

6th June 2025

To Whom It May Concern

Open Tender for Tender for supply, installation, testing, and commissioning of cleanroom and utilities

This is an RFQ (Request for Quote) for the supply, installation, testing, and commissioning of cleanroom and utilities as part of an open 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 the Indian Nano electronics 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 the scientific community at IISc and beyond. The vendors are requested to factor in the value of this exposure in their quotes. Details of existing facilities and the INUP program can be gleaned from: http://www.mncf.cense.iisc.ac.in/

https://www.inup.cense.iisc.ac.in/

Procedure

- 1. Vendors must submit a technical proposal and a commercial proposal in **two separate sealed envelopes**. Only vendors who meet the technical requirements will be considered for the commercial negotiation. **PLEASE MAKE SURE THE SITE VISIT IS DONE BEFORE SUBITTING THE BID. ONLY BIDS FROM VENDORS WHO HAVE VISITED THE SITE WILL BE ENTERTAINED.**
- The deadline for submission of proposals is the 27th June 2025, 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 Bidder should belong to either class 1 or class 2 suppliers distinguished by their "local content" as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter and should provide all the required supporting documents.
 - a) Class 1 supplier: Goods and services should have local content equal to or more than 50%.
 - b) Class 2 supplier: Goods and services should have local content equal to or more than 20 % and less than 50%).
- 5. Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as Class-1 local suppliers/Class-2 local suppliers by claiming services such as transportation, insurance, installation, commissioning, training, and other sales service support like AMC/CMC, etc., as local value addition.
- 6. Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
- 7. The quotations should be on FOR-IISc Bangalore basis in INR only.



- 8. Bidders offering imported products must submit an authorized letter of OEM with a particular tender name and address.
- 9. The bidder should have local vendor support for installation.
- 10. MSMEs can seek an exemption to some qualification criteria. IISc follows GFR2017 for such details.
- 11. Bidder should provide a local content declaration as per the format attached in annexure 4 on the bidder letter head.
- 12. Purchase preference as defined by the recent edits to GFR (within the "margin of purchase preference") will be given to the Class-1 supplier.
- 13. 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 for every line item. 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 should also contain the make and model of the components/parts to be used in the installation. If any line item is missed filling "yes" or "no" in second column we shall consider it has "no". The technical bid without the compliance table will be disqualified.
- 14. All items in the bid must have technical specification sheet or brochures.
- 15. 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.
- 16. Vendors must submit with technical bid with the complete BOQ and drawings of HVAC equipment, ducting, Piping, Instrumentation, automation, Cleanroom wall panel, utility distribution, exhaust ducting, gas lines and elevation drawings. The technical bid without the proper BOQ and drawings will be disqualified.
- 17. In the commercial bid, please provide the itemized cost of the different subsystems, along with possible breakups.
- 18. Provide optional itemized cost for required spares for 2 years of operation. Please note, the cleanroom is expected to be operational 24x7 and breakdowns should be minimal or nil.
- 19. All items supplied should have at least one year warranty.
- 20. As an additional option, provide the cost of an annual maintenance contract (AMC) for 1-year, post-warranty. The AMC must cover 1 scheduled and 1 emergency visit per year. The AMC cost must also include an itemized list of spares that are essential for the scheduled visits.
- 21. The RFQ must include references of 3 previous construction of semiconductor cleanroom with utilities to 3 previous installations, preferably in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently.
- 22. The offer shall be valid at least 90 Days from the date of opening of the commercial bid.
- 23. Any questions can be directed to Mr. Gajendra M, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore 560012, India. (<u>gajendram@iisc.ac.in</u>)
- 24. Cancellation of Tender: Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole

discretion,

- unconditionally and without having to assign any reason, reserves the rights:
- a. To accept OR reject lowest tender or any other tender or all the tenders.
- b. To accept any tender in full or in part.
- c. To reject the tender, offer not confirming to the tender terms.
- 25. The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the



items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period. The bidder should also arrange for technical training to the local facility technologists and users.

- 26. 100% payments (except AMC) will be released after completion delivery and satisfactory installation subject to TDS as per rules. AMC cost (if ordered), after completion of warranty period will be released on half-yearly basis at the end of each six months subject to satisfactory services. Price basis must be on FOR-IISc Bangalore basis only. As per GFR no advance payment can be made to domestic vendors, unless an equal amount of bank guarantee is provided.
- 27. Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.
- 28. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Bangalore, India.



Technical Specifications

SL.NO	Description	Qty	Unit
1	CLEANROOM CONSTRUCTION		
а	Cleanroom Solid Wall Panel for Class 10000		SQMTR
	Supplying & Fixing of Progressive type Solid Double skin modular 100mm thick		
	Solid wall panel for partitions and wall paneling, made of 0.8 mm thick Powder		
	coated sheets on both sides with PUF as infill of density 40 \pm 2 kg /m3, GI		
	Profiles for reinforcement along the periphery with bottom track, and		
	necessary arrangements, All Joints shall be sealed with cleanroom compatible		
	Neutral Grade Silicon Sealant.		
b	Cleanroom Return Air Riser Wall Panel for Class 10000		SQMTR
	Cleanroom Return Air Riser wall panel with inbuilt Return Air Risers of not less than	h	
	0.8 mm thick Powder coated GI sheet (hot dipped with zinc coating of 120 gsm),		
	15mm puff insulation on both side of riser, within the wall papel. Bisers with		
	adjacent ceiling heights to extend minimum 200mm high above the top of the false	•	
	ceiling with minimum 25mm flange.		
C	Cleanroom Ceiling Panel for Class 10000		SQMTR
	Cleanroom Ceiling panels shall be Progressive type Double skin modular 75 mm thi	ck	
	Ceiling wall panel made of 0.8 mm thick Powder coated sheets on both sides with I	PUF	
	as infill of density 40 \pm 2 kg /m3, GI Profiles for reinforcement along the periphery	with	
	bottom Aluminum track, and necessary arrangements, All Joints shall be sealed wit	h	
	cleanroom compatible Neutral Grade Silicon Sealant.		
	Ceiling panels are suspended by threaded tension bars with adjustable turnbuckles	1	
	fastened to the overhead support at fixed intervals to withstand 150-200 Kg per sq	•	
	mtr.		
d	Cutout in Wall & Ceiling Panels		NOS
	Suitable factory-made cut-outs wherever required shall be provided in the wall		
	panel and ceiling panel as applicable for fixing HEPA filters with Modules, light		
	fixture, return air grills, power sockets, communication outlets, LAN outlets,		
	cables, pipes, exhaust ducts, Magnahelic gauge, smoke sensors, pendants,		
	utilities etc., are also to be included in the quotation after conducting an		
	inspection to the proposed clean room and utility.		
	Factory made wall cut-outs for switches and sockets and includes one conduit		
	per cut-out. Quantity and size as per requirement. Quantity will be as per the		
	Electrical design and will be finalized on drawing approval.		
	Factory made ceiling cut-out for HEPA Modules (with lip as per HVAC design).		
	Quantity and size as per requirement. Quantity will be as per the HVAC design		
	and will be finalized on drawing approval. Each 0.74 SQM (1200 mm X 600 mm).		
	Factory made ceiling cut-out for Light Fixtures (with lip as per electrical design).		
	Quantity and size as per requirement. Quantity will be as per the Electrical	ł	



