

INVITATION FOR TENDER FOR SUPPLY OF ULTRA HIGH TEMPERATURE FURNACE FOR GRAPHENE

Sealed tender offers are invited in two separate sealed covers (Technical and Commercial offers) from original manufacturers / agents of the manufacturer / suppliers / direct agents manufacturers for the supply of the following equipment.

FULLY AUTOMATIC ULTRA HIGH TEMPERATURE FURNACES FOR GRAPHENE PRODUCTION WITH FULL SUPPORTIVE ACCESSORIES FOR ARGON/NITROGEN, HIGH VACUUM AND COOLING AMBIENCE

The offer must include: Door-step delivery, unloading, installation and commissioning, and full training to IIT Kharagpur Scholars/Staff.

Please send offers, ALONG WITH DESCRIPTIVE CATALOGUE/ BROCHURE. The validity of the bid should be at least five months (150 days) or more from the date of the opening of this tender. Please ensure that your quotation reaches not later than 14.02.2019 (Tuesday) by 15:00 Hrs. (IST) at the following address:

**Dr. Satyahari Dey,
Professor, Department of Biotechnology,
Indian Institute of Technology Kharagpur,
721 302, West Bengal, India**

We intend to purchase two types of furnaces having two different Tmax and operating temperature range. The bidders may quote for one or both. While quoting for one type they may deposit respective EMD.

**Type-I: Tmax 3000°C (operating temperature range 2600-3000°C [the offer must explain inner core composition that ensures zero contamination to graphene]
Earnest money of Rs. 400000.00**

**Type-I: Tmax 2600°C (operating temperature range 2000-2600°C [the offer must explain inner core composition that ensures zero contamination to graphene]
Earnest money of Rs. 200000.00**

EMDs is/are to be deposited in the form of Account Payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India. **Any bid which is not accompanied with an EMD shall be summarily rejected.** Earnest money deposited will be forfeited if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. No interest will be paid on the earnest money of the unsuccessful bidders.

Tender Reference	IIT/SRIC/STEP/2018/EQ1 dated 21/1/2019
Tender Fee	NIL
Last Date and Time for submitting the tender document	14.02.2019 (Tuesday) by 15:00 Hrs. (IST)
Time and Date of Opening of Technical Bids	14.02.2019 (Tuesday) by 16:00 Hrs. (IST)

Place of Opening Tender	SRIC Meeting Room. Indian Institute of Technology Kharagpur, 721 302, West Bengal, India
Address of Communication	Dr. Satyahari Dey, Professor, Department of Biotechnology, Indian Institute of Technology Kharagpur, 721 302, West Bengal, India
Contact Telephone Numbers	- 91+3222 - 283760
E-mail	sdey@bt.iitkgp.ac.in

Technical specifications for Ultra High Temperature Furnace for Graphene

EFFECTIVE Volume of the Chamber	
Volume	Type-I: minimum volume 1.0 litre; Type-II: 80 litres or more
If retort used, useful space without retort installed H x W x D (mm)	Please specify
Useful space (with retort) H x W x D (mm)	Please specify
Materials used for heating elements, and insulation	Graphite.
Chamber	Water-cooled stainless steel of high grade.
THERMAL SPECIFICATIONS	
T _{max} (Vacuum) (°C)	Please describe for both types
T _{max} (Atmospheric Pressure; under inert gas conditions) (°C)	At least 3000 °C (Specify time to reach highest temp for argon and nitrogen. Also, mention for how long it can operate at maximum temperature).
ΔT (between 500 and 2200°C) (as per DIN 17052) (K)	±10
Max. heating rate (up to 2200°C and beyond it) (K/min)	10 or less
Cooling down time for empty furnace (h)	Not more than 9 hours
Temp measurement system – if more than one used, please specify all details	

