Tender Notification for the Procurement of a connected two-box Argon Glove Box System with custom Evaporator (Last Date for Submission: 21 August 2019; 5:30 PM IST)

Kindly send your best quotation for a two-box nitrogen/argon glove box system with the following technical specifications on C.I.P. Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, E.D., and payment terms. The tender should be submitted in two separate sealed envelopes - one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 21 August 2019; 5:30 PM IST.

The bids should be addressed to:

The Chairman,
Solid State and Structural Chemistry Unit
Indian Institute of Science (IISc)
Bengaluru, India - 560012.

The sealed bids should be sent to:

Anshu Pandey
Associate Professor,
Solid State and Structural Chemistry Unit
Indian Institute of Science (IISc)
Bengaluru, India - 560012.
Ph: +91-80-2293-2070
email:anshup@iisc.ac.in

Please enclose a compliance statement along with the technical bid. Bids with no statement of compliance will be considered invalid.

Technical Specifications for Nitrogen/Argon Glove Boxes

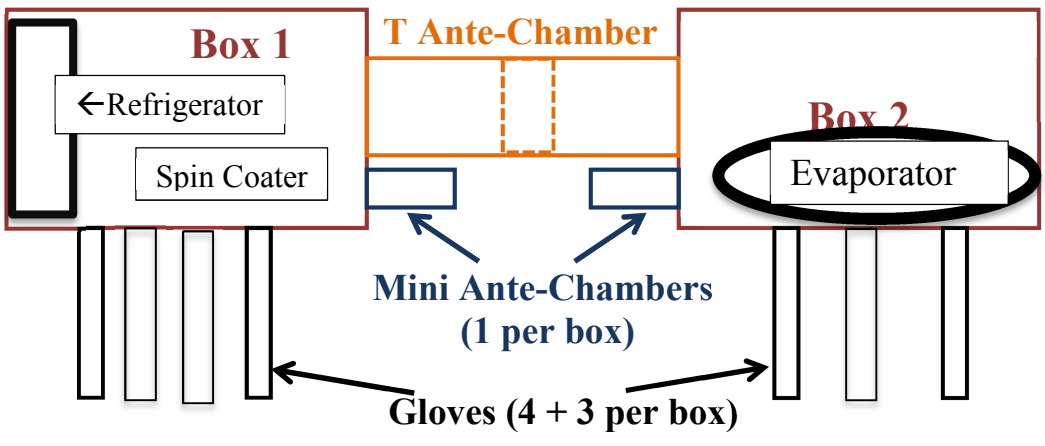

Figure 1. A schematic (not to scale) top-view of the glove box system being specified in this tender request.

1. System Arrangement

1.1 There should be two glove boxes, which can be interconnected via a T-shaped Ante Chamber (see Figure 1). The specifications for each of the boxes is as given below.

Both Box 1 and Box 2 should independently meet the following specifications unless mentioned otherwise.

2. Dimensions

2.1 The working space of glove box 1 should be at least 900 mm in height, 1800 mm in length and 775 mm in depth. Box 2 should have dimensions of atleast1500x900x775 mm. The total system must be no longer than 5000 mm.

3. Programmatic Logic Control

3.1 Each box should be controllable with independent and fully integrated programmatic logic control (PLC), with a touch panel interface.

3.2 The touch panel interface should serve as a central control unit for all glove box functions and procedures

3.3 All glove box functions should be accessible via the touch panel.

3.4 The PLC should also enable plotting graphical trends of box pressure, oxygen and moisture levels over at least 24 hours.

3.5 It should be feasible to remote monitor box parameters. The PLC should preferably have the ability to send notifications and alerts regarding maintenance schedule and box malfunctioning.

3.6 Graphical display of the box pressure, O2 and moisture levels should be available, preferably in color, in the touch panel interface.

