



राष्ट्रीय प्रौद्योगिकी संस्थान - आंध्रप्रदेश  
NATIONAL INSTITUTE OF TECHNOLOGY ANDHRA PRADESH  
Near National Highway No. 16, Kadakatla, Tadepalligudem – 534101  
West Godavari District, Andhra Pradesh

Ref. No.:NITANP/DSOS/2022/573/14

Date:07.09.2022

**LIMITED TENDER ENQUIRY**

**Sub: Supply of Electron beam and thermal evaporation unit for thin film deposition**  
**–Quotation invited – Regarding.**

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Please send your lowest quotation to supply the item(s) as attached in Annexure-1. The quotation is to be sent in a sealed envelope by to the following address:

**C/o Tender Box**  
**Material Management & Disposal Section,**  
**Sardar Vallabhbhai Patel Administrative Building**  
**NATIONAL INSTITUTE OF TECHNOLOGY, ANDHRA PRADESH,**  
**Near National Highway No. 16, Kadakatla,**  
**TADEPALLIGUDEM – 534101**  
**West Godavari District, Andhra Pradesh.**

**The quotation has to be sent by Post (Ordinary / Register / Speed Post) or drop in a drop box physically. (Any other mode will not be accepted)**

The envelope must be subscribed as “**QUOTATION**” at the center of the envelope and the above **reference number at left top** along with the name of the tender on the envelope. Quotations without the above subscription **will not be accepted**.

The last date to receive the sealed quotation is **28.09.2022**

## Annexure-1

### Supply of Electron beam and thermal evaporation unit for thin film deposition

#### Quantity-01

#### Technical details of Thermal and Electron Beam Evaporation System

Thermal & Electron beam Evaporation systems will be used for Laboratory R &D applications for preparation of various types of thin films (metals, Semiconductors and Insulating) for optical and electronic device applications, The basic unit consists of a deposition chamber and vacuum pumping system together with all the electrical components necessary for the coating process.

**VACUUM CHAMBER:** 12" Non-Corrosive and nonmagnetic stainless steel Metal box type chamber (40 cm x 40 cm x 40 cm or above) with front door opening. The chamber is fabricated from polished stainless steel. Removable liners inside the chamber. One circular glass window enables visual inspection of the coating process. Water cooling pipeline on the outer wall of the chamber to prevent overheating and to reduce the out gassing by circulating the water.

**VACUUM PUMPING SYSTEM:** The chamber is evacuated by a diffusion pump backed by a double stage direct drive, rotary vacuum pump (desired vacuum range:  $1 \times 10^{-3}$  m.bar to  $3 \times 10^{-3}$  m.bar and above). Vacuum Coating Unit is containing following vacuum components & Valves.

**Rotary Vacuum Pump**----- (1 No) Capacity 250 LPM, Direct drive, Single phase, Double stage, Oil charge 0.75liters, Ultimate vacuum  $1 \times 10^{-3}$  m.bar.

**Diffusion Pump:** --- (1No) Size: 6", Displacement 700 LPS, Heater wattage 500 watts, Oil charge 100 ml DC 704 silicon oil. Ultimate vacuum  $2.0 \times 10^{-6}$  m.bar.

**6" Butterfly valve**---- (1No) High vacuum valve is fixed to a base plate of 13" dia. this valve isolates the chamber from the pumping system so that the chamber can brought to atmospheric pressure without switching off the pumping system.

**6" LN<sub>2</sub> Trap:** Capacity 2 L, for better vacuum.

**1" Quarter swing Butterfly Valves**----- (2 No.s) one is for roughing and another for backing.

**A 1/4" air admittance valve**----- (1 No) is fixed to the chamber pipeline to release the chamber vacuum after each coating process cycle.

**Needle valve:** [1No] along with the unit for gas purging. A fine control needle valves providing in the pipeline for use during H.T. discharge cleaning or Sputtering employed.

#### Chamber gadgetry (Standard):

**L.T EVAPORATION FEEDTHROUGHS:** 1No. of LT electrical feedthrough for evaporation made of electrolytic pure copper with 200 Amps current carrying capacity.

**H.T ION CLEANING FEEDTHROUGH AND GADGETARY:** One HT electrical feedthrough to carry power for ion cleaning. A strip type ion bombardment gadget is fixed on the feedthrough to provide uniform glow discharge.

**ELECTRICAL CONTROLS:** Unit operates on 220V A.C 50 Hz single phase power supply.

**L.T POWER SUPPLY:** A 200 Amps power supply capable of delivering 200 Amps at 10 Volts. 100 amps at 20 volts intermittent-1Nos

**H.T POWER SUPPLY:** A 5000 volts DC open circuit. 3500 volts at 50 mA high reactance type transformer and solid-state bridge rectifier.

**L.T/H.T CONTROL:** Variac (Dimmer) Controller in the input circuit of LT/HT selector for the output power variation.

**METERS:** Separate digital panel meters provided for HT primary current LT secondary current through current transformers.

**SAFETY DEVICES:** A thermostat switch fitted to the water-cooling coils of the diffusion pump protects from excessive heating by switching off the heater.