	design and will be finalized on drawing approval. Each 0.36 SQM (600 mm X 600	
	mm)	
е	Clean room Window Modules	
	Windows and door vision panels should be formed from double glazed toughened	NOS
	glass composite modules. View panels of size 900 x 900 mm shall be provided in	
	wall panels - View panels glass shall be at least 5 mm thick toughened Glass with	
	Ceramic border of 20mm width. View panels shall be fixed flush to both faces of	
	wall panels No crevices / joints/sloped profiles should be used for fixing the	
	glass to avoid particle contamination and dust accumulation.	
f	Clean room Doors	
	Clean room Doors shall be 44 mm thick doors flush on one side made of static-	
	dissipative type powder coated door frames 1.2mm thick totally flushed with	
	the wall panels - Concealed hardware for fixing the door frames In fill of PUF/	
	Honeycomb is used to give the effective acoustic and thermal insulation.	
	Stainless steel double bearing butt hinges as per BS 7352 CLASS 9 - Mortise	
	dead locks with all ancillaries like door closer, lock & key, hinges, d-handle, push	
	plate, drop seal & tower bolt with view glass of size 0.4m x 0.6m. Door-sets	
	should match the partition modules.	
g	Double leaf door (1800x2100x50mm)	NOS
h	Single leaf door (900x2100x50mm)	NOS
i	Emergency door (1800x2100x50mm)	NOS
j	Coving	
	All the Covings (Inner and Outer Coving) are Extruded Aluminum Powder	
	Coated /Anodized clip-on type covings of R-50mm. Coving shall be used at wall-	
	wall and wall-ceiling joints and Wall to Floor.	
	R 50 Inner Coving	RMT
	R50 Outer Coving	RMT
	Coving Corner Pieces: All the Inner and Outer 3D & 2D corner pieces are	
	Aluminum powder coated finish.	
	3D Corner Pieces	NOS
	2D Corner Pieces	NOS
k	ESD Flooring	SQMTR
	The electrostatic dissipative flooring should be provided for Cleanroom Class	
	10000 area with the specification below: -	
	\cdot The anti-static floor material shall have a Resistance level of 10Megaohm to	
	1Gigaohm	
	\cdot Load carrying capacity of the material shall be 750PSI (min.) conforming to BS	
	2050.	
	· The joints shall be welded by thermo chord weld.	
	\cdot The flooring shall Include providing and laying (P/L) suitable copper strip (foil)	
	grid of size 3' x 3' (approx.) as recommended by manufacturer and connecting	
	to the dedicated earthing	



	Work includes preparation of existing surface with suitable (compatible for		
	clean room application) floor leveling material so as to make the surface free		
	from any undulations		
I	Dedicated Earthing for ESD Flooring		NOS
	ESD Flooring includes, dedicated earth pit accessories and Interconnecting Copper		
	strip 30x5 mm thick.		
	Vendor has to ensure 0.1 ohm resistance can be achieved at the cleanroom point.		
m	Cleanroom lights		
	Cleanroom compatible LED lights. The envisaged Lighting level in clean rooms is		NOS
	500 Lux, at 90 cm above the floor. Lights must be openable towards inside the		
	room. Dimensions: 600 x 600 mm Power: 42 W		
n	HEPA filter		NOS
	HEPA filter module		
	The Clean Room ceiling system shall include HEPA filter ceiling modules as indicated	k	
	on the drawing.		
	\cdot The filters will be used as terminal air distribution device. The air supply plenum		
	shall be connected directly to a connecting collar on the filter top with individual		
	damper in the plenum and flexible ducts.		
	• The filters shall H13 class filters as per EN1822 with an efficiency of 99.95%.		
	\cdot The design Air velocity through filter shall be 0.45m/s with IPD of 100±5% Pa or		
	better.		
	• The frame of the filter shall be of Extruded Anodized Aluminum construction.		
	• The filter media shall be Glass Fiber with hot melt separator.		
	• The filter shall have expanded sheet metal face guard. The face guard shall be		
	powder coated in off-white color.		
	• The filter shall be having endless polyurethane D-profile, Liquid pour to solid in		
	extrusion profile seal at the outlet.		
	All the filters shall be individually tested according to EN1822 and computerized		
	scan test report should accompany each litter.		
	• The inter shall be need in place dulizing fiold down devices with the ceiling grid		
	against cailing grid		
	• All filter modules shall be complete with air inlet collar of 12" diameter (approx)		
	• Ton sheet should be of G L /Aluminum single niece drawn with seamless neck. In		
	case neck is not seamless neck joint to the ton sheet he a proper leak proof joint		
	and with the capability of supporting a person standing on the top surface		
	• Filter media shall be bonded to extruded aluminum cell sides. Dimensions :1210 l		
	x 600 D x 60 mm H		
0	Fan Filter Units Fan		NOS
	Filter module with HEPA filters. These FFM's are self-powered grid module with		1105
	modular design, to fitting in standard T grid ceiling. Total height is 320mm. The		
	Fan Filter Module is U.L listed and CE certified. FFU speed can vary from 0.2 to		



