



CSIR-CSIO

CSIR-CENTRAL SCIENTIFIC INSTRUMENTS ORGANISATION

Sector - 30/C, Chandigarh - 160 030 (India)

www.csio.res.in

e.mail : purchase@csio.res.in,

cosp@csio.res.in

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EXPRESSION OF INTEREST

Central Scientific Instruments Organisation (CSIO) intend to procure “**Ion Assisted Deposition System with Dual EB Gun and Thermal Evaporation Facility**”. To finalise the broad-specifications of the system, a Pre-Indent Conference (PIC) has been arranged on **17.12.2015 at 11.00 A.M.** The prospective manufacturers their authorized channel partners or agents/suppliers and system integrators, are invited for discussion with the committee on the aspects of utility, technology, feature, literature, design, technical parameters, clientele, and other related issues of the equipment. The prospective bidders are requested to depute your technical expert professionals for this purpose. The tentative specifications can be seen at annexure A at our website www.csio.res.in.

The committee shall finalize specification after knowing/obtaining details about relevant/available technology in the market suiting to the requirement and R&D needs of CSIO. The Committee shall also evaluate the credentials/ Technical capabilities /financial standings and track record of the companies/ vendors attending the PIC and on the basis of these, it will also finalize minimum qualification criteria for bidding.

Controller of Store & Purchase

ANNEXURE : "A"

Tentative Specifications For "Ion Assisted Deposition System with Dual EB Gun and Thermal Evaporation Facility"

A. Vacuum Chamber:

S/n.	Specifications
A.1.	Vacuum Chamber must accommodate at least three or more rectangular substrates of size 310 mm x 160 mm x 10 mm or more
A.2.	02 sets of protection shields for chamber walls, door and top of the chamber
A.3.	Necessary separation between the E-beam gun sources to avoid cross-contamination of the materials during deposition

B. Vacuum Pumping System:

S/n.	Specifications
B.1	Ultimate vacuum desired for the system is 4.0×10^{-7} mbar or better measured in a clean, cold system. Pump down time for ultimate pressure 24 Hrs.
B.2	The system must be able to produce a vacuum of 1.0×10^{-5} mbar or better within 60 mins after opening the high vacuum valve under minimum 300 degree centigrade substrate temperature.
B.3	Pre Vacuum Pumping System (Combination of Rotary and Roots pump) Pumping capacity of Rotary Pumps: 65 m ³ /hour or better Pumping capacity of Roots Pump: 500 m ³ /hour or better
B.4	High vacuum pump : Closed loop Compressed Helium based Cryo Pump Pumping Capacity of Cryo Pump: 8,000 l/s or better for air and for water vapour 17,500 l/s or better.
B.5	High vacuum Plate Valve must include a 90 Deg. Elbow for Cryo pump protection.
B.6	The items at serial no. B.3, B.4 & B.5 must be from a reputed US/European manufacturer.
B.7	Cold/Hot water distribution system for suitable operation of chamber and pumping system

C. E- Beam Evaporation System:

S/n.	Specifications
C.1	Two fully programmable E beam evaporation sources with power supply of 10 KW to 12 KW to enable simultaneous co-evaporation from both the EB guns. (In case of single power supply, it must be at least 10 KW and in case of two single power supplies, it must be at least 6 KW for each evaporation source) Make: Reputed US/European manufacturer
C.2	The electron beam sources must have provisions to be operated sequentially as well as simultaneously for co-deposition of two materials.
C.3	Four pot crucible of size 30cc each E beam source with crucible indexer.
C.4	Single pot crucible of 100cc E beam source with rotation and with additional 4 pot crucible of size 30 cc each which can fit into the same arrangement as the 100cc crucible.

D. Thermal Evaporation Source:

S/n.	Specifications
D.1	Resistive Thermal evaporation source of maximum rated power of 4 KW or more with separate power supply.

E. Substrate Holder and Heating Assembly:

S/n.	Specifications
E.1	Spherical calotte substrate holder having load weight capacity of up to 40 kgs.
E.2	Rotation of the substrate holder with a maximum possible speed of 30 rpm or better with speed control.
E.3	Substrate heater having variable temperature range from ambient to 300 degree centigrade temperature on the substrate.

F. Water Distribution system:

S/n.	Specifications
F.1	Water distribution system must consist of stainless steel pipe lines distributed evenly to the plant and the controlling solenoid valves and other gadgets must be suitably mounted on a frame.
F.2	The water pressure, water temperature and water flow must be indicated digitally on the Water distribution system.
F.3	The flow switches must have variable switching point and must be introduced in every branch individually at the exit. The outgoing pipe line must have integrated non - return valves.
F.4	The desired working pressure & flow rates must be properly displayed on the Water distribution system.
F.5	Warm water unit must be used to reduce the absorption of water vapor from the atmosphere while the fixture is being loaded with substrates. Control of cool / warm water must be automatically controlled with electrical water valves.

