateral Adjustable slit

5. Computer controlled optical chopper: Frequency range: 0.5 Hz to 500 Hz

6. Calibrated Detector: Detector type: Silicon, Active Area: $10 \times 10 \text{ mm}^2$, Wavelength range: 200-1000 nm at room temp. One spare silicon detector is required.

7. Current Pre Amplifier: Gain Transimpedance: from 10^4 to 10^9 V/A, Minimum Gain accuracy : ± 1 %, Maximum output: $\pm 10\text{V}$, Amplifier Bandwidth: DC to 100kHz, Noise at 1kHz and 10^6 V/A: $< 2.3 \times 10^{-12} \text{ A Hz}^{-1/2}$, Maximum Linearity: ± 1 % (for AC signals), Suitable power supply to be provided.

8. Dual Phase Digital signal processing Lock in Amplifier with following specs

- Frequency range 1mHz to 100 KHz

- Minimum dynamic reserve: 100 dB
- 5 ppm/°C minimum stability
- 0.01° minimum phase resolution
- Auto-gain, -phase, -dynamic reserve and -offset
- Synthesized reference source
- Analog outputs: 0 – 10V; log(1 V/ decade) or linear (programmable minimum and maximum)
- RS232/GPIB or similar computer interfaces

9. Suitable Stand (Bread Board) for mounting the all components with extra 6 inch space for sample

10. Necessary Focusing Optics.

11. Installation & training: Installation, personnel training and test measurements of the system at our side (NPL, New Delhi) will be carried by your trained engineers with your instruments, accessories, tool & tackles at your cost.

12. Current testing resistor (if needed)

13. Software: Complete software package to get Spectral Response Curve as well as I-V Plot. Should save each dataset in separate ASCII text file.

14. Computer: Latest version computer with monitor compatible to the system.

15. Operation manual: You are requested to supply the operation manual of the equipment, circuit diagram etc. written in English only along with the consignment.

Warranty: One year from the date of installation

Option for extended warranty 2 years

Constant Photocurrent Method (CPM) with Spectral Response Measurement facility

The primary purpose of Constant Photocurrent Method (CPM) is to measure the sub gap parameters such as defect density (N_s) and Urbach Energy (E_0) of silicon thin film by detecting a very small absorption in sub band. In the CPM technique, the photocurrent is maintained constant over the range of photon energy in order to get constant quasi-Fermi levels. The system should include 250 Watt lamp, and a monochromator to tune the light source, a source meter to act as an active load, series of resistors to sense the current produced by the modulated monochromatic light, precision lock-in amplifier to allow measurement of the photocurrent generated by the modulated monochromatic light. Additionally, the system should include light tight sample chamber, vertical adjustment components, sliding sample holder, and thermal control for cooling as well as heating for the sample holder.

The spectral response (SR) measurement of a solar cell is one of the richest in information tests currently performed in design and fabrication processes. The internal quantum efficiency (IQE) of the solar cell is also derived from the measurement of the spectral response.

Specification for Constant Photocurrent Method (CPM) with Spectral Response Measurement facility:

- 1) Tunable Light Source: 250 W lamp (300-2500nm)
- 2) Bias Light Source: 75W Xenon arc lamp
- 3) Lock-in amplifier: Stanford SR800
- 4) Monochromator: Triple grating turret to scan 250-2500nm.
- 5) Computer-controlled optical chopper.
- 6) Sample enclosure with adjustable dual cell holder.
- 7) IV tester - 20W version for continuous solar simulators.
- 8) Motorized vibration free table with compressor
- 9) 2 kW UPS.
- 10) Data acquisition for spectral response between 300 nm and 2500 nm, quantum efficiency, constant photocurrent method, and IV measurements. MS Windows based software.
- 11) PC (latest version)

Specifications of Steady State Photo-carrier Grating (SSPG) Set-up

SSPG experiment measures the (i) ambipolar diffusion length of photo generated minority carriers in amorphous and micro-crystalline silicon and CIGS thin film etc (ii) ratio of electron and hole drift mobilities, (iii) measurement of refractive index of transparent materials/other materials. In SSPG experiment a Mach-Zhander type interferometer setup is used to measure the photoconductivity. A mixed refrigerant closed cycle cryostat will be used for temperature dependent measurement of ambipolar diffusion length of photo generated minority carriers from 125 to 800 K with an accuracy of ± 1 K.