Controllers Specifications	
Furnace Control	Fully automatic.
Controller	From a globally known manufacturer and should be integrated with touch screen interface.
Remote Maintenance	
Please provide the hardware/software details for automated programming/maintenance of the furnace	
Vacuum Pump Specifications	
Vacuum Pump	Latest technology such as Turbomolecular pump
Please specify type of pump and capacity. The name of the manufacturer should also be specified. Please specify for optional turbo pumping system also including manufacturer name, etc.	
Specifications for Heated Outlet with Afterburner (if any)	
Heated Gas outlet	The unit should be integrated with an afterburner and heated gas outlet for strong outgassing applications.
Emergency Purge Tank Specifications	
Emergency Purge tank	The purging tank must be filled with inert nitrogen at a pressure of 6 to 9 bar. In case of an emergency this tank must provide enough inert gas for purging.
Advanced Temperature Measurement	
The equipment must have the sliding thermocouple to measure low level temperature and pyrometer for high temperature up to 3000°C.	
UPS Specifications	
UPS (International Brands only – specify make, model, battery backup and other features).	
ELECTRICAL CONNECTIONS REQUIRED: Bidder must provide the following data.	
Power (kW)	
Voltage (V)	
Current (A)	
Pre-fuse or equivalent (A)	
COOLING WATER SUPPLY: Bidder must provide the following data.	
Chiller	The equipment must include proper chiller and/or cooling options (inclusive of emergency situations where there is a shutoff of power with plant in operation) and the surface of furnace should be cold to touch.

	The chiller is to be placed outdoors.
Consumption (l/min)	
Max. entry temperature (°C)	
Advance Flow Pressure (bar)	
Return Flow Pressure (bar)	
Temperature difference between advance and return flow	
Max. Chloride content	4 parts per million (Normal water)
Water hardness	60 mg/l (Normal water)
pH-Value	≤ 7 pH
GAS SUPPLY: Bidder must provide the following data.	
Gas type	Argon (Ar) or Nitrogen (N ₂) (Minimum purity should be mentioned)
Flow Rate (l/h)	
Inlet pressure Please specify	
Compressed Air Please specify pressure and flow	6 - 8 bar
Any other gases required (specify pressure and flow rate).	
OPERATION PRESSURE: (FURNACE CLEAN, COLD, DRY AND EMPTY)	
Pump type	Double stage rotary pump
Leakage rate (mbar l/s)	≤ 5x10 ⁻³
OTHER ITEMS:	
<p>(A)The equipment must include safety devices for heating, vacuum and gas management systems</p> <p>(B)It also must have controls, switchgear and process documentation of the entire unit.</p> <p>(C) An unfurnished industrial shed of 1500-3000 sq ft may be provided to the supplier and the supplier has to equip the ambience for the installation. The bid must include all items, such as Chiller, pump, compressor, air dryer, dehumidifier, computer, UPS, Voltage Stabilizer, necessary piping and fittings with gauges, flooring, false-partitioning and roofing (suc as Al-glass) along with air conditioning (if needed) to house the equipment, and others needed items for smooth and efficient operation of the furnace. The technical bid must include technical details of all components with make and model. There will NOT be any liability for these from the customer end. IIT will ONLY provide space and electrical, water points. The Price Bid must include their cost in the basic price.</p>	

(D) Bidder must mention in the bid about the space, electrical and water connections needed for the above mentioned turnkey solutions.

(E) Delivery & installation: Within 20 weeks from the date of opening L/C. Penalty may apply thereafter. Firms offering earlier supply will be given preference due to time bound need of a project.

WARRANTY:

The entire facility including the software must have 3 years comprehensive warranty after the date of installation.

GENERAL TERMS & CONDITIONS

PLEASE SPECIFICALLY INDICATE THE FOLLOWING POINTS IN YOUR QUOTATIONS AND COMPLY THE TERMS AS MENTIONED HEREUNDER: -

1. TENDERS ARE INVITED COMPLYING THE REQUIREMENT FOR TENDER AS DETAILED IN THE TENDER SPECIFICATION TO BE SUBMITTED IN THE COMPANY'S / FIRM'S LETTERHEAD NEATLY PRINTED / TYPED DULY SIGNED BY AUTHORIZED PERSON WITH THE SEAL OF THE BIDDERS. ALL ENVELOPES CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPES SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOPE.

