



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

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Technical Specification of Glove Box with Integrated Thermal

(8-arm glove box with integrated spin coater, electrical feedthrough and thermal evaporator)

- A) Glove Box Work Station (Right Hand BOX1)** with stand having castors and machine feet and following specifications and integration of deposition system

Minimum Inner Box Dimensions 900 mm x 1800 mm x 775 mm [H x L x D]
Glove box should be modular and expandable with bolted side panels.
Four Polymer glove ports (diameter~220mm), O ring sealed with gloves
Inside surface brushed finish Ra 1.2 μm and Outside surface coated, white (RAL 9003)
Leak rate < 0.05 Vol %/h or lower
Front Window Polycarbonate with additional coating for chemical & Scratch resistance
Dust filter 0.3-micron, class H13 should be included in the work station
Stainless Steel sliding shelves (3 Nos) should be included in the work station.
Automatic Box pressure range $\pm 15\text{mbar}$ with oil-free pressure relief valve
It should include Water proof Foot pedal for box pressure manipulation
Glove box should have 5 DN 40 feed through, one should be electrical
Fluorescent lamp should be front mounted with automatic auto off facility
Main antechamber Cylindrical design with stainless steel sliding tray
Size (internal dimension) 390mm diameter x 600mm length
Vacuum/Refill process with Manual operation
Pressure gauge, Manometer analogue display
Mini- Antechamber right –Inner dimensions , diameter 150mm and Length 400mm
Position 1/3rd inside and 2/3rd outside with Hinged doors and sliding tray
3 way valve and hinged cover inside and outside

- B) Glove Box Work Station (Left Hand BOX2)** with stand having castors and machine feet and following specifications and for integration of sublimation system

Minimum Inner Box Dimensions 900 mm x 2000 mm x 775 mm [H x L x D]
Glove box should be modular and expandable with bolted side panels.
Four polymer glove ports (diameter~220mm), O ring sealed with gloves
Inside surface brushed finish Ra 1.2 μm and Outside surface coated, white (RAL 9003)
Leak rate < 0.05 Vol %/h or lower
Front Window Polycarbonate with additional coating for chemical & Scratch resistance
Dust filter 0.3-micron, class H13 should be included in the work station
Stainless Steel sliding shelves (3 Nos) should be included in the work station.
Automatic Box pressure range $\pm 15\text{mbar}$ with oil-free pressure relief valve

It should include Water proof Foot pedal for box pressure manipulation
Glove box should have 5 DN 40 feed through, one should be electrical
Fluorescent lamp should be front mounted with automatic auto off facility
Mini- Antechamber left –Inner dimensions , diameter 150mm and Length 1100mm
3 way valve and hinged covered inside and outside

C) Gas purification and Circulation unit,

PLC Controller with Color Touch panel for all operation including remote monitoring of glove box parameters including sending alerts and maintenance notifications. Option should be readily available for voice assisted operation also.
PLC controlled Double Column purifier with capacity of each column, oxygen removal 36L and Moisture removal 1300g
Should maintain purity < 1ppm H₂O and O₂ (at complete pressure range)
Circulation unit should be fitted with a blower of speed upto 85m³/hour speed
Rotary vane pump should have oil mist filter, Oil re-circulation (Gas Ballast) Vacuum: Better than 17 m³/hr, dual stage.
Blower speed reduction or increase, as per O₂ and H₂O level
Positive Pressure regulation without vacuum pump should be possible.
Fluorescent lamp with automatic auto off facility
Activation of above features should be possible at user's Set Time.
Automatic PLC controlled regeneration sequence
Exhaust -Combined gas purge outlet from the gas purification system , regeneration gas outlet ,vacuum pump outlet and Glass Bottle for regeneration gas

D) Oxygen Sensor

PLC controlled and Solid State
Inline positioned
Measuring range: 0-1000 ppm
Should be free from frequent calibration

E) Moisture Sensor

PLC controlled and solid state sensor
Inline positioned
Measuring range: 0-500 ppm
Should be free from frequent calibration

F) Heat Exchanger

should integrated with the glove box along with suitable recirculating chiller

G) Recirculation Chiller (2nos)

Temperature Range 5 to 25° C
Temperature Controller Microprocessor Digital PID controller cum Indicator, Accuracy +/-1 °C
Temp. Stability +/-0.1 °C, Sensor PT100 Sensor
Cooling Capacity at 0°C 1000 watts
Bath Volume 10 - 12 Ltrs, Flow rate 15 Ltrs per minute
Pump Type should be Chemical resistant magnetic pump
Pump Pressure 2 bar

H) Solvent adsorption unit

with 5kg activated carbon should be integrated with Glove Box to allow the use of organic solvents inside the glove box. Should have provision for PLC controlled Re-generable solvent

trap with 8 kg adsorbent loading with inline circulation line positioned PLC controlled solvent sensor with range 0 to 4,000ppm and operated through the control panel.

I) Purging

Purging to be automatically activated, when the Oxygen in the glove box is exceeded, able to set point (10-999ppm) and continuously purging till the set point is reached and automatically start the circulation of the gas purifier. Automatic and adjustable mechanism for regular gas purge with time, duration and the day. Glove box purging to be operated by the operational panel of the purifier up to 200l/min with PLC control as well as manual regulation valve. Able to purge both the box or any one when opted for partition wall and and/or box piping

J) PVD Deposition System

Vacuum chamber integrated in glove box at rear wall.