	0.5m/s and air flow rate vary from 400-900 CFM. The sound level will be 55dB's		
	when measured from 760mm below from filter face. The vibration level is 0.9mils.		
	The Fan motor drive will be direct drive, forward curve centrifugal type with		
	sealed bearing. The motor will have permanent split capacitor type, rated for		
	continuous operation with thermal overload protection with two speed switches.		
	The power requirement is 230V_50Hz single phase with maximum current of 1.9A		
	with 280 watts now rinnut. The fan/motor assembly is canable of delivering air at		
	filter proscure of 0mm to 22mm final state. These EEM will have a speed		
	niter pressure of similar to assess of the meter (blower from low medium and		
	controller for increasing the speed of the motor/blower from low, medium and		
	nigh. Dimensions: 1215 LX 600 D X 350 mm H FFU Material of construction: Al Zinc		
	Alloy		
р	Air Shower	1	NOS
	Supply of Single-entry air shower		
	* Dimensions: 1500mm Ly 1500mm Dy 2200mm L		
	*Class 100 Compatible		
	*Door interlocking arrangement should permit opening of only one door at a		
	time During operation, neither entrance nor exit door should be operated. A		
	lock switch for overriding the electronic control system ensuring manual		
	operation should also be provided.		
	*The air shower shall be provided with per filter of HDPE, Washable type with		
	efficiency 90% down to 10 micron and HEPA filter with efficiency of 99.97%		
	down to 0.3 microns etc.,		
	*Air Shower shall include: Differential Pressure Gauge, ON/OFF Switches, PAO		
	Test Port, Timer for setting Air Shower operation time (settable for 30 seconds		
	to 5 minutes), Emergency STOP button, Automatic as well as Manual Working.		
2	HVAC		
a	Air Handling Unit		
b	AIR HANDLING UNIT (AHU)	1	NOS
	Scope of work included design, supply, installation and commissioning of		
_	dedicated AHU for Annex building of CeNSE		
C	AHU CASING		
	1) And shall be of modular construction and of draw tinough type comprising of		
	fremowerk chall be of extruded Al sections joined by molded high tensile		
	rainferrend plastic and shall be assembled to provide a sturbul strong and salf		
	remored plastic and shall be assembled to provide a sturdy, strong and sen-		
	supporting frame work for various sections. Each section shall be complete with		
	its own independent base and mounted on 14G galvanized sheet steel and		
	aluminum die cast channels. Zinc deposition on the GI sheets shall be minimum		
	120gsm.		
	2) AHU shall be of double skin, with 45+5 mm thick PUF insulation sand-witched		
	panel, U.8 mm thick percolated GSS outer skin and U.8 mm thick plain GSS sheet		
	inside. The density of PUF insulation shall be minimum 38±1Kg/m3.		
	3) The tramework for each section shall be joined together with soft rubber		
	gasket in between to make joints airtight.		



	4) Suitable air tight access doors with Aluminum die cast heavy duty hinges		
	and locks shall be provided for various sections.		
	The casing shall incorporate thermal break profile and all other necessary design		
	Features to ensure that condensation does not occur during all seasons.		
	5) The AHUs shall be having Sound attenuators at Suction and delivery of AHUs to		
	reduce the sound to 50±2dB		
d	CIRCULATION FAN		
	1) Fan Type: Direct driven, Plug type high efficiency centrifugal fan		
	2) Desired noise level should be reduced to 70±5 dB or less by suitable sound		
	attenuators on supply and return air path.		
	3) Required Total static pressure: 150±2mmWG.		
	4) Fan should have backward curved blades to improve efficiency.		
	5) Fan blades should be made of Aluminum alloy for stability.		
	6) Motor and fan assembly should be floor mounted and to be placed on		
	extruded aluminum sections and on the vibration isolators to reduce amplitude		
	to less than 25-50 microns.		
	7) Motor Requirement: Adequately sized, TEFC Squirrel cage induction motor		
	with VFD drive and suitable for $415V \pm 10\%$, 3 phases, 50 Hz $\pm 5\%$ AC power		
	supplies.		
	8) The motor should be of high efficiency IE3 class as per IS12615–2011-NonFLP.		
	9) Motor should be compatible for VFD operation.		
	10) Flexible connection should be fabricated of neoprene coated flame proof		
	fabric attached by screws or bolts at 6" interval should be provided. Flexible		
	connection should be provided with the sufficient material width to prevent		
	interference with the free operation of the fan vibration system.		
	11) Fan should be factory statically and dynamically balanced as required to		
	achieve field balance levels.		
	12) Epoxy based coating shall be provided on all the surfaces of ferrous fan housing.		
	13) Vibration measurement should be made in three orthogonal areas at each		
	bearing location. Where equipment configuration precludes measurement at		
	bearing; measurement should be made on adjacent routine structure.		
	14) Peak to peak displacement at the rotational frequency should be measured.		
	Governing displacement should be at the rotational frequency of fan.		
	Controlling displacements at frequencies other that the rotational frequencies		
	are not in compliance with the balance requirements.		
е	COOLING COILS		
	1) Cooling medium requirement :Chilled water at a temperature of 8±1 DegC		
	2) The velocity across the cooling coils should not exceed 2.25 m/s.		
	accordingly, cooling coil area should be selected.		
	3) Coils should be of seamless copper tubes with Al fins, 8 rows deep, with 12-		
	13 fins/inch, with copper header, flange connection and SS 304 enclosure.		
	4) Copper tubes should be 25±5% SWG and hydrostatically tested for		
	21kgpersq.cm.		
	5) Cooling coil condensate tray should be of 14±5% SWG SS304 material.		



