

**Fwd: CT specifications: 3 different segments**

**DK**

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Mon, 09 Dec 2024 12:45:15 PM +0530

To "ARUN BISWAS" <ak.biswas57@nic.in>, "SANKAR GARG" <sankar.garg@gov.in>, "Amit Batra" <amit.batra@gov.in>

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Dear Ma'am,  
I am attaching the CT specifications in three different segments (**High end 256 slice; Mid end 128 slice and Low end 64 slice**).  
The committee has discussed and approved these specifications.



Regards  
Raju

**Dr Raju Sharma**  
*MD, MAMS, FICR*  
Professor & Head  
Department of Radiodiagnosis & Interventional Radiology  
All India Institute of Medical Sciences  
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| Sl. No   | <b>Technical Specification for 256 Slice CT scanner</b>  |
|----------|--|
|          | The system quoted should be latest state of art top of the line. The system should have <b>192 or 96 + 96 or more physical independent rows of detectors capable of Dual Energy applications</b> . The scanner should be capable of comprehensive whole-body imaging including cardiac, abdomen, neuro and vascular imaging applications, true isotropic volume acquisition. It should also be capable of 3-D reconstructions at fast speeds, quantitative calcium scoring in the vessels using all documented quantification algorithms, 3-D image display during acquisition on-line as well as real time, 3-D vessel imaging with feasibility for volume rendering. |
|          | The AERB compliance for the equipment and its installation would be the responsibility of the supplier.  |
|          | The offer should meet the specifications as followed:  |
| <b>1</b> | <b>Gantry:</b>   |
| a        | The CT Scanner should have low Voltage Slip Rings incorporated in the Gantry   |
| b        | The Minimum scan time for a 360 Degree rotation should be less than or equal to <b>0.28 seconds or better</b>  |
| c        | The gantry should be provided with User control panels on either side for easy positioning.  |
| d        | The sub millimetre Slice @ <b>0.67 mm or less in 192 physical rows / 96+ 96</b> as sandwich arrangement of detector and should be able to acquire <b>256 slices or more</b> per rotation. The system should be in position to perform <b>256 or more</b> acquisition Slices per Rotation for general, cardiac/vascular applications. Vendor should specify the Z - axis total detector width.  |
| e        | The Gantry should have 3D Positioning Laser lights.  |
| f        | The Scan field of view (FOV) in acquisition mode should be at least from 250 mm to 500 mm with intermediate Steps for scanning different anatomies.  |
| g        | Aperture should be at least <b>75 cm diameter or more</b>  |
| <b>2</b> | <b>X ray Section:</b>  |
| a        | The X ray Generator should be compact and inbuilt in the Gantry.   |
| b        | The System X ray power should be 100 kW (actual power) and above.  |
| c        | The mA range available should be <b>between 20 to 1000 mA or more</b> with increments in steps of not more than 10mA.  |
| d        | The X ray Tube should be essentially Dual Focus. The heat storage capacity should be at least <b>8 MHU or equivalent or more</b> . Specify the method and technique of cooling   |
| e        | Any special feature of the X ray tube to be highlighted with literature.   |
| f        | Specify the focal Spots of the X ray tube.   |
| g        | The X ray tube should have a cooling rate of not less than 1000 KHU per MIN  |
| h        | The X ray tube Cooler Unit should be in built in the Gantry.   |
| <b>3</b> | <b>Detectors:</b>  |
| a        | The Detector Offered should be Solid State. Specify the Material.  |
| b        | <b>The 256 slice or more acquisition per rotation should be possible</b> . The System should have <b>at least 192 rows or 96 + 96</b> Physical Rows of the detector or more.   |
| c        | Specify the Fan Angle of the X rays and the geometry. The detectors should not require frequent calibration.   |

