



### **Expression of Interest (EOI) for Supply, Installation, Testing & Validation of Bulk and Specialty Gas lines for National Nano- fabrication Facility at CeNSE Building (Last date: 30<sup>th</sup> June 2022)**

The GEECI (Gallium Nitride Ecosystem Enabling Centre and Incubator) at SID-Indian Institute of Science is seeking **EOI** from qualified Indian vendors for the **“Supply, Installation, Testing & Validation of Bulk/Specialty Gas lines for National Nano- fabrication Facility”** at the Centre for Nano-science and Engineering (CeNSE). CeNSE is a multidisciplinary research department at IISc that houses a 14,000 sq. ft. cleanroom and characterization facility used by 200 faculty members from various disciplines at IISc. CeNSE also runs a nationwide program which has allowed 4200 participants from more than 700 universities and institutes all over India to use the facilities at CeNSE. Consequently, any utility/facility at CeNSE receives significant exposure to scientific community at IISc and beyond. The vendors are kindly requested to factor in the value of this exposure in their quotes.

#### **Procedure :-**

1. The GEECI at SID-Indian Institute of Science intends to invite Expression of Interest from vendors for the selection of conceptual design for **“Supply, Installation, Testing & Validation of Gas lines for National Nano- fabrication Facility at CeNSE Building”**.
2. The GEECI Intend to float a RFP(Request for Proposal) as soon as possible with necessary schedules for the purpose of inviting the Technical and commercial bids to implement the project.
3. Vendors will be required to visit our office, discuss the plan and conduct the site survey. For site visit and verification please contact NNFC office, GF-20, CeNSE, IISc, Bangalore. Without site survey, vendor will not be considered for tenders. Last date for the site visit is on or before 23<sup>rd</sup> June 2022, 5.30pm.
4. Please find the Annexure below:  
Annexure 1: Technical Requirements  
Annexure 2: List of gases and tools
5. Vendors are encouraged to highlight the advantages of their design.
6. The conceptual design proposals must include references of 3 previous design & installations (in India) of similar scope which is of 5 years or older. The referees must belong to semiconductor facilities. Please provide the names and contact addresses of the referees, so that the CeNSE committee can contact them independently.
7. The vendor referees must be able to provide the following information:
  - a. The Vendor must submit references from at least 3 previous installations of coaxial tubing (semiconductor industry only)
  - b. The application for which their system was designed.
  - c. Certify that the vendor has capability to design and implement gas distribution system.
  - d. Certify that the design implemented by the vendor has stood the test of time. The performance matches design specifications. The system is functional.

e. Certify that the vendor provides high-quality service and support, since installation.

8. For site visit and any questions please contact Mr. Raghupathy, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (raghupathyn@iisc.ac.in)

## Annexure 1

### Technical Requirements

Sl. No.	Item	Description
1.	Application	Bulk and Specialty gases for a semiconductor foundry process. Project plans to connect the existing gas distribution network to the new tool. The work will involve cutting into exiting lines and extending them. Ability to maintain ultra-high purity of the gas lines during this job is crucial and the most important aspect of the order. We cannot tolerate any contamination due to operator error or inexperience.
2.	Industry type	Semiconductor research laboratory
3.	Tubing	Seamless SS-316L electropolished tubes with roughness $\leq 10$ Ra.
4.	Valves & Fittings	<ol style="list-style-type: none"> <li>Internally electropolished with an internal surface roughness of <math>\leq 10</math> Ra</li> <li>Only metal-to-metal face-seal to be considered from approved makes</li> </ol>
5.	Welding work	Vendor must have at least 10 years of prior experience in SS316L orbital tube welding. Demonstrated ability to maintain purity needed for semiconductor works is crucial. Vendors must demonstrate capability by showcasing prior experience.
6.	Gas line Sticks in VMB and VMP	The Point of use sticks in VMB should contain the following : <ol style="list-style-type: none"> <li><math>\frac{1}{4}</math>" VCR Connector, 2 Diaphragm valve, Gas Regulator, pressure gauge, Diaphragm valve and <math>\frac{1}{4}</math>" VCR Connector.</li> <li>VCR End cap/Blind should be considered for all sticks.</li> </ol>
7.	General gas line stick outside VMB at tool entry point	The Point of use sticks in VMB should contain the following : <ol style="list-style-type: none"> <li><math>\frac{1}{4}</math>" VCR Connector, Diaphragm valve, Gas Regulator, pressure gauge and NRV</li> </ol>
8.	Vacuum line Gas stick above the VMB/ Coaxial Pressure switch	The Vacuum gas line stick above the VMB/ Coaxial Pressure switch should contain the following: <ol style="list-style-type: none"> <li><math>\frac{1}{4}</math>" VCR blind/End cap, 2-Diaphragm valve, Co-axial pressure switch (to be connected to PLC).</li> </ol>
9.	Gas leak detectors	The GLD should contain the following features and should be integrated to the current GMS SCADA at NNFC. <ol style="list-style-type: none"> <li>Onboard display with healthy, warning and critical lighting</li> <li>0 to 20 mA output for PLC</li> <li>Relay output for different level of alarms</li> <li>Cartridge of 2 years life.</li> </ol>

