

TECHNICAL SPECIFICATIONS AND OTHER ALLIED REQUIREMENTS

Sl No.	Description of items	Quantity
File No.	PUR/400/SCEG/RK/E/2023-24	
1	Supply, Installation of Electron Beam Evaporation System. (DETAILED SPECIFICATIONS AS PER ANNEXURE – I)	01 Set.

1. DELIVERY, INSTALLATION:

The delivery, installation is to be completed within 08 weeks from the date of issue of purchase order. The installation and demonstration shall be carried out by your expert- engineers of supplier/Manufacture. During fabrication & installation necessary training on operation and maintenance of the goods/system shall be imparted to relevant Scientist/Engineer/Technicians.

2. AMC REUUIRED:

The Annual Maintenance Contract 01-year to be provided by the Supplier at no additional cost.

3. PAYMENT TERMS:

100% payment shall be paid within 30 days after delivery, installation of Electron Beam Evaporation System and acceptance of the material upon submission of claim supported by the acceptance certificate issued by the purchaser.

4. PERFORMANCE SECURITY:

Performance Security @3% of invoice value shall be provided by the supplier within 21 days from the date of issue of Purchase Order.

5. BID SECURING DECLARATION FORM:

Bid Securing Declaration is to be submitted by the Bidder as per the format prescribed in the tender document.

6. WARRANTY:

12 months' warranty to be provided by the supplier from the date of satisfactory installation of ordered goods.

7. MANUFACTURER AOTHORISATION FORM:

Manufacturer Authorisation Form to be provided by the supplier.

8. MAKE IN INDIA CERTIFICATE FOR LOCAL CONTENT

Certificate for local content to be provided by the supplier in form 14 (Format attached along with Tender Document). Percentage of value addition & Name and address of the factory where the value addition was made should be mentioned clearly in the Form 14.

Annexure-I

TECHNICAL SPECIFICATION OF SUPPLY AND INSTALLATION OF ELECTRON BEAM EVAPORATION SYSTEM -01 no.

SL. NO.	ITEMS		SPECIFICATIONS
1.	ELECTRON BEAM EVAPORATION SYSTEM	(A)	VACUUM CHAMBER: <ul style="list-style-type: none"> ➤ Material of Construction (MOC): SS 304 grade or better. ➤ Minimum Chamber size: 500 mm (W) X 500 mm (D) X 500 mm (H) ➤ A front opening quick access door for loading & unloading of the substrates and materials. ➤ One high vacuum compatible, toughened glass view port with periscope view mechanism. ➤ At least one set of removable stainless-steel liners for easy cleaning ➤ Baffle plate to prevent debris from being deposited on electrodes and the high vacuum valve ➤ Necessary ports required for pumping, evaporation sources, gas Inlet, vent, gauge, feedthrough, view port, port for substrate heater and rotation mechanism etc
		(B)	ION CLEANING GADGETARY <ul style="list-style-type: none"> ➤ A bar type ion bombardment gadget with necessary HT feedthrough and cable for the glow discharge cleaning of the substrate work holder ➤ A 5000 volts DC Open circuit, 3500 volts at 50 mA high reactance type transformer and solid state bridge rectifier. Thyristor based power controller for HT power control and a digital panel meter for the HT primary current display
		(C)	ELECTRON BEAM SOURCE <p>One no. of E-beam evaporation source with following:</p> <ul style="list-style-type: none"> ➤ Minimum 4 no's with not less than 4cc volume crucibles (each) ➤ Power: 3 KW (@5 KV) ➤ Constant emission current regulation $\pm 0.5\%$ ➤ Beam deflection: 270° ➤ Integrated X-Y beam sweep coils ➤ Water cooling system ➤ Quick release electron emitter assembly ➤ Feedthrough kit with two numbers of Ceramic high voltage feedthrough, water feedthrough, water pipes and water-cooling connection kit ➤ Electron beam water flow switch kit ➤ An Electro pneumatically operated source shutter ➤ Motorized turret indexer
		(D)	ELECTRON BEAM GUN POWER SUPPLY: <p>Power supply comprise a free-standing power supply module and remote mounting high voltage gun control panel operational at 5KV. The power supply with the following specifications:</p> <ul style="list-style-type: none"> ➤ Power Supply: operational at 200-240 V, 3 phase, 50Hz. ➤ 5kV, 600 mA output with Twin Tetrode Power Tubes for $\pm 1\%$ voltage regulation & instantaneous