4. T-shaped ante-chamber connecting the two boxes

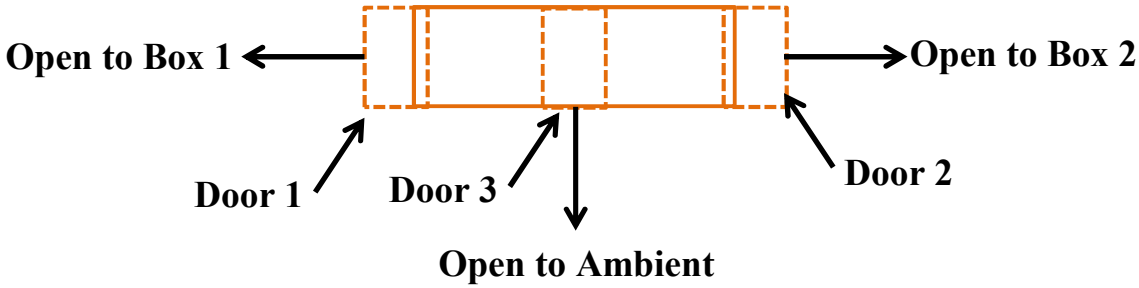

Figure 2. A schematic (not to scale) top-view of the T Ante-Chamber that connects the two glove boxes.

4.1 The T-shaped ante-chamber that connects the two glove boxes should have three vacuum doors, which can seal the ante-chamber for evacuation.

4.2 The ante-chamber should be cylindrical with a diameter of at least 390 mm and a length of at least 800 mm.

4.3 The doors should preferably be with a swing-type opening mechanism to conserve working space.

4.4 There should also be a tray preferably mounted on telescopic rails, which can be slid back-forth and facilitates transfer for tools and chemicals from one glove box to the other.

4.5 The purge and pump out of the ante-chamber should be programmable and be activated via a software controlled touch panel or computer. It should also allow the user to choose between manual control or programmatic control.

5. Purifier

5.1 Each glove box should have an independent and at least one purifier capable of purifying the glove box ambient to attain a purity of <1 ppm H_2O and O_2.

5.2 The removable capacity should be a minimum of 35 liters for oxygen and at least 1300 grams for moisture.

5.3 The purifier should be fully regenerable with an automatic/programmed control.

5.4 The purification system of the glove box should be fully integrated with the heat exchanger and a gas circulation blower.

5.5 The gas circulation blower should be capable of a circulation rate of at least 80 m^3/hour.

5.6 The blower speed should be dynamically controlled via program logic based on the moisture and oxygen content in the glove box so as to make the blower operation power efficient.

6. Solvent Absorption Unit

6.1 Each box should have an independent solvent absorption unit with activated carbon (atleast 5 Kg).

6.2 The solvent trap should be capable of absorbing volatile organic solvents.

6.3 The Solvent absorption unit should have both inline and bypass modes (See Figure 3).

6.4 Extra, separate solvent absorption, oxygen and moisture removal catalysts must be provided to ensure atleast one additional cycle of catalyst replacement for all purification units.

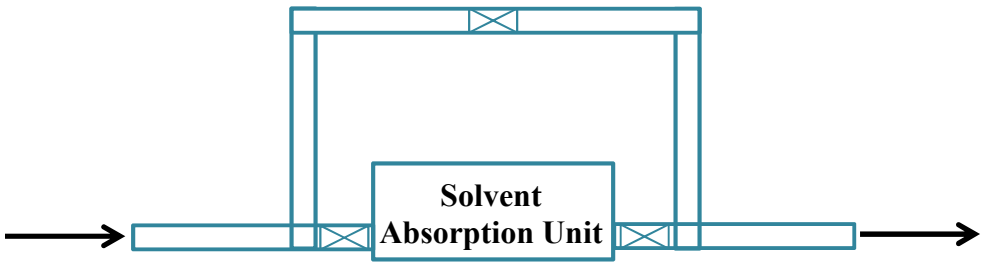

Figure 3. A schematic (not to scale) side-view of the circulation lines for the solvent absorption unit that shows the absorption unit by-pass and inline connections.

7. Box pressure

7.1 Box pressure should be controllable automatically (via programmatic logic) within a pressure range of -15 to 15 mbar.

7.2 The desired pressure should be settable via the touch panel interface.

8. Gloves and Glove Port Covers

8.1 There should be four polymer (polypropylene is preferred) glove ports for one box and atleast 3 for the box with evaporator and butyl gloves should be provided for these glove ports.