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| <b>4</b> | <b>Patient Couch:</b>  |
| a        | The patient table offered should have a minimum load bearing capacity of at least 150 KG.  |
| b        | The Minimum table top height should not be more than 65cms from the floor level for easy transport of trauma patients.   |
| c        | <b>The table top width should be at least 40 cms for better comfort.</b>   |
| d        | The range of metal free scan should be at least 200 cms.   |
| e        | The vertical range should be at least 40 cms (max height — min height)   |
| f        | Specify the reproducing accuracy of the table.   |
| g        | Remote UP/DOWN, FWD/BWD of the Patient Couch should be standard.   |
| <b>5</b> | <b>Topogram:</b>   |
| a        | Views: should be feasible in frontal and lateral views   |
| b        | Should be possible to interrupt acquisition manually if necessary.   |
| <b>6</b> | <b>Spiral/Helical Section:</b>   |
| a        | The system offered should have Spiral Capability of 60 seconds or above.<br>Real Time Spiral @ 10 f/s should be standard.  |
| b        | The range of Spiral facility in Axial Direction should be more than 100 cms.   |
| c        | The Reconstruction Time in Spiral scan should not be more than <b>110</b> milliseconds.  |
| d        | The system should have the Smart Prep or equivalent facility & ability to track Contrast medium to trigger scan should be included in the scope of Supply                    |
| e        | High Resolution scan package should be offered as standard and specify the minimum slice thickness for which High Resolution scan package is possible.                       |
| f        | Multi Slice CT Fluoroscopy to be quoted as standard.   |
| <b>7</b> | <b>Console &amp; Workstation</b>   |
| a        | The Console offered should be the Latest Multi-tasking Processors and a menu driven platform with a RAM size of at least 32 GB.  |
| b        | CT console should be of dual monitor design. The Monitor should be: Medical grade, Colour TFT/LCD. The Twin Monitor system should work on either shared or Common data base. |
| c        | The display matrix should be at least 1024 x 1024.   |
| d        | The reconstruction time for an Axial scan should not be more than 100 milli seconds.   |
| e        | The Hard disk Capacity for both Image and Raw data should be 1 TB or more.   |
| f        | It should have facility to store at least 5,00,000 Images  |
| g        | The system should be supported with archiving facility of DVD & CD Main Console  |
| h        | DICOM facility to send, store, print, receive, Query / Retrieve, MWM, MPPS etc should be standard.   |
| i        | Patient radiation dose should be displayed on the monitor as well as on the patient films.   |
| j        | PC Based connectivity should be standard for easy transfer of Images & Report. The image transfer from main console to workstation should be automatic and immediate.        |

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| k  | Workstations & Server: A multimodality client server architecture-based solution with minimum concurrent 40000 slices rendering capacity, with 64 GB RAM or better with total storage of minimum 20 TB <b>(internal/external)</b> . Client hardware specification- 2 nos Workstation with dual energy licences for all dual energy applications on each workstation: quad core processor or better, 16 GB RAM or better, 1TB hard drive or better, DVD Writing with medical grade monitor of minimum 2 MP resolution or better & 3 button mouse. The server client solution offered should be OEM. Concurrent licence should be offered for all software/application and should process simultaneously on all the offered workstation at the same time point. |
| 8  | <b>Applications to be offered as standard:</b>  |
| a  | The system should have standard software like 3D Volume rendering, MIP, CT Angio, colour Angio Display, CT Perfusion, should be available as standard on the system   |
| b  | The following software should be offered as standard (MPR, Minimum and maximum intensity projection. 3D volume rendering, 3D SSD (Shaded Surface Display). ROI, volume calculation, CT number display, window width, window level, topogram display, cine display, HRCT lung, dynamic scan)   |
| c  | Cardiac Scan Attachment with ECG Gated Segmented Recon, Calcium score, Vessel Flythrough of the Coronaries should be available with software package.   |
| d  | Automatic display of MPR Images after scan will be preferred.   |
|    | Whole organ (brain & body) perfusion CT:<br>Scanner should have capability of Whole brain acquisition of <b>Minimum 14 cm of coverage</b> .   |
| e  | Bolus triggered Brain Perfusion CT study (at least 3-level) with automatic CBF, CBV, MTT, TTP maps, ROI placing, comparing ROI, saving maps   |
| f  | Neuro DSA with automatic bone removal software. Automatic bone removal for other body parts also  |
| h  | Fusion CT: fusion of morphological data obtained on CT, MR or DSA.  |
| i  | Dynamic CTA with a coverage of <b>16 cm or more</b> to cover large areas greater than detector width  |
| j  | Dynamic 4D CT should be provided.   |
| k  | Metal Artifact Reduction (MAR) should be offered  |
| l  | Stroke Analysis & Quantification should be offered  |
| m  | Complete Liver Volumetry & Segmentation should be offered   |
| n  | CT Virtual endoscopy and Colonoscopy with detail quantification should be offered   |
| o  | Advanced vessel analysis.   |
| p  | Time point comparison.  |
| q  | Coronary tree analysis: automated 3D processing of coronary arteries, calcium scoring, stent analysis, LV analysis.   |
| 9  | <b>Dual Energy Applications:</b><br><br>Dual Energy Applications to be provided as standard –<br><br>Renal Calculi Characterisation, Gout, Lung perfusion & pulmonary emboli detection, Vascular plaque characterisation, Virtual NCCT, Direct Neuro CTA, Contrast vs blood differentiation, Monoenergetic imaging, Endo leak assessment, Virtual non calcium (Bone marrow edema detection), Metal Artifact Correction / Beam Hardening artifact Correction, Brain Haemorrhage<br><br>Dual Energy Application must be possible on all workstation and all fields of view with minimum FOV <b>35cm</b> .   |
| 10 | <b>Additional Application</b> (may be added by local institution as per their requirement – only as optional)– This may be provided on additional cost, the price of which should be separately mentioned<br>Coronary analysis (Optional) - <b>Minimum</b> 2 nos of concurrent users should be possible.<br>Cardiac including myocardial perfusion (Optional)   |