	6) Vertically stacked Cooling coils should have SS 304 drip trays between the SS	
	pipe drain connection left at the drain tray and finally should be connected to	
	drain point with suitable trap to check ingress of outside air.	
	7) Fouling factor requirement:0.0002hr.m2DegC/Kcal.	
	8) Accessories requirement: Frame, support, inlet and outlet header, vent	
	connection and drain connection with valves, pressure gauges with valves at	
	inlet and outlet and their associated fittings.	
f	HEATERS	
	The AHUs should have Electrical heaters section to maintain the cleanroom	
	temperature in the winter season.	
	1) Strip/Tubular heaters of sufficient capacity should be selected in each AHU to	
	maintain the area temperature.	
	2) The heaters should be complete with mounting frame, Thermostat,	
	humidistat, airstat in redundant arrangement along with all control	
	devices which will be controlled by thyristors.	
j	FILTERS	
	Thereshouldbe3stagesoffiltrationintheAHU.Specifications:	
	Filtersfacevelocityshouldnotexceed2.25m/sec.	
	• Filter mounting frame should be made out of extruded aluminum	
	material The frame should be strong enough to withstand the weight of	
	two persons for climbing the frame during the filters replacement	
	- Retween filter sections, minimum specing of 600 mm should homeintained	
	• Between met sections, minimum spacingorooonimshouldbemaintained.	
	• Filters should have a quick release filection and sealing gasket.	
	• All the filters should have Al frame(flange type)with a module size of 600mm x 600m(preferably)	
	1) 1st Stage Pre-filters should be of G4 grade as per EN 779, non-woven	
	synthetic material sandwiched between HDPE mesh on both sides with	
	minimum thickness of 150 mm flange type with an initial pressure drop of 5 mm	
	WG or less, suitable for cleaning with dry air or water jet.	
	2) 2nd stage bag filters should be of F7 grade as per EN779, non-woven	
	synthetic material sandwiched between HDPE mesh on both sides and suitable	
	for minimum thickness of 300mm initial pressure drop of 6-8 mm WG or less.	
	suitable for cleaning with dry air or water jet	
	3) 3rd HEPA Filters should be of H1/1 grade, suitable for AHLL capacity. Filter	
	media should be of micro fiber glass. Efficiency required: 99 995% down to 0.3	
	micron. The filters should have Apedized Al frame with a medule size of	
	600mm v 600mm (proforably). The filter modia chould be anow (DLL handed to	
	the filter assing	
	The little casing,	
	Pressure drop<15mmotwG.Accessories Requirement: Frame ,supports, sealing	
h	Alua (Vender should give their calculation)	
	a Total Supply air=13500CEM	
	a. Total Supply all -13500CHW	
	c Fresh air=8282 CFM	
	d Total fan Static=150mmWG	
	e. 8 Bow Cooling Coil Capacity=72Tr	
	f. Heater capacity=56Kw	
CENTRE		

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i	Humidifier: Pan Type Humidifier	1	NOS
	Construction: Tank made from 1.2mm or 2mm thick Stainless Steel 304 grade		
	sheet, In welded construction with steam Inlet / Outlet / Drain / Overflow Nozzle,		
	Top Cover Open able with S.S Bolts		
	Heating Element: Electrical Resistance Immersion Type, S.S tube Nickel plated		
	Rating: 4KW x 3 Nos = 12KW With 0.5 KW Additional Heater with Thermostat		
	To maintain 75°C Temperature inside tank		
	Electrica IPanel: Made from 18 Gauge CRC Sheet (Epoxy Painted),		
	Main Incomer of suitable capacity (L&T make) Outgoing Contactor (L&T / ABB /		
	Schneider make). Fault Indicating & R.Y.B phase Indicating lights (Esbee make).		
	On / Off switch with light (Esbee make)		
	Duly Eactory wired. Controls: Level Switch – RC-611 for Low Level Cut out (with		
	Nylon Ball) Float valve with S S Ball at Inlet connection		
	Thermostat for additional heater (Range = 5 Deg C to 75 Deg C) Master		
	Thermostat for total load (Range = 50 Deg C to 120 Deg C) Sight Glass provided to		
	check water. Overflow valve		
	Insulation: 25mm thick fiber glass wool and cladded with 22Gauge G I sheet		
	Humidifier: - 2.5 Kg/Hr		
2	Chiller Unit		
3			
a	Chillers (401R+401R) (1W+1S)	2	NOS
	Air cooled Scroll Chiller: Supply, loading, unloading, lifting, shifting, installation,		
	cooled single/multiple screw/rotary chiller packages of minimum capacity of 80		
	TR at 39-41 Deg C ambient conditions prevailing at Chennai. The leaving water		
	temperature from the chiller shall not exceed 7 Deg C when entering water		
	temperature is 12 Deg C. The compressor (s) operates on eco-friendly		
	refrigerants such as R134a/407c/410a complete with controls and accessories.		
	crankcase heaters, automatic modulating capacity control, forced feed		
	lubrication system with oil separator etc. Air-cooled condenser(s) made of		
	copper tubes mechanically expanded into aluminum fins, statically and		
	dynamically balanced low noise condenser fans and motors. Shell and tube DX		
	type/ Flooded type chiller with steel shell and copper tube and complete with		
	drain points. Microprocessor based control center unit in fully enclosed steel		
	cabinet (IP 55 Protection) with power and safety operating controls in separate		
	compartments and complete with monitoring facilities for suction/Discharge		
	pressure, oil pressure, suction line super heat etc. Power supply panel (IP 55		
	protection) housing all main power connection(s), starters for compressor(s)		
	and condenser(s), factory wiring for compressor(s), condenser(s).		
4	Chilled water circulation Pumps	2	NOS
	Chiller Water Pumps	2	1105
	1) O_{μ} Output ty -2Nos (1W+1S)		
	2) Pump flow rate: 7251 PM@4Kg/cm2		
	3) Pump type: Horizontal centrifugal numps		
	4) Heavy duty for continuous operation		
	5) MOC ⁻ \$\$304		



