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Request for Quote for **Supply, Installation, Testing and Commissioning of 20KL capacity Liquid Nitrogen Storage Tank with Accessories**

- The GEECI (Gallium Nitride Ecosystem Enabling Centre and Incubator) at SID-Indian Institute of Science is seeking bids from qualified industries for a 20KL capacity Liquid Nitrogen Storage tank with accessories
- Companies need to submit two bids, a technical bid and a commercial bid, in two separate sealed envelopes. The bids should be submitted no later than 21 days from the date of posting of this tender, as listed on the website date/time stamp, and by 5 pm on the 21st day or next weekday in case the 21st day falls on a weekend or a national holiday.
- Both technical and commercial bids should be addressed to “The Chief Executive, SID, IISc, Bangalore 560012.”
- The envelopes should be addressed to “Prof. Srinivasan Raghavan, CeNSE, IISc, Bangalore, 560012” and submitted to the office at CeNSE, IISc in Room No. GF 15 between 9 am and 5 pm.
- All questions regarding this tender should be addressed to Prof. Srinivasan Raghavan at the email address sraghavan@iisc.ac.in
- Post such submission all vendors should send an email to sraghavan@iisc.ac.in with the subject line: “GEECI_Bidder’s name Tool Name” to intimate him of the submission within one day.
- Deviations from the technical specifications requested are allowed. Such deviations must be highlighted and justified. Their acceptance or rejection will be left to the discretion of the technical committee.
- The equipment sought will be placed at the Centre for Nano Science and Engineering (CeNSE), Indian Institute of Science (IISc). IISc is India’s No. 1 institution on higher learning and the Center for Nano Science and Engineering is home to one of the best academic fabs in the world.
- Please find the **Annexure-1** for Technical requirements.
- The technical response, corresponding to the tool being offered, should be in the form of a compliance table with at least 5 columns.
Serial number in column 1. Each of the numbered technical items below should be addressed in a separate row of the table in column 2. Compliance to this requirement, in Yes/No, deviation from it and justification should be provided in the neighboring columns 3-5. Post the opening of a hard copy of the technical bid the committee will request for a soft copy of the files for further processing. Companies should NOT mail soft copies of the files unless specifically requested for.
- Detailed technical specifications of the tank being offered should be included.
- 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.
- If multiple systems can fulfill the requirements, vendors can submit multiple bids.
- Vendors are encouraged to highlight the advantages of their tank over comparable tanks from the competitors.
- The commercial bid should be broken up to the maximum extent possible into separate items with a cost against each to enable better comparison of price for various configurations across the bidders. As an option, please provide itemized cost for any suggested accessories/addons 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.
The quotes should be split into a line item indicating the base price and then each optional item should be listed separately with its pricing.

Procedure

- 1) Only vendors who are compliant with the technical requirements will be considered for commercial comparison. The bid is awarded to the lowest cost vendors (referred as L1).
- 2) The commercial comparison is made as per Government of India rules, specifically GFR 2017. Note that GFR has recently been amended. As per recent edits to the GFR, there are three classes of vendors distinguished by their “local content”. In the cover letter, vendors must mention which applies to them:



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- a. Class 1 supplier: Goods and services have a local content of equal to or more than 50%.
 - b. Class 2 supplier: Goods and services have a local content more than 20% but less than 50%
 - c. Non-local supplier: Goods and services have a local content of equal to or less than 20%
- 3) This tender will only apply entertain Class 1 or Class 2 suppliers. Vendors must provide a self-declaration of what Class they belong to.
 - 4) In the commercial bid, please provide an itemized cost of the system and required accessories, such as vaporizer, valves, piping etc.,
 - 5) As an option, please provide itemized cost for any suggested accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the system. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
 - 6) Quote should come only from Indian Original Equipment Manufacturer (OEM). The quotations should be in INR only and must include shipping cost.
 - 7) Mention GST separately. IISc will be taxed at 5%. IISc will provide the GST exemption certificate against invoice.
 - 8) Please indicate the warranty provided with the tool. Warrant of 3 years or more is required.
 - 9) As an option, provide itemized cost for required spares for 2 years of operation from the time of installation.
 - 10) Clarify if periodic (preventive) maintenance be done by a trained on-site engineer or requires a specialist from the OEM.
 - 11) The technical proposal must include references from 5 previous installations in India. Please provide the names and contact addresses of the referees so that the committee can contact them independently.

Annexure-1

Technical Requirements: LN2 Storage tank and Vaporiser

A	Application	On-site Liquid Nitrogen Storage for a semiconductor foundry. Scope of the order includes: 1. LN2 storage tank 2. Vaporizer
B	Industry type	Semiconductor cleanroom class 100 and class 1000
C	Liquid Nitrogen Tank :	
1	Storage tank type	Perlite+Vacuum Insulated Vertical Liquid Nitrogen Storage Tank
2	Quantity	01 No
3	Gross Capacity(Water)	20,000 Litres
4	Net capacity	95% of gross capacity
5	Vapour Space	5% of gross capacity
6	Configuration	Vertical (with supporting legs)
7	Inner Vessel: Design & Manufacturing code or standard	ASME-SEC.VIII DIV-1 or EN 13445, EN-13458 -2:2002 or equivalent (Cold Stretching is acceptable).
8	Max allowable working pressure	17 kg /cm ² (g)
9	Design temperature	-196 degC to +35degC
10	Design pressure	As per code / standards
11	Hydraulic test pressure	As per code / standards
12	Insulation for inter space	Perlite powder under vacuum.
13	Static evaporation loss % per day	0.3% per day based on an ambient temperature of 20degC when filled to design capacity with saturated liquid nitrogen at Atmospheric pressure.
14	Material of construction	ASME SA 240 TP 304/304L or equivalent.
15	X-ray	100% radiography for all welding joints as per Code.
16	Helium leak test	Leak tightness of 1x10 ⁻⁶ mbar l/s

