

Domestic Tender Notification for the Procurement of a “Glove BOX Integrated FTIR Spectrometer” in the Department of Physics, Indian Institute of Science, Bangalore.

**Tender no: IISC/PHY/KRM/515/2021-22, Dated 19.01.2022**

This is an open domestic tender notification for the procurement of “Glove Box Integrated FTIR Spectrometer” . The last date to submit the sealed covers containing Technical and Commercial Bids is February 04, 2022 before 5:00PM.

The Tender specifications are as follows:

### **Tender specification**

#### **“Glove box integrated with FT-IR Spectrometer”**

##### **Enclosure**

- The working space of each glove box should be at least 850 to 950 mm in height, 1750 to 1850 mm in length and 730 to 790 mm in depth.
- The window materials should be impact-resistant polycarbonate that is at least 10 mm thick.
- Main body must be SS304 or SS316 brushed stainless steel, at least 2.5 mm thick.
- 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.
- The external should either be powder coated or Spray paint finish.
- We strongly prefer a system in which the space underneath the glove box is empty.
- Need a modular system that can be expanded further. The side-panels must be removable to accommodate future expansions.
- Glove Ports: Delrin(POM) Natural white/PP

##### **Programmatic Logic Control**

- Glove box should be controllable with independent and fully integrated Siemens programmatic logic control (PLC), with a touch panel interface
- The touch panel interface should serve as a central control unit for all glove box functions and procedures.
- All glove box functions should be accessible via the touch panel.
- Graphical display of the box pressure, O<sub>2</sub> and moisture levels should be available in the touch panel interface.

- Automatic Box purge should be possible via PLC.
- PLC should trigger an automatic box purge either due to high O<sub>2</sub> or moisture or both in the glove box or an automatic timer option to trigger box purge at a pre-set time for a pre- set duration.
- Touch panel implementations showing this should be provided. A copy of relevant documentation from the user manual should also be provided.
- Gas (argon or nitrogen) flow rate of 200 liter/min or greater during purging should be possible.
- The O<sub>2</sub> and moisture trigger set-point range for automatic box purging should be between 10-999 ppm. Touch panel implementations showing this should be provided. A copy of relevant documentation from the user manual should also be provided.

### **Purifier**

- Single Column Gas purification system 7 inch Siemens touch screen HMI, remote and graphical PLC controller with Auto-regeneration
- Glove box should have at least one independent purifier capable of purifying the glove box ambient to attain a purity of <1 ppm H<sub>2</sub>O and O<sub>2</sub>.
- The removable capacity should be a minimum of 38 to 43 liters for oxygen and at least 1350 to 1450 grams for moisture. Specification sheets or data sheets attesting to this must be provided.
- The purifier should be fully regenerable with an automatic/programmed control using forming gas (10% H<sub>2</sub> or lower) or Ar or N<sub>2</sub>.
- The gas circulation blower should be capable of a circulation rate of at least 95 to 110 m<sup>3</sup>/hour. The maximum and minimum circulation rates of the blower should be provided and should work without any heat exchanger.
- The blower speed should be dynamically controlled via program logic based on the moisture and oxygen content in the glove box, to make the blower operation power efficient. Implementation diagrams or specifications that prove this is possible must be provided.
- The purifier loop must have at least two H13 or H14 dust filters (HEPA or ULPA filters)
  - one for filtering inlet gas (nitrogen or argon) and one for filtering the box ambient before it goes out to the gas circulation system.
- Oil bubblers should NOT be used in any of the gas circulation lines. The mechanism for pressure regulation should be clearly mentioned.
- NO component in the gas circulation line (except for the vacuum pumps) should use oil or oil containing parts.
- Eco Mode Operation
- Auto purge with time sequence or ppm of O<sub>2</sub> and H<sub>2</sub>O

### **Sensors**

- A solid-state/Electrochemical oxygen sensor capable of measuring oxygen levels from 0.1 ppm to 1000 or 10,000 ppm should be provided with box.

- A solid-state moisture sensor capable of measuring moisture levels from 0.1 ppm to 500 or 3000 ppm should be provided with box.

### **Box pressure**

- Box pressure should be controllable automatically (via programmatic logic) within a pressure range of -15 to +15 mbar.
- The desired pressure should be settable via the touch panel interface. Touch panel implementations showing this should be provided. A copy of relevant documentation from the user manual should also be provided.