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| <b>11</b> | <b>Dose reduction Techniques:</b>   |
| a         | Noise Suppression protocols to maintain LCR at low dose should be standard.   |
| b         | Special Softwares (Like MA Modulation in Routine & Cardiac Mode) to ensure Dose efficiency should be standard.  |
| c         | Specify the CT Dose Index.  |
| d         | Should have model based iterative reconstruction technique (ASiR-V /VEO/ADMIRE/IMR/ AIDR) for X Ray dose reduction. If VEO is not available, vendor should submit an undertaking from OEM.<br><b>Also vendor should offer the latest and best available iterative reconstruction available in the offered system during participation of bid.</b>   |
| e         | Low dose Paediatric CT mode should be available   |
| f         | Radiation dose reduction technique i.e. mA modulation in X, Y & Z axis, etc.  |
| g         | Patient radiation dose should be displayed on the monitor & patient films.  |
| <b>12</b> | <b>Accessories: (Make and Model of all the quoted accessories should be specified)</b>  |
| a         | Dry chemistry Camera / printer should be of Agfa or Fuji or equivalent with Resolution: 16 bits/ 500 dpi or more with minimum three ports. Support Multiple Film Sizes: one of which must be 17"x14". DICOM 3.0Compatible.  |
| b         | Lead Glass as per AERB norms: 200 x 100 cm or better  |
| c         | UPS with Maintenance free batteries capable of 30 minutes back up to run the entire CT, Computers, Dry chemistry camera, Work Stations etc. It should be covered under 5 years warranty followed by duration of CAMC.   |
| d         | Dual head pressure injector:<br>Dual head pressure injector (of any make) with Synchronization with CT Scanner, with dual flow with 100 nos of Syringes of 200 ml & 300 sets of necessary tubing (with check valves to prevent saline and contrast mixing) and connectors.<br><br>Unit price for disposable syringe and tubing set should be quoted separately and the same should be valid during warranty period. |
| e         | One Multi parameter monitor of 10 inch or higher for patient vitals (BP, ETCO2, SPO2, Pulse, IBP etc) should be provided, it should have all connecting accessories for adult, paediatric & neonates) also should have IBP interface cable-2nos, and IBP disposable transducer 10nos, IBP Y cable-2 nos *All accessories should be for neonates, paediatric & adult separately)                                     |
| f         | Light weight lead aprons (0.25mm Lead equivalent) with hangers - 4 Nos.   |
| g         | Lead apron stand — 1 No.  |
| h         | Thyroid Shields – 2 nos.  |
| i         | Gonadal Shields – 2 nos.  |
| j         | LED X-ray Film viewer with adjustable brightness; capable of holding 3 films of 14"x17" size. – 2 no.s  |
| <b>13</b> | <b>Additional Optional Accessory (maybe added as per requirement of local institution) –</b><br><br><b>1. Anaesthesia Workstation</b><br><br><b>Suggested specifications given as Annexure 1. However, the local institution may get it vetted by the anaesthesia department</b>  |
| <b>14</b> | On Site Training for a period of 4 Weeks.   |
| <b>15</b> | <b>Certifications:</b>  |

