

Chapter 8: Specification and Allied Technical Details (Item No. 1)

Revised Technical Specification of 400 MHz FT-NMR Spectrometer Under Buy-Back after Pre-Bid Meeting January 2017

400 MHz FT-NMR Spectrometer under Buy-back offer may be given for an existing Bruker (Switzerland) make, Model Avance DPX 300 MHz FT-NMR Spectrometer. The existing equipment can be inspected in Analytical Chemistry Group (CSTD) of CSIR-NEIST, Jorhat, Assam.

- Latest version of High performance 400 MHz (9.4 Tesla) NMR spectrometer with highly-shielded superconducting magnet of standard/normal bore for multi-dimensional solution and solid state NMR experiments. Liquid Helium hold time should be 365 days (one year) or more and Liquid Nitrogen hold time more than 07 days.
- Helium level meter with alarm function with vibration dampening system and liquid Helium transfer lines. Stainless steel cabinet with electromagnetic compatibility and safety regulations. The part number, detailed specifications of superconducting magnet and its installation site requirements, such as complete dimensions of the magnet and minimum operational height (for liquid helium transfer and other servicing).
- Field stability: Less than 5 Hz/h or better.
- High performance Orthogonal Shim system with minimum of 20 (twenty) room-temperature shim systems and specify the number of cryoshims. Smart magnet control system for shim and lock control and digital lock control unit with automatic facility. Autosimming and manual shimming facility.
- Two-channel electronic console: 100W (1H/19F) and 300W (X nuclei) and suitable RF amplifiers, pre-amplifiers and receiver under full computer control with 2H amplifier, lock switch and gradient shims.
- 5mm multinuclear (1H-19F)/X Broad Band Direct/observe Z-gradient VT Probe capable of covering almost all nuclei ranges and computer controlled automatic tuning and matching and able to perform all the inverse experiments with 1H and 13C sensitivities 450 and 180, respectively or better.
- One dual 5 mm 1H/13C (13C observe) PFG-VT NMR probe OR 1H/X (broad band, X-Observe) probe OR 1H-19F/X (broad band, X-Observe), with 13C sensitivity 180 or better.
- One solid state 4 mm CP-MAS VT-probe with essential accessories including two sets of sample kit and additional one set of caps, including necessary moisture filters with dew point -80 °C or better.
- The instrument must have the facility to record NMR at variable temperature at least in the range of -170 °C to +150 °C with temperature accuracy +/- 0.1°C and with low and high-temperature accessories (with +/- 1 °C room temperature stability, +18 to 40 °C ambient).
- Auto sampler: Automatic sample changer for 5 mm spinners for 60 samples or more including equal numbers of spinners.
- A suitable windows based computer with 24" monitor for performing NMR equipment operation and colour laser printer along with necessary accessories. 8 GB RAM or more, 1 TB HDD or more.

Software

- Latest NMR acquisition and Processing software with Plotting, Structure Verification and Analysis of 1D and 2D Spectroscopy with additional processing softwares.
- The software should be latest one and should function all latest parameters in automatically. PC controlled Windows based operating system for NMR Data acquisition (arbitrary dimensions and processing of 1D, 2D, 3D and 4D experiments.) NMR GUI for training of users in use of 1D and 2D experiments with NMR literature library.
- Structure analysis software should be provided with licenses along with one processing PC (with latest configuration) for off-line processing (Processing, Plotting, Structure Verification, Multiplet Analysis, Deconvolution, Automation, and Projection Reconstruction Spectroscopy).

List of accessories required:

Required Consumables and Spares: Consumables along with the machine such as spares for routine maintenance, non-magnetic, tool kits essential for routine operations.

Low temperature accessories:

- Low temperature accessories: ~26 liter LN2 container and heating assemblies.
- Closed-cycle refrigeration based sample cooling system for variable low-temperature experiments down to – 40 °C or below.

Other Accessories

- Complete set of Original Instruction Manuals
- Liquid nitrogen transfer lines (04 Nos.)
- Liquid nitrogen (LN2) Dewars (04 Nos) of 60 ltr capacity with pressure gauge and the required tubing of adequate length has to be supplied along with the machine.
- Suitable oil free scroll air-compressor, refrigerated dryer and air filter.
- Suitable Online UPS (Inductive Load) with built-in isolation transformer with minimum 2 (two) hours back-up time under full load for complete system will be required.
- Liquid helium and liquid nitrogen needed for complete installation. Quenches if occurred during installation and afterwards, supply of cryogenic liquids till the stabilization of superconducting magnet is vendor's responsibility at no additional cost to the CSIR-NEIST, Jorhat, Assam.
- Spectroscopy kit: Sample tubes: 5 mm - 500 pcs; Caps, 5 mm: 600 pcs; Spinner standard, 5 mm: 3 pieces low-temperature spinners-2, high-temperature spinners-2. Sample Solvent height measuring device.

Warranty:

Comprehensive warranty which shall include magnet, console, probes, and all accessories of the spectrometer for five years which should cover:

- (a) All parts and labour, installations.
- (b) Free maintenance and service.
- (c) Regular upgrades to all software during the entire warranty period.

(d) Supply and filling of liquid Helium for the superconducting magnets.

Training: On-site operational level training for at least two weeks shall be provided.

After sale service: Supplier should mention their details of service setup and manpower at nearest location, who will be responsible for after sale support. Response time should be within 48 hrs. Supplier is expected to provide probe backup in case of probe breakdown at customer's site so that users are not affected.

All necessary components/accessories required for installation and smooth running of the equipment to be quoted.

Bidder should ensure availability of spares and liquid Helium for at least 10 (ten) years.

Annual Maintenance Contract (AMC) for 5 (five) years with 2 (two) preventive and 1 (one) break down visit minimum. The rates will be obtained but not included in the total cost for price comparison.

Insurance coverage and liaising with insurance company for any other matter will be the responsibility of the supplier up to the installation of the instrument.