### **Gloves and Glove Port Covers**

- There should be 4 POM (polypropylene is preferred) glove ports for each box and butyl gloves should be provided for these glove ports.
- The size of each glove port should be at least 9" in dia
- The glove ports should be O-ring sealed against the gloves.
- At least 1 additional pairs of butyl gloves should be supplied with the box., include the cost of gloves in the commercial bid.
- Must include at least one glove port cover.
- The thickness of the butyl gloves should be a minimum of 0.4 mm

### **Automatic Large Antechamber**

- The box must have one large ante-chamber for sample transfer.
- The ante-chamber should be cylindrical with a diameter of at least 380mm to 420 mm and a length of at ~580 mm to 650 mm.
- The doors should preferably be with a swing-type hydraulic-assisted opening mechanism to conserve working space.
- There should also be a tray preferably mounted on telescopic rails, which can be slid back and forth. The tray should facilitate transfer for tools and chemicals.
- The chamber must have an Automatic PLC controlled evacuate and purge system with pressure gauge.

### **Vacuum Pumps**

- Box should come with a Rotary vane pump (at least 17 to 20 m<sup>3</sup>/hour capacity) with oil mist filter.
- There should be automatic gas ballast control
- The pump ON/OFF should be controllable via the touch panel. Touch panel implementations showing this should be provided.

### **Mini antechambers**

- The box must have one mini ante-chamber for sample transfer.
- The ante-chamber should be at least 145 mm to 155 mm in diameter and 380 mm to 410 mm in length.
- The ante-chamber should have a tray to enable sample transfer.
- The chamber must have a manual pump and purge system: with pressure gauge, manual valve and connection to vacuum pump.

- The ante-chamber should have a door that can seal the ante-chamber for evacuation.

### **Feedthroughs**

- The box should have at least 4 KF-40 feedthroughs. These can be connected to liquid, electrical or vacuum feedthroughs. The details of placement can be discussed at the time of ordering
- The system must have at least 1 electrical feedthrough with 15 A connector that are compatible with 220 V – 240 V supply.
- A vacuum port should be provided for connecting vacuum pumps.

### **Other**

- There must be a lamp inside, preferably LED. There must be a switch on the outside of the body or touchscreen to turn the light on/off.
- The circulation system should make it possible to have positive pressure regulation without vacuum pump
- A foot pedal for controlling box pressure should be provided.
- At least two height-adjustable stainless-steel shelves of at least 1000 mm in length and at least 200 mm in depth should be provided. These should be centrally located so that any chemicals or tools are accessible from glove ports.
- All electrical connections should comply with line power specifications in India. Single phase voltage range is 220-240 Vac and the three-phase voltage range is 415 - 440 Vac. The line frequency is 50Hz.

### **Technical specifications of Research grade FT-IR Spectrometer**

- The spectrometer should be able to record the spectrum of a sample in the Mid infrared wave number region of 7800 - 350  $\text{cm}^{-1}$ .
- The spectral resolution should be better than 0.09  $\text{cm}^{-1}$ .
- The spectrometer must have a motorized, continuously variable aperture, for optimal peak shape collection of data.
- The Interferometer must be a dynamically aligned, non-air bearing/air bearing/any other advanced type Michelson design.
- Instrument should be field upgradeable to Near IR, Far IR range and Raman
- The interferometer must be capable of supporting an Automatic Beamsplitter
- The instrument must be capable of 55,000:1 peak to peak signal to noise ratio, measured at 4  $\text{cm}^{-1}$  resolution in the well proved standard region of 2200-2100  $\text{cm}^{-1}$ .
- Wavenumber precision should be better than 0.01  $\text{cm}^{-1}$ .
- The spectrometer cover shall be sealed and desiccated and must be equipped with coated KBr sample compartment windows. The instrument must be equipped with the necessary internal plumbing and external connector for optional purge operation
- Optics: Gold Coated.
- The system should have one DLaTGS detector to function at room temperature and can be field upgradeable to keep MCT detector (with liquid N<sub>2</sub> hold time of more than 12 hrs) simultaneously if purchased at a later stage.