	6) Impellor: SS304		
	7) Motor: Adequately sized TEFC, squirrel cage induction motor having high		
	efficiency rating IE3 Class and suitable for 415V + 10%, 3 Phase, 50 Hz + 5%.		
	8) Pumps shall be horizontal, closed coupled, single stage, centrifugal, end		
	suction with back pull-out design. Hence, the rotating unit can be removed		
	and serviced without disconnecting the suction and discharge pipe.		
	9) The noise level shall not exceed 75dbA at 1m from the source.		
	10) Accessories: Pressure gauges at suction and discharge, isolating butterfly		
	valves at suction and discharge, check valve, strainer, integral piping, base		
	frame, foundation bolts, nuts, vibration isolator/rubber pads etc. Pumps		
	should be Horizontal end suction Type.		
5	Chilled water pipeline	1	LOT
	Piping		
	1) AllthepipesshallbeSS304 SCH10, PN10rated, all pipelines should be joined with		
	TIG welded.		
	2) Square cut plain ends should be welded for pipes up to and		
	including100MMDia.		
	3) All pipes 100MM Dia. Or larger should be beveled by 35DEG.before welding.		
	Pipe		
	Supports/hangers		
	1) Pipe support should be provided and installed for all piping wherever		
	indicated, required or otherwise specified. Wherever necessary, additional		
	hangers and supports shall be provided to prevent vibration or excessive		
	deflection of piping and tubing.		
	2) All vertical pipe support should be made of 12mm M.S. rods, and the		
	horizontal support should be of M.S. angles of 50x50x4 mm thick.		
	3) Pipe supports should be adjustable for height and prime coated with rust		
	preventive paint & finished coated with black paint using approved grade of		
	naint		
	loining		
	1) All ninelines should be joined with TIG welded		
	2) All nines 125 MM Dia, or larger should be beyeled by 35 DEG, before		
	welding		
	Dual Plate Check Valves		
	1) ThehodyofthecheckyalveshouldhemadefromSS30/PN16rated		
	singleniececastingincylindricalshane		
	2) There should be two plates, which should be hinged in the centre of the circle		
	2) Both plates should have springs attached to them for assisting in closing		
	stion of the value		
	action of the value.		
	4) There should be properly/designed metal to metal seal between the plates		
	and the outer body, to ensure non leaking sealing.		
	5) The valve design should confirm to API 594 or equivalent specifications.		
	Strainers		
	1) Strainers should either be pot type or 'Y' type SS304 body PN 16 rated, tested		
	up to pressure applicable for the valves as per design.		
CENTRE	FOR NANO SCIENCE AND ENGINEERING	o 11 of	26



	2) The strainers should have a perforated bronze sheet screen with 3 mm		
	perforation and with a permanent magnet, to catch iron fillings.		
	Al Cladding Insulation		
	All the chilled water lines shall be Chilled water line shall be insulated with Puff		
	50mm thick insulation and cladded with Aluminum sheet.		
6	TESTING		
	1) In general, tests should be applied to piping before connection of equipment		
	and appliances. In no case should the piping, equipment or appliances be		
	subjected to pressures exceeding their test ratings		
	2) The tests should be completed and approved before any insulation is applied.		
	Testing of segments of pipe work should be permitted, provided all open ends		
	are first closed, by blank offs or flanges.		LOT
	3) After tests have been completed the system should be drained and flushed 3		
	to 4 times and cleaned of all dust and foreign matter. All strainers, valves and		
	fittings should be cleaned of all dirt, fillings and debris.		
	4) All piping should be tested to hydraulic test pressure of at least one and half		
	times the maximum operating pressure but not less than10kg/cm2 for a period		
	of not less than12hours. All leaks and defects in the joints revealed during the		
	testing should be rectified to the satisfaction.		
7	BMS integration (Instrumentation & Control)		
	system available.		
	1. Three-way flow control valve, complete with all the accessories and with a		NOS
	manual bypass line with an isolation valve.		
	2.All three areas/partitions shall have temperature sensors with accuracy of ±0.2		NOS
	deg C or better and humidity		
	3. The cooling coil water-inlet and water-outlet shall have temperature sensors		NOS
	cum transmitters.		1105
	4. Pressure gauges with isolation ball valves at inlet and outlet of the coils. In		NOS
	order to ensure a protection, a lemperature gauge shall come with a thermo well.	<u> </u>	NOC
ļ	C. Differential processor access and filters and filters		NOS
	6. Differential pressure sensor across pre filters and fine filters.		NOS
	7. VFDs for AHU fans. HMI control panel for monitoring Temperature, T and		NOS
	humidity, RH of all Partitions/rooms. AHU supply air volume shall be varied based		
8	on the room exhaust flow rates.		
0	INSULATION		
а	HVAC Ducting Distribution		
	Duct Specifications:		
	Complete supply air ducting including the flexible ducting connecting the solid		
	duct work with filters collar and return air ducting is covered under scope of		
	work.		
	$\bullet {\sf Dustsshall bemade from {\sf GIsheet of lock forming quality having {\sf ZincCoating as per {\sf AST}}}$		
	MA-525G90.		
	 The ducts shall be constructed as per SMACNA standard. 		
	Theductsshallbedesignedfor100mmofWCpressure.		



