सीएसआईआर-केंद्रीय खनन एवं ईंधन अनुसंधान संस्थान
CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
(Council of Scientific & Industrial Research)
बरवा रोड, धनबाद – ८२६ ००१, झारखंड, भारत
Barwa Road, Dhanbad – 826 001, Jharkhand, India

GSTIN No.20AAATC2716R1ZT E-mail: spo.cimfr@csir.res.in Contact Nos.: 0326-222237200 Extn.: 349 /251

PURCHASE ORDER

File No. CIMFR/PUR-1A(19)2024/67/ **Dated: 25..02.2026**

From,	To,
Director CSIR-Central Institute of Mining and Fuel Research, Barwa Road Dhanbad- 826001	**M/s. Thermo Fisher Scientific India Private Limited** **C/o. Toll Global Logistics, Mayashree Logistics Centre,** **Survey No. 38/4, 40/1, 40/2P,45/A,** **Kuksa, Opp. NH-3,** **BHIWANDI-THANE – 421 302, Maharashtra.** **Tel.: 022 6716 2200** **E-mail: vivek.sharma@thermofisher.com**

Sub: Award of Contract for Supply, Installation, Commissioning and Training of Inductively Coupled Plasma-Mass Spectrometer (ICP-MS).

Reference: 1. CSIR-CIMFR Tender No. CIMFR/PUR-1A(19)2024 (Published on CPP Portal with tender ID 2025_CSIR_253320_1 dated 24.10.2025.
2. Your Quotation No. TFS/DHN/JHAR/CSIR-CIMFR/ICP-MS/11/2025-26 dated 24.11.2025, e-mail dated 10.02.2026, 16.02.2026, 20.02.2026, 24.02.2026 and other correspondences exchanged with you.

Dear Sir/Madam,

With reference to the bid submitted by you as referred above and after evaluation of bid, it is informed that Competent Authority of CSIR-CIMFR has approved you as the successful bidder for **Supply, Installation, Commissioning and Training of Inductively Coupled Plasma-Mass Spectrometer (ICP-MS).**

Accordingly, you are requested to arrange for supply and installation of the offered item/items as detailed below. The equipment shall be covered by Warranty, CMC & AMC. CMC shall be effective from the date of completion of Standard Warranty and AMC shall be effective from the date of completion of CMC.

Ref.: Quotation No. TFS/DHN/JHAR/CSIR-CIMFR/ICP-MS/11/2025-26 dated 24.11.2025, e-mail dated 10.02.2026 and consecutive e-mails.			
S.No	**Description of the Item**	**Qty.**	**Amount (Rs.)**
1.	Thermo Fisher Scientific iCAP MSX XS Quadrupole ICP-MS Spectrometer with QCell Mass Flow Controller (MFC) and Argon Gas Dilution (AGD) capability along with PC iCAP MSX-300 CRI (XS)	01 unit	1,07,07,410.00
	Detailed specification as per Annexure - II		
		Total	1,07,07,410.00
		GST @ 18%	19,27,333.80
		Total	1,26,34,743.80
		Total: FOR CSIR-CIMFR Stores, Price for Equipment (R/o)	**1,26,34,744.00**
Price in Words: (Rs. One Crore Twenty Six Lakh Thirty four Thousand Seven Hundred Forty four only)			

The Purchase Order shall be governed by the General Condition of Contract (GCC) read with the relevant Special Conditions of Contract (SCC) as stipulated in CSIR-CIMFR Tender Document. The technical specifications and other allied features of the ordered goods and services shall strictly conform to those specified in the CSIR-CIMFR Tender Document. In case, any pre-dispatch inspection has been prescribed in the tender document, the same shall be conducted in the manner laid down in the tender document or as mutually agreed between the Purchaser and Supplier.

You are requested to send us the Order Acknowledgement immediately and in any case within 07 days of receipt of this Purchase Order.

You are also requested to deposit an unconditional performance bank guarantee of **Rs. 6,31,737.00 (Rupees Six lakh Thirty-one Thousand Seven Hundred Thirty-seven only)** within 21 days from Scheduled commercial Bank valid till the contract period + 60 days issue of this award of contract in prescribed format / or, Purchaser may ask to submit Performance Security at the time of releasing final payment.

