

DETAILS REQUIRED FOR SUBMISSION OF TECHNICAL BID FOR MRI MACHINE

The MRI machines will be installed at various medical colleges where apart from the usual range of cases seen in a tertiary referral hospital, there will be significant burden of trauma and emergency cases. Accordingly, the technical bid submitted by the OEM should mention the following data, and meet the following minimum requirements (where specified). The model/make should be a recently launched model, likely to be continued in the market for the next 10 years.

MAGNET

- **1.5T active shielded super conductive magnet,**
- **It should have at least 60 cm patient bore with flared opening.**
- **Homogeneity of magnet should be less than 3.5 ppm over 45cm DSV. Actual homogeneity data should be specified.**
- The magnet should be well ventilated, non-claustrophobic and illuminated with built in communication with patient.
- Specify cooling system, boil-off rates and helium refill data.
- Specify details affecting patient comfort, like patient aperture at lowest, at maximum, hand held alarm, and details of patient couch.

SHIM SYSTEM

- High performance, highly stable shim system with global and localized automated shimming for high homogeneity magnetic field for imaging.
- Should provide passive, active and auto shim.
- Please specify details of shim plates and active shimming.

GRADIENT SYSTEM

- Actively shielded Gradient system with **a slew rate of at least 120 T/m/s** and a **peak amplitude of atleast 33mT/m.**
- Specify details of gradient system used, details of maximum amplitudes and slew rates along 3 axes and amplitude at 100% duty cycle.

RF SYSTEM

- A fully digital RF system capable of transmitting power of **at least 10 kw.**
- At least 16 independent RF receiver channels with each having bandwidth of 1 MHz or more along with necessary hardware to support quadrature ICP array/Matrix coils.
- Specify the highest number of receiver channels available.
- Specify details of acquisition techniques available.

COMPUTER SYSTEM /IMAGE PROCESSOR / OPERATOR CONSOLE

- The main Host computer should have a 19 inches or more high resolution LCD TFT color monitor with 1024 x 1024 matrix display
- The system should have image storage capacity of 100 GB
- The reconstruction speed should be at least 1300 or more for full FOV 256 matrix.
- The main console should have facility for music system for patient in the magnet room. The system should have DVD / CD / flash drive archiving facility. The system should be provided with auto DVD writer.

MEASUREMENT SYSTEM

- Largest Field of View should be **around 45 cm in all three axis.**
- The measurement matrix should be from 128x128 to 1024x1024
- slice thickness in 2D and 3D should be as minimum as possible. Please specify.

COIL SYSTEM

- The main body coil integrated to the magnet (must be Quadrature / CP).
- Multichannel Head coils with at least 8 channel for high resolution brain imaging.
- Spine Array/Matrix Coils for thoracic and lumbar spine imaging.
- Body Array/Matrix coil with at least 38 cm z axis coverage. (The best available body coil with the vendor must be supplied)
- Dedicated Knee Coil
- Dedicated Shoulder coil
- Pelvic Coil
- Endovaginal Coil

APPLICATION SEQUENCES

- The system should have basic sequences package with Spin Echo, InversionRecovery, Turbo Spin Echo with high turbo factor of 256 or more, Gradient Echo with ETL of 255 or more, FLAIR.
- Single slice, multiple single slice, multiple slice, multiple stacks, radial stacks and 3D acquisitions for all applications.
- Single and Multi shot EPI imaging techniques with ETL factor of 255 or more
- Fat suppression for high quality images both STIR and SPIR.
- The system should acquire motion artifact free images in T2 studies of brain in restless patients (Propeller, Multivane, Blade etc)
- Dynamic study for pre and post contrast scans and time intensity studies
- MR angio Imaging: Should have 20/30 TOF, 20/30 PC , MTS and TONE, ceMRA, Facilities for Accelerated time resolved vascular imaging with applications like Treats/Tracks/Tricks sequences.
- Fat and water excitation package. Diffusion Weighted Imaging, with at least b value of 5000 or more.
- Non contrast enhanced abdominal and peripheral angiography for arterial flow with Native/Trance/Inhance sequences



- High resolution Abdominal and Liver imaging in breathhold and free breathing modes with respirator triggered volume acquisitions
- The system should have basic and advanced MRCP packages including free breathing and 3D techniques.
- The system should have facility for flow quantification of CSF, vessel flow and hepatobiliary system.
- The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, Multislice & Multiangle 2D, 3D Spectroscopy and Chemical shift imaging in 2D/3D. The complete processing/post-processing software including color metabolite maps should be available on main console.
- Perfusion imaging of brain (including ASL)
- Susceptibility weighted imaging (i.e.SWI)/ Venous BOLD imaging.
- Multi Direction DWI and DTI with minimum of 32 directions(Complete package including quantification and tractography software). Prospective motion correction enabled software preferred.

