



# NATIONAL PHYSICAL LABORATORY

(Council of Scientific & Industrial Research)

Dr. K. S. Krishnan Marg, Near Pusa Campus,  
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## **Global/Open Tender Notice No: 07/2011**

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-VI/AD(644)11-PB / <b>T-106</b>	High Resolution Field Emission Scanning Electron Microscope	One No.	6.00 Lacs
2.	14-VI/AD(645)11-PB / <b>T-107</b>	Melt Spinning System	One No.	3.00 Lacs
3.	14-III/AKB(417)11-PB/ <b>T-108</b>	Gas Flow Calibration System	One No.	3.00 Lacs
4.	14-VI/NS(651)11-PB/ <b>T-109</b>	High Energy Ball Mill	One No.	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 **JANUARY 30, 2012 up to 5.00 p.m. (IST)**.

The date of opening of technical bid(s) is **JANUARY 31, 2012 at 10.30 A.M. (IST) onwards**.

**Stores & Purchase Officer**



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## Global/Open Tender Notice No.- 07/2011

December 16, 2011

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-VI/AD(644)11-PB/T-106	High Resolution Field Emission Scanning Electron Microscope	One No.	6.00 Lacs	300/- (If buy from NPL)	TB
2.	14-VI/AD(645)11-PB/T-107	Melt Spinning System	One No.	3.00 Lacs	300/- (If buy from NPL)	TB
3.	14-III/AKB(417)11-PB/T-108	Gas Flow Calibration System	One No.	3.00 Lacs	300/- (If buy from NPL)	TB
4.	14-VI/NS(651)11-PB/T-109	High Energy Ball Mill	One No.	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 **JANUARY 30, 2012 up to 5.00 PM.** along with EMD.

Alternatively, the same may be **purchased** from Room No. 227-A, Purchase Branch up to **JANUARY 25, 2012** against a request letter along with Draft of Rs. 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 **JANUARY 31, 2012 at 10.30 A.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.- 07/2011

December 16, 2011

### 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 **JANUARY 30, 2012 up to 5.00 PM.** The tenders will be **opened** at **10.30 AM. Onwards on JANUARY 31, 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/WARRANTY:** 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:

- (α) 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.
- (β) 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,

- (α) The parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and  
(β) 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).**

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

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 <b>at lab. FREE OF COST</b>	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	<b>For Import Cases only:</b>	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 <b>will be given free of cost</b> . 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 Sl No	2 Item Description	3 Country of origin	4 Unit	5 Qty	6 Unit Price		7 Total price (5x6)		8 Charges for Insurance & transportation to port/ place of destination		9 Total Price (7+8)  CIF
					FOB (named port of shipment)	FCA (named place of delivery)	FOB (named port of shipment)	FCA (named place of delivery)	Ocean	Air	

Total Bid price in foreign Currency \_\_\_\_\_ in words.

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

- (α) Indian agents name & address \_\_\_\_\_
- (β) Installation, commissioning & training charges, if any \_\_\_\_\_
- (γ) Cost of Spares \_\_\_\_\_
- (δ) The Indian agent's commission shall be paid in Indian Rupees only based on the Exchange Rate prevailing on the date of negotiation of documents.
- (ε) 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 party 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.

