




	<b>School of Chemistry</b> <b>MADURAI KAMARAJ</b> <b>UNIVERSITY</b> (University with Potential for Excellence) Madurai 625 021, Tamil Nadu. India.	
<p style="text-align: center;"><b>TENDER NOTIFICATION (NO. MKU/SOC/FIST/01/ 2020)</b></p> <p>Sealed Tenders (two-cover system) are invited for the following equipment for School of Chemistry, Madurai Kamaraj University, Madurai-625021</p>		
<b>ITEM No.</b>	<b>EQUIPMENT</b>	
1	Supply and Installation of 400 MHz NMR	
Last date for Submission: 23-03-2020 until 11.30 am.		
Tender announcement date: 08-03-2020. Details available at <a href="http://www.mkuniversity.ac.in">www.mkuniversity.ac.in</a> <div style="text-align: right;"> <b>The Coordinator,</b>  <b>DST-FIST Programme</b>  <b>School of Chemistry, MKU</b> </div>		

	<b>MADURAI KAMARAJ UNIVERSITY (UNIVERSITY WITH POTENTIAL FOR EXCELLENCE)</b> Palkalai Nagar, Madurai 625 021, Tamil Nadu. INDIA.		
S.O.(RP)/SOC/DST-FIST/2020 Date: 08.03.2020			
For and on behalf of School of Chemistry, Madurai Kamaraj University, the sealed tenders (two-cover system) are invited by The Coordinator, DST - FIST, School of Chemistry, Madurai Kamaraj University, Madurai 625 021, under the DST-FIST program, for the supply and installation of the following equipment, from the Reputed Suppliers/executors.			
<b>ITEM No.</b>	<b>NAME OF THEEQUIPMENT</b>	<b>EMD Amount (1 % of the estimate cost)</b>	<b>Period of Contract</b>
1.	Supply and Installation of 400 MHz NMR	Rs. 2,00,000/-	90 days
Tenders are invited until <b>11.30 am on 23.03.2020</b> which will be opened by the Technical/Purchase Committee constituted by the Authorities of Madurai Kamaraj University at School of Chemistry at 12.00 pm on the same day in the presence of the Tenderers or their agents who choose to be present at the time of opening.			
The specifications, terms and conditions are available in the University website <a href="http://www.mkuniversity.ac.in">www.mkuniversity.ac.in</a> from 06-03-2020. The tender documents are available for downloading free of cost at the websites.			
The Coordinator DST-FIST Program School of Chemistry Madurai Kamaraj University Madurai-625021			

### TENDER SCHEDULE

**Tender Announcement Date:** 08-03-2020  
**Publication Date on Portal:** 08-03-2020  
**Last date for Submission:** 23-03-2020, until 11.30 AM  
**Tender-Technical Bid Opening:** 23-03-2020, at 12.00 PM  
**Price-Bid-Opening:** Will be intimated to the qualified bidders.



**School of Chemistry**  
**Madurai Kamaraj University**  
**(University with Potential for Excellence)**  
**MADURAI – 625 021**



## **TENDER DOCUMENT**

Terms and condition for the **Supply & Installation of 400 MHZ NMR** for School of Chemistry, Madurai Kamaraj University, Madurai – 625 021, as per Guidelines of Government of Tamil Nadu Tender Transparency Act for the purchase of equipments by Government Departments, Undertakings and Autonomous Bodies [April 1998]

### **1. DUE DATE AND TIME**

Sealed Tenders are invited by The Coordinator, DST-FIST, School of Chemistry, Madurai Kamaraj University under two cover system from the reputed manufacturing concerns or Original Equipment Manufacturer/ their regional Agents / Authorized dealers and suppliers for the **Supply & Installation of 400 MHz NMR**, as per specifications indicated in the Commercial bid.

The duly filled Tender forms containing the Technical Bid and Commercial Bid should reach **on or before 11.30 am of the date specified in the tender schedule**. Tenders received after due date and time will be summarily rejected.

*The EMD amount of 1% of the estimated cost (specified in page no. 2) should be enclosed in the Technical bid only.*

### **2. MODE OF DESPATCH**

Tenders should be addressed to “**The Registrar, Madurai Kamaraj University, Madurai – 625021**” Attention to The Coordinator, DST-FIST Program, School of Chemistry, by designation and should be only in sealed covers by Registered or Speed Post with Acknowledgement due or in person. Tenders received in ordinary covers without seal will not be considered.