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| I   | Should have import/manufacturing license from Central licensing Authority or State licensing authority of CDSCO for Medical Devices and copy of valid license should be submitted for the quoted model.<br><br>In case the vendor has not yet obtained import/manufacturing license from CDSCO for the quoted model, proof of application for CDSCO medical device license to be submitted in the bid document and valid CDSCO license to be produced at the time of supply/ NOA for the quoted model |
| II  | The system should be AERB type approved and the copy of E-LORA Listing should be submitted along with bid. If the quoted model has not been yet installed in India, vendor should submit NOC from AERB.   |
| III | Regular QA according to AERB norms will be responsibility of bidder during warranty and CMC period.   |
| IV  | Offered system should be BIS / European CE with 4 digit notified body no / USFDA certified.   |
| 16  | <b>Turnkey (Suggested broad guidelines provided – To be modified as per the requirements and norms of the local institution)</b>  |
| 1   | The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Airconditioning and Fire detection system for the construction of CT Scan Centre  |
| 2   | While preparing the plan, the following aspects have to be addressed.   |
| a)  | Care should be taken to provide easy negotiation of the patient stretchers/ trolleys through corridors and doors.   |
| b)  | Radiation shielding for doors, walls, windows etc.  |
| c)  | Furniture like desk, chairs, shelves etc.   |
| d)  | Patient stretcher and other furniture/ accessory to make the scan centre functional.  |
| 3   | The cost of Site Modification for the area of 1000 sq. Ft and Air-conditioning of Tonnage 20 TR (including standby unit/s) will be considered for Ranking / Evaluation purpose. Total capacity of the Air-Conditioning (duct-able) for the entire CT scan centre area should be at least 20 TR (incl. standby air-conditioning) with humidity control between 55-60 % RH  |
| 4   | Moreover, Bidders will have to quote the Unit Rates of the following components of site modification work.  |
| a)  | Civil works   |
| b)  | Electrical work   |
| c)  | Public health (plumbing and sanitary fittings).   |
| d)  | Air Conditioning (HVAC)   |
| e)  | Interior Furnishing & Furniture   |
| f)  | Miscellaneous   |
|     | Fire Detection system (consisting fire panel, smoke & heat detectors, hooters, response indicators etc.) for the entire CT area   |
|     | <b>Scope of Site Modification work for CT unit:-</b>  |
|     | The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning and Fire detection system for the installation of CT centre  |
|     | <b>The CT SCAN CENTRE shall consist of the following rooms:</b>   |
| a.  | CT Gantry Room  |
| b.  | Console room  |
| c.  | Equipment room  |
| d.  | Patient preparation room cum change room  |
| e   | Radiologist room (if space available)   |
|     | The actual area of site modification works done will be considered for payment, based on the unit rates and site measurements based on the area available.  |
|     | <b>Civil work</b>   |