Should be Suitable for substrates size up to 100 x 100 mm or Ø 100mm

System to include PLC-control with additional touch panel (colour) Operating interface for all main

functions of the evaporator including graphical interface of the system.

Should be approx. 400 x 400 x 500 mm (WxDxH)

Material vacuum chamber should be stainless steel,

Viewing port DN100 including shutter is needed on inner door

Doors inside and outside should be of Aluminium, Ni-plated

Inside, horizontal should be sliding door, outside should be hinged door

Stainless in-liner as protection shielding for easy removal and cleaning on chamber and Doors

To include high vacuum measurement system including PIRANI and PENNING vacuum gauge head (metering range: atmospheric pressure to high vacuum)

Pre-vacuum rotary vane pump (2-stage), 14m³/hour pumping speed, including oil mist filter, gas ballast, oil return kit and fore-line trap.

Vacuum pump turbo molecular pump with 250 l/s pumping speed with Controller

Two temperature controlled source for evaporation of organic molecules

Volume of 4 cm³ Crucible of Alumina Conical

Temperature range: 50°C to 800°C Thermocouple Type K needed

Should Include power supply and PID control for each source.

Including power and signal feedthrough

Water cooled base

Should include shielding to minimize thermal and material cross talk

Stability/accuracy of +/-0.1K, Ramp-down from 600°C to 50°C below 1 hour is required

Two source shutters including controllers, rotational type, stainless steel shutter blade, based on motor vacuum (24VDC)

Thermal resistance evaporator for corrosive material like aluminum or Nickel

Double boat type. Conductive ceramic boat including ceramic crucibles of 1cc

Temperature range should up to 1700°C,

Water cooled base , should include supply supply(0 to 15V and 0-200A and 2kVA)

Two Source shutters including controllers, rotational type, hastelloy shutter blade, based on motor vacuum (24VDC)

Three Single rate sensor head , Quartz crystal microbalance (6MHz)

Including oscillator and position fixture for reproducible positioning

Thin Film Deposition Controller with QCM 4 Sensor inputs.

Frequency range: 1 to 6.5 MHz Frequency

Resolution: +/- 0.012 Hz @ 4 readings/sec
Thickness resolution: 0.015 Å @ 4 readings/sec
Rate reading: 0.01 Å/sec
Processes: 100 processes, 1000 layers, 50 films
Co-deposition should be possible with up to 4 films
Interfaces like RS-232 and USB needed
Windows software needed

Rotary work holder
variable max speed range of 0-30 RPM, with stainless steel electro-pneumatic shutter
to accept basic substrate carrier and mask for substrates upto 100 x 100mm (4"x4") or dia Ø
100mm (4")

Stainless steel substrates carrier for substrate of 4" x 4", substrate thickness range 0.5 to 2.5mm
and edge exclusion zone 2mm

Stainless steel Shadow mask for substrate carrier, minimum lateral feature size > 2mm and edge
exclusion zone 2mm

deposition system should be integrated in glove box 1

K) Sublimation Unit

Purification application and separation of fractions
Material load should be 0.5g to 5g
Horizontal Glass Tube based vacuum sublimation
Visible process control
One set of glass tubes (duran upto 450°C)
Three Independent heating zones oven up to 600°C
Temperature gradient needed
Three channel control unit (PID controller required)
To include suitable turbo molecular pump and roughing pump)
Base pressure less than 10(-6)mbar
To include vacuum gauge and display unit
Unit should be integrated in the glove box 2

L) Spin Coater-Stand alone

Angular speed of the substrate, acceleration/deceleration
and coating duration to be set to suit the user requirement
atleast 5 inch touch screen display in the front panel.
The process with 10 steps, each step should have
different values of speed, acceleration/ deceleration and coating duration
Actuator: Brushless DC servo motor
Program Memory: Infinite
Speed Profile: Speed, Duration and acceleration
Spin Speed: 60 - 10000 RPM
Speed Resolution: 1 RPM
Speed Accuracy: +/-1%
Acceleration/Deceleration: 10 - 2000 rpm/s
Duration: 1 - 99 sec/min/hour for each step
Sample Chucks: 3 Nos. 14mm, 22 mm, 36 mm
(Outer diameter of the O ring)
Maximum Sample Diameter: 100mm
Minimum Sample Diameter: 13mm

Bowl Material: Polypropylene
Bowl Size: 8 inches
Lid with transparent window and sample dispensing port
Safety interlock to prevent spinning when the bowl is open
Sample Holder should be of PTFE disk with silicon rubber O ring
Sample Mounting: Secured by vacuum holding
Vacuum Connector: 8 mm dia Snap-in hose connector
Drainage hose
Nitrogen/Inert Gas Inlet
Vacuum pump On/off and Release Switches
Oil free, Max flow rate: 45 lpm
Max vacuum: 27 inches Hg
Mac Pressure: 60 psig

Terms & Conditions:

- i. Vendors are required to provide brochures / literature while complying the specifications.
- ii. Manufacturer/ Bidder should submit the layouts along with the tender document and drawing after the order.
- iii. Vendor must have supplied > 02 glove box integrated with deposition system and should have satisfactory running of the system at purchaser's site in last 5 years.
- iv. Upgrade options should be readily available and should be quoted with full information
- v. Local service should be available.
- vi. Warranty: - One Year