### **3. SUPERSCRPTION**

The Tender should be sealed and superscripted as “**Tender for Supply & Installation of 400 MHz NMR**” for School of Chemistry, Madurai Kamaraj University, Madurai – 625 021, due on **the date and time specified in the Tender schedule of this document**.

The Tender document relating to the Technical Bid duly filled in and signed must be put in sealed cover super scribed as **“Technical Bid”**. The Tender document relating to the Commercial Bid must be duly filled in and signed and must be put in a sealed cover separately, superscripted as **“Commercial Bid”**. The sealed Tender cover containing the Technical Bid (**with EMD**) and Commercial Bid should be sent to the **“The Registrar, Madurai Kamaraj University, Madurai – 625021”** and **Attention to The Coordinator, DST-FIST Program, School of Chemistry**. Covers received without such superscription will be summarily rejected.

#### **4. EARNEST MONEY DEPOSIT**

Each Tender should be accompanied by Earnest Money Deposit of E.M.D. of **Rs.2,00,000/-**(*1% of the estimated cost*) by Demand Draft drawn in favor of **SB A/C No. 10143136536, State Bank of India, Madurai Kamaraj University Branch or The Coordinator, DST-FIST, School of Chemistry, Madurai Kamaraj University, Madurai-625**. The Earnest Money Deposit of any unsuccessful tenderers will be returned after the acceptance of the successful tender, at the expenses of the Tenderers within a reasonable time consistent with the rules and regulation on this behalf. The above **EARNEST MONEY DEPOSIT** amount held by the University till it is returned to the Tenderers would not earn any interest there for. Earnest Money Deposit of the successful Tenderer may be adjusted towards security deposit for the successful tenderer.

#### **5. ELIGIBILITY CRITERIA**

The bidders must fulfil the following Eligibility conditions and also submit documentary evidence in support of fulfilling these conditions while submitting the Technical Bid. The University will consider the Commercial Bid of the vendors who qualify in the Technical bid. For those vendors who are not qualified in the Technical Bid, the Commercial bid will not be considered. The bidder should have the record of

- i) Installations at reputed institutions / organizations,
- ii) Sufficient service back-up in Tamil Nadu / South India for all types of related works.
- iii) The Tenderer should submit the latest **Income Tax and Commercial Tax Clearance certificates**
- iv) The Tenderer should submit the GST No.
- v) The bidder should have at least three years experience and focus on related business, as on 31-12-2019
- vi) A minimum average annual turnover 10 times the approximate cost of the quote value of the items to be purchased in the last three years.

#### **6. DETAILS TO BE FURNISHED AND MODE OF PRESENTATION**

The Tender should contain particulars like name and addresses of the Tenderers, net rate including GST/excise duty, custom duty\* (for imported item, clearing and forwarding charges, surcharge, GST, freight, octroi, insurance for delivery, delivering

up to the point, installation and commissioning of the equipment and such other levies that may be applicable.

- a. The rates should be kept firm for **Ninety days** from the date of the opening of the Tenders for acceptance.
- b. The rate should be quoted for each item with specification and model if applicable and should be indicated clearly both in words and figures. Any **scoring or overwriting** should be attested by the Tenderer with full signature. The rate quoted should be firm and **should not be subject** to any variation clauses.
- c. The **University shall not pay any increase in duties, taxes and** surcharges on account of any revision by the Government at the time of supply and installation.
- d. Supply of the equipment and other accessories shall be as per the specifications mentioned in the corresponding Appendixes and according to the delivery and installation schedule indicated.

## **7. OPENING OF TENDERS:-**

The tenders received up to **11.30 am. on the date specified in the Tender Schedule** will be opened by the Technical/Purchase committee **at 12.00 p.m.** on the same day in the presence of those Tenderers or their representatives who may be present at the time of opening. The representatives of the Tendering firm who are attending the opening of the Tenders should bring a letter of authority from the Tendering firms which they represent to identify their bonafide.