THE FOLLOWING DOCUMENTS ARE REQUIRED FROM THE INDIAN AGENTS OF FOREIGN FIRMS:

- 1.1 FOREIGN PRINCIPAL'S PROFORMA INVOICE INDICATING THE COMMISSION PAYABLE TO THE INDIAN AGENT AND NATURE OF AFTER SALES SERVICE TO BE RENDERED BY THE INDIAN AGENT.
- 1.2 COPY OF THE AGENCY AGREEMENT WITH THE FOREIGN PRINCIPAL INDICATING THE NATURE OF AFTER SALES SERVICES, PRECISE RELATIONSHIP BETWEEN THEM AND THEIR MUTUAL INTEREST IN THE BUSINESS.
2. TECHNICAL CATALOGUE/LEAFLET SHOULD BE ENCLOSED WITHOUT FAIL. PROVIDE COMPLIANCE STATEMENT WITH RESPECT TO THE TECHNICAL SPECIFICATIONS MENTIONED ABOVE.

3. PLEASE CONFIRM WHETHER YOU ARE AUTHORISED TO QUOTE ON BEHALF OF YOUR PRINCIPALS AND IF SO, PLEASE ENCLOSE A COPY OF SUCH AUTHORISATION WITH YOUR QUOTATION.
4. **PRICE BIDS FOR FOREIGN FIRMS:** PRICES ARE TO BE QUOTED ON 'EX-WORKS' DULY PACKED OR ON "FCA/FOB" INTERNATIONAL PORT" BASIS AND ALSO INCLUDING AGENCY COMMISSION PAYABLE TO YOUR INDIAN AGENTS, IF ANY, SHOWING CLEARLY THE FOLLOWING BREAK UP:-

- I) EX-WORKS PRICE
- II) PACKING & FORWARDING
- III) FREIGHT
- IV) ANY OTHER RELEVANT EXPENSES.
- V) TAXES PAYABLE BY THE INSTITUTE

INSURANCE WILL BE PAID BY OUR INSTITUTE SEPARATELY AND SHOULD NOT FORM PART OF THE QUOTED PRICE.

PRICE BIDS FOR INDIAN FIRMS: PRICES ARE TO BE QUOTED ON F.O.R., IIT KHARAGPUR, ON DOOR DELIVERY BASIS CLEARLY SHOWING THE BREAK UP.

5. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF **150 DAYS** FROM THE DATE OF OPENING.
6. INDIAN AGENTS ADDRESS AND PERCENTAGE OF AGENCY COMMISSION INCLUDED IN ABOVE F.O.B./EX-WORKS PRICE. (THIS WILL BE PAID TO THE INDIAN AGENTS IN INDIAN RUPEES ONLY AND NOT IN FE). PLEASE ENCLOSE COPY OF AGENCY AGREEMENT ENTERED INTO WITH YOUR PRINCIPALS INDICATING THE NATURE OF AFTER SALES SERVICES OF INDIAN AGENTS, PRECISE RELATIONSHIP & MUTUAL INTEREST IN THE BUSINESS.
7. **MEASUREMENTS/WEIGHT:** NETT/GROSS OF THE CONSIGNMENT. IN CASE OF AN ORDER, YOU SHALL USE AIR WORTHY PACKAGE (AS APPLICABLE) DULY CERTIFIED WITH DOCUMENTS – PLYTO – SANITARY CERTIFICATE (AS PER QUARANTINE ORDER 2003).
8. **SCOPE OF SUPPLY:** SHOULD INCLUDE FREE INSTALLATION AND COMMISSIONING
9. **PAYMENT TERMS FOR FOREIGN FIRMS**

THE OFFER WILL BE MADE ON A SINGLE CURRENCY AND ONLY ONE PO WILL BE ISSUED FOR THE ENTIRE SCOPE OF THE SUPPLY.