WORK STATION

- A workstation with preferably the same user interface as of main console is required with the availability of all necessary software including:
 - a. Basic post-processing software including MIP, MPR, surface reconstruction and volume rendering technique.
 - b. Advanced post-processing offered applications perfusion quantification, advanced diffusion and DTI, processing of 20/30 CSI data, with color metabolite mapping, quantification of CSF flow data, vascular analysis package.
- It should have at least 19 inch LCD TFT color monitor, with hard disk of at least 120 GB for at least 250,000 image storage in 256 matrix, and 4 GB RAM capacity or more, with self-playing OVO/CO archiving facility.

SAFETY FEATURES

- Specify the Emergency Ramp Down unit (ERDU) for fast reduction of the magnetic field for the quoted magnet system. Ramp Down time should be specified.
- Specify details of the magnet quench bands
- Specify details of Real time SAR calculation and display capabilities to ensure prescribed RF power levels
- Specify details of manual override of the motor drive for quick removal of the patients from the magnet bore
- **02 hand held metal detectors and 02 door metal detectors**
- **Suction and O2 pipeline and manifold to be provided inside the RF enclosure.**
- **Fire Fighting System, Detectors and 6 Fire Extinguishers.**

DOCUMENTATION

- DICOM compatible Dry Chemistry laser camera with integrated processor for filming from main console & workstation.
- Printing on films of 14" x 17" in a resolution of **500 or more dpi.**
- **5000 compatible films to be provided.**

UPS

- The system should be provided with UPS system for the complete system with at least 30 minute back up. Appropriate online servo stabilizer should also be provided.

RF CABIN

The system should be supplied with the imported RF cabin with RF room shielding, RF Door screen, and interiors for the same should be carried out suitably. Details to be specified.

ACCESSORIES

- One qualified and trained technician for a period of one year, deployed at the cost of the firm.
- Water Chiller for Cold Head I Gradients.
- One Non-ferromagnetic patient transfer trolley
- Necessary application softwares
- Application training to be provided onsite for total of FOUR weeks and training for Two Radiologists to be provided training at premier govt. teaching institute within country for two weeks.
- Any other

TURNKEY COMPONENT:

- This project involves installation and commissioning of the equipment with all necessary and ordered accessories, all necessary civil, mechanical, electrical work to facilitate the commissioning of the equipment and the same shall be at the supplier's cost and risks if any.
- The medical college shall provide bare walls and approximately 1500 sq.ft (variable according to the location and availability in the concerned medical college) and power supply upto the room.
- Additional lead lining (to meet AERB norms), RF Cabinet, flooring, false ceiling, air-conditioning, tiling, trenching/railing etc are to be provided/executed by the firm. In case of air-conditioning, it will be the responsibility of the firm to ensure accurately required and optimal operating temperatures, as well provide the essential electrical accessories. Bidder shall visit identified site for assessing actual requirements and readiness.

PLEASE NOTE:

- Point wise technical compliance report supported by the technical catalogue /specifications must be submitted in all truthfulness and shall be essence of the technical bid.
- Technical specifications offered in the technical bids shall be verified to be in the claimed working specifications on the same quoted model working reliably in India or abroad.
- In case of adverse verification report by the verification team, even though the technical bid qualifies technically on paper, that technical bid shall be treated disqualified.

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- Technical bids offering better specifications with proven diagnostic capabilities shall be preferred.
- Turnkey component being variable, will not be part of the deciding L1 parameter. Cost of one technician as mentioned above will be included in the L1 parameter.
- List of prior installations in India.
- Company should preferably have a Service Engineer stationed in Lucknow.

WARRANTY AND CMC TERMS (specific to MRI):

- Five years onsite warranty of main and all subsystems/parts of the equipment. The warranty and Annual Maintenance Contract (AMC) shall be subject to penalty clause of:
- **PENALTY:** Rs. 10,000/- per day if down time exceeds 05 % (ie. against 95% uptime guarantee on whole year 365 days time basis). Principal/CMS of the concerned medical college hospital may sign a separate operational agreement, with particular emphasis on safety protocols and safe operations, with authorised representative of the firm for the same.
- In addition to above if down time exceeds 05 % (ie. against 95% uptime guarantee on whole year 365 days time basis) equal amount of time shall be extended in the warranty/ AMC period as the case may be.
- The warranty shall be inclusive of the helium refill and all other consumables like batteries, filters etc.
- Post warranty: Five years AMC has to be quoted with all labor and spare parts subject to same as above mentioned penalty clause during the warranty period. The AMC shall be inclusive of the X-ray tube and all other consumables like batteries, filters etc.

