



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

Purchase Requisition No. 1000005117 (SRM Rfx No. 6100000080)

TECHNICAL SPECIFICATIONS FOR ELECTRON BEAM EVAPORATION SYSTEM

Electron beam evaporator for depositing metal, oxides and semiconductor thin films.

Technical specifications for the required electron beam evaporation system are as follows:

1. Vacuum Chamber: Non-corrosive, non-magnetic, water cooled, front door type opening stainless steel chamber with removable stainless steel liners and necessary pumping lines, valves, ports and connections for vacuum pumps, power supplies, substrate heater, and thickness monitor.
2. Frame to mount the system with castor wheels etc and instrumentation rack. All components should be fully mounted in an aesthetic metal cabinet. Digital thickness monitor, rotatory drive control, gauges, valves, and controls for evaporator etc. should be mounted on the front panel.
3. 4 pocket, 4cc crucible size for E-beam evaporation (Make: Telemark or ULVAC or substantially equivalent) with bottom drive and shutter. A suitable rotatable crucible with indexer and automatic crucible positioning should be included.
4. 2 or 4 pocket crucible for thermal evaporation should also be there to system to work in dual mode of E-beam and thermal evaporation. A suitable rotatable crucible with indexer and automatic crucible positioning should be included.
5. Shutters either manual or pneumatic should be there for both the electron gun and thermal evaporation source.
6. The chamber to be able to achieve pressure of 5×10^{-7} mbar. Operating pressure: 5×10^{-6} mbar.
7. Suitable standard turbo vacuum pumps, roughing pump and gauges should be provided for creating and monitoring the vacuum. (Make for pumps: CTI / Austin /Leybold /Alcatel /Varian /Edwards / Pfeiffer or substantially equivalent)
8. All feedthroughs/welds on the flange should be leak tested and leak rate should be $< 1 \times 10^{-8}$ mbar -liters/sec.
9. Digital thickness monitor (make INFICON / Telemark / ULVAC or substantially equivalent): water cool crystal holder, thickness resolution- 1 Å, rate accuracy: 0.1Å/sec. Expected lifetime of crystal should also be mentioned. Should be combined with sensors in such a way that the thickness can be monitored from two different places.
10. Substrate holder: up to 4 inch, motorized 360 degree rotation, adjustable speed. Substrate heating adjustable to 400°C or higher, digital PID controller and display.
11. Manual or automatic power supplies for electron beam gun, along with their accessories. (Make: Telemark or ULVAC or EDWARD or TEMESCAL or substantially equivalent)

12. Cooling systems, such as chillers, should be provided.
13. Control system to be in the front side. Necessary safety panel switches should be provided for the system.
14. Necessary power supply to heat the sources should be provided.
15. Installing and commissioning: The supplier or his representative will do free of cost installation and commissioning of the equipment at IIT Bombay. The infrastructure/utilities required from IIT Bombay during installation and commissioning should be intimated with the offer.

TERMS AND CONDITIONS

1. Vendor should supply the original invoices, original warranty certificates and original test reports of the imported items of the electron beam evaporation system.
2. The system must be complete in all respects and the manufacturer must ensure complete integration of all sub system with cables, connectors as required and take the responsibility for service.
3. Detailed manufacturing drawing of the mounting flange with accessories should be provided along with the quotation.
4. Total footprint, weight and cooling requirements, if any, to be clearly mentioned and will be an important factor.
5. Vendor has to provide complete set of operation, service & maintenance manual, technical manuals with full diagrams and drawing in duplicate.
6. Acceptance: Upon post-dispatch of equipment, it will be accepted as per the following acceptance criteria: Demonstration of all controls, safety devices, etc.; Testing of complete assembled unit for ultimate vacuum better 1×10^{-6} mbar under normal operational conditions. Deposition of Titanium (10 nm), Nickel (10 nm) by electron beam evaporation for desired thickness and uniformity better than $\pm 5\%$; Deposition of Aluminum, Silver (50 nm) by thermal evaporation for desired thickness and uniformity better than $\pm 5\%$; and testing of all sub-system for their performance mentioned in the specification.
7. Training: Training should be given at least 2 days by the firm engineer at user's site after completing the installation and commissioning of the system by the vendor with free of cost.
8. The system must be complete in all respects and the manufacturer or representative must ensure complete integration of all sub-system with cables, connectors as required and take responsibility of service and supply spares.
9. Requesting following additional information from vendors:
 - Brochure of the standard equipment.
 - Warranty for duration for 1 year standard and 2 years extended warranty with Comprehensive Maintenance Contract (CMC).**
 - Details of current installations in India.
10. Delivery period: 90 days