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**Tender Corrigendum**

No. 12(333)/2020-P

Date: 01-04-2022

Reference to the Tender no. **2022\_CSIR\_650942\_1** for 'NMR Spectrometer', it is to notify the **revised specification** for the equipment mentioned below. The bidders are requested to quote accordingly.

Sd/-

Store and Purchase Officer

## **Revised Technical Specifications of 400MHZ NMR after Pre-bid Meeting**

### **The Revised Technical Specifications of 400MHZ NMR after Prebid Meeting**

**Indent for the procurement of state of the art 400 MHz standard bore NMR spectrometer with two channels to carry out high resolution NMR experiments in liquid state at variable temperatures**

#### **BASIC REQUIREMENTS.**

##### **I. Superconducting magnet:**

- a) Standard bore size (54 mm internal diameter)
- b) Operation field corresponding to 400 MHz  $^1\text{H}$  frequency (9.4 Tesla)
- c) Shielded magnet with the shortest possible distance for both axial ( $< 1.5$  mtrs) and radial ( $< 3$  mtrs) 5G lines
- d) Suitable vibration damping accessory for acquiring artefacts free data collection (specify the damping frequency limit)
- e) All support equipment for magnet (Liquid Helium transfer lines, O rings, coupling attachments, spares etc.)
- f) Helium and nitrogen level meters
- g) Liquid Helium hold time  $\sim 300$  days or more. (Specify the refill volume and total volume)
- h) Liquid Nitrogen hold time of minimum 14 days (Specify the refill volume and total volume)
- i) High performance cryo and RT shim systems for optimal line shape
- j) Pneumatic sample load/spin/eject system

##### **II. Automatic Sample Handler with appropriate Console Unit:**

- a) A robotic auto sampler module (with a capacity of 60 samples)
- b) 2 channel (one proton and one broad band) architecture suitable for multidimensional experiments
- c) Lock channel with a provision for deuterium detection and decoupling
- d) Should be able to carry out  $^{19}\text{F}$  detection with  $^1\text{H}$  decoupling and vice versa
- e) Appropriate amplifiers for all the channels (for the broadband and  $^1\text{H}/^{19}\text{F}$  channel)
- f) Communication between all channels by appropriate communication system
- g) Receivers (Digital) with excellent detection capability and elimination of artefacts such as quadrature images with control unit having state of the art technology for signal acquisition, filtering, sampling etc.
- h) Uniaxial Z-gradient amplifier: PFG system, gradient shimming for 1D and 2D
- i) Automatic tuning and matching system
- j) ADC with Band Width 5 MHz or more
- k) Preamplifiers for multinuclear observation with all necessary filters for noise and artifact reduction
- l) Frequency, phase, and amplitude shaping capability with simultaneous switching of the parameters possible in  $< 50$  ns
- m) Variable temperature set up from  $-150^\circ\text{C}$  to  $+250^\circ\text{C}$  with a resolution of  $0.10^\circ\text{C}$
- n) Precision NMR tubes (1000 quantity) suitable for use on high field spectrometers
- o) 5mm and 3 mm spinners (two quantity each) for high temperature NMR



- p) Self-pressurized liquid nitrogen dewar (capacity – 250 ltrs) for routine filling of liquid nitrogen in NMR magnets. (Liquid Nitrogen Storage Capacity of the Dewar: 230-300 Litres ( Please submit separate quotations for any available capacity in the given range); Material of the Dewar: Non-magnetic stain less steel; Self-pressurised Dewar (minimal operating pressure: 0.1 bar or lower; maximal operating pressure: 2 bar or higher); Should have a primary pressure gauge for pressure indication and control; Should have appropriate valves to control the output pressure of the gas, filling and withdrawal of the liquid, vent pressure.; Should have a secondary output pressure control gauge in series with the primary gauge to obtain low output pressures in the range 0.1 (or lower) to a maximum of 0.35 bar.; Should have indicator for liquid level; Suitable for filling liquid nitrogen into NMR spectrometer magnets; Should be mounted on caster base (round or square shape) fitted with high quality wheels. Wheels should have breaks/pedal locks and rotate 360 degrees.; Liquid nitrogen evaporation rate: 2% or lower per day.; Should come with an appropriate relief valve; Should come with colour coded valves for ease of use; Vent to prevent overfilling of the dewar; All the material used for the equipment (Dewar, gauges, caster base, wheels and others) should be non-magnetic.; Optional: LCD display of the real time pressure levels of the gas and liquid nitrogen levels)

### **III. Software:**

- a) Latest available Windows based software for NMR acquisition and data processing
- b) Free updates for a period of 10 years
- c) Three additional NMR data processing software licenses

### **IV. External Cooling Unit:**

An external temperature control module (along with a suitable dryer) using compressed air that is compatible with the proposed spectrometer for easily achieving temperatures as low as -80 °C or lower.

### **V. Probes:**

- a) A state of the art 5 mm dual channel broad band probe with an ability to observe X/(<sup>19</sup>F) with <sup>1</sup>H decoupling and (vice versa) equipped with auto tune and match. Operating temperature range at -100°C to +150°C or even improved ranges. Probe sensitivity: For <sup>1</sup>H-500(S/N) and for <sup>13</sup>C-190 or better
- b) A state of the art 5 mm dual channel broad band probe with an ability to observe X with <sup>1</sup>H decoupling and (vice versa) equipped with auto tune and match. Operating temperature range at -100°C to +150°C or even improved ranges.
- c) A state of the art 5 mm dual channel inverse broad band probe with an ability to observe X with <sup>1</sup>H decoupling and (vice versa) equipped with auto tune and match. Operating temperature range at -100 °C to +150 °C or even improved ranges.

### **VI. User Interface:**

A high-end work-station with latest configuration (minimum of 32 GB RAM, minimum 1TB dedicated hard disk for software installation, data storage hard disks



(overall 4 TB), 24" or bigger TFT Monitor, latest available processor and automatic duplex printer with scanner.

### **Requirements and conditions**

- a) Standard warranty (1 year) for the comprehensive maintenance of the entire spectrometer should be provided
- b) An additional comprehensive warranty for 4 years from the lapse of the standard warranty.
- c) On-site training for operation and maintenance should be given during the installation.
- d) Complete cost of installation should be borne by the vendor.
- e) Cryogens required for installation and topping off the magnet should be provided by the vendor and should be included in the basic cost of spectrometer.
- f) Price for each item of the spectrometer should be quoted separately.
- g) Technical details of all items should be produced.
- h) In case of magnet-quench during the installation or later due to faulty design, the expenses incurred for recharging or replacing should be borne by the vendor.
- i) Hard copy/soft copy of the service and operational manuals for all the modules of the spectrometer, peripherals and accessories must be supplied with the spectrometer.
- j) The minimum power required for the operation of spectrometer with all the accessories must be specified in the quote.
- k) The suppliers may quote the price of all components separately