Yours faithfully,

(Stores and Purchase Officer)
For and on behalf of CSIR

Enclosures:

1. Terms and condition (Annex-I)
2. Detailed specification (Annex-II)

Copy to:

1. Dr. P. Gopinathan, (Indenting Officer)
2. Sr.CoFA/CoFA/FAO
3. Stores Officer
4. Office Copy

Budget Head/Project No. : MMP-085202

Annexure -I

नियम व शर्तें/ Terms & Conditions

<table>
<tr><td>1. General</td><td>(i) Supplier has to submit acknowledgement within 15 days from the date of Purchase Order.
(ii) CSIR-CIMFR will not be responsible for payment without completion of contractual/ PO liabilities.
(iii) The ordered items must comply strictly with the specifications as mentioned in the Purchase Order and your submitted Offer.</td></tr>
<tr><td>2. Price</td><td>FOR CSIR-CIMFR Stores, Digwadih Campus, Dhanbad-828108, Jharkhand</td></tr>
<tr><td>3. Destination</td><td>CSIR-CIMFR Stores, Digwadih Campus, Dhanbad-828108, Jharkhand</td></tr>
<tr><td>4. Delivery Period</td><td>On or before 20.03.2026 from the date of issue of PO. Unloading charges, if any, will be paid by the Supplier.</td></tr>
<tr><td>5. Installation & Commissioning</td><td>Installation & Commissioning will be done by M/s. Thermofisher Scientific India Private Limited on or before 20.03.2026 at CSIR-CIMFR, Dhanbad.</td></tr>
<tr><td>6. Training</td><td>Operational Training of the equipment will be provided by the supplier.</td></tr>
<tr><td>7. Warranty</td><td>The whole system including all supplied items will be with One Year standard onsite warranty from the date of Installation & Commissioning. The comprehensive warranty for the entire system including microwave digestion. During the warranty period, Two Preventive maintenance visits and breakdown visits as and when needed to be provided.</td></tr>
<tr><td>8. Country of Origin</td><td>Germany.</td></tr>
<tr><td>9. CMC</td><td>On site CMC for a period of 03 years (including microwave digestion system) will be continued just after expiry of Standard warranty. A separate Order will be issued for CMC. CMC Payment will be released on yearly- basis after certification of user scientist. Two Preventive maintenance visits and breakdown visits as and when needed for each year. Yearly PM kit and tuning solution to be provided by M/s. Thermofisher Scientific India Private Limited for ICP-MS during the CMC Period.
Rates will be as per the amount mentioned below:
<table>
<tr><th>Years</th><th>Amount (₹)</th><th>GST (18%)</th><th>Total Amount(₹)</th></tr>
<tr><td>For 1st Year</td><td>3,56,900.00</td><td>64,242.00</td><td>4,21,142.00</td></tr>
<tr><td>For 2nd Year</td><td>3,56,900.00</td><td>64,242.00</td><td>4,21,142.00</td></tr>
<tr><td>For 3rd Year</td><td>3,56,900.00</td><td>64,242.00</td><td>4,21,142.00</td></tr>
</table></td></tr>
<tr><td>10. AMC</td><td>On site AMC for a period of 03 years (including microwave digestion system) will be continued just after expiry of CMC. A separate Order will be issued for AMC. AMC Payment will be released on yearly- basis after certification of user scientist. Two Preventive maintenance visits and breakdown visits as and when needed for each year. Yearly PM kit and tuning solution to be provided by M/s. Thermofisher Scientific India Private Limited for ICP-MS during the AMC Period.
Rates will be as per the amount mentioned below:
<table>
<tr><th>Years</th><th>Amount (₹)</th><th>GST (18%) (₹)</th><th>Total Amount(₹)</th></tr>
<tr><td>For 1st Year</td><td>2,81,167.00</td><td>50,610.00</td><td>3,31,777.00</td></tr>
<tr><td>For 2nd Year</td><td>2,81,167.00</td><td>50,610.00</td><td>3,31,777.00</td></tr>
<tr><td>For 3rd Year</td><td>2,81,167.00</td><td>50,610.00</td><td>3,31,777.00</td></tr>
</table></td></tr>
<tr><td>11. Payment Terms</td><td>100% payment will be released subject to the receipt of goods, challan, inspection report, warranty certificate, Test Reports (Calibration Certificates), if any, satisfactory installation & commissioning report, training completion certificate, final acceptance certificate of the user and completion of verification of the PBG by the Institute through in-land Letter of Credit.</td></tr>
<tr><td>12. PBG</td><td>Performance Bank Guarantee (PBG) for 05% of Rs. 1,26,34,743.80 = Rs. 6,31,737.00 (Rupees Six Lakh Thirty-one Thousand seven hundred thirty seven Only) to be submitted within 21 days from the date of issue of PO and valid up to 14 months from the date of installation & commissioning and acceptance of the user.</td></tr>
</table>

