

Notice Inviting Tender

**SUPPLY, INSTALLATION, COMMISSIONING & TRAINING OF AN INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY FACILITY
FOR DETERMINATION ELEMENTAL CONCENTRATION AND ISOTOPE RATIO**

Tender No. CEAS/2019-20/SM/001



**INDIAN INSTITUTE OF
SCIENCE**

CEAS/2019-20/SM/001

Centre for Earth Sciences

Indian Institute of Science, Bangalore – 560012

September 2019

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SECTION 1 – BID SCHEDULE

1	Tender No	CEAS/2019-20/SM/001
2	Tender Date	30th September 2019
3	Item Description	Supply, Installation, Commissioning, and Training of an Inductively Coupled Plasma Mass Spectrometry Facility
4	Tender Type	Two Bid System a) Technical Bid (Part-A) b) Commercial Bid (Part-B)
5	Place of Submission and tender opening	To, The Chairman, Prof. Nagesh Kumar Centre for Earth Sciences, Indian Institute of Science, Bangalore – 560012, India
6	Last Date & Time for submission of tender	22nd October 2019, 17:00 hrs (3 weeks from the day of floating of the tender)
7	Date of opening of technical bids	25th October 2019
8	For further clarifications	Dr. Sambuddha Misra Centre for Earth Sciences, Indian Institute of Science Bangalore- 560012, India Email: sambuddha@iisc.ac.in with copies to nagesh@iisc.ac.in and chair.ceas@iisc.ac.in +91-80-2293 2027; +91-80-2293 3405

SECTION 2 – ELIGIBILITY CRITERIA

Prequalification criteria:

1. The Bidder's firm should have existence for a minimum of 3 years. (Enclose Company Registration Certificate)
2. The Bidder should have qualified technical service personnel for the instrument(s).
3. If the Bidder is a local distributor/dealer/Agent, it is mandatory to attach authorization certificate along with the bid from the original equipment manufacturer.
4. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per -Annexure 4
5. The Bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect has to be given as per Annexure 3.

SECTION 3 – TERMS AND CONDITIONS

A) Submission of Tender:

1. All documentations in the tender should be in English.
2. Tender should be submitted in two envelopes (two bid system).
 - a. **Technical Bid (Part-A) –**
Technical bid consisting of all technical details, check list for conformance to specifications, format in which the price bid is quoted without the actual prices (suppliers who include any indication of prices in the technical bid will be automatically disqualified).
 - b. **Commercial Bid (Part-B) –**
Indicating item wise price for the items mentioned in the technical bid, as per the format of quotation provided in tender, and other commercial terms and conditions
3. The technical bid and price bid should each be placed in a sealed cover, superscripting on both the envelopes the tender no. and the due date and Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscripted with the Tender No & Due Date.
4. The SEALED COVER superscripting tender number / due date & should reach The Chairman, Centre for Earth Sciences, Indian Institute of Science, Bangalore – 560012, India on or before due date mentioned in the tender notice. In case due date happens to be holiday the tender will be accepted and opened on the next working day.

If the quotation cover is not sealed, it will be rejected.

5. All communications are to be addressed to- The Chairman, Centre for Earth Sciences, Indian Institute of Science, Bangalore– 560012, India.
6. GST/other taxes, levies etc., are to be indicated separately. The BIDDER should mention GST Registration and PAN in the tender document (Indian Bidders only).
7. If price is not quoted in Commercial Bid as provided in tender document the bid is liable to be rejected.
8. The Institute reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to the award of contract, without there by incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders.
9. Incomplete bids will be summarily rejected.

B) Cancellation of Tender:

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

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

C) Validity of the Offer:

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

D) Evaluation of Offer:

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

E) Pre-requisites:

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

F) Mode of Shipment:

In case of foreign bidders, the consignment must be airlifted, insured and transported to the Indian Institute of Science. Necessary custom clearance from Bangalore International Airport will be facilitated by IISc, Bangalore.

G) Customs clearance:

The IISc, Bangalore will furnish the necessary papers for the import of items into India, necessary custom duty exemption certificate and other supporting documents to facilitate the import of the items will be provided.

H) Warranty:

The complete system is to be under warranty / comprehensive maintenance package for minimum 5 years / 60 calendar months (year wise breakup value should be shown in the commercial bid) including free supply of consumables, spare parts and data analysis software from the date of functional installation. If the instrument is found to be defective, it has to be replaced or rectified at the cost of the bidder within 30 days from the date of receipt of written communications from IISc, Bangalore. If there is any delay in replacement or rectification, the warranty period should be correspondingly extended.