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| a)        | Civil construction work including construction of brick wall if any, plastering, flooring as per the approved plan and equipment layout plan.  |
| b)        | Concrete bed at CT equipment area.   |
| c)        | Platform for unloading and shifting the CT should be provided if necessary.  |
| d)        | Cable tray, trench & channel – necessary trenches, cable tray and channels at required location would be provided.   |
| e)        | All the construction work to be done as per the final plan approved by the Consignee.  |
| <b>a)</b> | <b>Flooring</b>  |
| 1         | Flooring: - 600 x 600 mm vitrified tiles with 100mm tile skirting to match in Gantry & console room, lobby and patient preparation areas, Radiologist room etc   |
| 2         | 50 mm thick cement concrete flooring with Vinyl flooring in CT equipment / UPS room.   |
| <b>b)</b> | <b>Painting</b>  |
| 1         | Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in patient preparation area, Lobby area, console room & Equipment room and Radiologist room etc.<br>Full height wall tiles should be provided in the CT Gantry room.  |
| <b>c)</b> | <b>False Ceiling</b>   |
| 1         | Acoustical tile for ceiling with light weight insulating material of high quality supported on grid or finished seamless with support above ceiling. Finished with white paint or powder coated with white paint, if metallic. Ceiling height to suit the equipment mount and clearances.  |
|           | <b>Plumbing work</b>   |
| 1         | All water pipes and fittings shall be of high density polythene of approved and standard make. The gratings shall be brass chrome plated. All plumbing accessories should be of standard make.   |
| 2         | Hot water service to be provided if required. (The water supply line and drain line will be provided by consignee upto CT complex)   |
|           | <b>Electrical work</b>   |
| 1         | The supplier shall be required to specify the total load requirements for the CT scan centre including the load of air conditioning , room lighting and for the accessories if any. The supply line will be provided by the Institute up to one point within the CT Scan centre area. The distribution panel shall be provided by the vendor. Few lights in each room shall be connected to the UPS to provide emergency lighting. |
| 2         | The electrical work shall include the following:   |
| a.        | Wiring – All interior electrical wiring- with main distribution panel board, necessary MCBs, DB, joint box, switch box etc. the wires shall be of copper of different capacity as per the load and should be renowned make as listed below.  |
| b.        | Switches light and power points should be of modular type and of standard make as listed below.  |
| c.        | General lights – LED light fittings with 500 Lux Illumination  |
| d.        | Adequate number of earthing required for equipment and accessories should be provided by the equipment vendor.   |
| <b>3</b>  | <b>AIR CONDITIONING:</b>   |
|           | Ductable Split / Ductable package air conditioners may be used according to room requirement and suitability. Humidity control should be effective to eliminate moisture condensation on equipment surface. The Air conditioning should be designed with standby provision to function 24 hours a day.   |
|           | The outdoor units of AC should have grill coverings to prevent theft and damage.   |
|           | Ventilation is required in toilet.   |
|           | Dehumidifier of 110 Liter - 2 Nos. to be provided  |



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| <b>2</b>      | <b>Environment specifications:</b>   |
| a)            | Relative Humidity range: To be maintained between 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment. |
| b)            | Temperature ranges: 22± 2° C in all areas except equipment room which shall be as per requirement of the equipment.                                  |
| c)            | Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the bidder.    |
|               | <b>Furniture:</b>  |
| a             | Revolving chairs height adjustable, medium-back with hand-rest in the Control room, Radiologist room and viewing area. – 4 NO.S                      |
| b             | Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 3 NO.S                             |
| c             | Drug trolleys 1 numbers for patient preparation area.  |
| d             | Patient trolley with rubber foam mattress to be kept in the patient preparation room.  |
| e             | Name boards for all rooms  |
| f             | Tables for Workstation and Radiologist - 2 NO.S  |
| g             | Changing rooms should have change lockers and dressing table.  |
| h             | Dustbins: 10 no.s  |
| i             | Any other furniture item as per requirement.   |
|               | All furniture items should be of standard make as mentioned in the table below.  |
|               | <b>Miscellaneous:</b>  |
| 1             | Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc.  |
| 2             | Fire extinguisher Dry CO2 type as required for the building safety.  |
|               | <b>LIST OF ITEMS AND SUGGESTED MANUFACTURERS.</b>  |
|               | <b>ITEMS</b> <b>PREFERRED MAKES</b>  |
| A             | <b>FLOORING VITRIFIED TILES</b> -Somany, Kajaria , H&R Johnson, RAK india  |
| B             | <b>PAINT</b> - Dulux, Asian Paints , Nerolac   |
| C             | <b>PLUMBING</b> - Kohler, Jaguar , Grohe , Roca  |
| D             | <b>SANITARY ITEMS</b> - CERA, Hindware, Parryware  |
| E             | <b>ELECTRICAL</b>  |
| 1             | <b>CABLES</b> - Finolex, Havells ,V-Guard  |
| 2             | <b>SWITCHES</b> - Legrand, L&T, Crabtree , Roma  |
| 3             | <b>DISTRIBUTION BOX , MCB</b> - Legrand, L&T, Siemens, Havels  |
| 4             | <b>LIGHT FITTINGS</b> - Philips / Crompton / Wipro/syska   |
| F             | <b>AIR CONDINTIONING</b> - Daikin, Hitachi, Blue Star, Voltas,   |
| G             | <b>FURNITURE</b> - Hermen Miller , Godrej , Featherlite,Geeken   |
| <b>Sl. No</b> | <b>BILL OF QUANTITY</b>  |
| 1             | <b>High End Dual Energy CT Scanner</b> ,as specified   |
| 2             | Servers: as specified  |
| 3             | Workstation Nodes: as specified  |
| 4             | Dry Chemistry camera : as specified  |