## High Resolution Field Emission Scanning Electron Microscope

### Specifications

1. **Basic configuration**
  - 1.1 Accelerating voltage up to 30 kV (variable continuously or in step, with beam deceleration mode in addition to normal mode)
  - 1.2 Electron source Field Emission Schottky Gun, automatic filament cut-off for safety, factory certified filament life (with one extra gun)
2. **Resolution**
  - 2.1 Resolution 2 nm at 1 kV and 1 nm at 15 kV  
Resolution should be demonstrated on our sample
  - 2.2 Magnification 25X to 1 MX or maximum possible magnification compatible with desired resolution as mentioned
3. **Probe current** up to 100 nA, continuously variable.  
The instrument should come with a probe current measuring unit
4. **Imaging of nonconductive specimens** Capability to image nonconductive specimens/polymers/ceramics etc., by charge compensation
5. **Detectors**
  - Inlens secondary electron
  - Inlens Back scattered electron
  - Chamber mounted Everhart Thornley Secondary electron
  - Low vacuum Secondary electron
  - Back scattered electron (retractable)
  - Specimen current monitor
  - STEM retractable detector with bright field and dark field mode
  - Infrared chamber scope (IR-CCD)
6. **Specimen stage**
  - Motorize 5-axis eucentric, X=100 mm, Y=100 mm, Z=25 mm, or better, Tilt: up to 70° or better, Rotation=360° continuous.
  - Multiple sample holders, sample current monitor and standard samples (Gold on Carbon, Magnification calibration sample, Tin ball sample for astigmatism correction) to be provided. It should be large enough to accommodate all specified detectors
7. **Specimen chamber** Chamber should be large enough to accommodate other detectors such as EDS,

EBSD, WDS etc. at the time of purchase or at a later date. The SEM design should permit EDS, EBSD and WDS to be mounted in the same direction so that the data of these can be obtained simultaneously

**8. Energy dispersive spectroscopy**

- 8.1 Detector
- 8.2 Detector range
- 8.3 Detector resolution
- 8.4 Softwares

Liquid N<sub>2</sub> – free SDD (Si drift detector) from Beryllium-Uranium 132 eV or better for qualitative and quantitative elemental analysis, X-ray mapping, Capability for spectrum analysis, Digital control of the beam for composition profile. Phase mapping. Peak deconvolution. Element to phase map and phase to element map. Drift correction facility

**9. Electron Backscatter Diffraction Pattern (optional)**

Hardware and software for acquisition and indexing of electron backscatter diffraction patterns with beam and stage control. Planes mapping/orientation, Texture, Phase identification. Standard phase database. A combined EDS and EBSD should be able to perform experiments related to chemistry, phase and crystallography. Touch sensor alarm for collision prevention. Integrated forward scatter detector. Data acquisition speed minimum 130 fps

**10. Temperature and mechanical stages (optional)**

- 10.1 Heating/cooling stage
- 10.2 Tensile stage

Cooling LN<sub>2</sub> to Heating stage module up to +750°C  
Dynamic testing stage module which can be operated either within or outside the SEM. 300N maximum load. Can operate in tension or compression and can be fitted with horizontal 3- or 4-pt bending options.

**11. Calibration Standards**

Standards for resolution, magnification and EDS (single and multi-element with at least 20 elements) to be provided. These standards should be supplied from ISO certified suppliers with accuracy/traceability etc. certificates.

12. **Vibration Isolation** Active vibration damping system for SEM with pneumatically isolated legs
13. **Vacuum system** Clean ultrahigh dry pumping (oil free) system. Vacuum should be suitable for high resolution and spectroscopic analysis. It should be fully automatic microprocessor controlled with manual over riding options (if possible). Please provide the technical details of vacuum pumps
14. **Microscope Controlling Softwares**  
 Electron microscope should be completely digital controlled with capability of controlling basic microscope operation as well as EDS, EBSD etc. from separate platforms.  
 A separate version should be made available for offline processing and analysis of the images on a separate computer, along with a standard PC and Printer.  
 Separate license for analysis of EDS and EBSD data should be provided for a stand alone PC.  
 Upgradation of these softwares has to be supplied free of cost as and when it is upgraded within 10 years of microscope supply.
15. **Sample preparation (optional)**
- 15.1 **Specimen cutting tool**  
 Precise cutting machine, preferably about 4 inch diameter OD low/high speed diamond saw for SEM specimen (international branded product)
- 15.2 **Specimen grinder / lapping system**  
 A lapping system for the surface thinning / polishing of SEM specimen, with auto-controlled specimen holder. (international branded product)
- 15.3 **Electropolishing unit**  
 For optical finish flat surface of SEM specimen (international branded product)
- 15.4 **Sputtering / Evaporation unit**  
 Sputter coater with Carbon, Gold, Platinum Coating facility along with the required Target materials ( 2 each of C, Au and Pt targets), (international branded product)
16. **Uninterrupted power supply (UPS)** Online UPS (15 kVA) for the power back-up of the system for at least two hour, compatible with the SEM and the peripherals. (branded product)