## **8. AGREEMENT:**

- a. The successful tenderer should execute an agreement for the fulfillment of the contract in the stamp paper in the model form enclosed in Appendix, within fifteen days from the date of acceptance of the tender.
- b. The expenses incidental to the executing of agreement shall be borne by the successful Tenderer.
- c. The conditions stipulated in the agreement form should be strictly adhered to and violation of any of the conditions will entail termination of the contract without prejudice to the rights of the University and recovery of any consequential loss from the successful Tenderer.

## **9. SECURITY DEPOSIT:**

- a. The successful Tenderer will be required to remit the **Security Deposit** equivalent to **Five percent** of the value of the Purchase order within **fifteen days** from the date of receipt of communication/intimating them of the acceptance of the

Tenders. If the accepted Tenderer fails to remit the Security Deposit within the above said period, the Earnest Money Deposit remitted by him will be forfeited to the Madurai Kamaraj University and his Tender will be held void. Purchase order will be released after execution of the above contract by the successful Tenderer and after remitting the Security Deposit by way of Demand Draft / Bankers' cheque / irrevocable bank guarantee drawn in favor of **SB A/C No. 10143136536, State Bank of India, Madurai Kamaraj University Branch** or **The Coordinator, DST-FIST Programme, School of Chemistry, Madurai Kamaraj University, Madurai.**

- b. The Security Deposit furnished by the Tenderer in respect of his Tender will be returned to him at the **end of the warranty period** (Three years) subject to the satisfaction of the University.
- c. In case of successful Tenderer, The Earnest Money Deposit, if paid, may be adjusted towards Security Deposit the Tenderer remitted, if opted by the Tenderer.
- d. If the Tenderer fails to act according to the Tender or backs out when his Tender is accepted, his Security Deposit mentioned above will be forfeited to the University.

## **10.SUPPLY AND INSTALLATION OF EQUIPMENTS**

- a. The supply and installation of equipments/items and other accessories should be made strictly in accordance with the specifications given in the Commercial Bid and should successfully fulfill the tests carried out by the University. The supply and installation should be as per the delivery schedule to be sent by the University along with the placement of firm orders. The successful Tenderer should give guarantee for a period of **3-5 Years** for the equipment and other accessories installed, against breakage or breakdowns due to manufacturing defects. The guarantee period takes effect from the date of satisfactory trial run. The Tenderer shall be liable to make good the loss by replacing the equipment or other accessories found defective during the guarantee period. The equipment hardware should be installed in the premises of the University at the cost and risk of the Tenderer.
- b. The material or goods are to be guaranteed for a period of at least Three-years after installation and commissioning against manufacturing defect and bad workmanship. The warranty period specified, will commence from the date of handing over the equipment after running and carrying out successfully the tests prescribed by the University to its satisfaction.
- c. Documents such as operation manuals, software, user manuals and circuit diagrams and other relevant materials shall be provided by the Tenderer along with equipment, free of cost.

d. If the supply, installation and commissioning of the systems are not effected before the specified period from the date of purchase order, the University shall have the authority to cancel the order and to take any such action which will be deemed fit in the circumstances.

e. If any manufacturing or other technical defects are found within the specified months from the date of installation, commissioning and handing over the system to the University Authorities, the same will have to be rectified or replaced free of cost by the supplier.

f. During the warranty period, if due to manufacturing and other technical defects of the equipment supplied, the system is down and if it is not restored in working condition within 48 hours, the supplier shall be liable for a penalty of one percent per week during breakdown period on the total contract price.

g. The warranty will cover all the materials and goods supplied by the supplier under this contract irrespective of the fact whether these have been manufactured by the supplier or not.

h. In case of failure by the Tenderer to deliver goods or materials demanded from them within the period specified for delivery or in case of goods or materials being delivered without a correct invoice in duplicate, the Registrar or anyone duly authorized by him shall have power to reject any such goods or materials so rejected or not delivered unless the supplier shall themselves forthwith supply others that shall be sufficient and satisfactory and any excess of cost so incurred by the Tenderer over the contract price together with all charges and expenses attending the purchase shall be recoverable by the University from the supplier.

i. The successful Tenderer shall supply licensed versions of the equipment systems. The University will not be held responsible for any consequences arising of patent right problems.