I) Annual Maintenance Contract:

Annual maintenance contract for a period of 5 years post warranty should be provided on completion of warranty period.

J) Purchase Order:

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

K) Delivery and Installation:

The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order. The system should be delivered, installed and made functional within 90 days from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period. No partial shipment is allowed.

- M) Payment Terms:**
The payment will be through a Letter of Credit and milestone of the payment will be determined after the mutual discussions with the successful bidder.
- N) Statutory Variation:**
Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.
- O) Disputes and Jurisdiction:**
Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Bangalore, India.
- P) General Requirements:**
1. A breakdown of costings for all items included in the specification;
 2. Details of third-party components included within the specifications which the Institute could purchase directly from manufactures (e.g. computer hardware, software and peripherals, vacuum system components);
 3. Details of warranty provisions.
 4. Details and costings of spares kit.
 5. Details of maintenance arrangements/agreements.
 6. Details of service engineer's call out charges (per day).
- Q) General:**
1. All amendments, time extension, clarifications etc., within the period of submission of the tender will be communicated electronically. No extension in the bid due date/time shall be considered on account of delay in receipt of any document(s) by mail.
 2. The bidder may furnish any additional information, which is necessary to establish capabilities to successfully complete the envisaged work. It is however, advised not to furnish superfluous information.
 3. The bidder may visit the installation site before submission of tender, with prior intimation.
 4. All imported equipment should be quoted in the currency of the country of origin, and all locally sourced items should be quoted in Indian Rupees.
 5. Any information furnished by the bidder found to be incorrect, either immediately or at a later date, would render the bidder liable to be debarred from tendering/taking up of work in IISc, Bangalore.

Section – 4 – Technical Specifications

Technical Specifications for procurement/installation of an Inductively Coupled Plasma Mass Spectrometry facility at the Indian Institute of Sciences (IISc), Bangalore, India.

The Indian Institute of Sciences (IISc), Bangalore, India is a premier research institute carrying cutting edge research in the field of Sciences and Engineering. The institute is planning to set up a plasma-based mass spectrometry facility to measure abundance and isotope ratio of multiple elements in natural, environmental, extra-terrestrial, and biological samples. The Institute invites Sealed Tenders for the procurement, commissioning, standardization and calibration of the mass spectrometer(s) as per the technical specifications given below. **IF MULTIPLE MASS SPECTROMERES ARE PART OF THE BID THEN SPARES AND CONSUMABLES OF THE MASS SPECTROMETERS MUST BE COMPATABLE WITH ONE ANOTHER.**

Please quote your specifications in the same order as per this document. A compliance statement must be submitted item-wise showing your compliance / deviations in clear terms. Hard and soft copies of the quote MUST be inserted along the documents.

The instrument(s) should be capable of measuring the isotopic ratio and abundance of select elements (as tabulated below) and with high precision and accuracy. The scientific interest of the Centre covers a wide range of elements in the field of Earth, Planetary, Ocean, and Biological Sciences. The utilization of the instrument will not be restricted to the measurement scheme below, but research and development of new isotope systematics, determination techniques, and analytical methodology. Bidders are requested to highlight additional features of their instrument that would enable the users at IISc to utilize the instrument to establish cutting-edge isotope analyses methods. Following are some of the isotope systematics we intend to measure, both in solution and Laser Ablation mode.

ISOTOPE SYSTEMATICS OF PRIMARY INTEREST	
Systematics	Masses to be measured
U-Th Series Dating	228, 229, 230, 232, 234, 235, 238
U/Th/Pb Geochronology	202, 204, 205, 206, 207, 208, 235, 238
Hf Isotopes	180, 179, 178, 177, 176, 175, 174, 173, 172, 171
Sm-Nd Isotopes	142, 143, 144, 145, 146, 147, 148, 150 – add Ce 140 too for monitoring
Ba Isotopes (with Xe)	131, 134, 135, 136, 137, 138
Mo Isotopes	100, 99, 98, 97, 96, 95, 94, 92
Sr Isotopes (with Rb and Kr)	83, 84, 85, 86, 87, 88
Cu Isotopes	63, 65
Zn Isotopes (with Ni)	62, 63, 64, 65, 66, 67, 68, 70
Ni Isotopes (With Fe)	56, 58, 60, 61, 62
Fe Isotopes (with Cr and Ni)	52, 53, 54, 56, 57, 58, 60
Cr Isotopes (with Ti)	49, 50, 51, 52, 53, 54, 56
Ca Isotopes	42, 43, 44, 46, 48 (and if possible, mass 40)
Si Isotopes	28, 29, 30
Mg Isotopes	24, 25, 26
B Isotopes	10, 11
Li Isotopes	6, 7