13. Penalty Clause	Since, time of delivery of the ordered stores is the essence of the contract. The supplier shall arrange to deliver the ordered items as stipulated workout any fail. The same must be get installed & commissioned immediately as per schedule. However, in case the delivery cannot be made within agreed upon time, CSIR-CIMFR shall have the right to claim penalty for **late delivery and late installation & commissioning @ 0.5% of the total contract value per week** subject to a maximum of 10%. If the delay in shipment and late installation & commissioning of the ordered materials attributable to the supplier exceeds the time period mentioned in the Purchase Order from the date of original agreed upon date of delivery, CSIR-CIMFR shall have the right to cancel the contract/ purchase order. This also applies for violation of any of the contractual terms in any form.
14. Denial Clause	Since delay in delivery is a default by the seller, the buyer should protect himself against extra expenditure during the extended period by stipulating a denial clause (over and above levy of LD). In the denial clause, any increase in statutory duties and/or upward rise in prices or any adverse fluctuation in foreign exchange are to be borne by the seller during the extended delivery period, while the purchaser reserves his right to get any benefit of a downward revisions in statutory duties and foreign exchange rate.
15. Termination for Default	The Purchaser may, without prejudice to any other remedy for breach of contract terminate the Contract in whole or part. If the Supplier fails to perform any other obligation(s) under the Contract.
16. Force Majeure	The supplier shall not be liable for forfeiture of its performance security liquidated damages or termination for default, if and to the extent that, its 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 even 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 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.
17. Governing Law	**Jurisdiction**: This contract between the supplier and the buyer shall be governed by the LAWS of India and under this contract shall be taken by the parties only in Dhanbad, India to competent jurisdiction. And the Place of Jurisdiction will be Dhanbad. **Arbitration**: Any difference/ dispute arising out of the agreement shall be referred to Delhi International Arbitration Centre (DIAC), Delhi High Court, New Delhi.
18.	All the terms & Conditions of NIT GEM-CPP Portal Tender ID: 2025_CSIR_253320_1 dated 24.10.2025 will also be applicable.

Note: Contractual obligation as per the Purchase Order will be considered as completed only after Installation commissioning, training, one year standard warranty, 03 years CMC and 03 years AMC.

Yours faithfully,

(Stores and Purchase Officer)
For and on behalf of CSIR

Annexure-II

File No. CIMFR/PUR-1A(19)2024

Detailed specification of ICP-MS

Sr. No.	Part Number	Description	Qty.	Total Price in Rupees
1.	BRE731451A	**Thermo Fisher Scientific iCAP MSX XS Quadrupole ICP-MS Spectrometer with QCell Mass Flow Controller (MFC) and Argon Gas Dilution (AGD) capability along with PC** **iCAP MSX-300 CR1 (XS)** **Complete iCAP MSX ICP-MS analysis system to include:** • Digital, solid state 27 MHz RF-generator with full PC control giving continuously variable power from 380 W to 1600 W • Computer-controlled gas control for all plasma gases • Option to add a maximum of two additional MFCs to the system • Bench height, open architecture sample introduction system comprising PFA concentric nebulizer (400 µL/min at the default peristaltic pump rate) and quartz cyclonic spray chamber (software-controlled Peltier cooling, -10 to 20°C) • Integrated, software-controlled nebulizer gas humidifier to reduce salt build up at the nebulizer tip • Close-coupled, compact, low pulsation, 12-roller, 4 channel mini-pump with metal free rollers, EasyClick automatic tubing tensioning system and bubble sensor to protect from unnecessary loss of sample • Push-in, unshielded, demountable quartz torch with automatic gas connectivity and a high purity 2.5 mm ID quartz self-aligning injector, compatible with a range of application specific injectors (alternative materials and internal diameters) • Integrated Argon Gas Dilution capability that enables the analysis of high matrix samples by diluting the nebulized sample stream, decreasing the sample load and enabling tolerance of the direct analysis of a higher level of matrix compared to standard operating conditions • Computer controlled plasma positioning in all three dimensions, x, y and z • Plasma TV for simplified plasma optimization • Ni sample and skimmer cones, with optimized cone geometries for reduced matrix deposition and maintenance • Variable and optimized Skimmer Lens potential to deliver best performance	1	Quoted

