

**National Centre for Nanoscience & Nanotechnology,  
University of Mumbai,  
(NCNNUM),**



National Center for Nanoscience and Nanotechnology, Ramkrishna Bajaj Sanskrut Bhavan,  
II floor ,University of Mumbai, Vidyanagari, Santacruz (E), Mumbai 400 098, India.  
Tel: (022) 2654 3495, Fax (022) 26530299 Email: director@nano.mu.ac.in

Tender Document for

**High Performance Stainless steel Modular Glove Box with Double line  
Provision integrated to thermal vacuum evaporation unit**

No: NCNNUM/Tender/ 262/2012

Date: 24<sup>th</sup> January 2012

Part A - Terms and Conditions

Part B – Specifications

Price: Rs. 500/- (non refundable)

**Important Dates:**

Period of Sale of Tender Document	24 <sup>th</sup> January till 14 <sup>th</sup> February , 2012,
Last Date of Receiving sealed Bids/Tenders:	15 <sup>th</sup> February, 2012, 1.00 pm
Time and date of Tender opening	15 <sup>th</sup> February, 2012, 4.00 pm

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**Part A - Terms and Conditions**

## Tender Notice

National Center for Nanoscience and Nanotechnology  
Ramkrishna Bajaj Sanskrut Bhavan, II floor  
University of Mumbai, Vidyanagari, Santacruz (E),  
Mumbai 400 098, India  
Tel: (022) 2654 3495, Fax (022) 26530299  
NCNNUM/262/ of 2012  
Date: 24<sup>th</sup> January 2012

Sealed Tenders / bids for the purchase of **High Performance Stainless steel Modular Glove Box with Double line Provision integrated to thermal vacuum evaporation unit**, for National Center for Nanoscience and Nanotechnology, University of Mumbai are invited for and on behalf of University of Mumbai by the Director, NCNNUM.

Tender Document containing terms and conditions and technical specifications of the equipment are available in the Office of the Director National Center for Nanoscience and Nanotechnology, University of Mumbai, Vidyanagari, Santacruz (E), Mumbai 400 098, on all working days between 11.00 a.m. to 4.00 p.m. from 24<sup>th</sup> January 2012, to till 4 pm of 14<sup>th</sup> February , 2012 by paying Rs.500/- (Rs. Five hundred only) in cash /Demand Draft from any Scheduled Bank/Nationalized bank, drawn in favour of **“Finance and Accounts officer, University of Mumbai”**. Terms & conditions and technical specifications can also be downloaded. In case, the tender document is downloaded from the website, the Tender Document fee of Rs. 500/- should be enclosed in the Technical Bid Envelope, in the form of a Demand Draft from any Nationalized bank, drawn in favour of **“Finance and Accounts officer, University of Mumbai”**. The tenders bids duly complete in all respects, along with the necessary documents and EMD of Rs 1, 50,000/- (Rs. One Lac fifty thousand only) should be submitted to The Director, National Center for Nanoscience and Nanotechnology, University of Mumbai on 15<sup>th</sup> February, 2012, 1.00 pm.

The tenders / bids so received shall be opened on 15<sup>th</sup> February, 2012, 4.00 pm in the office of The Director, National Center for Nanoscience and Nanotechnology, University of Mumbai in the presence of the representatives of the suppliers. The names of shortlisted tenderers shall be announced on the website after scrutinizing the Technical bids and evaluating their suitability to meet the University requirements.

Right to reject any or all tenders without assigning any reason there for is reserved by the University of Mumbai.