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| 5  | Lead Glass of 200 x 100 cm   |
| 6  | UPS with Maintenance free batteries  |
| 7  | Dual Head Pressure Injector  |
| 8  | Pressure Injector Syringes   |
| 9  | Tubings for Pressure Injector  |
| 10 | Multi Para monitor: as specified   |
| 11 | ULTRA LIGHT WEIGHT lead aprons   |
| 12 | Lead Apron Hanger  |
| 13 | Lead apron stand   |
| 14 | Thyroid Shields  |
| 15 | Gonadal Shields  |
|    | <b>Components of Site Modification Work:</b>   |
| 1  | Civil works  |
| 2  | Electrical work  |
| 3  | Public health (plumbing and sanitary fittings).  |
| 4  | Air Conditioning   |
| 5  | Interior Furnishing & Furniture  |
| 6  | Miscellaneous items  |
|    | <b>Furniture:</b>  |
| 1  | Revolving chairs height adjustable, medium-back with hand-rest.  |
| 2  | Cupboard with laminate door shutters   |
| 3  | Drug trolleys for patient preparation area.  |
| 4  | Patient trolley with rubber foam mattress  |
| 5  | Tables for Workstation and Radiologist.  |
| 6  | Changing rooms (with change lockers and dressing table).   |
| 7  | Dustbins   |
| 8  | Room Signage   |
| 9  | Venetian Blinds  |
|    | <b>Miscellaneous:</b>  |
| 1  | Cabling of Network (LAN) connectivity for camera system, console system, workstation and computers etc |
| 2  | Fire extinguisher ABC type of 2kg each as required for the building safety                             |
| 3  | Dehumidifier of 110 Liter  |

## Annexure 1

### ANESTHESIA WORKSTATION WITH ANESTHESIA MODULAR MONITOR : Qty 1

**Anesthesia workstation is used for delivering anesthesia agent to the patient during CT**

- A. It should be integrated anesthesia workstation
  - A. It should offer ICU quality ventilator, suitable for adult, children & neonates.
  - B. Single user interface should control and display all parameter including control of modes, display of cylinder pressures etc.
  - A. The machine should be suitable for low and minimal flow anesthesia application
  - A. The machine should have automatic calculations and presetting of patient specific ventilation settings
  - B. It should have configurable screen layouts for individual screen set ups.
  - C. It should have Nitrous oxide free operation configurable
    - A. The anesthesia machine and vaporizer should be manufactured by same company.
1. The Anesthesia Machine capable of providing anesthesia to Adult, Paediatric and Neonatal patient should have the following:
    - a. Should have pipelines attachment for oxygen, nitrous oxide and compressed air.
    - a. Should have yoke assembly for oxygen and nitrous oxide with pin index system.
    - b. Durable main switch to put the machine in the on or off position.
    - c. There should be digital control and display for oxygen
    - d. There should be electronic gas mixing.
  2. Should have safety features like :
    - a. Should be provided with " pneumatic/electronic" hypoxic guard.
    - a. Should provide 25% or more of oxygen when an anesthetic gaseous mixture is in used.
    - b. Should have extra flow meters for oxygen only.
    - c. Should have digital display of pressure value of Cylinders and Central pipeline
    0. Should have oxygen flush with a flow rate of more than 35L/min.
    0. **Vaporizer – New generation**
      - a. Should be able to hold two vaporizers (Isoflurane, Sevoflurane & Desflurane) simultaneously.
      - a. Cost of vaporizers to be quoted separately.
      - b. Quantity of vaporizer to be purchased will be as per requirement.
      - c. Temperature / pressure compensated and flow independent vaporizer.
      - d. The vaporizer design should be maintenance free.
      - e. Should have illumination of vaporizer setting and filling level
      - f. Should preferably have electronic monitoring of vaporizer setting and filling level
    0. **CO2 absorber system** with the following features :-
      - a. Single/Double canister
      - b. Autoclavable
      - c. Canister capacity of 0.8 kg or more.
      - d. It should be possible to bypass the canister if removed during clinical cases to change soda lime.
    0. APL valve assembly and Bag mount should be conveniently placed.
    0. Independent port for open circuit.
    0. Should be provided with drawers for storage space
    0. Machine should have a good quality handle and castors to move the machine with locking system.