		• Unique, front opening spectrometer interface cassette for easy access to the sample cone, skimmer cone and the extraction lens • 3D-focusing, maintenance-free RAPID lens deflects ions by 90°, removing neutrals from the ion beam while maintaining high ion transmission • IntelliLens lens voltage optimization for individual analytes ensuring exceptional sensitivity across the entire mass range • Proprietary QCell with Flatapole technology to ensure high ion transmission and low backgrounds to deliver enhanced analytical performance • High performance, full size, quadrupole mass analyzer, covering the mass range 2-290 amu with Extended Sensitivity (XS) capability; design delivers low abundance sensitivity and ultra-fast scanning • "Plug & Play" user replaceable, discrete dynode electron multiplier detector providing 11 orders of linear dynamic range via simultaneous analogue/pulse counting detection • "Plug & Play" user replaceable, discrete dynode electron multiplier detector providing 11 orders of linear dynamic range via simultaneous analogue/pulse counting detection • The instrument comes with a Windows PC, Mouse, Multimedia Keyboard (US QWERTY Layout), and a 27" Monitor. • The ICP-MS instrument is controlled by the Qtegra Intelligent Scientific Data Solution (ISDS) Software platform. It allows full remote access to the instrument for remote monitoring of the system. • It is necessary to order one of the below Installation Kits with the instrument: **Plasma Ion Source** • Torch: ❖ Push-in, single piece, quartz ❖ Automatic gas connectivity ❖ Horizontal and vertical position: +/- 2 mm, 0.02 mm step width ❖ Sampling depth: 0-15 mm, 0.025 mm step width • RF generator: ❖ Digital, solid state RF generator, 27 MHz ❖ Dynamic swing frequency matching ❖ RF power range: 500W to 1600W ❖ No plasma shield required ❖ Automated in-sample switching between hot and cold plasma • Load coil: Water-cooled, silver-coated, copper load coil • Mass flow controllers (Ar): Coolant, auxiliary, nebulizer **Additional Mass Flow Controllers**: • Capacity for two further controllers: gas dilution, oxygen addition etc. • Plasma TV: Webcam for remote monitoring of plasma status **Interface** • Access: Bench height, accessible via pop-out door • Sample cone: Solid Ni, 1.1 mm diameter orifice • Skimmer cone: Ni, 0.5 mm diameter orifice • Interface pump: External, high performance pump • Extraction lens: Single extraction lens, situated before the slide valve on the hinged interface door • Slide valve: PC controlled		

		Ion Optics • Unique 90° cylindrical ion lens – the RAPID lens: Right Angular Positive Ion Deflection, **Completely off-Axis design providing high ion transmission across the entire mass range.** • RAPID lens dimensions significantly larger than ion beam and neutrals, eliminates lens cleaning maintenance. • **Off-axis design delivers class-leading background noise.** • Electrical connections with gold spring contacts from the analyzer housing to ions optics improve reliability. **Quadrupole Mass Analyzer** • Field: Virtual hyperbolic; Frequency: 2 MHz • Mass range: 2-290 u [Capable of analyzing radioactive compounds like Uranium oxides as per BIS Draft regulations] • Scan speed: ❖ > 90000 amu/s without any interval scans ❖ 3700 amu s^{-1} Li to U with 40 interval mu masses ❖ Li-U-Li in < 5 ms (100 µs at each mass) • Mass stability: < ± 0.025 u per day • Abundance sensitivity: < 0.5 ppm at m-1 (m= 238U) • Resolution: 0.3 to 1.0 amu (User definable) **Ion Detection System** • Long lifetime maintenance free detector designed for ICP-MS requirements. • Dwell times of 100 µs in both analog and counting detection modes. • **Linear dynamic detection range: >10 orders of magnitude.** • Automated optimization of operating voltages and cross-calibration. • Cradle design for ease of detector exchange. **Vacuum System** • Configuration: Three stage, differential pumping • Vacuum pumps: ❖ Split-flow turbo molecular pump ❖ External backing rotary pump ❖ Pump down time < 15 min (< 1·10-6 mbar) **iCAP MSX ICP-MS instrument configuration and performance specification: (Guaranteed Performance Specification)** • Nebulizer PFA concentric: (400 µL·min-1) • Spray chamber : Quartz, cyclonic • Torch : Quartz, demountable • Injector : Quartz, 2.5 mm ID • Cones/interface : Ni -tipped sample and skimmer **Sensitivity (kcps/ppb)** • ^{7}Li → 80 ; • ^{59}Co → 290; • ^{115}In → 600; • ^{209}Bi → 500; • ^{238}Ua→ 850 **Detection limits (ppt)[b]** • ^{9}Be → <0.3; • ^{115}In → <0.1; • ^{209}Bi → <0.1 **Oxides (%)c → ^{140}Ce^{16}O/^{140}Ce <2.0** **Doubly charged (%)c ^{140}Ce++/^{140}Ce+ <3.0** **Background (cps)c *m/z* 4.5 <1** **Stability (%RSD)** **Short term c <2 (10 min)** **Long term <3 (2 h)**		

