

**DEPARTMENT OF CHEMICAL ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY, DELHI  
HAUZ KHAS, NEW DELHI-110016**

**Dated-4th March 2013**

**NOTICE INVITING QUOTATIONS**

**Sub: Purchase of "GLOVE BOX INTEGRATED WITH THERMAL EVAPORATOR"**

Sealed quotations in separate envelopes of technical and commercial bid kept in a one sealed outer envelope are invited for purchase of a Glove Box integrated with Thermal Evaporator as per specifications given below:

**SPECIFICATIONS:**

- i. A Glove box with glove ports, viewing glass windows, anti-chamber etc.
- ii. A rectangular box type of coating unit with diffusion pump backed by rotary vane pump, vacuum gauges, LT & HT electrodes, substrate holder etc.
- iii. Digital thickness monitor with water-cooled crystal feed-through one set for each coating unit.
- iv. A combined control console for the total system with standard system protection and interlocks for the safe operation of the total system.
- v. Mounting stands for the coating unit and glove box for easy operation.

**Ante Chamber:**

The Ante-chamber designed for vacuum of the order of  $10^{-2}$  mb and the vacuum is measured with pirani gauge.

**Isolation Valve:**

1" Quarter swing Butterfly type stainless steel non-magnetic valve provided in the vacuum line and can be operated manually.

**Vacuum Pump:**

A Direct Drive Double Stage Rotary Pump of 250 lit/min capacity is connected to both Glove Box and Ante Chamber through isolation valve and SS bellow and pipeline.

**The specifications of Rotary Pump:**

Free air displacement capacity	: 250 lit/min (15m <sup>3</sup> /hr) 8.9CFM
Ultimate vacuum at the intake with Mcleod Gauge (With Gas ballast Closed)	: $1 \times 10^{-3}$ mb.

Vacuum connection	: KF-25.
Motor H.P.	: 1/2 H.P. Single Phase.
Cooling	: Forced air cooling.
Pump rotation speed	: 1440 rpm.
Vacuum with gas ballast open	: $5 \times 10^{-2}$ mb.
Oil temperature	: 55°C after 7 hours.
No. of stages	: 2.

## **DIGITAL HIGH PRESSURE PIRANI GAUGE**

### **SPECIFICATIONS :**

Measuring range	: $1 \times 10^{-3}$ mb. To 999 mb. (N2 Equivalent)
Display	: 3 digit 7 segment filament LED display.
Resolution	: 1 digit of display bellows 1 mbar
Response time	: 200 m seconds.
No. of gauge heads	: One.
Recorder output	: 10 volts recorder output
Operating temp. range	: 10 to 85 °C.
Bridge voltage	: 2.5 V to 12.5 V approx.
Process control relay	: DPDT, 2A at 230 VAC resistive load.
Power	: 10W nominal.
Main supply	: 230V, 5 Amps, 50 Hz
Control unit size	: 113 W x 135 H x 250 D
Cable length	: 2 m.

### **Side Door:**

Side door of the main chamber away from antichamber is openable fully with suitable locking arrangement to facilitate transfer of big instruments inside the glove box if required.

### **Pressure Gauges:**

6" Size dia Gauge suitable for both vacuum and positive pressure measurement and also an electronic pressure sensor with controller is provided.

### **Ports:**

Two windows on the front side for Gloves. One side port with flange for Ante-chamber fixing and one at the back for taking power supply leads inside glove Box.

### **Ante Chamber:**

350mm dia x 400mm long. Material SS 304 provided with hinged door.

**Valves:**

Solenoid operated valves to isolate pump from Glove Box and antechamber and are mounted outside the chambers. Also, solenoid controlled valves will be provided for back filling to Glove box and antechamber.

**Flanges:** 'O'ring sealed flanges are all machined flanges.

**Port Connections:** All port connections are KF couplings only.

**Weldings:** All weldings are done by TIG Argon welding.

**Mounting Stand:**

Constructed of all welded steel tube. Frame is provided with jacking facility and level adjustment features on caster rollers.

**BOX TYPE COATING UNIT****High Vacuum Pumping**

The High Vacuum system built with 4" size diffstack type of diffusion pump suitable for general pumping of gases in any chamber. The system contains Rotary Vane Type Mechanical Pump, Oil vapor Diffusion Pump and necessary valves. If the Liquid Nitrogen Trap is filled with LN2 the system gives  $10^{-6}$  mb. One Analog Combined Pirani-Penning Gauge provided for monitoring vacuum of Backing, Roughing and High Vacuum.

**Rotary Vacuum Pump****Specifications:**

Free air displacement capacity	: 250 lit/min (15M <sup>3</sup> / hr.)
Ultimate vacuum at the intake with	
McLeod Gauge (With Gas ballast Closed)	: $1 \times 10^{-3}$ mb.
Vacuum with gas ballast open	: $5 \times 10^{-2}$ mb.
Vacuum connection	: KF-25
Exhaust port	: KF-25
Motor Power	: ½ HP, Single- Phase. (230V/AC 50 Hz.)
Cooling	: Forced air cooling.
Pump rotation speed	: 1440 rpm.
Oil temperature	: 55 <sup>0</sup> C. after 7 hours.

No. of stages	: 2.
Oil Capacity	: 0.75 lit
Seal material	: Viton
Noise level	: 60 Db
Overall dimension LBH	: 500 x 132 x 250mm
Weight	: 26 kg.