## **11.PAYMENT OF COSTS:**

The terms of payments for purchase of equipments: The total cost of equipments will be paid on installation, commissioning and handing over of the Equipments after testing all the software and fulfilling the technical specifications and also after the submission /payment of security Deposit (5% of the equipment cost. Also, could be submitted in the form of Bank Guarantee). The testing that should be carried out for commissioning the material supplied and the satisfactory working of the systems are to be certified by the University.

In case of payment to OMs outside the country, LC/ wire transfer mode payment would be made upon the submission /payment of security Deposit (5% of the equipment cost; also, could be submitted in the form of Bank Guarantee).

## **12.FORFEITURE OF EARNEST MONEY DEPOSIT:**

If the accepted Tenderer fails to act according to the tender conditions or backs out after his tender has been accepted, his Earnest Money Deposit will be forfeited to the University.

The successful Tenderer shall not assign or make over the contract, the benefit of burden thereof to any other person or persons or body corporate. He shall not underlet or sublet to any person/s or body corporate for executing the contract or any part thereof.

## **13.PENALTY FOR NON-FULFILMENT OF TENDER:**

Penalty will be levied at the rate of 1% per week on the total contract price if the installation and commissioning has not been completed in full within the stipulated period subject to force majeure conditions. Besides, such performance may entail black listing of the supplier.

## **14.ACCEPTANCE AND WITHDRAWALS:**

The final acceptance of the tender is entirely vested with **University which reserves the right to accept or reject** any or all the tender without assigning any reason whatsoever. There is no obligation on the part of the University to communicate with rejected Tenderers. After acceptance of the tender by the University, the Tenderer shall have no right to withdraw his Tender or claim higher price. Tenders with **incomplete information** will be summarily rejected.

## **15.POST WARRANTY:**

The post warranty annual maintenance charges (AMC) is applicable for the remaining period after the satisfactory completion of the warranty period offered by the vendor. The annual maintenance charges should be indicated.

The AMC payable from the date of completion of warranty in advance against invoices/bill to be preferred by the vendor. The vendor agrees to provide comprehensive maintenance of the equipment, which shall include preventive maintenance and corrective maintenance at the location specified by the University. The maintenance shall also include replacement of all parts of equipments. The equipment which is down should be restored in good working condition within 48 hours. Otherwise the supplier shall be liable for a penalty of 1% per week of the breakdown period on the total price of the system. The University reserves the right to terminate the maintenance contract in the event of unsatisfactory maintenance and claim damages for non-fulfillment of contract.



## **16. PENALTY FOR FULFILLMENT OF CONDITIONS**

The supplier agrees that in the event of non-fulfillment or non-observance of any of the conditions stipulated in the conditions, the Supplier shall pay as penalty an amount equivalent to 10% (ten) percent of total value of equipment or an amount equal to the actual loss incurred by the purchaser whichever is greater. This provision applies up to the end of the life cycle of the equipments (i.e.) even during the post warranty period.

## **17. EXEMPTION OF CUSTOMS DUTY AND EXISE DUTY**

The Madurai Kamaraj University, being a Research oriented higher education institution, is exempted from paying Excise duty and Customs duty / Concessional Customs Duty. The supplier shall therefore obtain Exemption Certificate from the University, issued by the Government of India, before clearing the consignment.

## **18. TIME-SCHEDULE**

Time-schedule is mandatory. Supply should be made within 4 - 6 months for any purchase. If not supplied or part only is supplied, then concurrence for purchase from L2 to be got from L1. If no concurrence is given by L1, then notice to be issued and after 15 days L2 is called and negotiated for the supply at L1 rate, or at a lesser price originally quoted by L2. University is vested with the power of modifying the quantity, time and alteration in the specification without hindering the requirements. Those who are agreeable for the above terms should only apply for the tender.

## **19. GENERAL**

The tenderers while sending their tender should enclose a copy of the conditions stipulated duly certified and attested by them in token of accepting the tender conditions that they understood and accepted them in full. Tenders received without the certified copy of the conditions shall be rejected summarily.

I/We \_\_\_\_\_ have gone through the terms and conditions and will abide by them as laid down above.