10.	Hardware	<ol style="list-style-type: none"> <li>1. Clamps for tubing support</li> <li>2. Unistrut support to be used at standard lengths</li> <li>3. All line must be tagged/labelled for identification</li> </ol>
11.	Testing & validation	<ol style="list-style-type: none"> <li>1. Pressure hold test at 1.5 times of operating pressure for 24 hours with 0 psi pressure drop.</li> <li>2. Helium leak test. Must demonstrate a leak rate of less than <math>9 \times 10^{-9}</math> mbar.l/s</li> <li>3. Oxygen (&lt;2 ppm), Moisture (&lt;2 ppm). Particle (<math>0.1 \mu &lt; 5</math> ppm) tests</li> </ol>
12.	Installation & commissioning	<ol style="list-style-type: none"> <li>1. The Installation should be carried out by trained technicians.</li> <li>2. The Installation, testing and documentation procedure followed must be compliant to semiconductor standards.</li> </ol>
13.	Safety	<ol style="list-style-type: none"> <li>1. The installation technician should follow all site safety terms.</li> <li>2. Mandatory PPE: Safety helmet with face shield, electrical insulated gloves, electrical insulate Safety shoes.</li> </ol>
14.	Experience	<ol style="list-style-type: none"> <li>1. The Vendor must submit references from at least 3 previous installations of coaxial tubing (semiconductor industry only)</li> <li>2. The vendor must have experience of handling toxic, corrosive &amp; pyrophoric gases in the past and Relevant Proof must be submitted to support the claim.</li> <li>3. The names and contact addresses of the referees must be submitted with the proposal, so the purchase committee can contact them independently.</li> </ol>

## Annexure 2

### List of gases and tools

Sl. No	Tool	Bulk gas (Slpm)						Non coaxial line (Slpm)						Coaxial line (Slpm)					
		GN2	He	Ar	O2	N2	H2	FGA	CF4	CHF3	N2O	SF6	C4F8	SiCl4	C2H4	SiH4/H2	Nh3	Cl2	BCl3
1	MOCVD Reactor	50				200	220	3.5 m3							0.1	1	38	1.3	
2	Contact Mask Aligner	1																	
3	Plasma Asher	50		0.1	0.2	2			0.1										
4	PECVD	50		1	0.5	2			0.5		2				0.5	0.5			
5	ICP-RIE SiN	100	0.1	0.1	0.1	2			0.1	0.1		0.1	0.1						
6a	ICP-RIE GaN 4"	100	0.1	0.1	0.1	2				0.1		0.1	0.1					0.1	0.1
6b	ICP-RIE GaN 6"	100	0.1	0.1	0.1	2				0.1		0.1	0.1					0.1	0.1
7	ICP-RIE SiC etcher	120	0.1	0.1	0.1	3				0.1		0.2	0.1					0.1	0.1
8	Metal Etch	80	0.1	0.1	0.1	2						0.05		0.1				0.05	0.1
9 A	E-beam Evaporator	20		0.1	0.1	2													
9 B	E-beam Evaporator	20		0.1	0.1	2													
10 A	Sputtering System	10		0.1	0.1	2													
10 B	Sputtering System	20		0.1	0.1	2													
11	Rapid Thermal Anneal	12		2		2		2											
12	PE-ALD	100		2	0.1	2	0.1										0.1		