	• The ducts will be used for clean room class 100 environments. To meet	
	this requirement, the GI sheet for manufacturing the ducts shall be totally	
	oil free.	
	• Velocity for Supply Air shall not exceed 1500 fpm and return air shall not	
	exceed 1000 fpm, ducting shall be complete with dampers, vans, anchor	
	fasteners, supports, access doors, neoprene rubber gaskets etc.	
	• All the ducts shall be supported with the building structure with GI	
	threaded rods of 10mm dia and spring isolators of GI or coated suitable for	
	clean rooms.	
	• Ducting shall include dampers, supports, Isolators etc.	
	• All duct supports; re-enforcement shall be galvanized.	
	• All the dampers shall be Al anodized.	
	• The duct sections shall be joined with Angle iron flange joints.	
	• All the edges with min or leaks should be sealed with silicon sealant.	
	• Duct inspection window to be provided in the main ducts and	
	plenum boxes. The inspection windows shall be leaking proof,	
	easy to open/close.	
	The ducts fabrication work shall be carried	
	out in dust free environment. Sheet	
	Specifications:	
	All duct work, sheet metal thickness and fabrication unless otherwise directed,	
	shall strictly meet requirements, as described in IS: 655-1963 with	
	amendment-I (1971 edition).	
b	22G Ducting	SQMTR
	Flexible Duct Work	
	• Insulated, flexible duct work shall be installed from Al supply duct work to each	
	HEPA filter ceiling module.	
	The flexible duct work shall be sealed and secured at each filter module	
	and sheet metal collar utilizing stainless steel flexible duct bands and duct	
	band locks.	
	• The diameter of flexible duct shall be12" (approx.) matching with the air inlet	
	collar size.	
	• Flexible ducting shall be heavy duty suitable for +2500 Pa of air pressure and	
	30m/s air velocity.	
	Material of duct: Multiple layers of Al-polyester laminated with spring steel wire helix	
с	Flexible duct dia 250mm	DN/T
d	Volume Control Damper	SUNTE
	• At the junction of each branch duct with main duct and split of main duct	JUNIT
	volume dampers must be provided. Dampers shall be two gauges heavier than	
	the gauge of the large duct and shall be rigid in construction.	
	• The volume dampers shall be of an approved type, lever operated and	
	completed with locking devices which will permit the dampers to be adjusted	
	and locked in any position and clearly indicating the damper position.	



	• The dampers shall be of splitter, butterfly or louver type. The damper blade	
	shall not be less than 1.25 MM (18) Gauge, reinforced with 25MM angles 3MM	
	thick along any unsupported side longer than 250MM.Angles shall not interfere	
	with the operation of dampers, nor cause any turbulence.	
e	Fire Dampers	NOS
	 Automatic fire dampers to be provided wherever required as per the safety 	
	standards. The damper shall be multi blade louver type. The blades should	
	remain in the air stream in an open position and shall be constructed with	
	minimum 1.8 mm thick galvanized sheets. The frame shall be of 1.6 mm	
	thickness. Other materials shall include locking device, motorized actuator,	
	control panel to trip AHU motor etc.	
	 The fire dampers shall be capable of operating automatically on receiving 	
	signal from a fire alarm panel. All control wiring shall be provided between	
	fire damper and electric panel.	
	 A hinged and gasket access panel measuring at least 450mmx450 mm shall be provided on duct work 	
	Before each reheat coil and at each control device that may be located inside the ductwork	
f	Thermal Insulation	
	Supply & Return Air Duct Thermal Insulation with Aluminum foil faced self-	
	adhesive, Closed cell, Nitrile Rubber Insulation with proper sealing of joints filled	
	with silicon sealant. Insulation of duct exposed to atmospheric/ambient	
	conditions using Aluminum faced Closed cell Nitrile rubber, Class 'O 'fire rating,	
	density not less than 50 Kg/m3 all the joints shall be sealed with 75mm thick Al	
	tape.	
	Al-Cladding: HVAC ducts exposed to UV light shall be claded with Aluminum	
	Sheets of suitable gauge.	
	12mm thick for Boturn air ducting	SQMTR
-	Istinit thick for Return all ducting	SQMTR
g	Return Air Grills with collar Damper	NOS
h	Return Air Grill	
	The linear diffusers/grilles shall be fabricated from Aluminum extruded	
	sections. The diffusion blades shall be extruded, flush mounted type with	
	single or double direction air flow. The frame shall be of aluminum extruded	
	described under grilles shall be provided wherever specified	
9	Wet Chemical Exhaust (Existing System to be utilized)	LOT
	The existing wet chemical exhaust blower with a capacity of 10.500 CFM shall be	
	repurposed to serve the Annex Laboratory. " <i>Necessary modifications to the</i>	
	ducting on the terrace shall be carried out to ensure proper connectivity to	
	Annexe-1 and Annexe-2 laboratory".	
10	Electrical	
	HVAC Electrical Panels	NOS
	1) HVAC Electrical Panel : General Design Consideration a) System configuration	
	i. Voltage Supply: 415V± 10%	