SECTION – A: MAIN INSTRUMENT(S)

A. Description for Instrument(s) Capable of Elemental Isotope Ratio Determination:

This specification describes any mass spectrometer(s), preferably a magnetic sector kind that is equipped with inductively coupled plasma (ICP) ion source and capable of measuring isotopic ratios and / or abundances of multiple elements in solid and liquid samples. The instrument(s) should be equipped with an electrostatic analyser (ESA) for focussing the ions in energy as part of a double focussing system or provided with some means for reducing the spread in ion energy of the focused ion beam.

The mass spectrometer(s) must have more than one detector. The preferred configuration for isotope ratio determination will be at least 9 Faraday detectors and 1 ion counting multiplier in the focal plane, this is to permit dynamic and static multi-collector analysis of isotopes across the mass spectrum (4 to 310 amu), employing both multiple ion-counting devices and multiple-Faraday cups used exclusively and together; whereas, for elemental abundance determination the ability to switch between ion counting and Faraday Cup will be preferable.

Other Specifications:

If the mass spectrometer has fixed dispersion, the multiple collectors should be externally adjustable for movement along the focal plane; if the detectors are fixed position simultaneous ion current measurements may be achieved via electrostatic zoom optics. The collector system must permit the egress of the axial or near-axial ion beam in order for the beam to be recorded by a high sensitivity detector and amplifier. Sample introduction to the plasma source shall be via nebulizer and pumped spray chamber, desolvation or hydride generation nebulizer system in the case of liquids and be via laser ablation in the case of solids. Further, the sample introduction system should have a means of removing waste solutions, via a peristaltic pumping system or other. The mass spectrometer should be equipped with high resolution features to permit the measurement of 'interference' free isotopes of elements such as iron and silicon. The mass resolution settings should allow for low ($m/\Delta m \sim 400$; 10% valley), medium ($m/\Delta m \sim 6000 - 5/95\%$ edge) and high ($m/\Delta m \sim 8000 - 5/95\%$ edge) resolution analyses. Fully automatic operation is required. Data acquisition and processing shall be automatically controlled by an on-line desktop computer.

I. ICP-MS unit

(1) **Sample introduction system for solution mode** should have standard & complete nebulizer system including:

- I. **Peristaltic pump (sixteen rotor)** with software controlled variable uptake speed
- II. **Self-aspirating PFA nebulizers** with provision for sample flow rates of 35, 50, 100 and 200 microliters/minute with and without PEEK/Teflon reinforced sample uptake tube.
- III. **Desolvating nebulizer** for isotope ratio measurement with integrated gas and temperature controllers. At least one each of desolvating nebulizer with and without membrane option should be quoted.
- IV. **Spray chambers** (one each of cyclonic, Scott-type, and double pass) of quartz and PFA make that are compatible to the instrument should be quoted.
- V. **Micro-cyclonic spray chamber** (Quartz & PFA) with low internal volume.
- VI. **Hydride generator** for determination of elements with high ionization potential
- VII. **Auto sampler:** A compact auto sampler with small footprint, short sample path (essential for smaller sample size) and a protective cover to prevent sample contamination. It should have dual flowing rinse stations, which can operate in gas displacement or peristaltic-pump mode. It should have at least 48 sample holders and should be compatible with sample volumes as low as 500 μ L and up to 22ml. Other options of sample rack configuration, if any, should be quoted separately. The operational voltage should be 240VAC (50Hz). It should be compatible and integrated with instrument software.
- VIII. **The plasma torch** should be of the standard Fassel design mounted horizontally. The torch position should be under remote control in the x, y and z axes ensuring rapid and reproducible optimization of the plasma position; a viewing port shall be provided that allows direct observation of the plasma torch.

- IX. **The Mass Flow controllers on ICP torch and nebulizer gas supplies** should permit tuning for optimum stability and precision; there should be the capacity to add at least two additional flow controllers (e.g. for helium, nitrogen or argon).