**SIGNATURE OF THE TENDERER WITH OFFICE SEAL**

## **OTHER APPLICABLE GENERAL CONDITIONS:**

1. The quotation must specify the period within which the supply could be affected from the date of receipt firm orders.
2. The prices quoted should clearly specify charges for delivery of the goods to destination indicated overleaf.
3. Sales tax or any other taxes/GST if applicable should be shown separately giving the full rate of taxes for each item giving ex-incidence of such levies.
4. If the rates are under D.G.S. & D. please specify the same clearly enclosing necessary documents.
- 5. The leaflets/ catalogue, etc of the technical features of the offered equipment must be submitted for proper evaluation and would be considered for technical evaluation.**
6. Dealership certificate on the offered products must be included in case the vendor is a dealer.
7. The vendor must have credential in supplying such system in any institute of national importance and similar organizations
8. Bidder should have valid Service Tax registration number, GST number and meet all legal requirements.
9. Any amendment / corrigendum to the RFP (Request for proposed) document shall be posted on the University Website
10. University reserves the right to call for any other details or information from any of the Bidders. Moreover, the University reserves all rights to reject any bid at any time, at any stage, fully or partly for whole process and / or for particular bidder and also reserves all rights at any time to add, alter, modify, change, edit & delete any condition at any stage. MKU also reserves the right to cancel the entire tender process without assigning any reason. In this regard, the decision of University shall be final and binding on all the participant.
11. Every page of the RFP document shall be signed by the bidder or by a person duly authorized by the bidder.
12. Bidder shall submit letter of authorization, authorizing the person signing the RFP document on behalf of the bidder.
13. All changes, alterations, corrections in the RFP document shall be signed in full by the person(s) signing the RFP document, with date. No eraser and/or over writing without authentications is/are permissible.

14. The complete RFP document along with the documentary evidence should be numbered.
15. The bidder shall carefully examine and understand the scope of work, specifications/conditions of RFP and seek written clarifications, if required, to ensure that they have understood all scope of work, specifications/conditions of RFP.
16. If the bidder has NSIC certification they will get the NSIC benefits.
17. If the bidder, after submission, revokes his bid or modifies the terms and conditions thereof during the validity of his bid except where the University has given opportunity to do so, the earnest money deposit submitted by Bidder shall, in such case, be forfeited.
18. The successful bidder i.e. Service Provider, within 15 days of receipt of Letter of Intent or within such extended time as may be allowed by University in its discretion, shall submit a Performance Bank Guarantee for an amount equal to 5% of the contract value having validity of 36 months. In case of extension of maintenance contract, the Service Provider shall submit a fresh Bank Guarantee for the Contract value covering the extended period of AMC.

**TECHNICAL BID****SCHOOL OF CHEMISTRY, MADURAI KAMARAJ UNIVERSITY,****MADURAI – 625 021**

Tender Schedule for the **Supply & Installation of 400 MHZ NMR** to School of Chemistry, Madurai Kamaraj University, Madurai – 625 021.

**Profile of the Company:****The Company should provide the following details**

1. Name of the Organization	
2. Nature of the Organization (Govt. / Public / Private / Partnership /Proprietorship)	
3. (a) Address of the Registered Office of the firm with Phone Number, Cell No, Fax and E-mail. (b) Year of Establishment (related to Printers business) (c) TNGST & CST Reg No./GST No. (d) If approved small scale	
4. Annual turnover for the previous three years as on 31-12-2019 I. General : II. Equipments listed in tender Document	
5. Location of the factory with address	
6. Maintenance and service centre facilities in Southern states / other areas and total number of Service Engineers available:	

7. Names of the Government Agencies / Educational Institutions to whom similar Machines have been supplied in the preceding Three year			
8.Total experience in the related areas			
9. Is your Company an original manufacturer of the equipments and related items?  If yes, state the specific items you Manufacture			
10.What type of maintenance support does your company provide for the spares			
11.What are your conditions for up gradation of Equipments system after the warranty period?			
12. In case of breakdown of the equipment, what will be the mean Downtime? And state whether standby systems will be provided			
13. State the minimum amount of time required to supply the items if your company/ Organization gets the order			
14. State whether you will agree to supply the manuals Drivers for items supplied.			
<b>15.EMD PAYMENT PARTICULARS</b>			
<b>[The DD should be enclosed in the Technical Bid only]</b>			
(1) Demand draft particulars			
Sl.No	Name of the bank and Branch	DD No. and Date	Amount Rs.