		Isotope ratio precision (%RSD) $^{107}Ag/^{109}Ag$ <0.1 He KED mode Sensitivity (kcps/ppb) b $^{59}Co^{70}$ Interference removal $^{59}Co/^{35}Cl^{16}O^{18}$ Background (cps)b *m/z* 4.5 <0.5		
2.	BRE0062795	Labtech Chiller H150-3000N 230 V 50/60Hz	1	Quoted
3.	BRE0065577	Labtech Chiller H150-3000 Connection Kit for automatic control of chiller through Qtegra (v. 2.22 and higher)	1	Quoted
4.	095474-New	Connector Kit for LabTech Chiller	2	Quoted
5.	BRE0033157	iCAP MX Installation Kit with Oil Pump	1	Quoted
6.	BRE0064648	Qtegra ISDS Software for iCAP MSX ICP-MS, software pack and license (1 instrument and 3 desktop seats)	1	Quoted
7.	1324690	Online Internal Standard Kit	1	Quoted
8.	BRE0034170	iCAP MX CountKit IN/ZA	1	Quoted
9.	BRE0062626	iCAP MX Tune Solution	1	Quoted
10.	BRE0064596	iCAP MX Calibration Solution	1	Quoted
11.	3600812	Ni Sample Cone	5	Quoted
12.	BRE0031487	iCAP MX Skimmer Cone Ni	5	Quoted
13.	1305600	Quartz Injector (2.5 mm ID) (standard injector)	3	Quoted
14.	1230790	Quartz Torch	6	Quoted
15.	BRE0061036	iCAP MX Glass Spray Chamber	2	Quoted
16.	BRE0061133	iCAP MX Nebulizer C400d	3	Quoted
17.	1320050	PVC - Peristaltic Pump Tubing - Ø 0,508 - Orange/Yellow (pack of 12)	9	Quoted
18.	1320110	Santoprene - Peristaltic Pump Tubing - Ø 1,295 - Gray/Gray (pack of 12)	5	Quoted
19.	BRE0030065	iSC-65 Autosampler	1	Quoted
20.	BRE0033171	Sample Rack - 60 Position for 13 - 16 mm diameter tubes. (PP)	3	Quoted
21.	BRE0030312	iSC-65 Sample Probe (0.5 mm ID)	1	Quoted
22.	BRE0034373	USB-A Gigabit Ethernet Network Adapter	1	Quoted
23.	BRE0030827	Power Cord, 1.5m , India	1	Quoted
24.	942347004131	14mL Poly Tubes, 16 x 100mm for Rack 60 (1000/kit)	1	Quoted
25.	BRE0064559	iCAP MX Acid Resistance Kit (HF/inert) including Pt Sample Cone - Qty 1 & Platinum Skimmer Cone- Qty 1	1	Quoted
26.	BRE0009386	MicroMist Nebulizer 400 µL/min	3	Quoted
27.	BRE0032947	iCAP MX PFA Spray Chamber	2	Quoted
28.	BRE0062040	Sampling Cone Gasket Kit (20 pcs)	1 Set	Quoted
29.	3601289	Pt Sample Cone	1	Quoted
30.	BRE0063475	Pt Skimmer Cone	1	Quoted
31.	N/P	Microwave Digestion System IR sensor-based system with 15 vessels 50 ml (Operating Temp.: 250 °C. operating pressure: 40 bar). spring- 15, cover 7, vessel 7, IR sensor Protection cover 10	1	Quoted
32.	N/P	REEs (100 mg/l). PGE (10/100 mg/l), and multi-element (100/1000 mg/1-100ml	1 Set	Quoted
33.	N/P	Fume chamber (minimum 4 feet length) with the scrubber and a fume exhaust system	1	Quoted
34.	N/P	20 KVA or more true online UPS with IGBT based, DSP control system having 3 phase input & 1 phase with inbuilt Isolation Transformer with 12V SMF battery with Battery rack & Intercell connector to provide 30 mins backup	1	Quoted
35.	N/P	Branded Mono LaserJet Printer	1	Quoted