			<ul style="list-style-type: none"> ➤ Digital display of high voltage and filament/emission currents ➤ Interconnecting cables ➤ Safety interlocks for air cooling, high vacuum, water cooling and turret rotation ➤ Easily movable power module ➤ Integral high voltage transformer ➤ Forced air cooling facility
		(E)	<p><u>BEAM SWEEP:</u></p> <p>X-Y beam sweep controller of independent control of the following parameters in both X and Y direction:</p> <ul style="list-style-type: none"> ➤ Beam position ➤ Beam sweep amplitude and frequency ➤ Sinusoidal, triangular or square waveforms ➤ The various Sweep Patterns
		(F)	<p><u>SUBSTRATE HOLDER WITH ROTATION AND HEATING:</u></p> <ul style="list-style-type: none"> ➤ Capable of holding a 150 mm non-uniform sample with a maximum weight of 250 gm. ➤ The non-uniform sample will rotate continuously during deposition. Rotation speed adjustable up to 20 rpm on its axis. ➤ Sample rotation axis should be perpendicular to the evaporation direction. ➤ Sample will rotate on its horizontal axis. ➤ A suitable Substrate Heater of minimum 200 degC with a thermocouple and PID temperature controller. ➤ The substrate heater should be oxygen environment compatible up to maximum temperature. ➤ Temperature accuracy within ± 5 degC ➤ Simultaneous rotation & heating mechanism.
2.		(A)	<p><u>FILM THICKNESS MONITOR: 01 no.</u></p> <ul style="list-style-type: none"> ➤ Standard sensor inputs: two ➤ Measurement frequency range: 6.5 to 1.0 MHz ➤ Frequency resolution: ± 0.30 Hz @ 6 MHz ➤ Thickness and rate resolution/measurement: ± 0.37 Å ➤ Measurement interval: 0.10 to 2.0 sec ➤ Measurement filter: 01 to 20 readings ➤ Stored films: At least 90 ➤ Two analog outputs (rate and thickness): 0 to 5 V (dc), ➤ Digital inputs & relays: Two inputs, four relay outputs ➤ Communications interface: RS-232, Optional: USB or Ethernet ➤ Power: 200 to 240 V (ac), 50/60 Hz, 20 W ➤ CE compliance: Class 1 equipment, 73/72/EEC LVD, 89/336/EEC ECD ➤ RoHS compliance: Yes ➤ Windows software: Provides remote setup and operation.
3.	VACUUM PUMPING SYSTEM	(A)	<p><u>HIGH VACUUM PUMP:</u></p> <ul style="list-style-type: none"> ➤ An Air-Cooled Turbo molecular pump with suitable pumping speed (minimum 400 lit/sec) to achieve chamber vacuum level at least 5×10^{-7} mbar. ➤ Detachable liquid nitrogen trap to be provided for fitting below the high vacuum valve and for use when needed. ➤ Ultimate Pressure: $\leq 5 \times 10^{-7}$ mbar to be achieved

		(B)	<u>SCROLL PUMP:</u> <ul style="list-style-type: none"> ➤ Dry scroll pump of (10 m³/hr. or higher) for roughing and backing operations.
		(C)	<u>HIGH VACUUM VALVE:</u> <ul style="list-style-type: none"> ➤ Motorized high vacuum Poppet valve with built in facility to automatically throttle the pumping system by 'cracking' the valve for maintaining accurate process pressure for plasma processes, when needed. ➤ Drawing and photographs of Poppet valve should be attached with the technical bid.
		(D)	<u>VACUUM VALVES:</u> <ul style="list-style-type: none"> ➤ Electro pneumatically operated right angle valves for roughing, backing and high vacuum applications. ➤ An electrically operated vent valve. ➤ Fine control needle valve.
		(E)	<u>SS PLUMBING AND COLLAR:</u> <ul style="list-style-type: none"> ➤ SS Plumbing line with flexible hoses & KF connections wherever required with necessary interlocks.
		(F)	<u>VACUUM GAUGES:</u> <ul style="list-style-type: none"> ➤ A digital gauge with two numbers of high pressure pirani gauges monitor the pressure in the range of 1000 mbar to 10⁻³ mbar. ➤ A digital gauge with an inverted magnetron sensor to monitor the pressure in the range of 10⁻² mbar to 10⁻⁷ mbar.
4.	MOUNTING FRAME / SUPPORT STAND	(A)	<ul style="list-style-type: none"> ➤ Main cabinet should be power coated, and it should have front and back side door for easy servicing and maintenance. ➤ Main cabinet should be mounted on 4 castor wheels for mobility and easy maneuverability with jack bolt for keeping in specified location.
5.	CONTROL CONSOLE	(A)	<ul style="list-style-type: none"> ➤ A standalone Industrial standard control console which will be integrated to the system. All the controllers and displays, emergency ON/OFF Switch, sweep controller and deposition monitor will be mounted on the control console.
6.	WATER CHILLER	(A)	<ul style="list-style-type: none"> ➤ Water chiller should be provided for the whole unit with interlocks, tank, etc. Minimum capacity should be 1.0 TR, Minimum tank capacity: 40 Litre.
7.	AIR COMPRESSOR	(A)	<ul style="list-style-type: none"> ➤ Air compressor should be provided
8.	NECESSARY SPARES AND CONSUMABLES		<ul style="list-style-type: none"> ➤ Complete O-rings – 1 set ➤ Quartz crystals for Thickness Monitor- minimum 10 No's, ➤ Graphite crucibles- minimum 5 No's ➤ Molybdenum crucibles – minimum 5 No's ➤ EB Gun Filament – not less than 6 No's
9.	ON SITE COMPREHENSIVE WARRANTY		<ul style="list-style-type: none"> ➤ 12 months from the date of commissioning and acceptance of equipment
10.	ELIGIBILITY CRITERIA		<ul style="list-style-type: none"> ➤ A declaration from the OEM to support the user with all the spares for a minimum period of 10 years. ➤ The model offered in the technical bid should be available in the website of OEM.
11.	PROVISION FOR FUTURE UPGRADATION		<ul style="list-style-type: none"> ➤ Electron beam gun and power supply should be upgradable in future within the same systems without changing any other sub-systems.

12.	UTILITIES		➤ Details to be provided in the offer for space, power supply, gases, etc. for system operation
13.	MANUAL		➤ Operation manual to be given after installation and acceptance of equipment
14.	USER TRAINING		➤ Onsite hands-on training for minimum 2 users (not less than 2 working days) should be provided to make them well familiar with the operation of various components and successful growth of the thin films using the given deposition unit.