

Telephone 22574479 [EN]

Extn.



Department of ELECTRICAL ENGINEERING
Indian Institute of Technology, Madras
I.I.T.P.O., MADRAS - 600 036.

Ref. No.

Date 14/12/15.

ELE	MEL	2015	Thin Film Co-evaporation system.
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Under certificate of posting

b/c

Due Date: 04/01/2016

Dear Sirs,

- Quotations are invited in duplicate for the various items shown below/overleaf/enclosed list.
- The Quotations duly sealed and superscribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.
- The Quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
- If the item is under DGS & D Rate contract, Rate Contract Number and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate Contract price. If so, please send copy of the R.C. (Please note that we are not Direct Demanding Officers).
- Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable.
- Local Firms: Quotations should be for free delivery to this Institute. If Quotations are for Ex-Godown, delivery charges should be indicated separately.
- Firms outside Chennai: Quotations should be for F.O.R Chennai. If F.O.R. consignor station, freight charges by passenger train/lorry transport must be indicated. If Ex-Godown, packing, forwarding and freight charges must be indicated.
- The rate of Sales/General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, claim for Sales/General Taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax applicable to non-Government Educational Institutions run with no profit motive for which a commission. Sales Tax certificates will be issued at the time of final settlement of the bill
- Good should be supplied carriage paid and insured.
- Goods shall not be supplied without an official supply order.
- Payment: Every attempt will be made to made payment within 30 days from the date of receipt of bill/acceptance of goods, whichever is later.

Quotation to be sent below address
with closed cover.

Yours faithfully,

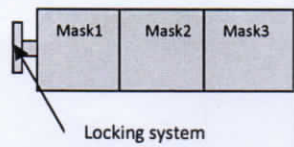
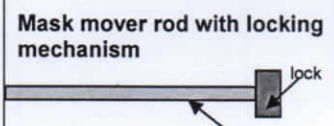
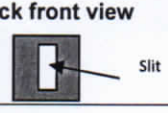
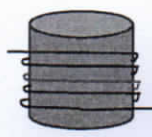
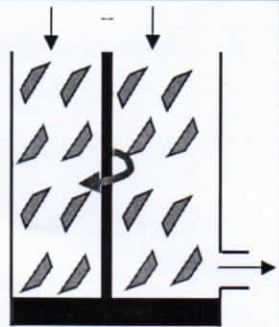
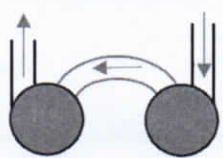
DR. DEBDUHA RAY
ASSISTANT PROFESSOR
DEPARTMENT OF ELECTRICAL ENGINEERING
IIT MADRAS




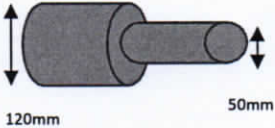
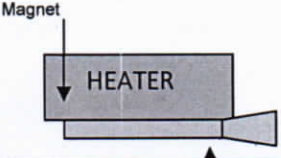
HEAD / Project Co-Ordinator

Fabricate a fully functional thin film co-evaporation system with custom designed load-lock with the following specifications:


Sl. No.	ITEM	SPECIFICATIONS/FEATURES	FIGURE
1	Vacuum chamber	<ul style="list-style-type: none"> Made out of non-magnetic SS grade, AISI-304L Cylindrical shaped chamber having dimension 450mm (D) X 500mm (Ht) One high vacuum compatible, toughened glass view port (150mm diameter for the glass) Two numbers of side ports (inner diameter 50mm). Standard KF 50 port mouth. One set of thin stainless steel sheet liner to prevent the deposition on the chamber wall Chamber must be provided with ports to connect turbo pump, rotary pump and gauges Chamber must also be provided with ports for evacuation, vacuum measuring gauge heads, gas feeding valves, etc. Chamber base plate must be provided with necessary required feed through ports for mounting, shutters etc. Top plate must be attached to the specially designed substrate heater with four pillars at its centre (shown in figure of next column) Top plate must have feedthroughs for the heater and one thermocouple (4 electrical points) Ten or twelve pure copper evaporation source stands (with vacuum feedthrough) must be provided where the source boats will be screwed on. Top cover and chamber must have slots for alignment. Pressure <math>10^{-7}</math> Torr Bottom plate must be provided with electrical feedthroughs with white LED lighting. 	
2	Substrate holder	<ul style="list-style-type: none"> Substrate holder is a rectangular box having 78mm L, 43mm W and 12mm H, which can hold four substrates of 1"X0.5" dimension It has four slots of 27mm L, 14mm W and 5mm depth, in which samples are placed. It also has the provision to screw a pull rod having 8mm Ø and 750mm L on one end. Substrates are held by using a top cover, which is a 68mmX43mm stainless steel plate having a rectangular hole of 64mmX21mm on it, which is screwed on the substrate holder at its four corners. Top cover has a rail on it, through which the mask-plate can be moved Top cover must not occupy more than 1mm space in 	

