Date: 01 June 2023
Global Tender

(As per the OM no.F.4/1/2023-PPD dt.23.03.2023– Government of India relaxation on global tender enquiry)

To Whom It May Concern

This order is being processed using Government of India funds. As such these funds are governed by GFR 2017 rules. The Government recently amended the GFR rules of global tender enquiry (GTE), and vendors must submit bids that are compliant with the latest rules.

This is a Request for Quote (RFQ) from the Indian Institute of Science (IISc), Bangalore, for the supply of RIE (Reactive Ion Etcher) to National Nanofabrication centre, CeNSE, IISc Bangalore.

A. Procedure:

1. Vendors will be required to submit a technical proposal and a commercial proposal in **two separate sealed envelopes**. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
2. The deadline for submission of proposals is **30th June 2023, 5:30 pm** Indian Standard Time. Bids should arrive at the office of **The chairman**, **kind attention**: **Prof. Akshay Naik, FF-13, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012**, India, by the above deadline.

1. The commercial bid and technical bids must be submitted in two separate envelopes. A technical bid must contain a point-by-point technical compliance document. The technical bid must not contain any price information.
2. The technical proposal should contain a compliance table with 5 columns. The first column must list the technical requirements in the order that they are given in the technical configuration below. The second column should describe your compliance in a "Yes" or "No" response. If "No" the third column should provide the extent of the deviation (please provide quantitative responses). The fourth column should state the reasons for the deviation if any. The fourth column can be used to compare your tool with that of your competitors or provide details as requested in the technical requirements table below.
3. As an option, please provide itemized cost for any suggested accessories/add-ons that may enhance the usability, capability, accuracy, or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits under the optional items.
4. Clarify if periodic (preventive) maintenance be done by a trained on-site engineer or requires a specialist from the OEM.
5. If maintenance requires OEM, as an additional option, provide the cost of an annual maintenance contract (AMC) for 3 years, post-warranty. The AMC must cover 1 scheduled and 1 emergency visit per year. It must also indicate who will service the AMC, an Indian

agent, or the OEM. The AMC cost must also include an itemized list of spares that are essential for the scheduled visits.

6. The bid must include references of 3 previous installations, preferable in India. Please provide the names and contact addresses of the referees so that the committee can contact them independently.
7. A pre-tender meeting for any technical clarifications can be scheduled with the undersigned by sending an email.
8. Payment terms should be mentioned in the technical bid. The payment terms have to be CIF or CIP.
9. If multiple systems can fulfill the requirements, vendors can submit multiple bids.
10. After the award of the Purchase Order (PO), the vendor must provide an Order Acknowledgement within 15 days from the receipt of the PO.
11. Training for at least 2 users from IISc should be provided to make them well familiar with the operation of various components and successful day-to-day operation.
12. The purchase of optional items is subject to budgetary constraints.
13. The bidder must confirm that the system manufacturer runs their own clean room with at least 2 systems of the quoted type installed there for ten years.
14. Spare parts of the system must be available for min 7 years.
15. Supplier must confirm that he runs a free of charge service hotline. Include the telephone number and email and persons on the hotline. Telephone response time max 30 min.
16. Service visit response time by OEM engineer not agent max 5 working days.
17. Provide audited financial statements of last three financial years.
    (F.Y2020-21,2021-22,2022-23)
18. The purchaser reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time before the award of contract without thereby incurring any liability of the affected bidder or bidders. The tender opening date is tentatively set for **07 July, 2023**.

19. Any questions or clarifications can be directed to:
    The chairman,
    kind attention: Prof. Akshay Naik,
    FF-13, Centre for Nano Science and Engineering,
    Indian Institute of Science, Bangalore 560012
    anaik@iisc.ac.in

20.The **validity of commercial quotation should be at least 60 days** from the last date for the submission of tender documents

21. The decision of purchase committee will be final.

Technical Requirements:

A. Technical Specifications of

Technical Specifications:

1.	Etching Chamber design and construction	i.	Chamber and all the parts inside the chamber must be compatible for etching different materials using Chlorine and Fluorine chemistry based on the following gases: SF6, CHF3, Ar, O2, Cl2, HBr, BCl3 , SiCl4
		ii.	40 mm flange (larger) viewport and a side port for OES
		iii.	No additional sealing or welds inside the process chamber (Chamber built from a single unit)
		iv.	Electrical Heating up to 60 C
		v.	The design of plasma source and pumping must be radially symmetric to ensure the best uniformity over a wide parameter range
2.	Console	i.	Within a Metal/all-steel cleanroom compatible enclosure, the module should house all the electronic subsystems, control units, pneumatics, water, gas services, and the dedicated module control processor
3.	Electrode	i.	Substrate electrode for up to 150 mm wafers
		ii.	Suitable clamps (two) must be provided for 150 mm wafers
		iii.	Grounded upper electrode with integrated shower head.
		iv.	Process Gas supply only by 4 VCR connection (no compression fitting for the process gases)
		v.	Helium heat transfer with mechanical clamping
		vi.	Electrode should be cooled by fluid.
		vii.	Temperature measurement should be by thermocouple embedded in the electrode.
		viii.	Remote controlled chiller unit for electrode temperature control from -5 to 40 C of stability +/- 0.5 C
		ix.	The full range of temperature control should automatically be controlled from the recipe without user intervention between the cooling and heating ranges
		x.	He line for backside cooling
4.	RF power supply	i.	600 W, 13.56 MHz and directly coupled with auto-tuning, fixed capacitor positions controlled by PC ## It must be possible to - work in automatic matching mode - work in automatic matching mode with preset Capacitor positions (from the PC, for each step) - work with fixed capacitor positions (from the PC, for each step)
		ii.	Measuring and visualization of forward and reflected power, dc bias voltage.
		iii.	Air cooled
5.	Vacuum system	i.	Base pressure < 1e-5 mbar