Sd/-  
Director,  
NCNNUM,  
University of Mumbai

## Terms and Conditions of Supply:

1. The tender document along with terms & conditions are available for sale from 24<sup>th</sup> January 2012 to 14<sup>th</sup> February 2012 in the office of the Director, National Centre for Nanoscience and Nanotechnology, University of Mumbai, Vidyanagari, Santacruz-E, Mumbai during office hours from 11.00.am To 4.00 .pm by paying tender fee of Rs 500/- in cash or a Demand Draft by any Scheduled Bank / Nationalised bank drawn in favour of **“Finance and Accounts officer, University of Mumbai”**. **The tender fee is not refundable.**
2. The completed sealed Tender/Bid in all respect will be accepted up to 15<sup>th</sup> February, 2012, 1.00 pm in the office of Director NCNNUM Ramkrishna Bajaj Sanskrit Bhavan, II floor Santacruz (E), Mumbai 400 098, India,
3. The received Tenders / Bids will be opened on 15<sup>th</sup> February, 2012, 4.00 pm before the Tender opening committee in presence of the tender representatives of the tenders / bidders in the office of the Director NCNNUM.
4. Tenderers / Bidders shall submit the following documents along with their tender and **be placed in the Technical Bid Envelope i.e . Envelope No. 1).**
  - (a) Income-Tax clearance certificate from the Income-Tax Officer concerned, certifying that the tenderer has cleared all the Income-Tax dues.
  - (b) Tenderers should be either manufacturer or authorized dealer of the said equipment and should submit the proof for the same. Also, the Tenderers should state whether they are a Proprietary Firm, Partnership Firm or a Private/Public Limited Company and furnish the proof of the same. If the tenderer is a partnership firm, the necessary partnership deed, disclosing the names of all partners and their interest in the firm shall be enclosed.
  - (c) Tenderer should enclose the list of names of the organizations and laboratories to which similar equipment have supplied and a certificate to the effect that the performance of the supplied equipment was satisfactory.
  - (d) The tender document must be accompanied by Earnest Money Deposit shall be Rs. 150,000/- (Rs One Lac Fifty thousand only). Earnest Money Deposit in the form of a Demand Draft drawn in favour of **“Finance and Accounts officer, University of Mumbai”** on any Scheduled/ Nationalized Bank, payable at Mumbai.
  - (e) In case, the tender document is downloaded from the website, the Tender Document fee of Rs. 500/- (Rs Five hundred only) should be enclosed in the form of a Demand Draft from any Scheduled / Nationalised Bank drawn in favour of **“Finance and Accounts officer, University of Mumbai”**
  - (f) VAT Registration No.
  - (g) Technical specifications offered by the Supplier. (h) Technical compliance table
  - (i) Proprietary certificate
  - (j) The authority to sign to tender document shall be submitted invariably by the tenderer.
5. The rates should be mentioned in the **Schedule** attached with the Tender Document. Each page of the tender shall be signed in full and stamped with the seal by the Tenderer. The Tenderer must clearly state in what capacity he or she is signing the tender (**which should be placed in the Financial Bid Envelope i.e. Envelope No.2)**
6. The Tenderer shall submit the tender in two envelopes. The first envelope (Technical Bid) shall contain all the documents referred to in **para four above** and sealed. The second

envelope (Commercial Bid) shall contain the **Schedule**, in which the Tenderer shall register the rates of equipment. The second envelope shall also, likewise, be sealed. Both the envelope then should be put together, and shall be sealed in an envelope, and shall prescribe time and date. The Technical Bid shall be opened first to ensure that Tenderer have submitted all the requisite documents. If the Technical Bids are found not in order or are deficient in some respect, the commercial bids in respect of such tenders shall not be opened. The date and time of opening the financial bids shall be announced immediately after opening all the Technical bids.