0. The ventilator of the machine should have the following features:-
  - a. Should be electronically controlled.
  - b. Should be suitable for new born, pediatric and adult
  - c. It should have colored screen with minimum 12" screen size.
  - d. Volume and pressure control mode of ventilations.
  - e. Electronic PEEP
  - f. Various ventilator modes: SIMV, pressure support, VCV, PCV modes etc
  - g. Tidal volume range from 20 ml to 1200 ml
  - h. Respiratory rate from 4 to 80 or more
  - i. I:E ratio 2:1 – 1:5
  - j. Display: Respiratory rate, peak airway pressure and PEEP
  - k. There should be no collection of water in the breathing system
0. Should have independent **paramagnetic** oxygen sensor for FiO<sub>2</sub> monitor and flow sensor for spirometry loops.
0. Should be able to display
  - a. Pressure Vs time
  - b. Volume/ Flow Vs time
0. The work station should be capable of delivery of low and minimal flow anesthesia even at 350 ml of total fresh gas to reduce patient consumption
0. It should have alternate O<sub>2</sub> supply mode in case electronic gas mixture failure.
0. Should have a battery backup of at least 60 minutes
0. A demonstration of the product is essential by the firm of the model quoted
0. **Monitor** should have the following
  - a. A modular configurable patient monitor for adult, pediatric and neonatal patient
  - a. Should have at least 19" or more TFT color display with a minimum of 8 waveforms at a time.
  - b. Should be touch screen
0. **Should be able to measure the following parameters:**
  - a. 3 and 5 lead ECG with electrocautery & defibrillator filter with ST Segment & arrhythmia detection with analysis,
  - b. Respiration , SpO<sub>2</sub> (SpO<sub>2</sub> technology to prevent motion artifact), temperature
  - c. SpO<sub>2</sub> with Masimo technology to prevent motion artifact
  - d. NIBP, IBP , ETCO<sub>2</sub>
  - e. Multi –Gas analysis with auto detection of all anesthetic agents
  - f. Integrated BIS/entropy Monitoring.
0. Should be able to automatically detect and calculate MAC of all anesthetic gases. There should be no electrical RF interference.
0. Should be able to calculate and display FiO<sub>2</sub>.
0. Intelligent cooling system to keeps the unit running quiet during use.
0. Separate indicator lights for technical and physiological alarms.
0. Maximum BEEP tone should be loud enough to be audible from at least a distance of 12 feet.
0. Should have graded audio and visual alarms for the following parameters:
  - a. Blood pressure - High and Low
  - b. SpO<sub>2</sub> - High and Low
  - c. Heart rate - High and Low
  - d. Respiration - High and Low
  - e. FiO<sub>2</sub> - High and Low
0. Trends – Upto **48** Hours or more
0. Display of Anesthesia ventilator data like wave forms for flow, pressure, agent and loops, and trends on patient monitors.

0. It should be ready to run Web based application like PACS, HIS, RIS, LIS, Cath lab Report, X-Ray as standard on the patient monitor
0. All the components like anesthesia ventilator, vaporizer, and patient monitor should be preferably from same manufacturer.
0. The quoted model should be European CE or US FDA approved
0. The machine should be supplied with the following accessories:
  - a. ECG Cable – 10 Nos
  - b. Reusable SpO2 Sensors: 5 each for Adult, Pediatric & Neonatal.
  - c. NIBP Cuff: 10 each for Adult, 5 each for Pediatric & 5 Neonate.
  - e. IBP Cable: 10 nos
  - f. BIS / Entropy Electrode – 50 to be given against staggered demand
  - g. ETCO2 Sample Line: 50 nos with each machine
  - h. Water trap 50 nos. with each machine
  - i. Reusable autoclavable Breathing circuit: 25 nos each for Adult & 5 pediatric
  - j. Temperature Probe – 1 Paed , 4 Adult (skin)
  - k. Isoflurane, Sevoflurane & Desflurane Vaporizers. Cost of vaporizers to be quoted separately.
0. Disposable breathing circuit including water trap- 50 each for adult and pediatric. Reusable anesthesia mask 10 set for adult, 5 pediatric and 5 neonate.
0. System should have facility and required accessories for suction and active AGSS (Anesthesia gas Scavenging System)( From same OEM)
0. Please provide Accessories which would last for one year.
0. Demonstration is must.
0. **System should have Web based Anesthesia Charting facility. Prices to be quoted separately along with Server and complete wiring.**
0. **Scope of Supply :**
  - a. Trolley with drawer
  - a. Writing surface
  - b. Pin Index yokes for O2 & N2O
  - c. Pipeline connections for all three gases
  - d. Integrated Ventilator & monitor
  - e. Semi closed breathing system
  - f. Adult & pediatric autoclavable patient tubings- as asked above
  - g. Anesthetic mask (silicon) size – Adult & child- As asked above
  - h. Vaporizers for Isoflourane, Sevoflourane, Desflurane- (f As asked above one machine ly)
  - i. Central gas supply hoses (Color coded)
  - j. Instruction for use
0. Should be European CE marked/FDA marked
0. Vendors should also quote the price for SPO2 probe and BP Cuff, IBP transducers (Pediatric & Adult), ECG leads separately for the further purchase if required and the same should be valid during warranty and CMC period.