		ii. Turbomolecular pump, pumping capacity at least 350 lps, magnetic bearings and heated iii. Dry backing pump, 90m3/hr or better iv. 200 mm VAT high vacuum gate ad automatic throttle valve. Smaller throttle valve not acceptable as it reduces the pumping throughput. v. Suitable range (400/100 mTorr) heated CM gauge temperature compensated Penning gauge, vacuum pipework with electrical heating up to 60C
6.	Gas supply	i. Gas pod for up to 8 MFC controlled gas lines ii. 4 non-hazardous lines with metal-shield MFCs with bypass and viton sealed MFC iii. Lines should be fitted with one electro-pneumatic isolation valve and in-line. iv. Gases for use: SF_6, CHF_3, Ar, O_2 v. Other four lines must be compatible and ready to with Hazardous gases such – Cl_2, HBr, BCl_3 (electrical HEATING up to 50C), $SiCl_4$ (electrical HEATING up to 50C) vi. Each gas line must have 2 µm in-line filter vii. Setpoints of the MCFs can be adjusted from the user interface. viii. Visualization of the setpoints as well as actual flow rates on PC monitor
7.	Load lock	i. Vacuum load-lock with small volume (approx. 6 lt) ii. Inter-chamber valve; VAT MonoVAT iii. Suitable independent dry pump iv. On starting a process request from the PC, the wafer should be automatically loaded for processing and returned to the
8.	Control, automation, and safety	i. Computer controlled system with software based on latest Windows OS ii. Including an automatic leak check and automatic MFC check iii. It should have a Plasma hold function between process steps to maintain power-on iv. Main system controller must be Programmable Logic Controller (PLC) v. The software should include full data logging capability of user-selectable run-time process parameters, to allow off-line verification and analysis of process conditions. vi. The system should not have a limit to the number of recipes it can store. vii. System tolerances should be editable by advanced users through the GUI. viii. It must be possible to mount the gas pod and PC separately. ix. The system should be fully interlocked to protect the system hardware from any service failure (e.g., failed water supply for cooling purposes) and to protect the operator from electrical shock during maintenance procedures. x. System should be left in a safe state, under vacuum, in case of power failure.

9.	Data Logging	i. Should have a Graphical display of all parameter. ii. Able to load in multiple steps and graph parameters. iii. Able to graph parameters in various ways – as measured value, measured value and set value, set value – measured value. iv. Ability to load in multiple recipes (and compare them graphically) v. Ability to display alarms and alerts associated with recipe steps loaded
10.	Mains	i. The system should be powered from a single 380-415v 50Hz 3-phase supply
11.	Documentation and commissioning	i. Operation and maintenance Manuals on CD, and OEM manuals. ii. The systems should be commissioned and demonstrated to meet up to three standard processes. iii. Recipes to be provided for all requested process with starting points and trend information.
12.	Software and control system	The control and process software should be supported lifelong. The operating system should be supported by the OEM.
13.	Compatibility with future upgrades	The system should be compatible with a future upgrade to ICP
	Optional items	
	(a)	Aluminum liner
	(b)	Optical Emission Spectroscopy for Process Control 250-900 nm wavelength range, complete with optical sensor attached to window of plasma reactor, optical fiber, CCD spectrometer, USB interface to PC and software
	(c)	Laser interferometer, end point detector 670 nm wavelength, motorized or manual x-y stage 20 mm x 20 mm Camera, view field 1 mm x 1 mm

Process Table:

Process Parameters	1 and 2	3
Etched material	Nb or NbN	Al
Substrate specification	Si	Si
Wafer size	Up to150mm	Up to150mm
Feature size / type	>10 μm line or trench	>10 μm line or trench
Assumed etch depth / μm	<0.5 and > 0.010	<0.5 and > 0.010
Etch rate / nm/min	>30	>40
Selectivity to mask	>1:1 (PR)	1:1
Profile	>85°	>85°
Uniformity (within wafer)	<±5%	<±5%
Run-to-run	<±3%	<±3%