1) Mach-Zhander type interferometer

The required components for the Mach-Zhander type interferometer set up:-

- a. He-Ne laser with 543.5 nm and 632.8 nm (tunable) wave length, power 5 mW(intensity falling on the sample 100 mW/cm^2).
- b. Two number of Beam splitter (50/50) and another (30/70)
- c. Polarizers- three numbers
- d. Mirrors- two number
- e. Chopper (variable frequency 1 to 200 Hz)
- f. ND filter (The ratio of intensity of B1/B2= 10 or less)
- g. Precision alignment for obtaining interference fringes using kinematic mounts
- h. Various mounts to hold the mirrors, polarizers etc.
- i. Vibration free floating table with a compressor and a facility to move (one meter) an integrated optical set up on top of the table.
- j. Other related accessories (UPS-2 KW, power supply, standard electro meter, photo diode etc).

2) Digital Lock-In Amplifier Specifications

Voltage input	single ended or differential
Sensitivity	2 nV to 1 V
Gain accuracy	$\pm 1\%$
Noise	6 nV/ square root(Hz) at 1 KHz
CMRR	100 dB at 10 kHz
Frequency range	0.001 Hz to 102.4 kHz
Phase resolution	0.001°
Absolute phase error	$< 1^\circ$
Relative phase error	$< 0.001^\circ$
Phase noise	
(a) Int.reference	$< 0.0001^\circ$ rms at 1 kHz
(b) Ext. reference	0.005 rms at 1 kHz 100 ms, 12 dB/oct
Phase drift	$< 0.01^\circ/\text{C}$ below 10 kHz
Acquisition time	40 ms
Demodulator Stability	$< 5\text{ ppm}/^\circ\text{C}$
Harmonic rejection	$< 90\text{ dB}$
Time constants	10 μs to 30 ks
Internal Oscillator accuracy	25 ppm
Interfaces	IEEE-488.2, RS-232
Analysis function	Smoothing, curve fitting, statistics

3) Mixed Refrigerant Closed Cycle Cryostat for temperature dependent measurement of ambipolar diffusion length of photo generated minority carriers Specifications for

Operating temperature range	125 to 800 K
Temperature accuracy	± 1 K
Cooldown Time	2 to 3 hrs
Window view	1 inch diameter
Sample holder size	2 inch
Compressor	air cooled
Vibration	vibration free
Refrigerant hoses	10 ft

Other Essential Requirements

- Supplier should have supplied at least one system of the same model that is quoted for, and which should be in working condition. Names and addresses (postal and e-mail) of customers should be provided.
- All components should be from standard firm
- Technical and application support in India, preferably from manufacturer. Details of support from manufacturer and Indian agent should be provided.
- Complete installation and operation of the system at NPL, and training of NPL personnel, for at least 2-3 days.
- Complete set of installation and operation manuals, circuit diagrams, etc.
- Complete set of all tools required for servicing and maintaining the system.
- All essential spare parts and accessories required for normal operation and maintenance of the system over a period of 5 years after installation
- Assurance of availability of technical support and spares and accessories for the system over a period of about 10 years after installation.
- Warranty for at least one year after installation.

Specification for Stylus Profiling System

The use of stylus-based surface profiler is to provide accurate measurements of thin film thickness, surface roughness, waviness, as well as thin film stress using curvature, flatness and uniformity on various types of thick, thin and ultra thin films on transparent, reflecting and opaque surfaces (silicon, quartz, polymer etc) having the following specifications:

Description	NPL specification
Step Height Repeatability	< 1nm (1 σ (standard deviation))
Vertical Range	$\geq 800 \mu\text{m}$
Vertical Resolution	1 \AA
Scan Length	55-200 mm
Sample Stage, X/Y stage	150 mm dia. motorized vacuum chuck with Wafer alignment pins
Thickest Sample Capacity	>20 mm
Stylus Force	1-15 mg (programmable)
Stylus Radius	50nm to 20 μm

Sample Size	200 mm
Sample Viewing	Selectable digital magnification, 1 to 4 mm
Single Sensor Design	Single sensor that enables scans at large vertical range up to 1mm and low force down to 1 mg, simultaneously without replacing the head
Color Video Camera	3 Mega Pixel or more
Data points per scan	1 10,000 or more
Data base software	Capable of analyzing roughness, waviness, step height, stress, height histogram. Stitching 3D, 2D/3D stress analysis
Vibration Isolation	Vibration isolation motorized table with compressor
PC	XP/Latest version with 1 GB RAM, 23" Flat panel LED monitor
Calibration standards	Step height standards with calibration certificate by National Metrology institute/ ISOIEC 17025 Accredited Lab