7. Tender / bids not accompanied by the requisite amount of Earnest Money Deposit are liable to be rejected.
8. The Earnest Money Deposit paid by the supplier shall be forfeited, if the supplier fails to pay the necessary security deposit in the event of his tender being accepted.
9. The amount of Security Deposit/Performance Guarantee shall be 5 % of the accepted cost. In case of successful tenderer the amount of Earnest Money Deposit shall be converted in Security Deposit/Performance Guarantee. Security Deposit/Performance Guarantee shall be refunded after the warranty period is over. The Security Deposit/Performance Guarantee can be paid in the form of Demand Draft or a Bank Guarantee from a Nationalised scheduled bank drawn in favour of **“Finance and Accounts officer, University of Mumbai”**.
10. Bidder should read carefully all the instructions and terms and conditions, etc before registering rates in the prescribed schedule of the tender. Price registering in the schedule of price to tender should be inclusive of all taxes and duties. The rate /price quoted shall be F.O.R/C.I.F Mumbai and to reach to the office of CNUM or as directed in the order.
11. The offers made by the Tenderers shall be valid for 120 days after the last date of submission of tender.
12. **The Technical Documents shall be opened** by The Director, National Center for Nano science and Nanotechnology, **at 4:00 p.m. on 15<sup>th</sup> February, 2012**, for those bids for which minimum three Bidders have participated. The tenderers or their authorized representatives shall be allowed to be present at the time of opening of the tenders. Financial bids of only qualified tenderers shall be opened. The date and time of opening the financial bids shall be announced after opening and evaluating all the Technical bids.
13. In case of imported items/equipments, the rates should be quoted in the light of exemptions enjoyed by educational institutions. University is exempted from the payment of Octroi and the necessary certificate/form can be issued by the University. The customs duty applicable to the University of Mumbai is maximum 5% of the invoice.
14. Technical specifications of the instruments/equipments/articles are given in **Annexure** to these papers i.e. Part B.
15. The delivery, installation & operational training of the instruments/equipment should be completed within 3 months from placing of the order, in case of the imported equipment and within 15 days if the instrument/equipment is made in India. No extension shall be granted to the contractors/suppliers for the period of delivery, under any circumstances.

16. If the supplier fails to deliver the article as per the delivery schedule, the University of Mumbai shall be free to procure the balance/undelivered supply, at the risk and cost of the supplier, from other such suppliers
17. The goods, articles, materials equipment supplied by the supplier shall be accepted after inspection by an officer authorized by the competent authority. No articles/materials which do not conform to the specifications laid down in the terms and conditions or damaged in transit accepted.
18. The bills of the suppliers shall be paid by the University after all the materials /articles/equipments have been received inspected and found in good condition as mentioned above.
19. **Vendor must submit Compliance statement in tabular form comparing each specification of the quoted item with that given in the Tender Document part B. The Vendor also must supply a soft copy of the Table only Microsoft in word format.**
20. **If the equipment is imported and requires PC, printer other peripherals, they can be bought from India and should be of International brand such as HP. The monitor should be LCD/TFT screen. The printer should be LaserJet printer. The processor should be Intel latest processor. The amount quoted for the items bought in India, installation; servicing etc. can be in Indian Rupees and the imported items can be quoted in foreign currency.**
21. **The warranty period shall be of Three years from the date of complete and satisfactory installation of the equipment.**
22. As the suppliers shall be responsible for the supply and installation (wherever necessary) of equipment at Mumbai, the cost towards insurance until destination in the University, shall be borne by suppliers.
23. In the event of any breach of the terms and conditions of the supply, the University of Mumbai may terminate the contract placed with the supplier, forfeit the security deposit of the supplier and make alternative arrangements for procurement of supplies at the risk and cost of supplier.
24. **Proprietary certificate, if any, should be included in the Technical bid.**
25. **The Conditional offers are liable to be summarily rejected.**
26. **Right to reject any or all tenders without assigning any reason there for is reserved by the University of Mumbai.**

## **Envelope No.1**

**National Centre for Nanoscience & Nanotechnology,  
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### **High Performance Stainless steel Modular Glove Box with Double line Provision integrated to thermal vacuum evaporation unit**

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## **PART B SPECIFICATIONS**

**Envelope No.2**  
(Financial/Price Bid)

**SCHEDULE TO TENDER**

Note:

1. Tenderers are advised to read carefully the Terms and Conditions of supply and the Instructions to the Tenderers" before recording the rates in this schedule.
2. No erasures or overwriting shall be allowed, unless they are authenticated under the full signature and the seal of the tenderer.
3. The Rates shall be FOR/CIF, at destinations/godowns/places indicated in the supply order.

Item no	Description of goods with details of specifications	Number/ quantity	Price/ Rate per Unit	Taxes	Duties	etc	Total

Total price .....

