

DETAILS REQUIRED FOR SUBMISSION OF TECHNICAL BID FOR CT SCAN

The CT Scan 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 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.

PATIENT TABLE:

- Enumerate vertical range, vertical scannable range and elevation speed (mm/sec).
- Mention Horizontal range, Horizontal scannable range (cms.) for metal free axial, helical & scout.
- Specify horizontal speed (mm/sec) and **table load capacity (kg.) (Minimum 200kg)**
- Specify positional accuracy (+ / _ mm) / reproducibility of table positioning and extender for 'feet' first.
- Specify the width and length of the table.

SCANNER GANTRY:

- **Aperture: 70 cm or more**
- Tilt range (degree): + 300
- Scan field of view: specify
- The Scan field of view (FOV) in acquisition mode: Specify min & max FOV with increment values.
- Specify focus to isocentre distance (mm) and focus to detector distance (mm).

X-RAY GENERATOR:

- High frequency inverter based generator with a power rating (kW): **Minimum 70 kW or above**
- KV range: Specify & enumerate KV & mA (with increment values)
- Specify the maximum mA allowed at 100kV

X-RAY TUBE:

- The anode heat storage capacity should be **minimum 6.3 MHU or more**
- Please specify Anode heat dissipation rate (peak)- MHU/KHU/min
- Focal spots: specify the focal spot Size in mm
- Mention the details of the cooling systems of the tube.
- Provide radiation leakage compliance report.
- Beam collimation to fan angle (degrees)
- It should have high load capacity and minimum tube cooling cycle. Specify all parameters related with tube assembly and provide tube-rating charts on single helical for mA / time etc.

DETECTOR SYSTEM:

- **Number of physically independent desired rows of detectors = 64**

- **Maximum number of simultaneously acquired slice/rotation = 64 or more**
- Detector type: Solid-state detector.
- Specify the material / compound and process of calibration.
- Specify the Total number of elements in a row, row arrangement, thickness, No. of channels and Z – axis coverage
- Specify the Cone beam correction scope
- Mention minimum slice thickness in Axial and Helical mode

SCANNED PROJECTION AND SCAN PARAMETERS:

- Specify power on to warm up time from fully off (in mins).
- Total time from fully off to scanning in an emergency (in mins).
- Specify Maximum continuous helical scan time(s)
- Specify maximum scanned projection radiography length
- Real time image
- Accuracy of slice prescription from the scanogram in mm

HELICAL AND AXIAL SCANNING:

- The minimum scans time for (axial and helical) full 360° rotations should be quoted
- **Full 360 rotation in helical mode must be 0.4 sec or less (give incremental details). The preference will be given for minimum scan time with maximum volume coverage.**
 - It should have multiple acquisition facility with no interscan delay
 - Specify helical acquisition width (number of channel x width in mm)

MAIN CONSOLE: HIGH RESOLUTION COLOR MONITOR

- Monitors LCD (TFT): 19" diagonal or more
- **Two** Monitors at console site one for image acquisition and other for both reviewing/filming and processing.
- Reconstruction matrix: 512 x 512
- Reconstruction rate: 16 images / sec or more on a 512 x 512 matrix
- Please specify the Range of CT number displayed and its accuracy.

IMAGE RECONSTRUCTION ON MAIN CONSOLE:

- Reconstructed FOV (cm): Please specify range
- Reconstructed matrix: Please specify range
- Reconstructed time: reconstruction of images should be simultaneous
- Archive data transfer rate (images /sec)

IMAGE STORAGE:

- Mention max storage capacity of the hard disks (for images of 512X 512 matrix size, uncompressed) proposed to be provided

- Combo drive (Read & write capability for DVD & CD).
- Enumerate Raw Data Memory (in GB) proposed to be provided
- State of the art CPU (mention the bit) of reputed make. Specify the Random Access Memory of main CPU system software storage, Image storage capacity.
- Scan control key board (ENGLISH) Specify display matrix configuration

IMAGE STORAGE AND ARCHIVE:

- Should have optimum **GB Hard disk to support system software and for image(at least 100,000 images in 512 matrix) storage.**
- Mention Exam, transfer (frame/sec) on dedicated connection
- Specify maximum extendable hard disk storage
- Archiving or a Read / Write capable DVD
- Provide 100 blank writable DVDs with CT system

HIGH CONTRAST SPATIAL RESOLUTION:

Please specify the high contrast of the system in lp/cm at different MTF cut off.

LOW CONTRAST RESOLUTION:

- Specify the low contrast resolution on 20 cm CATPHAN phantom.
- Algorithm (Standard and High Resolution)
- Also mention the Noise parameter (% +/_ % at mGy)

SPIRAL / HELICAL SCANNING:

- Mention gapless volume coverage with time taken for single / multiple runs
- Total single gapless spiral should be mentioned (mm)
- Table feed should be selected from sub mm to 10 mm with possibility of multiple feed.

HELICAL SCAN PITCH:

- Specify the pitch available: should be simplified and automated pitches possible

ROUTINE SOFTWARE:

Routine software for image evaluation and display : It should have minimum three ROI, angle and distance measurements, Histogram display, Profiles, symmetry comparison, variable multiple image display with independent window gating. Annotations & labeling, image addition and subtractions. Mentioned artifact reduction capability. Reversal of gray scale image filter, references scales, cross grid, scan save, Dynamic scan, cine display, topogram evaluation and below described Image Networking and management capabilities.