8.2 The size of each glove port should be at least 210 mm.

8.3 The glove ports should be O-ring sealed against the gloves.

8.4 At least additional 4 pair of butyl gloves should be supplied.

8.5 Each box should be supplied with at least one glove port cover.

8.6 The thickness of the butyl gloves should be a minimum of 0.4 mm

9. Mini Ante-Chambers

9.1 Each box should have at least one mini Ante-chamber for sample transfer.

9.2 The ante-chamber should be at least 150 mm in diameter and 300 mm in length.

9.3 The ante-chamber should have a sliding tray to enable sample transfer.

9.4 There should be a 3-way valve to enable evacuation and venting of the ante-chamber.
9.5 The ante-chamber should have a door, preferably a hinged door, that can seal the ante-chamber for evacuation.

9.6 Quote as OPTIONAL: There should be the provision of having a heated mini ante-chamber which can heat the chamber to at least 120 degrees centigrade. The temperature should be controllable via programmable PID control.

10. Box Construction

10.1 Both the boxes should have bolted side panels that will enable the boxes to be modular and expandable or enable connection to other similar boxes in the future.

10.2 The front panel of each box should be made of polycarbonate.

10.3 Inners of the glove boxes, and all ante-chambers should be 304 grade or 316 grade or similar corrosion/chemical resistant grades of brushed stainless steel.

10.4 The trays, rails and other components in the ante-chambers should also be of 304 grade or 316 grade or similar corrosion/chemical resistant grades of brushed stainless steel.

10.5 The external should either be coated with a chemical/abrasion resistant coating or be the brushed stainless steel of the same or better quality as the inners.

10.6 At least two dust filters (HEPA or ULPA filters) should be provided in each box – one for filtering inlet Argon and one for filtering the box ambient before it goes out to the gas circulation system.

10.7 Filters should be provided with the glove box. An additional pair of filters for each box should preferably be supplied with the equipment.

10.8 The box should have at least ***16*** DN 40 feed-through each, wherein at least one is electrical feed-throughs per box. BNC 4 per box, USB – 1 per box, banana 2 per box. 1 Liquid/gas feed through per box.

10.9 An illumination source that lights up the working space, preferably a fluorescent lamp, should be provided. The light should have a switch (a hardware or a control in the touch panel) to turn on/off.

10.10 The circulation system should make it possible to have positive pressure regulation without vacuum pump and should be fully integrated with the heat exchanger.

10.11 A foot pedal for controlling box pressure should be provided.

10.12 A retort stand should be provided with each glove box.

10.13 At least **two** height-adjustable stainless steel shelves of at least 900 mm in length and at least 200 mm in depth should be provided

11. Vacuum Pumps

11.1 Each box should come with a Rotary vane pump (at least 16 m^3/hour capacity) with Oil mist filter and Oil re-circulation.

11.2 There should be automatic gas ballast control

11.3 The pump ON/OFF should be controllable via the touch panel.

11.4 The option of upgrading to an oil-less scroll pump should be available.

12. Sensors

12.1 A solid-state oxygen sensor capable of measuring oxygen levels from 0-500 ppm should be provided.

12.2 A solid-state moisture sensor capable of measuring moisture levels from 0-500 ppm should be provided.

12.3 There should be the option of attaching a solvent sensor to trigger an alarm when the solvent absorption unit is full

13. Box Purging

13.1 Automatic Box purge should be possible via PLC.

13.2 PLC should trigger an automatic box purge either due to high O_2 or moisture in the glove box or an automatic timer option to trigger box purge at a preset time for a preset duration.

13.3 A maximum argon flow rate of 200 liter/min during purging should be possible.

13.4 The O_2 and moisture trigger set-point range should be between 10-999 ppm.

14. Other requirements and options

14.1 Oil bubblers should *NOT* be used in any of the gas circulation lines.

14.2 NO component in the gas circulation line (except for the vacuum pumps) should use oil or oil containing parts.

14.3 Recirculation chiller to have a stable globe box ambient temperature.

14.4 The chillers should be able to regulate the temperature between 5 and 30 degrees centigrade.

14.5 The chillers should preferably have a cooling capacity of 1000 W at or near room temperature (25 degrees Centigrade)

