



4th Jan 2024

To Whom It May Concern

Limited Tender for a RIE System

This is an RFQ (Request for Quote) for procurement of a RIE 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 in to 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 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 29th of January 2024, 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 the 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
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. Warrant of 3 years of more is preferred.
12. Provide itemized cost for *required* spares for 2 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

Requirements		Description
1.	Primary application	<ul style="list-style-type: none">• RIE for ETCH specify materials: SiO₂ and SiN• Etch Silicon
2.	Secondary application	<ul style="list-style-type: none">• Resist/Polymer Ashing
3.	Process capability	<ul style="list-style-type: none">• Blanket Etching of 1 micrometer of SiO₂/SiN, <5% non-uniformity within the wafer and <3% wafer to wafer, using photoresist as the mask• Ability to use F2 chemistries• Ability to use sputter etches using Ar• Anisotropic etch profile

		<ul style="list-style-type: none"> Please specify the highest aspect ratio that can be achieved
4.	Process recipes	<ul style="list-style-type: none"> At the time of installation, all standard process recipes should be provided
5.	Substrate details	<ul style="list-style-type: none"> Processing of up to 4-inch wafers However, we need suitable substrate adapters to process 3-inch, 2-inch and cut pieces of substrates measuring more than 2cmx2cm
6.	Chamber	<ul style="list-style-type: none"> Load lock chamber as an option: software-controlled load and unload options Easily replaceable chamber liners. The Process gas line should not be disturbed during venting/ opening of the chamber. Optimized chamber design to ensure low pumping downtime
7.	Electrode	<ul style="list-style-type: none"> Stationery electrode. He backside cooling to improve thermal conductivity and etch uniformity. BSP to ensure that the wafer is placed inside the tool without displacement. A chiller is required to ensure cooling, please specify the temperature that can be achieved. Sensor to check the table temperature is an option. Manual chuck with the capability to process small pieces to the 4-inch substrate
8.	Other Tool requirements	<ul style="list-style-type: none"> Wider matching network The presence of a vacuum valve is necessary to safeguard the turbo molecular pump during evacuation and venting. The Process gas line should not be disturbed during venting/ opening of the chamber. Specially coated pumps to avoid contamination and wear and tear of the pump. Inbuilt gas cabinet. Tool PC to be incorporated within the tool. Insulation for chiller lines to prevent the chiller line from getting exposed to the ambient temperature.
9.	Substrate temperature	<ul style="list-style-type: none"> Option to heat up to 80°C. If this is an additional requirement, itemize the cost

10.	Power level	<ul style="list-style-type: none"> 13.6MHz, 600W lower electrode with AMU
11.	Chuck configuration	<ul style="list-style-type: none"> Manual chuck with the provision to handle 4-inch wafers Please specify the clamping mechanism provided
12.	Endpoint detection	<ul style="list-style-type: none"> Give all the options available, itemize the cost
13.	Gas cabinet and Process gas lines requirement	<ul style="list-style-type: none"> Gas cabinet within the tool. The travel distance of the gas is reduced. Occupies lesser area. The Process gas line should not be disturbed during venting/ opening of the chamber. <ol style="list-style-type: none"> O2 Ar N2 SF6 CHF3 C4F8 Empty line Empty line
14.	Gas Manifold	<p>The gas manifold should have 8 lines.</p> <ul style="list-style-type: none"> MFCs need to be installed only for the lines and gases specified. 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 noncorrosive gases used for the specific process. MFCs should be Horiba-made.
15.	Footprint & weight	<ul style="list-style-type: none"> The system should be compatible with better than class 1000 cleanroom environment. Please specify the total footprint in cm x cm and weight.
16.	Process software	<ul style="list-style-type: none"> Front panel displaying equipment and process status along with appropriate software to be supplied. The software must allow varying levels of instrument access. Simplified basic access for a user to 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 troubleshooting.



		<ul style="list-style-type: none">• Graphical representation of tool and process parameters• Provision to alert the user in case of emergencies and an option to integrate the alarm system to NNFC building monitoring software• Software needs to be supported for the lifetime of the tool
17.	Power & Utilities	<ul style="list-style-type: none">• The instrument should work with Indian standards.• Mention the power requirements.• Mention any utility requirement (water, air, exhaust, etc.)
18.	Safety	<ul style="list-style-type: none">• Mention any special safety requirement of the tool• The tool must come with a complement of interlocks to prevent common user errors.• Any malfunction should have an audible alarm system.• Flashing lights during emergencies should also be an option
19.	Process acceptance	<ul style="list-style-type: none">• Si etch using SiO₂/photoresist as mask: 1um wide trenches etched to 5 um• SiO₂ etch using photoresist as mask: 1um wide trenches etched to 2 um depth• Etch profile: 95± 5%• Etch non-uniformity across 4-inch: <5%

Thanking you,

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