S. Arisan

36.	N/P	Gas Purification Panel, SS high pressure tubing, for Argon, Helium with appropriate plumbing, auto switching manifold	1	Quoted
37.	N/P	Argon Filled Gas Cylinder, 47 Lit. W/C (99.99% Purity) filled with gases, with necessary Tubing & Connectors & Certificates	5	Quoted
38.	N/P	Helium Filled Gas Cylinder (High Purity) in 47 Ltrs. Carbon Steel Cylinder with Valve, Valve guard, necessary Tubing & Connectors & Certificates; Gas Volume: 7.0m3	2	Quoted
39.	N/P	Double State SS Gas Regulators for Argon, Helium	4	Quoted
40.	N/P	Fly ash, and rock (clay/sandstone)/ore CRM covering critical elements, REES, and PGEs- 30gm	3	Quoted
41.	N/P	Muffle Furnace (1200, with 5°C accuracy)	1	Quoted
42.	N/P	Lithium meta borate 500 g /bottle	2	Quoted
43.	N/P	ICP grade HNO3 2.5 L; HF 2.5 L; HCl 2. L	1 Set	Quoted
44.	N/P	Micropipette (0-1 ml, and 1-10 ml), 1000 tips each	1 Set	Quoted

Make & Model for Computer, Printer, UPS, Gas Regulator and Muffle Furnace to be supplied by M/s. Theremofisher Scientific India Pvt. Ltd.

Sl. No.	Item	Make & Model
1.	Computer	Factory recommended PC from Dell, compatible with ICPMS system i7 with 1 TB HDD, 32 GB RAM, Windows 10 Professional, 27" Monitor.
2.	Printer	HP or any equivalent brand, Auto Duplex Laser Printer
3.	UPS	Vertiv / ORION Astra Series with Quanta 30 min backup, Quoted Branded 20 KVA or more true online UPS with IGBT based, DSP control system having 3 phase input & 1 phase with inbuilt Isolation Transformer with 12V SMF battery with Battery rack & intercell connector to provide 30 mins backup. Battery warranty of 2 years.
4.	Gas Regulator	Duttco Instruments, Double Stage SS body, Pressure Range inlet 0-200 Kg/cm^2, outlet 1-10 kg/cm^2
5.	Muffle Furnace	Thermo or any equivalent, Muffle Furnace (1200, with 5°C accuracy)

Technical Specification of Inductively coupled Plasma Mass Spectrometer system as per NIT