14.6 The vendor is responsible for the installation of the system at the institute.

14.7 A minimum of 1 year warranty and at least one additional year of annual maintenance contract is required.

15 Box 1 Specific Requirements

15.1 Refrigerator with -35C, Internal volume 18L or higher, 3 shelves with 5 variable levels, PLC Control

15.2 Three height adjustable SS shelves should be provided

15.3 Provision to incorporate spin coater in glove box.

15.4 Spin Coater (Quote as ***OPTIONAL***)

Capable of etching of up to Ø 160 mm substrates
System in Natural Polypropylene (NPP),
Transparent Lid with syringe holder for standard SPS syringe
Step-by-step Programming should be possible
Should include Keyboard with LED Display
Programmable Storage of 20 Programs with 99 steps / each for: Time 1-999 sec/step, Speed 1- 10,000 RPM,
Acceleration / Deceleration 1-7,500RPM/Sec, Vacuum On/Off
Digitally controlled Motor with digital incremental
Speed signal feed back
Should include standard Vacuum Chuck
S45 Ø45 mm for up to Ø 6“ wafers.
Drain connection should be included
Electrical feedthrough for power supply
Vacuum supply with vacuum buffer tank, secured by check valve
Feedthrough for motor sealing gas
Drain connection with separation valve and waste
Bottle outside the glovebox to be included

16 Box 2 Specific Requirements

16.1 Metal/Dielectric Evaporator suitable for Au/Ag/Al/Molybdenum oxide deposition
Capable of handling substrates of up to 50 x 50mm (2”x2”)
Co-deposition is a requirement
Vacuum chamber should be of stainless steel (surface sand blasted) with view port
Base pressure should be less than 5e-6 mbar
Removable Stainless steel in liner as protection shielding for chamber
Should include full range high vacuum measurement system-(PIRANI and PENNING)
Metering range should be atmospheric pressure to 5x10-9 mbar
Should include pre-vacuum rotary vane pump (oil sealed;2-stage) with up to atleast 2.5 m3/ h pumping speed)
Should include turbo molecular pump with at least 65 l/s pumping speed (N2); including controller
Single button automated start stop operation for evacuation and vent process
Single source designed for Aluminium or Nickel - Type: resistance boat-type conductive ceramic boat incl. ceramic crucible including water cooling and power

feedthroughs - incl. power supply 0-120 A, max. 600 W - incl.
source,Temperature range: up to 1400°C

Single source for metal deposition - type: resistance boat-type - tungsten, Temperature range: up to 1800°C – including Power feedthroughs - including. Power supply 0-120 A, max. 600 W - installed on water-cooled fixture - including source shielding

Two Source shutters rotational type ,Shutter blade: Tantalum, replaceable (tool free) based on vacuum motor, including. thermal shield, signal feed through, controller

Two units of quartz crystal microbalance,- water-cooled, oscillator, position fixture for reproducible positioning

Stainless steel substrate carrier plate for to fix substrates up to max size of 50x50mm (2"x2"),The substrate carrier plate to be equipped with a drilling pattern of M3 thread holes for flexible fixation of different types of substrates

Substrate Shutter, Single rotary substrate shutter; Stainless steel

Two Multi film rate / thickness monitor for accurate measurement deposition rate and
film thickness with TFT display with touch screen
QCM Sensor inputs: up to 6 pc.
Frequency range: 2-6 MHz
Thickness: 0 - 9990000 Å or more
Rate: 0 – 9999 Å or better
Frequency resolution: ±0.1 Hz or better
Thickness resolution: 0.1 Å or better
Shutter time 1 – 1000000 s or better
Outputs: 8x replay output, 2 analogue output 0-10V
Large (>150 mm) User Interface for easy control.
Interfaces: RS-232/485, Ethernet

The deposition system should be portable and usable both inside and outside the glove box. Taking it inside and outside the glove box should not break the inert atmosphere.

System should have upgrade organic source facility at Site

17. Terms and conditions

17.1 The vendor should have a track record of having previously supplied at least five glove boxes with the above or similar specifications in India (please furnish the details).

17.2 Glove box, Purification System, Sensors Technology should be from a single manufacturer to ensure full compatibility.

17.3 The vendor should have qualified technical service personnel for the equipment based in India (preferably in Bangalore).

17.4 The lead time for the delivery of the equipment should not be more than 4 months from the date of receipt of our purchase order.

17.5 Complete layout with drawings must be provided with the quote.

17.6 The indenter reserves the right to withhold placement of final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all of the above conditions without assigning any reason is reserved.

17.7 Statement of compliance must be provided with quote

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