A) 90% PAYMENT THROUGH SIGHT DRAFT/FOREIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION AND 10% AFTER SUCCESSFUL INSTALLATION & COMMISSIONING.

B) BANK CHARGES ON LC/SD (WITHIN INDIA APPLICANT ACCOUNT AND OUTSIDE INDIA TO BENEFICIARY ACCOUNT).

PAYMENT TERMS FOR INDIAN FIRMS

A) 100% PAYMENT THROUGH CROSSED ACCOUNT PAYEE CHEQUE / ELECTRONIC TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER & CONDITION AND SUCCESSFUL INSTALLATION & COMMISSIONING.

B) ENSURE MENTIONING

i) BANK DETAILS OF THE BENEFICIARY, GST NO. AND PAN NUMBER

ii) FULL NAME AND ADDRESS OF THE BENEFICIARY ON WHOM ORDER HAS TO BE PLACED

10. WHETHER ANY EXPORT LICENCE IS REQUIRED FROM YOUR GOVERNMENT, IF SO, PLEASE CONFIRM WITH DETAILS.

11. COUNTRY OF ORIGIN OF THE GOODS IS TO BE MENTIONED.

12. THE INSTITUTE SHALL PROVIDE THE CONCESSIONAL CUSTOMS DUTY AND EXCISE DUTY EXEMPTION CERTIFICATE AS PER GOVT. NOTIFICATION NO. 51/96 CUSTOMS DATED: 23.07.1996 AND CENTRAL EXCISE DUTY EXEMPTION IN TERMS OF GOVT. NOTIFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.

13. **LIQUIDATED DAMAGES:** THE STORES SHOULD BE DELIVERED/ DISPATCHED TO DESTINATION AND READY FOR OPERATION NOT LATER THAN THE DELIVERY DATE SPECIFIED. IF THE SUPPLIER FAILS TO DELIVER ANY OR ALL THE STORES OR PERFORM THE SERVICE BY THE SPECIFIED DATE, LIQUIDATED DAMAGES AT 1% PER MONTH OR PART THEREOF IN RESPECT OF THE VALUE OF STORES WILL BE DEDUCTED FROM THE CONTRACT PRICE SUBJECT TO A MAXIMUM OF 5%. ALTERNATIVELY, THE ORDER WILL BE CANCELLED AND THE UNDELIVERED STORES PURCHASED FROM ELSEWHERE AT THE RISK AND EXPENSE OF SUPPLIER.

14. **PATENT RIGHTS:** THE SUPPLIER SHALL INDEMNIFY THE PURCHASE AGAINST ALL THIRD PARTY CLAIMS OF INFRINGEMENT OF PATENT, TRADEMARK OR INDUSTRIAL DESIGN RIGHTS ARISING FROM USE OF THE GOODS OR ANY PART THEREOF IN INDIA.

15. ONLY THOSE BIDDERS WHO'S BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.

16. THOSE BIDDERS WHO DO NOT RECEIVE ANY COMMUNICATION FOR PARTICIPATION IN PRICE BID OPENING MEETING MAY PRESUME THAT THEIR BID HAS NOT BEEN ACCEPTED BY THE INSTITUTE.

17. CONDITIONAL OFFER WILL NOT BE ACCEPTED.

18. LATE TENDERS I.E. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.

19. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS:-

- A) INCOME TAX RETURN (3 YRS) AND LATEST SALES TAX RETURN (GST No.), AND PAN NO.
- B) BANKER'S SOLVENCY CERTIFICATE
- C) SUMMARY OF AUDITED STATEMENT OF ACCOUNTS FOR THE LAST THREE YEARS TO BE ENCLOSED AND FINANCIAL HIGHLIGHTS AND THE KEY PERFORMANCE DURING THE LAST THREE QUARTERS TO BE ENCLOSED AS PER FORMAT:-

COMPANY'S KEY PERFORMANCE

DESCRIPTION	JAN. TO MARCH	APRIL TO JUNE	JULY TO SEPT.
GROSS REVENUE			
PROFIT BEFORE TAX			
PROFIT AFTER TAX			
RETURN ON INVESTED			
CAPITAL (ROIC)			

- D) CUSTOMER SATISFACTION CERTIFICATE FROM ONE SUCH ORGANIZATION IS TO BE ATTACHED WITH THE TECHNICAL BID AND PRICE BID.
- E) NAME AND ADDRESS OF MINIMUM THREE CLIENTS TO WHOM SUCH EQUIPMENT HAVE BEEN SUPPLIED SHOULD BE MENTIONED.