Sl. No	Description	Specification
1.	General	Automated, quadrupole based inductively coupled plasma mass spectrometer (ICP-MS). Should be capable of measuring major, minor, trace and ultra-trace levels (ppt to percent) multi elemental/isotopic analysis from low, mid and to high mass in a linear detection mode. The instrument/application data generated credibility should have been established at least in the last 5-10 years in the form of research publications in internationally reputed journals. The supplier should provide a complete list of users from India with full addresses, e-mail, and telephone numbers. The firm should have supplied minimum 2 ICP-MS systems to Government funded Institutes/Organizations/Autonomous/PSUs in India during the last 4-5 years.
2.	Sample Introduction System:	Standard single-piece quartz torch with wide diameter: min 1.5 mm for matrix decomposition and sample ionization and a peristaltic pump. Spray Chamber: Temperature controlled spray-chamber with capability for faster temperature equilibration and extended temperature range (-5° C to 10° C) by effectively improving signal stability and reducing oxide interferences. The system should have the capability for direct handling of samples with a minimum of 1% total solids.
3.	Ion Source:	RF generator of power of minimum output 1.5 kW or more and minimum frequency of 27or 34 MHz
4.	Extraction Interface:	Suitable sampler cone with suitable diameter orifice and Ni-tipped sample and skimmer cones with suitable diameter orifice Sample and skimmer cones should be easily mountable and dismountable. Ion optics should have excellent focusing with off-axis system deflection to analyzer and detector to eliminate photons and neutrals. Background noise must be less than <1 cps at 4.5/9.0/220 amu or better.
5.	Cooling System/ Chiller:	Adequate water re-circulating chiller should be provided for continuous cooling of RF generator, RF load coil and ICP interface. Chiller should be offered with all consumables needed for trouble free five years of operation. Chiller should be supported by the ICP-MS OEM.
6.	Vacuum System:	It should have a rotary pump and turbo molecular pump with split flow. Default to closed position when plasma is off or in the event of a power failure, maintaining vacuum in the analyzer housing.
7.	Mass Analyzer System	It should be a hyperbolic profile and be covered fully under warranty/ CAMC. Collison and suitable mass cut-off/ total mass or equivalent feature should operate at 2.0 MHz to provide superior ion transmission, resolution, and abundance sensitivity. The analyzer quadrupole should discretely control the resolution of the selected mass region.
8.	Mass analyzer:	Mass Range: The entire mass range 5 to 260 amu or more Mass Resolution: Low (0.4 amu or better) & High (1.0 amu or better) variable. Mass Stability: 0.05 amu /Day or better Scan Speed: > 3000 amu/sec, total mass measurement

S. Ansari

9.	**Gas Flow Control System:**	The gas flow control system should be a microprocessor-based precision electronic mass flow controller for all the gas channels, including the plasma support gases. The offered instrument should have factory-fitted MFC as a standard feature. The gas flow control system should have computer-controlled safety interlocks and automatic gas flow controls for startup and shutdown operations.
10.	**Detector System:**	The ion detector should be a discrete Dynode electron multiplier unit or equivalent. The detector should be able to analyze the high and low concentrations of isotopes simultaneously with 10 orders or more dynamic ranges in a single scan. Both the analog and pulse counting modes should be protected against overload.
11.	**Interference Removal System**	Standard Mode and Collision mode, the system must have a Cell before the mass analyzer, which is capable of removing polyatomic interferences on various analytes by using the mass cut-off or equivalent feature or total mass. The cell should be covered under warranty and CAMC.
12.	**Auto Sampler:**	Auto sampler for handling about 200 sample vials of about 14 ml capacity each. With a completely metal-free flow path with X-Y-Z movement.
13.	**Instrument Control and Data Acquisition & Processing:**	A suitable interface should be provided for operation and data acquisition. The vendor should provide a branded PC with the latest suitable configuration (i7 processor based PC compatible with the software).
14.	**Performance:**	Detection Limits (ppt) • 7Li/9Be: 0.5 or better • 115In/89Y: 0.1 or better • 209Bi/205Tl/238U: 0.1 or better Application notes/ data sheets to be provided in support of detection limit The following guaranteed/factory specifications, typical specifications are not acceptable • For 7Li: 55 mcps/ppm or more/ 9Be: 14 mcps/ppm • 115In/89Y: 200 mcps/ppm or more • 205Tl/238U: 330 mcps/ppm or more/ 209Bi: 160 mcps/ppm • In KED Mode: Cobalt 14 mcps/ppm or better • Oxide ratio: CeO/Ce: < 2.0 % or better • Isotope Ratio Precision (%RSD) 107Ag/109Ag < 0.1 or better
15.	**System control and data acquisition:**	The system should perform auto-optimization of plasma parameters like plasma power, plasma gas flow, etc. The instrument software shall allow auto-tuning to enable the instrument to be used with consistent and reproducible day-to-day performance independent of the operator.
16.	**Operating Software:**	Shall allow for semi-quantitative analysis, external calibration. and internal standard addition methods for fully quantitative analysis, allowing parts per trillion level analysis
17.	**Report Generation:**	Quality control and software: Software for automated QA/QC during unattended operation. Master copies of all relevant software must be supplied.

