

## **INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT:**

### **High Performance Three/Triple Quadrupoles Inductively Coupled Plasma Mass Spectrometer (ICPMS) with Collision and Reaction cell modes using simultaneous Three Channel gas pneumatics**

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

Please send offers, ALONG WITH DESCRIPTIVE CATALOGUE/ BROCHURE. The validity of the bid should be at least four months (120 days) or more from the date of the opening of this tender. Please ensure that your quotation reaches not later than **21.04.2017 at 15:00 Hrs** at the following address:

**Prof. Sudarsan Neogi, Chemical Engineering Department,  
Indian Institute of Technology Kharagpur – 721 302, West Bengal, India**

Earnest money of **Rs.200000.00** is 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	<b>IIT/SRIC/CHE/SLG/SUN/ 2016-17/EQ2, Dated: 20.03.2017</b>
Price of Tender Document	<b>5000.00</b>
Last Date and Time for submitting the tender document	<b>21.04.2017 at 15:00 Hrs (Indian time)</b>
Time and Date of Opening of Technical Bids	<b>21.04.2017 at 16:00 Hrs (Indian time)</b>
Place of Opening Tender	<b>Chemical Engineering Department, Indian Institute of Technology Kharagpur – 721 302, West Bengal, India</b>
Address of Communication	<b>As stated above</b>
Contact Telephone Numbers	<b>+91- 3222 - 28 3936</b>
E-mail	<b>sneogi@che.iitkgp.ernet.in</b>

## DETAILED TECHNICAL SPECIFICATIONS FOR ICPMS

### Specifications for High Performance Three/Triple Quadrupoles Inductively Coupled Plasma Mass Spectrometer (ICPMS) with Collision and Reaction cell modes using simultaneous Three Channel gas pneumatics

- ICP-MS shall include, liquid sample introduction system, RF plasma ion source, Quadrupole for ion deflection, removal of photons, neutrals etc,
- Quadrupole/Octopole Based Cell to eliminate Spectroscopic/Polyatomic interferences using collision or KED approach, and pure reactive gases like e.g. CH<sub>4</sub>, O<sub>2</sub>, He/H<sub>2</sub>, CH<sub>3</sub>Cl for reaction Mode,
- Simultaneous dual stage discrete dynode detector and sample cone/skimmer interface all under computer control.
- **Scanning speed of a minimum of 5000 amu/sec or better to achieve maximum productivity for transient signals.**
- Quadrupole resolution settings dynamically scanned /set for each mass element.
- **Mass range upto 285 amu/daltons or better**
- Single software control for all functions like system operations, component optimization, methods development, calibration, analysis and reports generation.
- ICP-MS shall have a full color plasma view window for visuals on sampler cone, plasma color and injector tip.
- Bench top design with a utility free rear side.
- System shall not require any maintenance to be performed for long time to clean cell and analyzer quadrupole.
- **Should have fast data acquisition facility at least 100,000 points/second**

#### *Sample Introduction System:*

- **System should be capable to handle high TDS samples; up to 30% TDS**
- Liquid sample introduction system without O-rings concentric nebulizer cyclonic spray chamber, and quartz injector.
- System shall be close coupled, computer controlled three-channel integral peristaltic pump, integrated within ICP-MS unit.
- Cassette Torch mount with torch and injector assembly and flexibility with easy removal.
- Fully automated X, Y, Z torch alignment through software.
- Demountable torch which allows changing of injector without torch removal.

#### **Ion Source and RF plasma system must include:**

- Computer controlled preferably RF generator operating from 500 to 1600 watts for automatic control of torch ignition, shutdown, and system warm up.
- **RF Generator and load coil shall be free from water/gas cooling.**
- The RF Generator with an impedance matching network and providing for adaptation to any change in plasma within nanoseconds.
- Design shall not need plasma "screens" or "shields" to reduce secondary discharge.

### Plasma Interface:

- A Triple or dual cone design of cones for better focusing of ions.
- Unit shall preferably shall not use any extraction lens creating higher backgrounds for various elements
- Sampler and skimmer cones orifice with minimum 1.0 and 0.8 mm diameters respectively.
- Rapid mounting and removal cone design, easily accessible from outside

### Collision and Reaction cell with Triple channel gas pneumatics:

- ICP MS shall incorporate a Cell offering three modes of operation: Standard Mode, Collision Cell Mode with KED and Reaction Cell to utilize a wide variety of gases (including **100% pure reactive gases e.g. oxygen, CH<sub>4</sub>, O<sub>2</sub>, CH<sub>3</sub>Cl, He/H<sub>2</sub> mixtures** etc.). The switching of reaction and collision gases will be through software and automated. Unit will have the flexibility of applying both gases using single method for removal of interferences.
  - a. The band pass on reaction cell shall have the ability to provide both high mass and low mass cutoffs, user selectable mass band pass window with variable in resolution and mass position.
  - b. The system shall have online electronic dilution facility for extended dynamic range for ppm to ppb to ppt levels in single run.
  - c. The cell shall be capable of reducing the intensity of isobaric and polyatomic interfering species by up to 12 orders of magnitude.**
  - d. Reaction cell should ensure that it will not allow formation of unwanted species during dynamic reaction correction in the cell.
  - e. Reaction cell will have flexibility to connect oxygen gas for mass shift analysis and it will work along with KED for He gas.
  - f. Reaction Cell and main analyser will have online optimization feature to remove interferences and also analyse an element of interest.