An electrical circuit breaker in HT/LT/SH power supply line to protect these against over-load shorting. An over load protection device for vacuum pump motor.

**Electron Beam Gun Power Supply with Gun Assembly:** 3 KW Electron beam gun power supply controlling by single phase and thyristor controller with single source electron gun assembly power I/P:230 V/Single phase,50 Hz, Maximum O/P power: 3 KW, H.T. Voltage: 5-7 KV adjustable, Filament Supply 10 V @ 30 Amps, Emission current:500 mA, Four Source (Beam Deflection angle, 270° ), Minimum cooling water supply: 3 liters/min @ 20 degrees centigrade.

**Evaporation Source holder and Shutter:** manually operated source shutters (1 No.) with rotary shaft seal to cover the evaporation sources.

**Substrate Holder with Heating:**

- The substrate holder platform and associated fixtures is designed to accommodate 1 no of 3" diameter or bigger diameter or multiple substrates of smaller dimension can be accommodated.
- The substrate heater (IR lamp and filaments) is rated to heat the substrate from Room Temp. to 600 °C.
- The temperature of the substrate holder is controlled by digital PID controller using 'K' Type thermocouple.

**Digital Thickness Monitor:**

- Digital Thickness monitor with water cooled crystal holder, 1 No. of sensor head, feed through and Oscillator will be providing to measure the rate of deposition and thickness of thin film.
- Rate display: 3 digits LED auto ranging from 00.01 to 999 Ang/sec.
- Thickness Display: 4 Digit Display unit.
- Static thickness resolution: 1 Å at minimum update rate.

**VACUUM MEASURING GAUGES:**

**PIRANI GAUGE:**

This unit consists digital pirani gauge and two pirani gauge heads to independently monitor the backing and roughing pressure in the range of 0.999 to 0.001 mbar through a selector switch.

**PENNING GAUGE:**

A digital penning gauge with a gauge head to monitor high vacuum in range of  $9.9 \times 10^{-3}$  to  $1 \times 10^{-6}$  m bar

- **Safety devices:** Electrical circuit breakers are provided in HT/LT/Substrate heater power supply line to protect against over-load shorting. An over load protection device for vacuum pumps.

**Control console:**

Control console is fabricated with mild steel and neatly powder coated. It is accommodating all the electrical control instrumentation, control switches and standalone control panel of the following switches;

- ✓ ON/OFF switches for vacuum pumps and all valves
- ✓ vacuum measuring gauges controller
- ✓ Substrate rotation and substrate heater controls

The above control console is wired to operate on 230 V AC, 50Hz, Single phase power supply.

**Support structure:** should be made out of MS channel and angles, neatly painted and have castor wheels for mobility purpose.

- All the spare parts and supporting accessories need to be provided

**Water chiller: (1 No)**

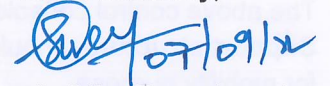
Reputed make 0.5TR capacity industrial chiller with 50 ltrs storage tank, water level indicator, temperature controller and water pump. The water-cooling lines are plumbed using standard flow meters and flow meters are used to control the sufficient water flows to the magnetron, chamber etc. The water lines are fitted with standard filters. Water distribution manifold is required

- Standard Warranty: Vendor will have to provide 1 year warranty for all the components of the system from the date of installation of the machine
- If Vendor has supplied similar configuration Electron Beam Evaporation Unit of the same brand / make to reputed Institutes in India. Please provide the list of such institutes along with the contact details.

While sending your lowest quotation – please specify the following:

1. Sales Tax : Inclusive  
GST : Indicate prevailing tax on percentage basis.
2. Excise Duty :
3. Rates  
a) F.O.R. Destination/  
b) Estimated Packing, Forwarding and Freight Charges in case of Ex-works only, may be mentioned on percentage basis.
4. Insurance : Inclusive/ indicate on percentage basis, in case payable by the Institute.
5. Preferred terms of payment (institute rules permit to pay on Receipt of materials in good condition/completion of the work):
6. Recommended mode of transport :
7. Discount offered, if any :
8. Validity of the offer :
9. Firm schedule of completion of work :
10. Detailed drawings / catalogues / Leaflets / literature / samples may be furnished wherever feasible / required
11. Please indicate clearly whether the rates quoted herein are the same as applicable to DGS & D / Government Department / Other Public Sector Undertakings.
12. The supplier shall invariably furnish the **Certificate of Clearance of GST Registration number along with the quotations.**
13. Please mention the Quotation number and name of the item/s (in brief) on your envelope when submitting your quotation to the Institute
14. Please note that the Director reserves the right to modify or alter the specifications and also to reject any or all the Quotations without assigning any reasons thereto.
15. The suppliers / firms are informed not to call on us without prior appointment.
16. The Institute is not responsible for delays / loss in postal transit or due to any other reasons.
17. Any Violation in the terms and conditions, the bidder will be made ineligible for the contract.
18. Presently our Institute doesn't have DSIR certificate so no concession in GST. Normal rate of GST will be applicable.

Yours faithfully,



Head of the Department

सह अधिष्ठाता / Associate Dean  
CENTRAL STORES & PURCHASE SECTION  
NIT Andhra Pradesh