### **Diffusion Pump:**

Size	: 4"
Pumping Speed	: 500 lit/sec (Unbaffled pumping)
Ultimate vacuum	: Better than 10(-6) mb.
No. of stages	: Three stages.
Material of construction	: Body: Stainless steel 304.
Jet	: Stainless steel 304.
Pumping fluid charge	: 100 ml.
Backing Pump displacement	: 250 lit/min.
Warm up time(min)	: 20 mins.
Cool down time(min)	: 20
Heater rating	: 500 watts.
Operating Voltage	: 230V AC 50 Hz. Single phase.

## **DIGITAL PIRANI PENNING COMBINED GAUGE**

### **PIRANI GAUGE**

Measuring range	: $1 \times 10^{-3}$ mbr. to 999 mb. (N <sub>2</sub> Equivalent)
Display	: 3 digit for value 1 ½ digit for exponent value 1 digit for channel number.
Resolution	: 0.1 of the display value
Response time	: 200 m seconds.
No. of gauge heads	: Two.
Recorder output	: 0-10 V DC (All channels)
Operating temp. range	: 10 to 85 ° C.
Bridge voltage	: 2.5 V to 12.5 V approx.
Power	: 10W nominal.

Main supply : 230V, 5 Amps, 50 Hz

### **PENNING GAUGE:**

Measuring range :  $5 \times 10^{-3}$  mbar to  $1 \times 10^{-6}$  mbar.  
 Operating voltage : 2 KV DC.  
 No of gauge head : One  
 Construction : Metal construction.  
 Response time : 0.5 Sec.  
 Input Voltage : 230V AC, 50 Hz.  
 Magnet : Permanent Magnet made out of ferrite magnet.  
 Field Strength : About 550 Gauss.  
 Material of construction : Glass to metal seal, S.S. Rod, aluminium body  
 and ferrite magnet.  
 Coupling : QF 25 Quick seal coupling.  
 Cable length : Two meters for each gauge head.

### **Metal Belljar:**

D shaped chamber of 300 mm length and height 450 mm fabricated from SS 304 material.  
 either strip filament , coiled filament, basket etc can be fixed depends on the requirement .

### **H.T.Power Supply:**

It comprises of an H.T. Transformers of 3.5 KV 50m A (5KV open circuit) and with H.T. cables connected to feed through in the base plate. The supply is controlled from the standard HT/LT switch fixed in the front panel.

### **L.T. Power Supply:**

It is derived from LT transformer of having capacity of 10 Volts, at 400 Amps and 20 V, 200 Amps, capable of delivering 360 Amp at 10V and 160 Amps at 20 V for evaporation purpose. The necessary connecting cables are provided.

### **Electrical:**

Mains Supply : 230 V AC, 50 Hz.  
 LT Power supply : An LT transformer capable of delivering 100 amps at 20V  
 or 200 amps operating at 10-V for evaporation purpose.  
 HT Power Supply : 5000 VDC open circuit used for ion bombardment and  
 DC Sputtering gadget, 3.5 KV at 50 m Amps.  
 LT/HT Control : A 8 amps Dimerstat in the input circuit of LT/HT selector

switch.

Meter : Separate meters for LT voltage & current reading.

### **DIGITAL THICKNESS MONITOR:**

#### **Specifications:**

Thickness maximum	: Transducer Limited typically 5000 micro gm/sq.cm much as 20,000 Microgram/sq for well behaved materials.
microgram/Sq.Cm=37 Ang.A)	
Rate display	: 3 digit LED.
Thickness display	: Automatically varied 0.4 to 5 update/sec.
Static thickness resolution	: 1 Ang. At minimum update rate
Input parameter	: Tooling factor, density and accoustic impedence inputs allow readout directly in Angstroms.
Films No.	: Allows input parameter for 1 to 100 films to be entered.
Tooling factor	: 1.0 to 999.9%.
Film accoustic impedence	: 5.000 to 99.99 x 10 <sup>(-5)</sup> gm/cm. Sec
Shutter control	: Dedicated replay.
Thickness set point	: 0.000 to 990.9% K. Ang. Shutter closed when displayed thickness equals or exceed set point.
Start Control	: Zeros thickness and open shutter.
Stop control	: Zeros thickness and open shutter.
Shutter position indicator	: LED on indicates shutter relay activated.
Crystal compatibility	: 5 or 6 Mhz, jumper, Jumper selectable
Crystal Holder	: Water cooled.
Crystal test display	: Type of crystal being used (5 or 6 Mhz)
Crystal Health	: % of crystal life remaining 0% of life referenced to a film thickness of 925 K.A of aluminum.
Crystal Frequency	: 5 or 6 Mhz.
Output Control	: Rate of thickness select. Full scale and zero scale output useful in calibration recording equipment.

Self test	: Automatic detection and indication of oscillator failure, power line failure, internal failure.
Power Requirement	: 230V AC, 50 Hz, 5 Amps.

**Terms and conditions:**

1. Quotations must be in sealed envelope; technical and commercial bid must be sent separately in two sealed envelopes & then put together in one envelope. The quotes must reach the following address by 19th March 2013, by 17:00 hours latest.

**Prof. A. N. Bhaskarwar****Department of Chemical Engineering.****Indian Institute of Technology, Delhi****Hauz Khas New Delhi – 110016.****[Kind Attn: LabII-384**

2. Price must be quoted CIF New Delhi.
3. Please specify warranty period.
4. Indian agency certificate must be enclosed if applicable.
5. Proprietary certificate might be enclosed if applicable.
6. Payment through L/C.
7. Validity of quotations should be at least 3 months.
8. Period of delivery should be mentioned.
9. Educational discount should be mentioned.
10. No advance payment will be made.

**Remarks: The Institute reserves the right to accept or reject any of quotations without assigning the reason thereof.**

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