In words .....only

**Date**  
**Place**

**Signature of the Tenderer**  
**Name of the signatory on tender**  
**Seal of the Firm/Co./**



## Part B – Specifications

### High Performance Stainless steel Modular Glove Box with Double line Provision integrated to thermal vacuum evaporation unit

Supply installation of Thermal Evaporator.

Brief technical Specifications:

A thermal evaporator with glove box for preparation of electrical contacts as well as organic molecule thin films having the following major components has to be supplied and installed at our Laboratory.

#### **Vacuum Chamber:**

A Vacuum Chamber fabricated out of non magnetic stainless steel having approximate dimensions of 370mm (W) x 380 mm(D)x500mm(H), with observation window and connecting for Glove box. Box chamber with front loading type is preferable. The chamber also should have necessary ports to for evaporation sources, substrate holder, substrate heater, Vent valve and few blank ports with dummies. 1 set of SS liners are required along with the chamber to avoid the coating in the chamber walls.

#### **High Vacuum Pumping System:**

A water cooled turbo molecular pump having pumping speed of 550 ltrs/sec for N<sub>2</sub> with necessary accessories like Turbo controller, connecting cables, Splinter shield, Purge/Vent valve etc. A double stage Rotary Vane Vacuum Pump having pumping speed of about 29 M<sup>3</sup>/Hr is required for roughing and also for backing of turbomolecular pump.

#### **Vacuum Measurement:**

Vacuum Measurement is by means of 1 No.of Pirani Gauge having measuring range from 1000 mbar to 5x10<sup>(-4)</sup> mbar and 1 No.of full range gauge which should be a combination of Pirani and Hot cathode ionization gauge having measuring range from 1000 mbar to 5x10<sup>(-10)</sup> mbar with measurement accuracy of ±15%.

Isolation Valve & Plumbing lines:

Necessary isolation valves of electro pneumatically operated right angle type for roughing and backing, with stainless steel plumb lines.

Note: All Vacuum Pumps, Gauges, Valves should be of reputed make and have their own service facility with in India for supporting after sales.

#### **Chamber Gadgets:**

3 Nos of Thermal Evaporation Sources for evaporation of organic materials, with necessary boats. 1 No. of Thermal Evaporation Source for evaporation of metals, with necessary boats. Motorized source shutter for thermal evaporator is required to avoid cross contamination. Suitable power supply for thermal evaporator.

#### **Substrate holder:**

Substrate holder with rotation is required to hold the wafers of ... size and Nos. the desired substrate variable rotation is 0 20 RPM.

Digital thickness monitor cum controller:

A reputed make quartz crystal deposition monitor cum controller which can control 50 programmable films, 1000 layers and 100 processes; dual sensors for sequential deposition is desired.

#### **Safety interlocks:**

Necessary interlocks like vacuum switches, water cut off switches, and high voltage safety interlocks to be incorporated.

#### **Vacuum Requirements:**

Ultimate Vacuum level of 1x10<sup>(-7)</sup> mbar in cleaned empty degassed chamber.

## General Requirements:

### Specification of Glove Boxes

1st module of 1st glove box system. MODULAR GLOVEBOX in Stainless Steel (US 304L); Dimensions L/H/D = 1200x900x725 mm, Stainless Steel supporting frame (casters and lock-out cylinders), Vacuum pump 21m<sup>3</sup>/h dual stage with mist eliminator, automatic gas ballast with ultimate vacuum < 1 x 10<sup>-3</sup> mbar, standard 1 leaktight electrical & 2 blank (ISO KF40) feedthrough, Alarm red light (control of the parameters through touch panel) according to O<sub>2</sub>/H<sub>2</sub>O levels INDEPENDENT PURIFICATION UNIT single filter with; Full automatic regeneration process, Automatic pressure control, Circulator with variable flow Capacity; O<sub>2</sub>=30L, H<sub>2</sub>O=1440g, Interface with touch panel, Stainless Steel module, on casters Configured to receive a solvents trap module, Sound level of the glove box: 47 dB (A). FRONT PANEL in Glass inclined 10 Deg.

