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To Whom It May Concern

Limited Tender for a Hydrogen Fluoride vaporiser System

This is an RFQ (Request for Quote) for procurement of a HF vaporizer system as part of a limited tender for the Centre for Nano Science and Engineering (CeNSE) at IISc, Bangalore.

CeNSE is a multidisciplinary research department at IISc that houses a 14,000 sq. ft. cleanroom and characterization facility used by 50 faculty members from various disciplines at IISc. CeNSE also runs a program called Indian Nanoelectronics Users Program (INUP) which has allowed 4200 participants from more than 700 universities and institutes all over India to use the facilities at CeNSE. Consequently, any tool in CeNSE receives significant exposure to scientific community at IISc and beyond. The vendors are requested to factor in the value of this exposure into their quotes. Details of existing facilities and INUP program can be gleaned from:
http://nnfc.cense.iisc.ac.in/
http://www.mncf.cense.iisc.ac.in/
https://www.inup.cense.iisc.ac.in/

Also, CeNSE hosts equipment on behalf of vendors, as a national standard or 'model' system. If the vendor is interested, CeNSE can consider working out a similar arrangement for the ICP-RIE system.

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 the 28^{h}of June 2023, 5:30 pm Indian Standard Time.** Proposals should arrive at the Main office, GF-15, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India, by the above deadline.
3. The decision of purchase committee will be final.
4. 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.
5. Any additional capabilities or technical details, that you would like to bring to the attention of the purchase committee, can be listed at the end of the technical table.
6. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors.

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7. If multiple systems can fulfill the requirements, vendors can submit multiple bids.
8. In the commercial bid, please provide itemized cost of the system and *required* accessories, such as software, power supply, etc.
9. 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.
10. The quotes should be CIF Bangalore, India. So please include cost of shipping.
11. Please indicate the warranty provided with the tool. Warranty of 3 years or more is preferred.
12. Provide itemized cost for *required* spares for 3 years of operation. For sake of this calculation, the vendor may assume active tool usage of 20 hours/ week. This number will be used to estimate the life cycle cost of the tool.
13. Clarify if periodic (preventive) maintenance be done by a trained on-site engineer or requires a specialist from the OEM.
14. If maintenance requires OEM, as an additional option, provide 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.
15. The RFQ 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.
16. Any questions can be directed to Dr. Savitha P, GF-20, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (savithap@iisc.ac.in)

Technical Requirements

1.	Primary application	• Etch of sacrificial SiO2 and striction free release of three-dimensional structures • Must conform to some SEMI standard for ICP equipment manufacturing, e.g. SEMI SEMI E6-0914,SEMI E15-0698E2 , SEMI S21-1106E , SEMI S19-0311 (Reapproved 0816), etc.
2.	Process capability	• Sacrificial oxide etches without damaging mechanical layer • High etch rate(>1000nm/min) and ability to control etch rates from low to high using various process parameters like pressure, temperature etc • High selectivity to device layer materials like Si, Si3N4, metals etc, please tabulate and provide selectivity to different materials. • Ability to use different type of sacrificial layer like thermal oxide, PECVD oxide, ICPCVD oxide, TEOS oxide and low temperature oxide • Etch nonuniformity of <5% with design(etch) density of 30% to 60% for same CDs and <10% for varied dimensions • <5% etch nonuniformity from wafer to wafer • No residue formation on the surfaces after etch

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		• Provide detailed technical literature for the system use, such as your prior experience and technical data on etch processes and tool **capabilities**
3.	Process recipes	• Provide standard high and low etch rate recipes at the time of installation. • Provision to create, edit and save minimum of 100 recipes
4.	Substrate details	• Should be capable of processing 6 inch Silicon wafers • Suitable substrate adapters to process small pieces(0.5x0.5cm) to 4 inch wafers should be available as an option • Thickness: 300um to 1000um
5.	Tool requirements	• Load lock chamber: software-controlled load and unload options • The roughing vacuum pump for the main chamber and load lock chamber should be dry pumps with appropriate pumping capacity.
6.	Substrate temperature	• 20 to 60°C.
7.	HF cylinder	• Provision to install HF cylinder within the tool, with no exposure to the environment
8.	End point detection	• Give all the options available, itemize cost
9.	Process chemical lines required	**Please specify the process chemical lines required. Specify safety measures to prevent leak of all process gases to the atmosphere**
10	Gas Manifold	MFCs need to be installed only for the lines and gases required. All the lines should have swagelok VCR fittings and welding if any should be orbital welding. The lines should be SS316L electro-polished suitable for corrosive and non corrosive gases used for the specific process.
11	Footprint& weight	• The system should be compatible with better than class 1000 cleanroom environment. Please specify the total footprint in cm x cm, and weight.
12	Process software	• Front panel displaying equipment and process status along with appropriate software to be supplied. • The software must allow varying levels of instrument access. A simplified basic access for a user to a full access to an engineer. • Interlock that can interface with the online reservation system, so that the tools can only be used by authorized users. • Complete logs of all the process and system parameters to be available and stored for future trouble shooting. • Graphical representation of tool and process parameters

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		• Provision to alert the user in case of emergencies and an option to integrate the alarm system to NNFC building monitoring software • Latest Software need and to be supported for the lifetime of the tool
13	Periodic Maintenance	• The system should require minimal maintenance. • Mention the recommended preventive maintenance schedule for the system. Any accessories needed for periodic preventive maintenance for 3 years e.g. O-rings, should be mentioned in separately the itemized quote. • Can the preventive maintenance be done by a trained on-site engineer or requires a specialist from the OEM? If the latter, please provide cost of a 3 year AMC with required kit/consumables. • The system should be supported by a trained local representative and should have a 48hour window of response
14	Installation and Training	• Installation and training at customer site, by the experts from principals should be part of the package. • During the installation all the specifications of the processes should be verified for acceptance by the customer. • If periodic maintenance can be done by the on-site engineer, please include the cost of training the engineer.
15	Power& utilities	• The instrument should work with Indian standards • Mention the power requirement. • Mention any utility requirement (water, air, exhaust, etc.)
16	Gas abetment system	• Specify the scrubbing system needed for treating exhaust gases after process
17	Safety	• Mention any special safety requirement required for the tool • The tool must come with a complement of interlocks to prevent common user errors. • Sensors should be provided to detect ppb levels of all process chemicals including HF vapour and utility failures including scrubber failure • Interlocks should be provided to prevent opening of the chamber in case HF is detected • Any malfunction should have an audible alarm system. • Flashing lights during emergencies should also be an option
18	Recommendation	• The system must submit references from atleast 3 previous installations • The names and contact addresses of the referees must be submitted with the proposal, so the purchase committee can contact them independently.

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19	Pre-purchase testing	• To ensure the equipment conforms for specifications, the committee requires the vendor to perform some standard tests *before* the purchase process is complete. The validity of the tender will hinge on the successful and accurate measurement of these test samples. • The vendor must conclude the testing and submit the data within 1 week of receipt of samples.
20	Acceptance tests	• Etch 10 micron laterally with access holes of 2 microns • <5% variation in etch front progress across a 4'' wafer Calculated using: $\frac{2\sigma}{\mu} < 0.05$, where σ is standard deviation and μ is mean and the variation is calculated over 9 points on a wafer • Demonstrate 25 transfers on robot back and forth to ensure that the robot is working properly. • Demonstrate working of all the accessories including endpoint detector

Thanking you,

(Signature)
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