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		between mask and substrate	
3	Mask plate and mask mover rod	<ul style="list-style-type: none"> Mask plate (assembly of three shadow masks) is a stainless steel plate having 1mm thickness, 222mm L and 27mm W (Length includes a T-shaped extension for locking to the mask mover). Mask is moved with respect to the substrate holder by using a rod (mask mover) having 8mm Ø and 350mm length. Mask mover comes from one side port (opposite to the one from which substrate and mask come in). This side port must have a 50mm cylindrical extension (with 10mm Inner Ø) having two vacuum seals on both ends to provide additional support for rod. Mask mover has a locking system on its tip and this tip is always inside the chamber. 	<p>Shadow mask with locking mechanism</p>  <p>Mask mover rod with locking mechanism</p>  <p>Lock front view</p> 
4	Chamber Gadgetry		
(a)	Wires for source heating	<ul style="list-style-type: none"> 4 LT evaporation wires Made out of electrolytic pure copper having 200Amps current carrying capacity 	
(b)	Chamber gadgetry on the bottom plate	<ul style="list-style-type: none"> A stainless steel mesh filter covering the pumping port to protect the turbo molecular pump from entry of unwanted particles A dummy plate made out of SS is mounted above the mesh filter & fixed to the base plate using three/four pillars 	
5	Vacuum system		
(a)	Turbo molecular pump (TMP) (1 No.)	<ul style="list-style-type: none"> Pumping speed (for N₂): 560 l/s. Compression ratio for N₂ > 10⁹ Rotational speed > 36000 RPM +/- 2% Run-up time < 4 min Ultimate pressure: < 5x10⁻¹⁰ mbar The pump must be supplied with display control units and necessary cables (complete TMP setup) Only Pfeiffer Vacuum or Oerlikon Leybold brand TMP will be acceptable. Full paperwork with warranty details should be supplied. 	
(b)	Two stage rotary vane vacuum pump (1 No.)	<ul style="list-style-type: none"> Pumping Speed : 250lit/min Ultimate Vacuum < 1 x 10⁻³ mbar Inlet/outlet Connection: KF-25 Motor Power : ½ HP Single Phase (230V AC, 50Hz) Oil Capacity: 1litres Emergency electrically operated valve at backing port. 	

(c)	Gate valve (2 No.)	<ul style="list-style-type: none"> • 250mm ID main gate valve (1 No.) • 50mm inner diameter (used with load lock) (1 No.) • Manually operated 	
(d)	Plumbing lines	<ul style="list-style-type: none"> • Made of SS304L material of 1" NB 	
(e)	Pirani and Penning gauges	<ul style="list-style-type: none"> • With 2 Pirani sensors and one Cold cathode sensor • A combined measuring range from <u>1000 mbar to 10⁻⁷ mbar</u> with digital display of pressure. 	
6	Digital Thickness Monitor (2 No.s)	<ul style="list-style-type: none"> • Rate Display : 3 Digit LED Auto Ranging from 0.00 to 999 Ant/sec • Thickness Display :4 digit LED display • Crystal Frequency : 6MHz • Film Density: 0.800 to 99.99 gm/cubic sec 	
7	Load lock	<ul style="list-style-type: none"> • Cylindrical shaped • 50mm (Inner Ø) x 250mm (L) • Opened on one end (standard KF 50 port mouth) and on other end attached to a movable rod (substrate pull rod through vacuum seal). Movement should be leak-free and should withstand high vacuum. Rod diameter: 8mm. Length:750mm • Must have a 100mm cylindrical extension for the load lock (with 10mm Inner Ø) having two vacuum seals on both ends which provides additional support for rod. • The substrate pull rod must have an extension having square cross section (4mm) and length 8mm with a 2mm screw hole on it. This portion is always inside the load lock and is for connecting to the substrate holder. 	 <p style="text-align: center;">Substrate pull rod</p>
8	Intermediate chamber (Adapter)	<ul style="list-style-type: none"> • Made out of non-magnetic SS grade, AISI-304 • Cylindrical shaped with length 30mm. • One end having inner Ø 120mm and outer Ø 150mm; other end having diameters same as the load lock (inner Ø 50mm, standard KF 50 port mouth). • Both ends must have rubber O-rings for vacuum tight connection (standard KF 50 on one end). • Provide suitable vacuum locks to seal and connect this chamber to glove box (contact for details). • Standard KF 50 port sealing mechanism between this chamber and the load lock. 	
9	Substrate heater	<ul style="list-style-type: none"> • 125mm (L) X 105mm (W) X 30mm (H) rectangular heater attached to the centre of top plate using four pillars (copper contact area) • Bottom of heater has one metallic rail made up of slightly flexible metal through which substrate holder and mask assembly slides. 	

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		<ul style="list-style-type: none"> • The bottom rail has a funnel type extension having 50mmX50mm square mouth towards the side port for easy sliding of substrate holder (this must be exact aligned to the side port). • The other end of heater has a buried magnet on bottom side which ensures good contact with substrate holder • Temperature: up to 200°C 	
11	Knudsen cell type heater	<ul style="list-style-type: none"> • One Knudsen cell type heater system which can give a maximum of 80 to 400°C with Digital PID controller & Thyristor Drive 	
10	Vacuum clamps (KF)	<ul style="list-style-type: none"> • Necessary KF vacuum clamps for the system. 	 <p>KF 50 vacuum clamps</p>
12	Purging port	<ul style="list-style-type: none"> • For purging N₂ 	