Signature:

Name of the Firm

Phone/Mobile No.

**COMMERCIAL BID****School of Chemistry, Madurai Kamaraj University, Madurai – 625 021**

Tender Schedule for the Supply & Installation of 400 MHZ NMR to School of Chemistry. as per Specifications below for the use in School of Chemistry, Madurai Kamaraj University, Madurai – 625 02

Sl.	Description/Specification	Qty.	Rate Rs.	Total (Inclusive of a Taxes) Rs.
1.				

Warranty Period should be clearly mentioned: ..... Years

A]

1. Please indicate the Annual Maintenance Charges per annum on the basic price of Equipments, excise duty, sales tax, etc., year wise for the remaining period of 5 years life cycle after warranty period.
2. Indicate the location of service centre, address with phone / fax numbers.
3. Indicate No. of Service Engineers available.
4. Minimum Time required for contact and Service

**MADURAI KAMARAJ UNIVERSITY**  
**School of Chemistry**  
**DST -FIST**

**Technical Specifications for 400 MHz NMR Spectrometer**

**400 MHz NMR-Specifications**

**Magnet:**

- Latest state of the art magnet for 400 MHz FT-NMR spectrometer for multi-dimensional and multi nuclear solution state and solid-state NMR experiments.
- Superconducting magnet system with an operating field of 9.4 tesla.
- Shortest possible radial and axial distance of 5 Gauss stray field from the center of the magnet. Please specify the stray field distances
- Cryogen cooled shim system in addition to room-temperature shims for optimal line shape (please mention the number of cryogen-cooled and room-temperature shim coils); automated gradient shimming capability with associated accessories (software/hardware).
- Minimum 300 - 365 days liquid Helium hold time and long liquid Nitrogen hold time. Please specify the total liquid He and liquid N<sub>2</sub> hold volume, refill interval and refill volume for liquid He and liquid N<sub>2</sub>.
- Liquid Helium and Liquid Nitrogen level indicating digital meters with alarms.
- All support equipment for cryostat (e.g. liquid He and liquid N<sub>2</sub> transfer line).
- Pneumatic sample load/spin/eject system.
- **Optional:** Auto sampler with a capacity of 24 samples or above.

**Console**

- Provide the latest configuration of console
- Equipped with two RF channels (please specify the frequency range of operation with best frequency and phase resolution) in addition to lock channel with provisions for deuterium decoupling and observation. Please specify the configuration and bandwidth of all the channels. Minimum 2 channel architecture with upgradation possibility to 3-channel and solid-state capability. [This should be an add-on accessory]
- Dual/Multi receiver capability with Digital receiver for simultaneous acquisition of multinuclei. 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, multi nuclei acquisition etc. **Optional:** A future upgradation with 3-channel spectrometer should be possible to be added later for Protein measurements. [This should be an add-on accessory]
- Broadband frequency generation for all channels
- Waveform generators for all channels for pulse shaping (please specify bits and total

memory of the shape card).

- Quadrature-artifact-free phase sensitive detection.
- Receiver control unit for signal acquisition with real-time digital filtering along with oversampling technology.
- Frequency, phase and amplitude shaping capability with individual/simultaneous switching of the parameters in 25 ns.
- Real time calculation of parameters of pulse sequences.
- Broad-banded frequency generation for all the channels.
- Fast Ethernet based communication system between all the channels.
- High-power linear broadband amplifiers >300 W for X-channel and ~100 W for  $^1\text{H}$  (and/or  $^{19}\text{F}$  channel) for double resonance liquid state NMR (and solid-state/3-channel upgradation in future). [This should be an add-on accessory] Please specify all relevant parameters including power (Wattage), frequency range, duty cycle, maximum pulse duration etc.
- Multinuclear preamplifiers with a  $^2\text{H}$  preamplifier for lock channel and observation.
- Automatic high-performance gradient shimming for 1D and 2D along with lock, spin and insert / eject and ADM
- Lock system should have high precision phase- and field-corrections (please provide documental evidence).
- Built-in tune/match display and add-on filters for noise reduction.
- ADC with high dynamic range and sampling rate. Please specify the resolution of the ADC (in bits) and the maximum sample rate.
- Z-Gradient accessory with a provision for at least 30 and above G/cm.
- Pulsed field gradients of any desired shape with high resolution.
- Pre-saturation pulse gradient channel.
- Variable temperature with a resolution, accuracy and stability better than 0.1 °C.
- Modern software interface for NMR acquisition and processing.