- 17. Installation and commissioning** The manufacturer should undertake to install and commission the equipment and all attachments and accessories and also demonstrate the performance guaranteed as per specifications at site. The main system as well as other accessories should run on 220 V, 50 Hz single phase AC power supply. Only ordinary electric points will be provided and rest of the connections/cables has to be provided by the supplier. Vendor has to provide pre-installation requirements before supply
- 18. Spare parts** Recommended set of spares and consumables for five years of operation may be quoted as optional items. Those spares/consumables which are not recommended, will be considered as the spares/consumables within the warranty period even after the expire of warranty
- 19. Guarantee/Warranty** The entire equipment must have warranty for free repairs and replacement for a period of 24 months from the date of installation and commissioning.
- 20. Training** On site training to the researchers by the company person in two phases: First training for two week immediately after commissioning of the equipment and Second training for two week after two months of first training. A part of these trainings should be taken care by the engineers from the principal manufacturer. In addition to the onsite training, a pre-dispatch inspection to show the running of the instrument as per specifications and subsequent hands on experience at the manufacturing site, for at least one week, for two scientists should be arranged and expenses should be borne by the vendor/manufacturer
- 21. Annual Maintenance Contract** AMC for a period of four years, beyond warranty. The quote should specify the response time for call and spare parts. Spares should be available for ten year. Please also quote optionally AMC covering replacement of parts.

- 22. The technical specifications should also include the following:**
- 22.1 The year of the introduction of the model quoted world wide. Please quote latest model available confirming our specifications
  - 22.2 List of users with their detailed addresses in India

**23. Terms and Conditions** As per CSIR/NPL Rules

The supplier and their Indian agent should give evidence of their ability to maintain a FEG-SEM and their list of supplies including contact address so that we can directly contact whenever there is need, and evidence of maintenance in India. These information/details will be considered as an important technical qualifications for evaluation of the tender.

A set of operation and maintenance manuals with mechanical drawings, description and circuit diagrams of the machine should be supplied.



## Specifications of Melt Spinning System

Laboratory scale melt spinning system consisting of high vacuum chamber, vacuum pumping system, induction melting system with crucible, RF generator, variable speed spinning wheel & drive assembly and crucible positioning system.

### TECHNICAL SPECIFICATIONS

1. Acceptance criteria of the equipment is that : for a melt capacity of 10 and 60 gms of standard alloy to produce (i) continuous rapidly solidified amorphous and nanocrystalline ribbons with a thickness of 20 – 50  $\mu\text{m}$  with width of 1-17 mm (ii) cast rods of diameter 3, 5, 8 & 12.7 mm.
2. Melt capacity 10 and 60 gms. Operating melt temperature up to 1600°C or more with cooling rate of at least  $10^5$  - $10^6$  K/sec.
3. Water cooled solid copper spinning wheel with a width of 40-60 mm and having diameter of 250 mm. It should be demountable and dynamically balanced capable of vibration-free speeds of 1 to 40 m/sec or better with max. deviation of +/- 0.2mm. In case of solid copper wheel, speeds of 1-60  $\pm 0.5\%$  m/sec. The variable rotation speed of the copper spinning wheel should be accurately displayed.
4. Automatic Crucible positioning system to ensure high reproducibility and possibility to melt away from the wheel – crucible positioning accuracy of +/- 0.01 mm
5. Facility of variable angle of inclination (ejection angle) by means of adjustable wheel drive by rotating the axis of the wheel up to angle of 30degrees  $\pm 2^0$ , from outside the vacuum chamber. High-vacuum chamber capable of operation under inert gas ( $\text{N}_2$ , argon, helium) at a max pressure of 1000 mbar and under vacuum better than  $10^{-5}$  mbar in less than 2 hour.
6. The high vacuum pumping system should consist of diffusion pump, 2-stage rotary pump with the necessary assemblies and compatible vacuum measuring gauges. Provision of a viewing port of observing the melt spinning process.
7. Facility of the blow-out of the melt by an inert gas with an typical pressure difference between crucible and chamber while ejection of 200-250 mbar. Bypass valve for the crucible assembly to avoid overpressure in the crucible before ejection.
8. Arrangement for continuous separation of ribbon from the wheel surface.
9. Measurement & display of melting temperature in the range of 500 – 1700°C +/- 3% or better of the measured temperature.
10. Casting option (under vacuum  $10^{-5}$  mbar at 1600°C; 10 and 60 gms) with table for casting forms, casting form made up of copper with & without water cooling to cast solid rods (diameter 3mm, 5mm, 8 mm & 12.7 mm). For water cooling system, all accessories like water cooled mantle with all feed-throughs, connectors and flanges to be supplied.
11. Measurement and display of all process parameters, like, melt temperature, chamber vacuum, copper spinning wheel speed, forcing gas pressure, etc.