Specifications for K shell & RF plasma source

S. No.	Item description	Quantity
1	Dual filament hot lip effusion cell for Gallium mounting on a 4.50" flange, compatible with MBE System, two Independently controlled filaments to grow optimal materials, Operating temperature Range 0 °C – 1400 °C (outgassing 1500°C), Temperature stability +/- 0.1°C, Temperature reproducibility +/- 0.1°C, Ta-wire dual 2x Type WRe 5/26% thermocouple bakeable up to 300 °C, PBN Crucible with capacity 16cc or more, Length 12", Integrated pneumatic shutter, Dual channel controller for power & thermocouple, PID temperature controller with interface, Power Supply 300W/10A, Power cables	1
2.	Dual filament hot lip effusion cell for indium mounting on a 4.50" flange, compatible with MBE System, two Independently controlled filaments to grow optimal materials, Operating temperature Range 0 °C – 1400 °C (outgassing 1500°C), Temperature stability +/- 0.1°C, Temperature reproducibility +/- 0.1°C, Ta-wire dual 2x Type WRe 5/26% thermocouple bakeable up to 300 °C, PBN Crucible with capacity 16cc or more, Length 12", Integrated pneumatic shutter, Dual channel controller for power & thermocouple, PID temperature controller with interface, Power Supply 300W/10A, Power cables	1
3	Cold lip effusion cell for Aluminum mounting on a on a 4.50" flange, compatible with MBE System, , Operating temperature Range 0 °C – 1,400 °C, Temperature stability +/- 0.1°C, Temperature reproducibility +/- 0.1°C, Ta-wire dual 2x Type WRe 5/26% thermocouple bakeable up to 300 °C, PBN Crucible with capacity 16cc or more, Length 12", Integrated pneumatic shutter, Single channel controller for power & thermocouple, PID temperature controller with interface, Power Supply 300W/10A, Power cables	1
4.	Low temperature effusion cell for magnesium mounting on a 2.75" CF flange, compatible with MBE System Operating temperature Range 0 °C – 1,000 °C, Temperature stability +/- 0.1°C, Temperature reproducibility +/- 0.1°C maximum temperature 1000 °C, K Chromel/Alumel thermocouple bakeable up to 300 °C, PBN Crucible with capacity 2cc or more, Length 12", Integrated pneumatic shutter, Single channel controller for power & thermocouple, PID temperature controller with interface, Power Supply 200W/6A, Power cables	1
5.	Dopant effusion cell for Silicon for mounting on a 2.75" CF flange, compatible with MBE System, Operating temperature Range 0 °C – 1,400 °C, Temperature stability +/- 0.1°C, Temperature reproducibility +/- 0.1°C, K type thermocouple , PBN Crucible with	1

	capacity 2cc or more, Length 12", Integrated pneumatic shutter, Single channel controller for power & thermocouple, PID temperature controller with interface, Power Supply 300W/10A, Power cables	
6.	RF Plasma Source for Nitrogen :Surface Treated Induction Coil, Integral Plasma Spark Igniter, Optical Viewport for Plasma Monitoring, "Zero" Ion Current, Integral Water Cooling, Changeable PBN chamber, Shield and Aperture, Manual Tuned Matching Network, Up to 600W RF Power, Length: 12 inches, 4.5" (DN63) CF Mounting Flange, Mini to VCR gas adapter, RF Generator & Cables Input: 220 VAC/ 60Hz, >4m RF Cable, Output: 13.56 MHz @ 0 to 600 W, Auto Tuning of Source to Power Supply, Auto ignition and ramp-up procedure for ease of operation, Software control of mass flow controller and RF supply, Display of plasma monitor signal and status variables, Data logging and Process Automation, Pneumatic Integrated Shutter for RF Plasma Source, plasma control interface, interlock to power supply, water safety interlock, mass flow controller & electronics	1
7.	Rack to house all the power supplies for k-cell and RF plasma source	1
8.	Cluster Flange 14" (355.6mmOD) with 4 ports of 63 CF port and 3 ports for 40CF to fit the k-cells & RF plasma source. Through holes flanges have 30bolts drilled 9.9mm diameter. The distance between sample and the end of the chamber flange is 458mm. The port should be fixed in such a way that the cells should focus 10mmx10mm sample, LN ₂ (Cryo) shroud for cooling of cells, 6 OHFC gasket to fit to flange.	1

- i. The geometry of the cell should be optimized so that uniformity of any evaporation on the substrate be better than +/-1% on 10mmx10mm sample.
- ii. The sources should be cooled through LN₂ (cryo) shroud.
- iii. The company should approve the 3-D-CAD design of the cluster flange and optimization of distance vs material consumption vs uniformity should be done.

Optional

Multi channel module for all temperatures and with an upgrade for shutter switching for temperature and shutter automation.