(2) ICP-Source

- I. The ICP-Source should NOT be air cooled.
- II. The inductively-coupled plasma ion source shall be a high efficiency source incorporating a field-proven solid state RF generator with a stability of better than 1% and an automatic RF matching network ensuring low reflected RF power at all times.
- III. Automated software controlled alignment facility of plasma torch with X-Y-Z movement for optimal positioning for maximum analyte signal sensitivity.
- IV. ICP source should be compatible with alternate sample introduction system that is commercially available (laser ablation)

(3) Ion Extraction Interface

Standard and high sensitivity combination of outer sampler cone and an inner skimmer cone should be provided for maximum stability, sensitivity, and precision. The interface should come equipped with high efficiency ion transmission features for improved sensitivity.

(4) Magnet and Mass Analyzers (applicable primarily for isotope ratio determination)

- I. A mass spectrometer, capable of scanning up to mass: charge ratio of 4 to 310 m/z along the axis is required.
- II. **Mass Analyzer:** Double focusing-type Mass Analyzers consisting of electrostatic analyzer (ESA) and electromagnetic analyzer providing high resolution capability for obtaining flat-top peaks for various isotopes. Highly stable ESA with fluctuations not exceeding ± 15 ppm.
- III. **Magnet:** Low hysteresis laminated magnet with efficient temperature control and compensation to achieve stable high resolution. The magnet power supply shall be controlled via field regulation. Capabilities shall include scanning of the magnet field via computer, both up and down at selected speed and step size, over a narrow mass region (less than 1 mass unit) as well as over the entire mass range from masses 4 to 310 amu. Scanning can be done using the high voltage and magnetic field, with variable speed and mass range window, both up- and down-mass. The mass position (m/z) readings shall be automatically calculated using latest mass calibration and displayed on the computer monitor with milli-mass resolution. Furthermore, the mass spectrometer shall be capable of operating at reduced accelerating voltage. Seller should specify magnet settling time for normal peak jump operation the magnet over a mass ranges of 10, 50 and 100 amu. Seller should specify drift in Hall probe or field probe sensor noise and drift over a 1-hour period.
- IV. **Minimum required mass resolution:** Physical and / or chemical resolving power (at 10% valley definition) as the ratio ($M/\Delta M$) of the instrument should be selectable at least in three categories - Standard (low), Medium and High. Resolution as a function of relative ion transmission should be as follows:

Resolution	M/ ΔM	Ion transmission (relative)
Standard (low)	≥ 400	100%
Medium	≥ 4000	$\geq 10\%$
High	≥ 8000	$\geq 5\%$

- V. **Resolving Power:** The instrument should be able to achieve high resolution with resolving power of >8000 (e.g. mass ^{56}Fe , which can resolve the molecular interference from ArO isotopes with demonstrated flat topped peak). The specification should clearly mention the relative transmission for various resolving powers.
- VI. **Stability:** The instrument shall have a system stability, which is measured as peak stability, including drift of magnetic field and electric field < 50 ppm/hr (Measured at Nd mass range).

(5) Detector specifications (applicable primarily for isotope ratio determination)