12. Compatible power generator system for the melting of sample (60 gms) with a capacity of power 12 KW or more capable for quick melting of different alloys (5 minutes for standard alloy).
13. Sample melting crucibles (both for 10 gm and 60 gms melt) of boron nitride (1600 °C) and quartz (1100 °C) with different dimensions of ejection slits for producing final amorphous/ nanocrystalline ribbon product of standard alloy, width 2, 5, 10, 17mm (10 each to be quoted separately). For conventional casting option, crucibles of boron nitride and quartz with different dimensions of round nozzle ejection slits (10 each to be quoted separately)
14. Compatible closed circuit cooling system for water circulation, like water chiller, etc, should be a part of system.
15. Unit to be compatible for single phase 230±5% V, 50 Hz or 3-phase 400±5% V, 50 Hz power supply.
16. Pre-despatch inspection & advanced maintenance interactive training at your works for two NPL scientists to be borne by the vendor (including travel, boarding and lodging costs), to demonstrate the working of the equipment on standard alloy, as per the acceptance criteria (alloys to be provided by the firm) and also all the specifications of the system to be demonstrated.
17. Complete Installation of equipment at NPL with demonstration of melt spinning & casting of standard alloy as per the acceptance criteria.
18. Operational and maintenance training for at least 5 working days at NPL, after successful installation and commissioning of the equipment at NPL.
19. Complete set of operation and maintenance manuals in English
20. Suitable mechanical tool kit to be supplied.
21. One year warrantee from the date of successful installation

### **OPTIONAL SPARES & ACCESSORIES**

Standard accessories, spares and consumables for trouble-free operation for 5 years should be quoted separately (including BN/quartz crucibles 10 and 60 gm of different dimension slits (for producing ribbons) and without slits, BN/quartz crucibles for casting, casting moulds of different dimensions, spare induction coils for 10 and 60 gms melt, among others)



## Gas Flow Calibration System

### Essential System Specifications

- (1) Gas Flow Calibration System using laminar and sonic flow elements.
- (2) Capability of the system to measure both mass flow rate and volume flow rate.
- (3) Range of the system for volume flow rate from 0.001 lpm (i.e. liter per minute) to 1000 lpm. The mass flow rate range should be compatible with volume flow range.
- (4) System should support multi-gas flow calibration using Nitrogen (N<sub>2</sub>), Air, Carbon Dioxide (CO<sub>2</sub>), Argon (Ar), Hydrogen (H<sub>2</sub>), Helium (He), Oxygen (O<sub>2</sub>) and Methane (CH<sub>4</sub>). The calibration charges of the system using above mentioned gases should be quoted separately.
- (5) The system uncertainty of  $\pm 0.25\%$  or better (at  $k=2$ ) in the volume flow range 0.001 lpm to 0.01 lpm and  $\pm 0.20\%$  or better (at  $k=2$ ) in the range 0.01 lpm to 1000 lpm. The mass flow rate uncertainty should be  $\pm 0.20\%$  or better (at  $k=2$ ) in the ranges compatible with volume flow rate.
- (6) There should be overlapping of laminar and sonic flow elements in the above flow ranges to enable intercomparison among them for performance verification of the system.
- (7) Mass flow resolution: 0.0025% of Full Scale reading or better,
- (8) Repeatability:  $\pm 0.08\%$  of reading or better,
- (9) Capability of system to operate on wide pressure ranges from 50 kPa to 600 kPa to provide gas flow meter calibration at low and high pressure.
- (10) Fully automatic operation of the system. The provision of manual operation of system should be available. The PC and software for automatic operation should be capable to manage the automated acquisition of the calibration data and supporting direct data export to Excel for additional analysis.
- (11) All necessary accessories for the system should be supplied.
- (12) All user and service manuals, necessary literature of the system should be supplied.
- (13) Calibration certificate of the system from any National Metrology Institute (NMI).
- (14) Complete installation and satisfactory performance at the site by the Supplier.
- (15) The training should be provided at the user's site.
- (16) Supply of two numbers of Mass Flow Controllers and two numbers of Rotameters (as DUCs) to demonstrate the calibration and support the calibration and measurement capabilities (CMCs). The numbers of DUCs may increase depending upon flow ranges.
- (17) Warranty of the system should be for minimum one year from the date of installation.