### **Probes for 400 MHz Spectrometer:**

- 1) 5 mm double-resonance broadband high-resolution probe with an actively shielded single axis Z-gradient for observation/irradiation of all NMR nuclei in the range  $^{31}\text{P}$  etc., in addition to  $^1\text{H}$  (please quote for maximum broadband range available); including  $1\text{H}$  ( $^{19}\text{F}$ ) coupling and decoupling techniques and vice versa including facility for  $1\text{H}$ - $^{19}\text{F}$



correlation 2D ex pts. sensitive to low gamma nuclei detection; a deuterium lock channel. Variable temperature ranges and automated tuning and matching.

- 2) 5 mm double-resonance ( $^{13}\text{C}/^1\text{H}$  nuclei) high resolution broad band probe ( $^{13}\text{C}$  observe/sensitive) with an actively shielded single axis Z-gradient for observation and a deuterium lock channel. Variable temperature automated tuning and matching.
- 3) Signal to noise (S&N) ratio 450 and above
- 4) **Optional:** To study natural products and/or samples of low amount/quantity, a 1.7 mm variable temperature triple-resonance probe for observation of  $^1\text{H}$ ,  $^{13}\text{C}$  and  $^{15}\text{N}$  with auto tuning and matching and having pulse field gradient capability with minimum operational temperature range of  $-50$  to  $+80$  °C with all accessories for low and high temperature operations. All the relevant probe specifications such as 90 deg pulse lengths, sensitivity etc. for standard nuclei ( $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{15}\text{N}$ ) are to be provided.

**Please specify the following:**

- Configuration of the coils.
- Pulse widths for  $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{19}\text{F}$ ,  $^{31}\text{P}$ ,  $^2\text{H}$  and  $^{15}\text{N}$  using standard samples. Please specify the sample used. Also provide the standard samples for all these nuclei
- Best resolution and line-shape (under sample spinning and non-spinning conditions). Please specify the line-widths measured using the standard sample.
- Best Signal-to-noise (S/N) ratio values for each nuclei of the probe measured using standard samples (Please provide data and mention the sample used). Provide specifications for each nuclei.
- Maximum gradient strength (30 and above G/cm).
- Gradient recovery times (not more than 100  $\mu\text{s}$ ).
- Decoupling pulse width, power, bandwidth, duty cycle capability on each RF channel.
- Temperatures range over which the probe can be used.
- Specify the warranty of the probes separately

**User-interface:**

- A compatible high-end workstation with preferable Windows operating system, LED monitor, CD/DVD read/write drives, USB ports.

**NMR software:**

- Latest version of the NMR software for spectrometer control, data acquisition and processing, and automatic recording of multiple experiments. Software tools for Structure Analysis, Integration and Deconvolution of 1D, 2D and 3D spectra, NMR simulation, Multiple analysis, Relaxation data analysis.

- Automatic setup with acquisition, analysis and quantification of the NMR samples
- High-end graphic tools for plotting one- and multiple-dimension spectra, for drawing structure and for making presentations on NMR experiment.
- Quoted software should have GxP and 21CFR compliance.

**Other Requirements:**

- Warranty of the instrument should be mentioned.
- Liquid Helium for installation should be included in the quotation
- Specify the pre-installation requirement including the minimum ceiling height, room size etc.
- Liquid Helium supply and filling contract for 5 years from the date of installation
- 5 mm standard NMR tubes for the spectrometer – 500 numbers
- Regular Liquid Helium filling one of the magnet service of suppliers

**Optional Requirements:**

- Real-time (online) reaction monitoring kit (syringe pump and capillary)
- Extended warranty for additional 2 years should be quoted
- Please provide a list of NMR instruments sold in India