- I. A minimum of nine (9) Faraday cups (FC) and an axial ion counting devices in the detector block with necessary electronics and amplifiers should be part of the mass spectrometer. A suitable combination of Faraday Cups and Ion Counting devices should be provided to cater the needs of simultaneous collection of ions of different masses required in a wide range of applications of isotope systematics as tabulated above. The ion optical system shall consist of a sector magnet with an "extended geometry" configuration. The ion optics must provide for magnetic field focussing of the ion beam in the vertical ("Z") direction as well as in the plane of curvature. The main multiple collector assembly shall provide at least 8 off-axis collectors and one axial Faraday for simultaneous ion current measurements (i.e. a total of 9 Faraday collectors). The magnet, flight tube and collector array shall be adequate for the simultaneous mass range of 17% (i.e. ^{202}Hg to ^{238}U or ^6Li to ^7Li). The positions of the off-axis collectors should be adjustable to allow for a range of possible mass separations, unless this can be achieved by use of an electrostatic zoom lens. Where collector positions are movable, multi-collector positioning should be achieved via computer control including in situ position read-back and the precision of cup movements should be $< 10\mu\text{m}$.
- II. **Faraday cups:** Dynamic Detection Range of $\geq 50\text{V}$ when fitted with $10^{11}\ \Omega$ resistor; Noise levels: $\leq 20\ \mu\text{V}$ at 4 second integration time or better; Detection Signal Decay: $\leq 10\ \text{ppm}$ after 2 seconds or better
- III. **Amplifiers and resistors: The instrument should have both 10^{11} and $10^{13}\ \Omega$ resistors (or equivalent), including gain calibration ability. Additional options like Daly Detectors in addition to or instead of $10^{13}\ \Omega$ resistors are welcome as long as there is demonstrated ability to determine ion beam sizes smaller 100mV with a 2σ precision comparable to that of $10^{13}\ \Omega$ resistors.**
- IV. The seller should specify the noise of these amplifiers at integration times of 5 seconds or less. Using 10^{-11} ohm and 10^{-13} ohm amplifiers should generate dynamic ranges of at least 0.5 and 50V, respectively. Seller should specify the respective noise on these amplifiers. The amplifiers shall be enclosed in a controlled environment of $\pm 0.01^\circ\text{C}$. A current source shall be provided for automatically calibrating the inter-channel gain factors. Sellers should specify the maximum noise level of the head amplifiers over a 5 second integration time including resistor and amplifier input noise
- V. There should be provision that any combination of faraday cup and amplifier can be selected on a routine basis through software, or there should be provision for enough Faraday Cups and amplifiers that multiple isotope systematics over a dynamic concentration range can be determined. Faraday cups and associated amplifier system should have minimum calibration error (cup bias). Configuration with higher dynamic range of signal measurement will be preferred. All the amplifiers for the Faraday detector should preferably be placed in an evacuated and temperature-controlled enclosure to ensure their performance independent of external environment.
- VI. The seller should be able to perform mass calibration, ion counter efficiency and gain calibration from the operating software. The seller should also specify amplifier calibration stability within a 24 hour period.
- VII. Electron Multiplier: The Seller sensitivity detection system (electron multiplier): sellers should specify the linearity, dark noise, peak flatness (over 200ppm) and the relative stability of the counting efficiency in a 1 hour period. Additionally, the Seller should specify the relative counting efficiency (in %) of secondary electron multiplier (SEM) at their optimal operating voltage (which should also be defined).

(6) Abundance sensitivity:

- I. Abundance sensitivity should be $\geq 5\text{ppm}$ (without any application of retardation / RPQ / WARP filters) and should be such it can be improved to 500 ppb or better by applying retardation filter without losing a significant amount of transmission.
- II. Retardation/deceleration filters: To improve the abundance sensitivity for analysis of certain isotope systematics (viz. Isotopes of U: ^{237}U w.r.t. ^{238}U mass should be within 5ppm).

(7) Vacuum System

- I. The vacuum pumping systems MUST be able to achieve vacuum levels of: (i) $\leq 2 \times 10^{-8}$ mbar in the

collector area and (ii) $\leq 10^{-7}$ mbar in the electrostatic analyzer area. The following are the vacuum specifications:

- **Expansion chamber (between cones): <4 mbar**
 - **Extraction region: <10⁻³ mbar**
 - **ESA region: <10⁻⁷ mbar**
 - **Analyser region: <2 x 10⁻⁸ mbar during operation**
 - **Analyser region: <5 x 10⁻⁹ mbar ultimate pressure**
- II. Isolation valves should be placed and operable by the software and manually to ensure minimum vacuum loss during accidental power loss or scheduled maintenance.

(8) Electronic Component:

All electronic modules necessary for full operation shall be provided; they shall be mounted in the instrument or in auxiliary rackmounts. State-of-the-art solid-state control electronics shall be used throughout. Electronic boards, or their components, where applicable should be readily replaceable in the event of failure. Vacuum gauges and display devices to monitor all pumps in the system shall be provided and mounted in a position easily readable from the front of the instrument. The source and analyzer pressures shall be measured independently. A display of important instrumental parameters shall be provided on the video display of the computer, including turbo and ion pump status. Software should also incorporate a "status OK" display for pressures and pump speeds/temperatures.