### Optional System Specifications

- (1) The provision of range extension of the system up to 5000 lpm or higher.
- (2) The Annual Maintenance Contract (AMC) charges for the next three years may be quoted separately after the warranty period.

## **SPECIFICATIONS OF PLANETARY HIGH ENERGY BALL MILL**

Planetary high energy computer controlled ball mill for mechanical activation, alloying, and attrition of variety of metals, alloys and ceramics with the grinding bowls mounted on the rotating supporting discs.

1. Number of grinding bowl stations: 2
2. Max. feed size of input materials: 10 mm diameter
3. Size of bowls: 80 & 250 ml and Diameter of balls: 5mm, 10mm, 15mm and 20mm (to be quoted separately for stainless steel, tungsten carbide, silicon nitride, zirconium dioxide)
4. Machine should be compatible with all types / sizes of Bowl and balls materials as mentioned above.
5. Speed of grinding bowls: 0-400 rpm (variable)
6. Speed of supporting disc: 0-400 rpm (variable)
7. Variable transmission ratio – Independent control on the rotational speed of the grinding bowls and the main supporting disc in order to adjust a variable transmission ratio.
8. Facility of automatic reverse option (reversing the direction of rotation of bowls and main disc, after a specified running time of the grinding bowls)
9. Facility of continuous direct measurement of gas pressure and temperature in the grinding bowls while grinding. (pressure measurement range: 0 to at least 500 kPa, temperature measurement range: 10 to max 80°C)
10. Capability of dry and wet grinding under inert atmosphere.
11. Additional Lock Clamping arrangement of the grinding bowls for gas-tight bowl removal and transportation of bowls under inert gas pressure.
12. Facility of forced air ventilation for cooling.
13. PC controlled operation of the mill with alternative facility of manual control. Software (window based) should control the programming of the grinding parameters of the mill. Programmable software having options to control the entire grinding cycle including grinding bowl and disc speeds, grinding time, pause time, rotation reverse option, gas and temperature measurement in the grinding bowl while grinding. Real time display of

rotational speeds of grinding bowls. Should be able to store/recall multiple programs with different operating variables

14. Compatible PC with interface and a black & white laser printer to be supplied with the unit.
15. Overload protection through rotational speed adjustment and facility of cutoff in case temperature limit is reached.
16. The unit should operate at single phase  $230 \pm 5V$ , 50 Hz or 3-phase  $400 \pm 5V$ , 50Hz.
17. Complete installation and demonstration of equipment at NPL
18. Operation and maintenance training for at least 5 working days, after successful installation and commissioning of the equipment at NPL
19. Complete set of operation and maintenance manuals in English
20. Suitable mechanical tool kit to be supplied.
21. Two year warranty on the entire equipment from the date of commissioning.
22. List of users of this equipment in India to be supplied.

#### **OPTIONAL**

Standard accessories spares and consumables for problem free operation for 5 years should be quoted separately.

Size of bowls: 500ml should be quoted separately for all the materials specified in point no.3.