18.	**Accessories**	All instruction manuals and service manuals must be supplied along with the instrument. REEs (100 mg/l), PGE (10/100 mg/l), and multi-element (100/1000 mg/l of all 30 critical elements of Ministry of Mines needs to be covered) calibration standards must also be supplied. Minimum 100 ml each standard. The system should be offered with two additional offline software licenses. All the accessories needed for the operation of the system are to be provided. Floor mount fume chamber (minimum 4 feet length) with the scrubber and a fume exhaust system. Microwave digestion system: IR sensor based system with 15 vessels 50 ml (Operating Temp: 250 °C, operating pressure: 40 bar), spring-15, cover 7, vessel 7, IR sensor protection cover 10.
19.	**Warranty/ CAMC**	Onsite comprehensive warranty on the entire setup for 01 year for the entire system including microwave digestion system from the date of commissioning and acceptance of the system. During the warranty period, there should be two preventive maintenance visits and breakdown visits as and when required without any extra charges. After the completion of a one-year comprehensive warranty, CAMC for 3 years (including microwave digestion system). Year-wise cost of the CAMC to be quoted for 3 years. During CAMC period, for each year, two preventive and breakdown visits as and when needed without any extra charges. Yearly PM kit and tuning solution to be provided for ICP-MS during the CAMC period. After the completion of the CAMC period, AMC for 3 years (including microwave digestion system). Year-wise cost of the AMC to be quoted for 3 years. During AMC period, for each year, two preventive and breakdown visits as and when needed without any extra charges. Yearly PM kit and tuning solution to be provided for ICP-MS during the AMC period. CAMC/AMC payments will be made on a yearly basis after the successful completion of the respective service period
20.	**Spare components:**	Additional spares/consumables that will be supplied in addition to the standard supplies Additional platinum tipped cone and skimmer (02 set) HF/inert sample introduction kit -01 set. • Standard Ni sample and skimmer Cone-(05 sets) • Injector-03 number • Torch-06 number • Nebulizer: 03 quartz, 03 PFA • Spray chamber-02 number, 02 PFA • Sample introduction peri pump tubing-100 Nos • Sample drain peri pump tubing-50 Nos • In Sample Cone Gasket-20 numbers
21.	**UPS**	• Branded 20 KVA or more true online UPS with IGBT based, DSP control system having 3phase input & 1phase with inbuilt Isolation Transformer with 12V SMF battery with Battery rack & Intercell connector to provide 30 mins backup. Battery warranty of 2 years.
22.	**Printer**	• Branded Mono LaserJet Printer
23.	**Gas Panel**	• Gas Purification Panel, SS high pressure tubing, for Argon, Helium with appropriate plumbing, auto switching manifold to be provided.
24.	**Gas Cylinders & Regulators**	• Argon Filled Gas Cylinder (High Purity 99.999%) in 47 Liters carbon steel, 160 kg/cm^2. Qty- 05

		• Helium Filled Gas Cylinder (High Purity 99.999%) in 47 Liters carbon steel cylinder, 160 kg/cm^2.. Qty-2 • Gas regulators (SS double stage, inlet 200 kg/cm^2, outlet 1-10 kg/cm^2 or as needed for the application) with all necessary connecters, regulators, valves and tubing for Argon -02 and Helium - 02. • Cylinder safety certificate to be provided
25.	**Standards**	• Three bottles (30g min.) of fly ash, and rock(clay/sand stone)/ore CRM covering critical elements, REES, and PGEs.
26.	**Sample preparation accessories**	• Muffle Furnace (1200, with 5°C accuracy) to be provided. • Lithium meta borate 500 g two bottles. • ICP grade HNO3 2.5 L; HF 2.5 L;' HCl 2.5 L • Micropipette (0-1 ml, and 1-10 ml), 1000 tips each.
27.	**Commissioning and Installation**	• Transportation, loading, and unloading at CSIR-CIMFR Digwadih Campus are in the scope of the supplier. • Commissioning and installation must be carried out by the supplier at CSIR-CIMFR, Digwadih Campus, Dhanbad. • The detection limit, suitability of the system for rare earth elements, PGEs, and CRM recovery are to be demonstrated and documented the acceptance of the system. All the technical features should be demonstrated during commissioning.
28.	**Training at CSIR-CIMFR, Digwadih Campus**	Onsite training to CSIR-CIMFR 03 personnel for 07 days to operate the instrument, maintenance, and troubleshooting problems. The training to be started after the completion of the installation and commissioning of the system within a month