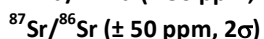
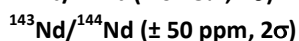
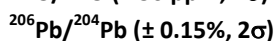
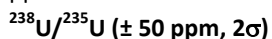
(9) Computer and Software:

- I. **Operating Computer:** The instrument(s) should come with a dedicated computer system with the latest available configuration, and a secondary hard-drive, is integrated in the CPU, that duplicates the operation hard-drive in real time. The computer system must include a dual layer DVD writer with double layer capability for archiving, a minimum eight number of USB ports, and wireless network cards. The computer system should be supplied with a twin monitor (27" LED screen each).
- II. **Printer:** A laser color printer with USB as well as ethernet connectivity; Automatic Duplex printing (both side printing); 1200 X 1200 print quality or better should be supplied.
- III. **Software:** The operational software should be capable fully integrated operation of the mass spectrometer and the sample inlet systems. It should also support other peripheral systems (such as third-party laser ablation, peri-pumps, and auto-sampler). Software upgrades should be supported for at least for 10 years at no additional cost.

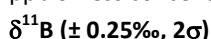
II. INSTRUMENT PERFORMANCE GUARANTEE

The quotation **MUST** include full performance figures of merit of the instrument, including sensitivity, accuracy and precision for short- and long-term analyses of standard solutions of Li, B, Sr, Nd, Pb, and U. Following are a select few performance guidelines that the supplier must guarantee to demonstrate on the proposed machine.

- (A) The sensitivity, accuracy, and precision, determined on standards recognized by the geochemical community / high purity ICP-MS concentration standards, of isotope determination performed at 200 ppb or less concentration should be demonstrated for the following:



- (B) The sensitivity, accuracy and precision, determined on standards recognized by the geochemical community / high purity ICP-MS concentration standards, of isotope determination performed at 10 ppb or less concentration should be demonstrated for the following:



$\delta^7\text{Li}$ ($\pm 0.35\%$, 2σ)

- (C) The tender should include the best sensitivity, internal precision (2σ), and external precision (2σ) for the elements listed below in the format tabulated below from any representative instrument. The values for the parameter can be quoted from published results in any recognized peer reviewed journal or from a factory instrument with an undertaking from the company. For reporting of the sensitivity, the exact sample introduction setup should be mentioned, and for internal- and external precision the exact number of ratios determined (cycle / block) and the number analyses averaged (n) should be quoted. The total mass of analyte consumed per analyses and detector / amplifier utilized must be mentioned.

Elements of Interest: Li, B, Mg, Si, K, Cr, Fe, Sr, Nd, Hf, Pb, and U. If more than one instrument is part of the quotation, then the elemental sensitivity for each instrument should be quoted separately. If any instrument is to be primarily utilized for elemental abundance determination then the internal and external precision for isotope ratio determination need not be quoted. Demonstrated ability to resolve plasma-based interferences, through utilization of physical or chemical mass resolution, should be part of the performance report.

Element	Isotope Ratio	Front-end Configuration	Sensitivity (V/ppm)	Analyte Mass per Analysis (ng)	Analysis Protocol	Internal Precision (2σ)	External Precision (2σ)

(D) Instrument Performance:

- I. Quotation should include full specification of mass spectrometer performance, including both internal and external precision in measurement for most of the isotope systems mentioned above. The service engineer should carry out various performance parameters of the instrument(s) according to those mentioned in the brochure and/or quoted in the technical bid submitted by the vendor, whichever is better both at factory before delivery and at IISc after delivery. Towards this the supplier should provide test certificates.
- II. Quotation to include clear, unambiguous statements of expected routine performance of the various preparation systems in combination with the mass spectrometers. It should state the overall precisions derived from analyses of multiple replicate samples of standard materials, with a clear indication of any effects in relation to sample size.

SECTION –B: ACCESSORIES AND SPARES

The offer should include all of the required accessories/ spares/ consumables for seamless performance of the system and its peripherals. A list of spares and consumables should be provided.

- a. The offer should also include following essential accessories and quoted preferably in Indian rupees.
- b. A 40 KVA 3-phase UPS (only from reputed brands/ manufacturers) that has an inbuilt Isolation Transformer and is capable of one hour of back up time with power output quality as per instrument’s requirements should also be quoted separately. This UPS will be tested by the ICP-MS manufacturer for electronic noise and other key performance parameters.

SECTION C: ADDITIONAL GENERAL REQUIREMENTS

- a. List of all installations in India with contact details of scientist / individual in-charge.
- b. The technical specifications listed above are a minimum indicative. The ease of operation and

maintenance, the ability to integrate latest technology, and after sales service facilities are some of the key factors in the evaluation process.