G. Thickness Monitoring and Control:

S/n.	Specifications
G.1	Quartz Crystal deposition controller with 4 or more crystal sensor head holder and drive for automatic selection of crystals.
G.2	Two additional quartz crystal monitors (with one or two crystal sensor head holder) to monitor and control the evaporation rate of individual EB gun sources for simultaneous evaporation.
G.3	The deposition controller must be integrated with the power supplies and the shutters for automated simultaneous and sequential deposition and process control
G.4	System to have an access/provision for retrofitting/upgrading to a Broad Band Optical Thickness Monitor at a later stage whenever CSIO needs.

H. Gas Inlet System:

S/n.	Specifications
H.1	The system must have provisions for MFC regulated gas supply for hollow cathode Ion source, neutralizer, substrate cleaning and reactive coatings. (For Oxygen, Nitrogen and Argon.).

I. Ion source:

S/n.	Specifications
I.1	Hollow Cathode Gridless filamentless ion source for ion assisted deposition is required to be integrated with the process control Make: Reputed US/European manufacturer
I.2	Ion source shall be used for coating on plastic substrates like PC, PMMA etc of varying sizes upto 310 mm x 160 mm x 10 mm (Maximum) rectangular plates. The firm must clearly mention that the offered ion source parameters are adequate for the chamber size and substrate dimensions.
I.3	The ion source must also have the capability for substrate cleaning/pre-treatment.

J. Film quality Parameters:

S/n.	Specifications
J.1	The system must ensure film thickness uniformity $\leq \pm 2\%$ on individual substrates of sizes upto 310 mm x 160 mm x 10 mm in a batch (with test certificates).
J.2	Batch to batch Reproducibility must be $\leq \pm 2\%$ (with Test certificates).

K. Acceptance Tests and Training:

S/n.	Specifications
K.1	The firm has to demonstrate the required film thickness uniformity and reproducibility on the substrate surface of maximum dimensions by using single layer Quarter wave optical thicknesses of at least Al_2O_3 and SiO_2 .
K.2	The firm also has to demonstrate wavelength peak at 545 nm using at least 10 alternate layers of SiO_2 and Al_2O_3 (Quarter wave Optical Thickness).
K.3	Training for three scientists at factory site for at least 7 days for the acceptance tests mentioned in K.1 and K.2.
K.4	Two weeks training at the user site (CSIO) after satisfactory installation.
K.5	Company must provide some literature indicating the certified technology related to co-deposition of multi-layers of metal or/and semiconductor oxides and publications (in highly reputed SCI journals using their systems).
K.6	Firm must give a certificate that they have installed at least 5 desired or similar types of systems during last three years (dual e-beam gun with ion assisted and thermal facility) worldwide. List of users of similar systems during last three years to be supplied along with quotation.

L. Consumables/Spare parts and operational Tools Required:

S/n.	Specifications
L.1	E B Gun filament (20 Nos.).
L.2	Necessary tools for easy assembly and routine maintenance of E beam system.
L.3	30 Quartz crystals.
L.4	5 Nos. of Liners (Mo Liners) to fit into the crucible pot of capacity 30cc.
L.5	2 Nos. of Liners (Mo Liners) to fit into the crucible pot of capacity 100cc.
L.6	10 Nos. of Thermal evaporation boats (Mo).
L.7	E B Gun filament (20 Nos.).
L.8	Kit of spares parts for maintenance of the machine for a period of 2 (two) years operation to be quoted. However the supplier must ensure continuous supply of spares throughout the useful life of the machine (for at least 10 years period)

M. Process Control Software:

S/n.	Specifications
M.1	Fully automatic, programmable and user friendly control software modules for precise monitoring and control of the coating plant.
M.2	System to have a capability of running at least 70 layers without breaking vacuum. Supporting documents/original brochures to be attached.
M.3	The system must be able to carry out all the control sequences including pre-treatment, coating and post treatment deposition modules.
M.4	The process control must have different operating modes like manufacturing mode, process mode, service mode, configuration mode at different operator level.
M.5	Main touch screen panel must have at least 4 windows option for monitoring the process, Alarms, Input/output signals.
M.6	Upto 300 Alarms are to be stored with different categories heading like for information only, warning, termination.
M.7	The process control software must have networking option for remote diagnostics.

N. Warranty:

S/n.	Specifications
N.1	One year standard warranty from the date of installation / commissioning against all the design, material, manufacturing defects etc.

O. Installation and commissioning:

S/n.	Specifications
O.1	Detail drawing of the equipment (System dimensions L X W X H), details of power supply requirement are to be supplied along with the quotation.
O.2	Requirements like vibration criteria, air conditioning, and flooring and any other installation requirements, if any, are to be specified.
O.3	The supplier to provide the Test certificate for different subsystems of the equipment.

P. Manuals / Documentation

S/n.	Specifications
P.1	Supplier must supply all printed catalogues and soft copies for systems/ subsystems.
P.2	One set of the following documents are to be supplied with the machine during delivery: <ul style="list-style-type: none">○ Operation and maintenance Manual○ Spare part list○ Electrical wiring diagram of various control modules etc.○ Preventive maintenance check list, troubleshooting charts and their guidelines

Q. Optional Items:

S/n.	Specifications
Q.1	The firm MUST quote comprehensive AMC services for 5 years after the expiry of the standard warranty.

Note: The price of all the subsystems are to be quoted part-wise.