### Quadrupole Mass Analyzer:

- System must have three/triple quadrupoles to maximize sensitivity for every element in a single run.
- Scanning speed 5000 amu or better per second and dwell times minimum 0.1ms
- Mass range should be from **1 amu to 285 amu** or better
  - a. Quadrupole analyzer shall have the ability to discretely control the resolution of selected mass regions dynamically, without affecting the overall nominal resolution of the system

### Ion Detector Assembly:

- b. The ion detector shall be a simultaneous dual-stage discrete dynode electron multiplier, providing element concentration calibration up to 12 orders of magnitude dynamic range in a

single scan using both analog and pulse ion counting mode, and offer protection against overload in both pulse counting and analog modes.

The system shall meet following performance criterion:

**Detection limits**

Based on three times the standard deviation of the blank using three-second integration time and peakhopping at 1-point per mass.

**Element ng/L (ppt)**

$^9\text{Be} < 0.5$ ,  $^{59}\text{Co} < 0.5$ ,  $^{115}\text{In} < 0.25$  and  $^{238}\text{U} < 0.25$

**Sensitivity Element M cps/mg/L**

$^9\text{Be} > 6$ ,  $^{115}\text{In} > 100$  and  $^{238}\text{U} > 80$

**Oxide and doubly-charged species**

$\text{CeO}^+/\text{Ce}^+ < 0.025$  and  $\text{Ce}^{++}/\text{Ce}^+ < 0.03$

**Background signal at Mass 220** < 1 cps

**Short-term precision** < 3% RSD

Long-term stability < 4% RSD over 4 hours

Mass calibration stability: < 0.05 amu over eight hours of continuous operation

Isotope-ratio Precision: < 0.08% RSD

Quadrupole Peak Hop (Slew) Speed: 1.6 M amu/sec

Transient Data Acquisition Speed: > 3000 temporal data points/sec maximum

**Vacuum System:**

- c. Vacuum system shall consist of four stage vacuum system utilizing a triple inlet turbo molecular pump to maintain lowest vacuum, include vacuum chamber isolation valve which automatically close as plasma is extinguished or with system faults.
- d. In the event of vacuum failure, the entire vacuum system must be automatically back-filled by inert gas to preserve the cleanliness of the system.
- e. Turbo molecular vacuum pump must be purged by an inert gas during operation to prevent damage by reactive gases and/or corrosive vapors such as those generated by the analysis of phosphoric acid.

**System Software:**

- f. Routine Maintenance Alerts; scheduled user defined alerts for continued operations.
- g. Method Development wizards.
- h. Pre-set methods
- i. Automated quality control checking features included.

- j. The system software shall support the following calibration curve fit modes for Quantitative analysis:
    - a. Linear least squares.
    - b. Weighted linear least squares.
    - c. Linear forced-through-zero least squares.
    - d. Method of standard additions (Matrix Matched calibration)
    - e. Additions calibration.
  - k. Computer controlled automated optimization of Cell gas flow.
- 4 Years EXTENDED WARRANTY after completion of standard 1 year Warranty**

## 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 ENVELOPS CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPS SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOP.

### **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.

1.3 PLEASE ENCLOSE THE DOCUMENT(S) RELATED TO THE ENLISTMENT OF THE INDIAN AGENT WITH DIRECTOR GENERAL OF SUPPLIES & DISPOSALS (DGS & R) UNDER THE COMPULSORY REGISTRATION SCHEME OF MINISTRY OF FINANCE.

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 120 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**

A) 100% PAYMENT THROUGH SIGHTDRAFT/FORIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION.

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 AND CONDITION & SUCCESSFUL INSTALLATION.

B) ENSURE MENTIONING

i) BANK DETAILS OF THE BENEFICIARY, VAT NO., SERVICE TAX 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) CURRENT INCOME TAX AND SALES TAX CLEARANCE CERTIFICATES (VAT No.), SERVICE TAX 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. **WARRANTY / GUARANTEE:** THIS COMPREHENSIVE WARRANTY / GUARANTEE SHALL REMAIN VALID FOR **12 MONTHS & EXTENDED WARRANTY for 04 YEARS** AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED TO THE FINAL DESTINATION.
21. 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.
22. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO **Prof. Sudarsan Neogi, Chemical Engineering Department**, INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR - 721 302 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 Prof. Sudarshan Neogi, at the address mentioned above.

**LAST DATE FOR SUBMISSION OF SEALED BIDS: 21.04.2017**

- 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.
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## Uploading Tenders (e-Publishing) on the Central Public Procurement Portal (CPPP)

<b>Name of Work/Item of Procurement</b>	<b>High Performance Three/Triple Quadrupoles Inductively Coupled Plasma Mass Spectrometer (ICPMS) with Collision and Reaction cell modes using simultaneous Three Channel gas pneumatics</b>
<b>No. of Covers</b>	<b>02 (Two)</b>
<b>Bid Validity in Days</b>	<b>120 Days</b>
<b>Bid Opening Place</b>	<b>Prof. Sudarsan Neogi, Chemical Engineering Department, IIT, Khargpur – 721 302</b>
<b>Bid Submission Closing Date</b>	<b>21-04-2017 15:00 Hrs</b>
<b>Bid Opening Date</b>	<b>21-04-2017 16:00 Hrs</b>
<b>Tender Submission Fee (if any)</b>	<b>Rs. 5000.00</b>
<b>Estimated Tender Value (if any)</b>	
<b>EMD (if any)</b>	<b>Rs. 200000.00</b>