20. THE INSTITUTE DOES NOT BIND ITSELF TO OFFER ANY EXPLANATION TO THOSE BIDDERS WHO'S TECHNICAL BID HAS NOT BEEN FOUND ACCEPTABLE BY THE EVALUATION COMMITTEE OF THE INSTITUTE.

21. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO

Dr. Satyahari Dey

**Professor, Department of Biotechnology,
Indian Institute of Technology Kharagpur,
721 302, West Bengal, India**

AND ACKNOWLEDGEMENT TO BE OBTAINED.

IMPORTANT

1. IIT Kharagpur authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity/ upgrade the criteria/ drop any item or part thereof at any time before placing the Purchase Order.
2. Promptly make arrangements for repair and/ or replacement of any damaged item(s) irrespective of settlement of claim.
3. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.
4. For any query pertaining to this bid document correspondence may be addressed to

Dr. Satyahari Dey,
Professor, Department of Biotechnology,
Indian Institute of Technology Kharagpur,
721 302, West Bengal, India
E-mail: sdey@bt.iitkgp.ac.in

LAST DATE FOR SUBMISSION OF SEALED BIDS: 14.02.2019 (Tuesday) by 15:00 Hrs. (IST)

1. Please Note that the Institute remains closed during Saturdays & Sundays and all specified government holidays.
2. Fax, e-mail Tender will not be accepted.
3. The General Terms and Conditions as stated above relate to supply of stores/ equipment/ assets etc. and for specific service other terms and conditions of the Institute will apply.

SYNOPTIC COMPLIANCE STATEMENT BY BIDDERS-

MAJOR SPECIFICATIONS of	* Please add quantitative data for	Remarks
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components	your product (bid without such details are likely to be rejected)	

SPECIAL NOTE

The furnace being very expensive and having unique technical specifications critical for its use by entrepreneurs the following tender opening (PRICE bid) conditions will apply-

- a) Vendor must have 2 such machines in running conditions in users' site and submit customers satisfaction certificate along with bid documents
- b) The vendor must demonstrate (at least in one site) prior to opening of price bid to 3 Members of the Technical cum Purchase Committee (TCPC) in India/manufacturing country, in users' site and/or in manufacturing factory, the successful demonstration with our sample run using the furnace of same specifications.

In the text of the technical specifications and in synoptic compliance statement please specify the unique specifications for **graphene** production of main chamber and accessories that justifies superiority over other similar manufacturers.

N.B. Please quote for latest Models launched by your Principal/Overseas Equipment Manufacturer (OEM). Bid should include a letter (hardcopy) from OEM that the quoted Model is not older than 3 years, and will be in market /spares will be available for at least 5 years. Also, the bidder must have installed successfully at least 02 such instrument in any Institution/organization in India/abroad (please provide users name, email id and mobile number for receiving our feedback from the users. Without the users details the technical bid will be considered incomplete.). **Technical bid with ambiguous/incomplete specifications is liable for rejection. Price break up for all major components are essential. Details of space and pre-installation needs are essential. The supply of operation and service manual with circuit diagrams/ trouble shooting guidelines for users are essential.**

A Technical cum Purchase Committee (TCPC) will review bids and the firm(s) quoted desirable specifications may be invited **FOR A PRESENTATION ANYTIME THEREAFTER. Direct quotation from Principal (hardcopy) is a must before placing order. The decision of the TCPC will be final for selecting eligible technical and financial bids**

Softwares must be updated online by the original vendor till 4th year and your quotation must mention it.