17	Surface treatment	Degreased.
18	Filling/Withdrawal Provision	(i) One Top filling and One Bottom filling (ii) Two independent bottom withdrawal lines. (iii) Additional LN2 withdrawal line & terminated with flange which will be directed towards hard stand for decanting to mobile Storage tank.
19	Outer Vessel: Design & Manufacturing code or standard	ASME-SEC.VIII DIV-1 or EN 13445 or CGA 341 or EN-13458 or equivalent.
20	Operating pressure	Vacuum.
21	Operating temperature	-20 degC to +50 deg C.
22	Outside diameter	As per design
23	Height	As per design
24	External surface finish	Mechanical cleaning & shot blasting suitable for high quality and durable painting purposes.
25	Primer / intermediate / final painting	Two coats of Epoxy based polyurethane paint should be done.
26	Materials of construction	Carbon Steel ASME SA 516 Gr.60/70 or equivalent.
27	Corrosion allowance	As per standard.
28	Inter space pipe work	Inter space pipe material shall be Seamless ASME SA312-304/304L.
29	External pipe and valves	External piping with valves & fittings for storage tank (i) Pipe : ASME SA 312 TP 304/ Equivalent. (ii) Valves : Bronze body with Stainless steel internals or equivalent.
30	Following minimum necessary Safety/ accessories shall be provided along with the tank	a. Valves. b. Gauges. c. Safety devices (primary and secondary). d. Redundant relief valve and Redundant burst disk for LN2 tanks. e. Liquid Level and pressure gauges for local readout . f. Pressure regulator (Settable).

		g. Interconnecting pipe lines between vaporizer and tank. h. In-built pressure building unit.
31	The Pressure Building Unit (PBU)	PBU to be provided LN2 tank continuous duty pressurization even during LN2 withdrawal period
32	Safety valves	All the safety valves should be pre-set to the required pressures
33	Lifting Hook.	The tank should be provided with lifting hooks at convenient locations
D	Atmospheric Vaporizer :	
1	Capacity	300Nm³/Hr
2	Quantity	1 No
3	Type:	Natural draft ambient air vaporizer with Aluminium finned construction and vertically mounted type.
4	Application	For generation of Gaseous Nitrogen (GN ₂) from LN ₂ (LIN) stored in the tank.
5	Fluid media	Liquid Nitrogen (LN ₂)
6	Fluid (LN ₂) inlet temperature to the vaporiser :	-196 deg C
7	Fluid (GN ₂) out let temperature from the vaporiser:	15 deg C
8	Operating atmosphere condition:	Ambient temperature about 21 deg C and RH about 60-70%.
9	Operating pressure	38 bar (g)
10	Design pressure	40 bar (g)
11	Pneumatic test pressure:	44 bar (g)
12	Design temperature:	-196 deg C to > +50 deg C
13	Duty cycle at 21 deg C and 70% RH:	Continuously for minimum of 12Hrs. at the rated flow capacity condition before defrosting for achieving outlet temperature of 15 deg C from the vaporiser.
14	Design standard:	ASME Code Sec VIII & Div 1, Pressure vessel Code or equivalent standard without U-stamp.
15	Inlet end connections:	As per design



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16	Outlet end connection:	As per design
17	Cleaning duty:	Oxygen service
18	Material of Construction:	Fins and Tubes: SB221 A96063 T5
19	Dimension of the vaporiser:	L= As per design requirement W= As per design requirement H= As per design requirement
20	Foundation leg:	Foundation foot print drawing and other foundation details shall be given along with the quote.
21	Lifting hook:	Lifting hook should be provided at appropriate locations of the vaporiser to facilitate lifting/unloading and installation.
E	Periodic Maintenance	<ol style="list-style-type: none">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.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 12-hour window of response.
F	Installation and Training	<ol style="list-style-type: none">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 tank should be verified for acceptance by the customer.
G	Documentation for LN2 Tank	2 set of Operating & Maintenance manual for tank. Copy of Quality test certificates of cryogenic pressure vessel 1 set containing :- <ol style="list-style-type: none">Approval letter along with approved drawings from CCOE for inner vesselCertificate from third party inspection Agency for inner vesselMaterial Heat chart for inner vessel pressure parts.Mechanical properties test report for production test couponHistory sheet for inner vesselMaterial test report for pressure parts (inner vessel)Name plate photo copyCertificate of safety valve, pressure gauge, level gauge
H	Documentation for Vaporiser	<ol style="list-style-type: none">Inspection and test reports - along with the equipmentOperation & Maintenance Manuals - along with the equipment
I	Inspection	As per Standard QAP of OEM.
J	Scope of work	All civil works including soil test and loading/unloading at site, foundation works, Installation and commissioning is in vendor's scope
K	Safety	<ol style="list-style-type: none">The installation technician should follow all site safety terms.

		<ul style="list-style-type: none"> b) MandataryPPE: Safety helmet with face shield, electrical insulated gloves, electrical insulatedsafety shoes. c)The Installation should be carried out by trained technicians
L	Approvals/Permission	The GEECI/NNfC Office, GF-20, CeNSE, IISc must be intimated prior 5 weekdays before start of work. The vendor must obtain explicit permission for any shutdown needed to implement the project. The request for shutdown must be escalated at least 10 weekdays prior.
M	IISc responsibility	<ul style="list-style-type: none"> a) Liquid Nitrogen will be arranged for commissioning of the tank. b) Free storage space at site will be provided. c) Payment will be within 30 days against a tax invoice, after satisfactory completion of the work.

Thanking you.