	$ii. Frequency: 50 Hz \pm 5\% iii. No of Phase and grounding: 3 Phase \& Solidly ground earthiv.$	
	PowerDistribution: A.C., 3 Phase 4 wire for 3 Phase system, 1 Phase 3 wire	
	system b) Code & Standards All electrical equipment and accessories to be	
	furnished, installed and commissioned shall be designed, manufactured, tested	
	and installed in accordance with relevant Indian Standard Specifications (ISS),	
	Indian electricity rules and any other applicable regulations.	
	2) Cabling for electrical supply from wall mounted electrical panel to respective	
	AHUs/Chillers/Pumps/Humidifier shall be armored copper cables.	
	3) Copper lugs should be used for cable termination.	
	4) Bus bar for incoming should be of copper.	
	5)Cabling for all the equipment shall be laid through GI ladder or conduit	
	. 6) AHU blower should operate on VFDs	
	Heater's control should be through Thyristors	
	8)Star-delta starter for chilled water pumps	
	9) Electrical Panel with bypass arrangement DOL/SD type electrical control panel	
	and provision Microprocessor controller with display for Temperature, RH	
	controlling, monitoring with status (AHU) interlocking with 3-way modulating	
	valve & Strip heater system and SCR for Heater controllers. Provision for: a) AHU	
	(Heaters, Blower, Humidifier) b) Pumps c) Chillers d) Compressor e) Process	
	Cooling Water system	
	10) AHU panel Interlocks a. FlowSwitch-1nos b. AHUDoorinterlock-1nosc. Smoke	
	and Fireinterlock-1nosd.ThermalInterlock-	
	1nose.AccesscontrolEmergencyinterlock-1nos.	
	HVAC Electrical DB: Supply, Installation, Testing and commissioning of Floor	
	mounted type 14swg CRCA Powder coated electrical control with main	
	incomer MCCB and provision for Microprocessor controller with HMI(refer the	
	I/O points mentioned in the Technical Specifications, PLC panel with HMI).	
	HVAC electrical DB will have the following provisions	
	1)AHUBlower-VFD-3Ph-2nos.	
	2)Chillerunit-41Kw,3Ph-Contactor-2nos.	
	3)Heater-SSR-90,50Kw3Ph-2nos.	
	4)Pumps-7.5Kw,3Ph-ContactorwithStarDeltaStarter-2nos.	
11	PLC Panel With HMI	
	Dedicated HVAC BMS system with HMI panel shall be with the following I/O's.	
	1)AirFlowSwitch-2nos	
	Room Air temp. and RH	
	Chiller interlocks (Provision only)	
	2)AHU Door interlock-2nos	
	3)Chiller-PumpInterlock-2nos	
<u> </u>	4)SmokeandFire-2nos	
<u> </u>	5)Thermal Interlock-2nos	
	6)Access control Emergency interlock-2nos.	



12	Electrical Cabling and Accessories (Cables, wire, conduit, Earthing, Switch		
	boards, Switches/Sockets etc)		
	Cables		
	The scope includes the Supply and installation of ISI marked PVC/XLPE insulated,		
	Extruded PVC inner sheath, GI strip armored overall FRLS PVC outer sheathed,	ĺ	
	on wall/surface/existing cable tray as required as per	1	
	the detailed specification and quantity in the BOQ. Control cables shall be copper condu	1	
	ctorPVCinsulated and power cables shall be XLPE insulated. The necessary	ĺ	
	nardware for installation of cables like cable tie, clamps, tags etc. Will be in the	1	
	KEI/NICCO/CCI/National/gloster/Ecko Instrumentation cables shall be	1	
	conforming to BS 5308, type II, 300/500 Grade with stranded 0, 75sg mm conper	1	
	conductor, PVC insulated, color coded, twisted to form a pair/pairs, twisted to	ĺ	
	form a unit .units laid up .mvlertaped binding, overall screened with aluminium	1	
	mylertap with tinned copper drain wire, extruded inner sheathed, galvanized	ĺ	
	steel round wire/strip armoured, overall IFRLSPVCsheathed.	1	
13	Wire		
	The scope includes the Supply and installation of stranded Copper conductor	1	
	wire, 1100-volt grade, FR PVC insulated single core conforming to IS 694 as per	ĺ	
	the detailed specification, quantity in the BOQ.	1	
	Conduit: The scope includes the Supply and installation of ISI make rigid steel,	ĺ	
	hot dip galvanized conduits of different size, quantity & Specification as per	ĺ	
	BOQ. The conduit shall be installed on wall/surface/ metal truss/existing cable	ĺ	
	tray, as required. Flexible conduit shall be made with bright cold rolled	1	
	annealed and electro-galvanized mild steel. Installation of conduits shall include	ĺ	
	all necessary hardware, metal strip, welding, Clamps etc.	<u> </u>	
	CablingforAHUBIowerInterlockandEmergencyLight-2nos2.5mm2,3CoreCable		RMT
	Cablingformodulatingvalve-2nos1.5mm2shielded3CoreCable		RMT
	CablingforPumps-7.5KW-2nos4mm2,4coreCable-2nos		RMT
	CablingforDuctTempSensor-2nos1.5mm2shielded3CoreCable-2sets	1	RMT
	CablingforDiffrentialpressuresensor1.5mm2shielded3CoreCable-9sets		RMT
	Cablingfor-Flowsensor-3Nos.1.5mm2shielded3CoreCable-2nos		RMT
	Cablingfor-RoomTempandRh-3Nos.1.5mm2 shielded 3Core Cable-3sets		RMT
	Cablingfor-WaterThermalSensor-2Nos1.5mm2shielded3CoreCable		RMT
	CablingforChillers16mm2cable4Corecable-2sets		RMT
	CablingforAHUBlower18Kw-2nos-4core6mm2cable-2sets		RMT
	CablingforHeaters-3Ph,75Kw-25mm2,3Corecable-3sets		RMT
	CablingforHeaters-3Ph,50Kw-16mm2,3Corecable-3sets		RMT
	CablingforHMIPanles1.5mm2shielded3CoreCable	[RMT
	GI Perforated Trunking with supporting System		RMT
14	Gas Lines		
	Existing gas lines should be dismantled and refixed as per the below specification.		
	1. Electro-polished SS316L. High-quality compression fittings for Argon & Nitrogon Gas lines		
	Niti ugell das illes.		
	2. Ivietal to metal face-seal VCK fittings to be considered for Oxygen Gas	<u> </u>	