- c. The details, credentials, and experience of individuals who are factory trained service engineers of the quoted model of mass spectrometer and is currently on roll in India or at the nearest service hub should be submitted with the offered quotation.
- d. Quotation should include all cost including logistics required to complete the installation at IISc.
- e. The Vendor should certify and confirm availability of spares, service support and, both hardware and software upgradation for at least 10 years from the year of installation.
- f. Any equipment of component procured locally and supplied with the instrument should be quoted in Indian Rupees.
- g. List of select user laboratories of an instrument of similar configuration and scientific application must be provided with the contact details (e-mail) of the person-in-charge of the instrument, model and date of installation.
- h. IISc may opt for demonstration of any technical specifications and performance of the quoted model, at any available user site in India or at the factory / preferred demonstration site for the company, as a part of technical evaluation.

SECTION D: Training

- I. After the successful installation of the mass spectrometer and its peripherals, selected personnel from IISc should be provided with hands-on and in-depth training on the operation, maintenance and application of the instrument by factory engineer. The cost of an on-site training session should be part of the quotation.

SECTION E: Warranty (to be quoted as a separate item)

Supplier should provide comprehensive onsite warranty (including parts and labour) for 5 years (60 months), to be executed in a 1 yr (manufacturer warranty) + 4 yr (extended warranty) fashion, including all locally supplied items after successful installation of the system. The supplier should also quote for annual service maintenance contract (breakdown visits and two preventative service visits) for the next five years after the warranty period.

SECTION F: Pre-installation Guideline

A comprehensive guideline/list of requirements for site preparation, installation of pre-installation infrastructure with their specifications is to be provided by the manufacturer.

Installation:

The complete installation of the supplied INSTRUMENT system should be carried out by the factory engineer. All the expenses including travel, accommodation etc. towards this should be included in the quote.

It is the responsibility of the vendor to ensure that all of the required accessories and ancillary items are included in the quotation for carrying out the installation, standardization, optimization and calibration of the instrument. The supplied system should be complete in itself in all respect to take up the sample analysis at the IISc premises.

Bidding Format:

Sr. No.	Technical Compliance Statement for Multi Collector Inductively Coupled Plasma Mass Spectrometer (MC-ICP-MS) System.	Complied/ Not Complied	Extra Features
	<p><u>PLEASE QUOTE THE SPECIFICATIONS IN THE ORDER OUTLINED IN THIS DOCUMENT ABOVE.</u></p> <p><u>A COMPLIANCE STATEMENT MUST BE SUBMITTED IN AN ITEM-WISE FASHION AND DEMONSTRATING THE COMPLIANCE / DEVIATIONS IN CLEAR TERMS.</u></p> <p><u>Hard and soft copies of the quote MUST be inserted along the documents.</u></p>		

The table heads should be listed according to and in order of the criteria listed in pages 9 onwards. For example:

	<p>SECTION – A: MAIN INSTRUMENT (INSTRUMENT) Demonstrated ability, based of published results and / or performance of an installed instrument (with certification of undertaking) of the best precision achieved for the elements listed in the table in page 9. Mass consumption for each analyses should be mentioned.</p>		
	<p>I. INSTRUMENT unit (1) Sample introduction system for solution mode</p>		
	<p>1.1 Peristaltic pump:</p>		
	<p>1.2 Nebulizers and spray chambers:</p>		
	<p>(a) Self aspirating PFA nebulizers with provision for sample flow rates of 35, 50, 100 and 200 microliters/minute with and without PEEK/Teflon reinforced sample uptake tube.</p>		

Section 5: Technical Bid

The technical bid should include all requirements of the tender along with all annexures, and should be submitted to:

**The Chairman, Prof. Nagesh Kumar
Centre for Earth Sciences,
Indian Institute of Science,
Bangalore – 560012, India**

Annexure-1:

Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Details of the Bidder

SI No	Name of the Bidder	
1	Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership Deed)	
2	Registration No/ Trade License, (attach attested copy)	
3	Registered Office Address	
4	Address for communication	
5	Contact person- Name and Designation	
6	Telephone No	
7	Email ID	
	Website	
8	PAN No. (attach copy)	
9	GST No. (attach copy)	

Signature of the Bidder

Name
Designation, Seal

Date:

Annexure-2:

**Declaration regarding experience To,
The Chairman, Prof. Nagesh Kumar
Centre for Earth Sciences,
Indian Institute of Science,
Bangalore – 560012, India**

Ref: Tender No: CEAS/2019-20/SM/001

Dated: /10/2019

**Subject: Supply, installation, and training of an Inductively Coupled Plasma Mass Spectrometry Facility at
the Centre for Earth Sciences, IISc**

Sir,

**I've carefully gone through the Terms & Conditions contained in the above referred
tender. I hereby declare that my company / firm has ---- years of experience in supplying and installing
Inductively Coupled Plasma Mass Spectrometers.**

**(Signature of the Bidder) Printed
Name**

Designation, Seal

Date:

Annexure-3:

**Declaration regarding track record To,
The Chairman, Prof. Nagesh Kumar
Centre for Earth Sciences,
Indian Institute of Science,
Bangalore – 560012, India**

Ref: Tender No: CEAS/2019-20/SM/001

Dated: /10/2019

Subject: Supply, installation, and training of an Inductively Coupled Plasma Mass Spectrometer Facility at the Centre for Earth Sciences, IISc

Sir,

I've carefully gone through the Terms & Conditions contained in the above tender (Ref: Tender No. CEAS/2019-20/SM/001). I hereby declare that my company/ firm is not currently debarred / blacklisted by any Government / Semi Government organizations / institutions in India or abroad. I further certify that I'm competent officer in my company / firm to make this declaration.

Or

I declare the following

Sl.No.	Country in which the company is Debarred /blacklisted / case is Pending	Blacklisted / debarred by Government / Semi Government/Organizations /Institutions	Reason	Since when and for how long
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(NOTE: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

Yours faithfully

(Signature of the Bidder)

Name

Designation, Seal

Date:

Annexure – 4:

**Declaration for acceptance of terms and conditions To,
The Chairman, Prof. Nagesh Kumar
Centre for Earth Sciences,
Indian Institute of Science,
Bangalore – 560012, India**

Ref: Tender No: CEAS/2019-20/SM/001

Dated: /10/2019

**Subject: Supply, installation, and training of an Inductively Coupled Plasma Mass Spectrometer Facility at
the Centre for Earth Sciences, IISc**

Sir,

I've carefully gone through the Terms & Conditions as mentioned in the above-referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Yours faithfully,

(Signature of the Bidder)

Name

Designation, Seal

Date:

Annexure – 5:

Details of items quoted:

Company Name	
Product Name	
Part / Catalogue number	
Product description / main features	
Detailed technical specifications	
Remarks	

Instructions to bidders:

- 1. Bidder should provide technical specifications of the quoted product/sin detail.**
- 2. Bidder should attach product brochures along with technical bid.**
- 3. Bidders should clearly indicate compliance or non-compliance of the technical specifications provided in the tender document.**

Section 6: COMMERCIAL BID

The commercial bid should be furnished with all requirements of the tender with supporting documents as mentioned under:

SI No	Description	Catalogue Number	Quantity	Unit Price	Sub Total
1	Instrument price				
2	Accessories for operation and installation				
3	All Consumables, spares and software to be supplied locally				
4	Warranty (5 years)				
5	Cost of Insurance and Airfreight				
6	CIP/CIF IISc, Bengaluru				

SI No	Description	Quantity	Unit Price	GST	Total

Addressed to:

The Chairman, Prof. Nagesh Kumar
Centre for Earth Sciences,
Indian Institute of Science,
Bangalore – 560012, India

SECTION 7 – CHECK LIST

(This should be enclosed with technical bid- Part A)

The following items must be checked before the Bid is submitted:

1. Envelope “A”: Technical Bid

a) Section 5- Technical Bid (each page signed by the authorized signatory and sealed) with the below annexures:

Annexure 1: Bidders details

Annexure 2: Declaration regarding experience

Annexure 3: Declaration regarding clean track record

Annexure 4: Declaration for acceptance of terms and conditions

Annexure 5: Details of items quoted

b) Copy of this tender document duly signed by the authorized signatory on every page and sealed.

2. Envelop “B”: Commercial Bid

Section 6: Commercial Bid

The quotations must be submitted in two separate sealed envelopes: Technical Bid (Envelope A) and Commercial Bid (Envelope B) super scribing on both the envelopes with Tender No. and due date and both of these in sealed covers and put in a bigger cover which should also be sealed and duly super scribed with Tender No. & Due Date.