ADDITIONAL SOFTWARE:

- Real time MPR (sagittal / Coronal / Paraxial / oblique and irregular)

- Image pan – zooming should be possible
- Dynamic scanning facility evaluation feature
- Colored CT angiography with 3D rotation capacity
- Software for Virtual Endoscopy, Bronchoscopy, Colonoscopy, Angioscopy
- Software for advanced volume rendering

IMAGE NETWORKING:

The system must be capable of networking of images from the main console to display workstation and an independent workstation, dry view camera, mass storage devices / hard disks, to HIS /RIS through **DICOM V3 ready** for being print, send, manage, query, retrieve, store enabled along with DICOM Modality Worklist Enabled, for their respective functions. The compliance must also support facility for multiple image/ investigations data to be stored and retrieved from the respective patient file.

INDEPENDENT ADVANCED WORKSTATION:

- The workstation should be capable of doing all advanced applications with High resolution 19" or more (LCD TFT) Monitor
- With latest and fastest CPUs (above 3 GHz) and 4GB RAM (expandable up to 8 GB)
- Two 70 GB each or more capacity Hard disks
- 2MB L2 Cache or better
- One RW enabled DVD & CD drive
- With already described Image Networking facility with suitable interfaces

With all above and below described digital Image evaluation and processing capabilities:

- Specify the transfer rate of images / sec. from operator console to work station
- Mention the capability of doing special studies in respect to advanced volume rendering
- Processors speed in GHz; Hard disk memory (GB), and recording facilities
- Workstation should be DICOM 3.0 compliant
- Cardiac Recon – CT Angio – Virtual Endoscopy
- Image recording devices (CD – DVD and DICOM V3 printing)

CARDIAC PACKAGE:

- To include advanced hardware & software for cardiac acquisition and post processing
- Prospective ECG and retrospective gating acquisition capabilities.
- Mention about ECG monitor for cardiac acquisition, ECG editing tool to adapt for irregular and extra heart beats.
- Specify Scan speed (Sec / gantry rotation) for cardiac applications
- Cardiac acquisition with gating capability (range of BPM)
- Specify details about enhancement filters and noise & dose reduction provision
- Specify details of coronary artery calcium scoring scope
- Should have segmentation of bony structures
- Indicate value of (i) spatial resolution (mm) and (ii) Temporal resolution (m. sec.)

APPLICATION SOFTWARE-INCLUDING LATEST AND ADVANCED APPLICATIONS:

- 3 – D Reconstruction display
- Maximum & minimum intensity projection
- 3-D shaded surface display
- 3-D volume rendering software
- 3-D virtual reality (CT Endoscopy, Bronchoscopy, Colonoscopy)
- Dental scan software package
- MPR (CURVED/OBLIQUE/CORONAL/ SAGITTAL)
- CT Angiography
- AUTOMATIC BONE SCULPTING (AUTO BONE)
- IMAGE FUSION for images from other sources

ACCESSORIES and OTHERS :

- Dry Laser film camera 500 DPI OR MORE WITH ATLEAST 2 ONLINE FILM SIZES, DICOM COMPATIBLE**
- UPS: Power-rating Compatible to whole machine load (including injector, camera, computer system with all workstations, X-ray gantry system and peripheral system etc.) for 30 minutes.** UPS must be online with high frequency inverter system and with high amperage capacity maintenance free battery bank. Appropriate online servo stabilizer should also be provided.
- Additional air conditioning as necessary to supplement central airconditioning.
- One Laser Color Printer for high resolution printing on minimum A4 size printing.
- All standard Accessories pertaining to patient comfort and desired study like patient restraint kit, elevated head holder, table extension, coronal head rest, table pad, arm rest, cushions and pads, IV pole and infant cradle.
- One set of Anesthesia Equipment** capable of inducing general anesthesia, inbuilt vaporizers and Monitors (with display of minimum three physiological parameters namely NIBP, ECG, SPO2 etc.
- Dual Head Injector:** Quote with latest model and detail specification for minimum 100ml capacity injector, also provide 200 sets of CT injector syringes.
- Necessary furniture in the console room and high end work station room.
- PATIENT MONITORING SYSTEM** with PaO2 and NIBP on pedestal stand
- Lead glass as required
- Miscellaneous furniture :** **ATLEAST one patient couch, one examination stool, one drug trolley, one film viewer (3 film), one storage cupboard, two office desks, two storage cupboards, 04 office chairs.**

TURNKEY COMPONENT:

- This project involves installation and commissioning of the CT 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), 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.
- 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.
- Manuals: Service and operator Manuals of main and subsystems, Cooling Chart curve of the x-ray tube and all other relevant material, if any, like concept guide/books; notable published work must be supplied in duplicate.
- List of prior installations in India.
- Company should preferably have a Service Engineer stationed in Lucknow.
- Specification compliance statement for all items is mandatory
- TRAINING: ON SITE with application engineer at least 4 visits in the first year.

WARRANTY AND CMC TERMS (specific to CT SCan) :

- 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 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 X-ray tube and all other consumables like batteries, filters etc.
- Post warranty: Five years AMC has to be quoted with all labor and spare parts inclusive of X-ray tube 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.

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