### GLOVEBOX Chamber Details:

Box Shell: Stainless Steel XCrNi18-9 (US 304L), 3mm thick  
Pipes: Entirely in Stainless Steel (US 304L)  
View Window: Glass, Inclined panel 10°, Bolted, easy dismountable.  
Gloveport: HPDE – Two Grooves, 180 mm or more. Quick lock door 186 mm diameter, practical placement of the gloves without pollution.  
Gloves: Butyl thickness, 0.6 mm, length 750 mm, Ambidextrous – size 7.5 or 8.5  
Light: Fluorescent Yellow light 220V – with on off switch.  
Shelves: 3 Standard Stainless Steel shelves, adjustable height.  
Supporting Frame: Stainless Steel, casters and lock out cylinders.

Tightness: Class 1 according to ISO 10648 -2 norm (Oxygen method), Leak rate < per hour 5.10<sup>-4</sup> per hour mm

### User Interface

Touch panel: English, User interface Integrated to touch panel  
Display: Pressure (Pa or mmWG) O<sub>2</sub>, ppm, H<sub>2</sub>O, ppm or °C DP  
Controls: Programmable Vacuum Chamber handling, Auto purging & Force Flushing,  
Programmable Logic Control; Setting: vacuum Chamber Cycle (Vacuum/filling up time/number of cycles) Flow of the blower, Pressure Control

### Purification

Process: Closed loop inert gas circulation, regenerable purifying loads  
Purification Unit: Independent module P (sys)  
Arrangement right side of the glovebox below main antechamber.  
Pipes & Reactors: Stainless Steel (US 304 L)  
Purification: 1 purification column for H<sub>2</sub>O and/or O<sub>2</sub>.  
Performance: H<sub>2</sub>O < 1ppm, O<sub>2</sub> < 1 ppm  
Measures (O<sub>2</sub>) & (H<sub>2</sub>O): Independent analysis circuit for easy maintenance and calibration and without pollution.  
Purification flow: From 0 to 40 cu. m/hr (ΔP:20mbar)  
Blower: Centrifugal Blower single stage, in a tight box, Adjustable flow brushless motor with electronic commutation.  
Cooling System: Not necessary, any temperature rise. No chilled water needed to operate the glove box:  
Regeneration Process: Automatic, Inlet and outlet regeneration gas through electrovalves.  
Heating: Integrated temperature regulation controlled through automate and temperature cut – out.

Tightness: Leak rate < 10<sup>-5</sup> mbar.L.per sec.

Regeneration: 95% N<sub>2</sub> or Ar + 5% H<sub>2</sub>.

Mini antechamber 150mmΦ dia, length 400mm Left side

### **O<sub>2</sub> ANALYZER – 2 No.**

Technology: Galvanic fuel cell oxygen sensor

Measurement and analysis range: 3 ranges in ppm or %

(0-100/1-1000/0-10000) OR (0-1/0-10/0-25)

Accuracy: +/- 1 in full range. Resolution: +/- 0.1% in full range

### **H2O ANALYZER – 2 No.**

Technology: Ceramic Moisture sensor

Measurement Ranges: -100/+20 °C (Dew Point).

Equivalence DP – PPM values as below:

°C (Dew Point)	-100	-76	-60	-42	+20
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PPM value	0.01	1	10	100	23700
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Calibration: Calibration certificate in 7 points (NPL & NIST)

### **SOLVENTS TRAPPING System VACUUM PACKED**

6 kg of active charcoal. Back connection KF40 for easy replacement Zero pollution swap charges of the purification/conditioning system in vacuum conditions. Engine, piping, by-pass and 3 way valves in Stainless Steel 304L. Efficiency and autonomy

Air Gun (Nitrogen gun)

Spin coater integration Housing & integration (the spin coater top reaches the floor level)