- The instrument must support up to three detectors and it should have the facility to place it permanently in the detector compartment and should be software selectable.
- Major components like Source, Laser, and interferometer must have default warranty of five years.
- Other Accessories: 1) Demountable cell with KBr windows & Assorted PTFE Spacers for Liquid Samples. 2) Universal Sample holder for films with Magnetic film holder.
- The instrument should be field upgradable / hyphenated to TGA-IR, GC-IR and FT-IR Microscopy & Raman systems.
- System should have the facility of at least two external output beams and two external source inputs.
- Branded Desktop PC, Inject Printer should be provided along with system.
- Software should have tools for Quantification method development and prediction using Beers' law, PLS, PCR etc.
- Software should have feature for automated mixture analysis and FTIR libraries must be provided with at least 20,000 spectra.

**Power Cord Indian and RSA 250v** - 1 No

**Standard Purge System** - 1 Set

~ Includes Purge Regulator, tubing and spectrometer attachment

**Universal Sample Holder - 25mm** - 1 Set

~ 2 x 3 Slide mount spring-clip holder

~ Ideal for films or transmission windows

~ Optimized for 25mm windows

~ 10mm optical aperture

**Magnetic Film Holder Sample Slide** - 2 No's

~ Holds thin films for transmission analysis

Includes:

~ One Magnetic Film Holder

~ Four magnetic strips with different apertures

~ One 'blank' magnetic strip for cutting custom size/shape

aperture Omni-Cell Body with Mount

~ includes front and back plates

~ cell nest

~ 4 quick release nuts

~ front and rear gaskets

~ 2 PTFE Luer plugs

~ used with Omni Cell Sealed cells and windows

**Omni-Cell Body with Mount** - 1 No

~ includes front and back plates

~ cell nest

~ 4 quick release nuts

~ front and rear gaskets

~ 2 PTFE Luer plugs

~ used with Omni Cell Sealed cells and windows

Omni-Cell KBr Windows, Rectangular (1 pair)

~ includes 1 drilled and 1 undrilled window

**OmniCell Assorted PTFE Spacers (pk of 10)** - 1 Set

~ 2 of each thickness should be supplied

**Branded PC, Printer** - 1 No

**N2 Cylinder** - 1 No

**UPS 5KVA with 30 min backup** - 1 No

**Electronic Analytical Balance** - 1 No

**(Capacity 100/ 220 g**

**Readability 0.01/ 0.1 mg)**

**Acceptance Tests**

### **Terms and Conditions:**

- IISc will expect acceptance tests, post installation. These can be recorded in the presence of representatives of the OEM. Inability to pass these tests will be counted as a technical failure and breach of contract.
- Maintain <1 ppm of H<sub>2</sub>O and O<sub>2</sub> for 24-hour period.
- Demonstrate automated routines for catalyst regeneration
- Demonstrate automated routines for maintaining target pressure.
- Vendor should have qualified technical service personnel based in Bangalore
- The instrument should carry a comprehensive warranty of 3 years from the date of installation.
- Free installation, demonstration and training should be provided.

With respect to this tender, the rules laid out by the Government of India in order No.P-5021/2/2017-PP (BE-II) issued by the Public Procurement Section, Department of Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, dated 04<sup>th</sup> June 2020, will be followed. As per this order, the government has defined :

‘Class-I local supplier’ as “a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%”.

‘Class-II local supplier’ is “a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%”.

Only ‘Class-I’ and ‘Class-II’ local suppliers are eligible to participate in this open domestic tender.

The bidder should sign and submit the declaration for Acceptance of Terms and Conditions.

The Bidder must not be blacklisted/banned/suspended or have a record of any service related dispute with any organization in India or elsewhere.

The quotes should be in English and submitted in sealed covers (Two bid system).

**Technical Bid** – Technical bid consisting of all technical details and check list for conformance to technical specifications.

**Commercial Bid** – Indicating item wise price for the items mentioned in the technical bid, as per the format of quotation provided in tender, and other commercial terms and conditions.

Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor

The quotations should be on FOR-IISc Bangalore basis in INR only

The items are required for research purposes, and IISc is a DSIR registered institution, hence eligible for GST exemption (i.e. GST @ 5%). While submitting the price quote, this point must be taken care. For getting GST exemption certificate, successful bidders must submit, a formal request together with Invoice copy and Purchase order copy

100% Payment after the satisfactory installation

ISO certification of the product is mandatory

The sealed covers should be submitted to the following address: Dr. K. Ramesh, Department of Physics, Indian Institute of Science, Bangalore 560012.

Phone: + 91 80 22932716 Email: [kramesh@iisc.ac.in](mailto:kramesh@iisc.ac.in)

Last date: February 04, 2022 before 5:00PM.