	Line.			
	3. Average roughness of 10 RA			
	4. Consider orbital weld joints for all Straight and Tee Connections of Tubing. Vendor should utilize available welding machine at CeNSE.			
	5. Testing			
	1. Pressure hold test at 1.5 times of operating pressure for 24 hours with 0 psi			
	pressure drop.			
	2. [Amendment added on 2nd Dec 2020] Helium leak test. Must demonstrate a			
	leak rate of less than 9x10-9 std cm3/s.			
	3. Oxygen/moisture/particle tests			
15	Misc			
A	Scaffolding Charges for duct erection	1	LOT	
В	Duct Supporting system		LOT	
С	Wall Openings for doors, wall panels, gas lines, Duct entry	1	LOT	
D	Engineering, Design and drawings		LOT	
E	Documentation		LOT	
F	Commissioning and validation		LOT	
G	Packing forwarding and Transportation		LOT	
н	Housekeeping	1	LOT	
1	Dismantling of existing Ducts at the Lab		LoT	
J	Civil works for AHU, Chiller, Pumps, Tank Placement	1	LOT	
к	Dismantling of False ceiling and Gypsum boards around the wall	1	LOT	
16	Validation			
А	Chillers- 6 deg C			
В	Cleanroom Temp- 20 +/- 2 deg C			
С	Cleanroom RH- 45+/- 5 %			
D	Light- 500 Lux			
E	Noise- 55 +/- 2dB			
F	ESD flooring- 10Megaohm to 1Gigaohm			
G	Particle count- as per Cleanroom Class 10000			



Annexure 1

Sr. No.	Description	Makes
1	Air handling unit(AHU)	VTS/ Citizen/Flaktwoods/Systemair/Zeco
2	Motors for AHU	Crompton/ Greaves/ ABB/ Siemens/ Schnider
3	Chillers	Daikin, Trane, Carrier.
4	Starter	Siemens/ABB/L&T/Schneider
5	Fire dampers	Air Master/ Caryaire/ Ajanta/ System Air/ Cosmos
6	Pan type humidifier	Rapid cool/ nordamann/ walter meier/ appidi
7	Ducting – GI Sheets	SAIL/TATA/Jindal
8	Duct insulation	Armaflex/k flex/supreme/aeroflex/ trocellene
9	Butterfly & ball valves	Regin/Siemens/ L&T/GEC/BDK/ZOLOTO
10	3-way, mixingvalve	Honeywell/Siemens/Johnson/Belimo/Regin
11	Balancing valve	L&T/Advance/Bell & Gossett/Tour & Anderson
12	Y-Strainer	Sant /DS Engg/Lehry/ASIAN/ZOLOTO
13	Pumps	Johnson/ Grundfos /Armstrong/ wilo ,Blue Star
14	Pipe SS	TATA/Jindal
15	Pressure and Temperature	WIKA/FORBE MARSHALL/HGURU/WAREE/BAUMER
	gauges	
16	BMS PLC and controls	Regin controls

A. Recommended makes for HVAC system:



Annexure 2 Lab Layout drawings



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Annexure 3 Lab Layout drawings



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Annexure 4

*(To be submitted In the company letter head by supplier)

Declaration of Local Content by Local supplier

Subject: Public Procurement (Preference to Make In India)

We hereby declare with reference to above subject and references

thatM/s ----- (Tick whichever is applicable as below)

"Class-I local supplier" meeting the requirement of minimum local content equal to 50% (fifty percent) or more defined in the above government notification for the goods and services

(or)

"Class-II local Supplier" meeting the requirement of local content 20% to less than 50% (fifty percent) defined in the above government notification for the goods and services

(or)

Non Local supplier (If not belonging to Class-I &

Class-II)Please mention the details against the

following: Enquiry no: dated.

Type of Supplier (Class-I/Class-II)

Product:_____

Project:....

Details of location at which local value addition will be made is as follows:

We also understand that the false declarations will be in breach of the code of Integrity under rule 175(1)(i)(h) of the General financial rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the General Financial Rules along with such other actions as may be permissible under law.

Authorized Signature M/s_____

(Signature and seal)

Place:....

Date:....

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Annexure-5

Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Details of the Bidder

- Sl. No Items Details
- 1. Name of the Bidder
- 2. Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership

Deed)

- 3. Registration No/ Trade License, (attach attested copy)
- 4. Registered Office Address
- 5. Address for communication
- 6. Contact person- Name and Designation
- 7. Telephone No
- 8. Email ID
- 9. Website
- 10. PAN No. (attach copy)
- 11. GST No. (attach copy)

Signature of the Bidder

Name Designation, Seal



Annexure-6

Declaration regarding experience

To, The Chair, CeNSE, Indian Institute of Science, Bangalore – 560012, India

Ref: Tender No: XXXXXXXXX Dated: XXXXX

Supply and installation of a "" at Physics, IISc Bangalore

Sir,

I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company / firm has ---- years of experience in supplying and installing - -----

(Signature of the Bidder) Printed Name

Designation, Seal



Annexure-7

Declaration regarding track record

To, The Chair, CeNSE, Indian Institute of Science, Bangalore – 560012, India

Ref: Tender No: XXXXXXXXX Dated: XXXXX

Supply and installation of a "Turbo pumping system" at Physics, IISc Bangalore

Sir,

I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company/ firm is not currently debarred / blacklisted by any Government / Semi Government organizations / institutions in India or abroad. I further certify that I'm competent officer in my company / firm to make this declaration.

Or

I declare the following SI.No Country in which the company is Debarred /blacklisted / case is Pending Blacklisted / debarred by Government / Semi Government/Organizations /Institutions

Reason Since when and for how long (NOTE: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

Yours faithfully (Signature of the Bidder) Name Designation, Seal



Annexure – 8

Declaration for acceptance of terms and conditions

To, The Chair, CeNSE, Indian Institute of Science, Bangalore – 560012, India

Ref: Tender No: XXXXXXXXX Dated: XXXXX

Supply and installation of a "Turbo pumping system" at Physics, IISc Bangalore

Sir,

I've carefully gone through the Terms & Conditions as mentioned in the above-mentioned tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration. Yours faithfully,

(Signature of the Bidder) Name Designation, Seal



Annexure – 9

Details of items quoted:

- a. Company Name
- b. Product Name
- c. Part / Catalogue number
- d. Product description / main features
- e. Detailed technical specifications
- f. Remarks

Instructions to bidders:

- 1. Bidder should provide technical specifications of the quoted product/s in detail.
- 2. Bidder should attach product brochures along with technical bid.

3. Bidders should clearly indicate compliance or non-compliance of the technical specifications provided in the tender document.