+ metal sheet for closing

#### **SPINCOATER**

-Wafer till 150mm

-Substrate till 125x125mm

-Speed till 8000tr/min

**VACUUM CHUCK FOR 2"x2" SUBSTRATES WITH CENTERING PINS**

**VACUUM CHUCK FOR WAFER**

**PIECES FOR EQUAL OR SUP. WITHOUT**

**CENTERING PINS**

**CONTROL PANEL REMOVED OUTSIDE THE GLOVE BOX**

-Screen frame

-Jaeger feed through

1 BALL VALVE FEEDTHROUGH/NW40

-1 for connection between spin coater and vacuum pump

-2 for vacuum

1 NEEDLE VALVE FEEDTHROUGH ON NW40

T shaped antechamber 400mm dia/850mm Length For connection between GB1 & GB2

### **Second module of the glove box, 3 port L-shaped**

1st module of 2nd glove box system

- L-shape profile for integration of thermal evaporating system

- Dimensions : app.1500 x 900 x 725 mm

- Stainless Steel frame (US304L) on casters and lock out cylinders

- PP glove ring Ø186

- 1 electrical feed through 220V

- 2 blanked feed through ISO KF40

Front Panel T3 Polycarbonate

#### **EVAPORATOR CONNECTION**

-Cut out -Dowel+flat gasket

-Pressostat

2<sup>nd</sup> glove box of the second module specification same as above glove box

**MODULAR GLOVEBOX in Stainless Steel (US 304L);**

- Dimensions L/H/D = 1200x900x725mm

- PP gloves ring Ø180

- Stainless Steel supporting frame (casters and lock-out cylinders)

- Vacuum pump 21m<sup>3</sup>/h with mist eliminator

- 1 leak tight electrical feed through Bi+T220V
  - 2 blanked leak tight feed throughs ISO KF40
  - Alarm red light (control of the parameters through touch panel). according to O<sub>2</sub>/H<sub>2</sub>O levels
  - 3 st. steel shelves
- INDEPENDENT PURIFICATION UNIT single filter
- with regeneration process
  - Automatic pressure control
  - Circulator with variable flow
  - Capacity; O<sub>2</sub>=30L, H<sub>2</sub>O=1440g
  - <1ppm O<sub>2</sub>/H<sub>2</sub>O
  - Interface with touch panel
  - Stainless Steel module, on casters
  - Configured to receive a solvents trap module

P(SYS)-CA

- Sound level of the glove box: 47 dB (A) in purification/regulation

Air Gun

CONNECTIONS GB(ADAPT)-LSP-T4

P(SYS) II S

-Piping

- 2 manual butterfly valves DN40

FRONT PANEL Polycarbonate for above two module of glove boxes.

Mini antichamber 150mmΦ dia, 400mm L

OPTICAL QUARTZ WINDOW ON bottom, dimension 150X150mm

UV PORTABLE LAMP, HIGH INTENSITY (250mW/cm<sup>2</sup> UVA)

DISPENSING ROBOT, COURSE 200x200mm

Hepa Filter, H13, 50m<sup>3</sup>/hr with Filter Support – 3 No.

Air Gun – 1 No.

List of additional feed through

Electrical FEEDTHROUGH – 3 No.

4 BANANA Ø4 /NW40 FEEDTHROUGH – 4 No.

INSULATED BNC 50 OHMS FEEDTHROUGH – 8 No.

Optical Fibre Feed through – 2 No.

Vacuum Feed through – 3 No.

Blank Feed through – 10 No.

6 Pin Feedthrough – 1 No.

12 Pin Feed – 1 No.

3 Pin Feed through – 1 No.

USB Feed through – 2 No

Isolated Triaxial Feed through – 10 No.

Utilities to be provided by us to be specified clearly. Complete System , Vacuum Cycle and evaporation cycle should be preferably manually operation, however PLC based system for automatic Vacuum cycle has to be quoted optionally. Installation has to be carried out by the trained engineers of the Equipment manufacturer and demonstration of the system for the specified ultimate vacuum levels, thin film uniformity, substrate heating etc.

After installation of the system, the complete system has to leak tested and leak rate has to be demonstrated as per the commitment in the quotation.

Training on operation and trouble shooting of the system has to be provided during the installation and also during the pre despatch inspection.

Operating manual in English – 1 set.

Recommended Spares for trouble free operation of the system for 2 years to be quoted separately.  
The supplier should have their own trained engineers in India to support after sales.  
World wide references for such systems has to be attached along with the Quotation.

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