All the probes and accessories both for Adult & Pediatrics age groups should be provided for 10 years.

**A demonstration of the product is essential by the firm of the quoted model and must provide preferably a performance certificate of the model quoted.**

## Technical Specifications for CT scan with 32 physical detector rows.

| Description   |
|---|
| <b>Whole Body CT Scanner with sub mm acquisition for entire 32 physical detector rows and 64 slice reconstruction or better.</b>  |
| <b>Gantry</b>   |
| 1. The CT scanner should have low Voltage Slip Rings incorporated in the Gantry.  |
| 2. The Minimum scan time for a 360 Degree rotation should be 0.8 Second or less.  |
| 3. The gantry with mechanical/digital tilt of upto $\pm 24^\circ$ or better.  |
| 4. The gantry should be provided with a user control panel or Mobile tablet and remote control for easy patient positioning.  |
| 5. CT Should be capable of acquiring sub mm slices 32 slices for entire 32 physical detector rows with slice profile of 0.7 mm or better. System should be able to generate/reconstruct 64 slices or better per rotation. |
| 6. The Gantry should have 3D Positioning Laser lights, with a patient observation camera if possible.   |
| 7. The Scan field of view (FOV) in acquisition mode should be 5–50cm with intermediate steps for scanning different anatomies. System should have an extended FOV of 700 mm or better.                                    |
| 8. Aperture should be of 70 cm in diameter or more.   |
| <b>X ray Tube:</b>  |
| 1. The X ray Tube current should be 13 to 350 mA or more with increments in steps of not more than 10 mA.   |
| 2. The system should work combined with the latest iterative reconstruction technique to avoid excess radiation.  |
| 3. Generator should be compact and inbuilt in the Gantry.   |
| 4. The System X ray power should be 32 KW or above.   |
| 5. Tube Voltage should be variable from 80 to 130 kV or better.   |
| 6. The X ray Tube should be with a capacity of at least 3.5 MHU. Any special feature of the X ray tube to be highlighted with literature.   |
| 7. Tube should have dual focal spots to adapt to various imaging needs.   |
| 8. The X ray tube should have a cooling rate of 900 KHU/min or better   |
| 9. The X ray tube Cooler Unit should be built in the Gantry.  |
| 10. The System should be Equipped with Ultra Low Dose Technology, Specify the Technology with detailed Technical Data On it.  |
| <b>Detectors:</b>   |
| 1. 32 slice acquisition per rotation should be possible with the detectors in sub-mm mode. Detector should have a minimum physical 32 rows of detector with capability to reconstruct 64 slices or better.                |
| 2. In-built mechanism for adapting the tube current during each scan. This should enable radiation dose reduction where body part thickness is less. Specify mechanism used in the system.                                |
| 3. The detectors should not require frequent calibration.   |

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| <b>Patient Table:</b>  |
| 1. The patient table offered should have a minimum load bearing capacity of at least 200 kg  |
| 2. The Floating tabletop width should be at least 45 cm or better for better comfort. The vertical range of travel should be at least 40 cm or better patient comfort.   |
| 3. Specify the reproducing accuracy of the table.  |
| 4. Remote UP/DOWN, FWD/BWD of the Patient Couch should be standard   |
| <b>Spiral / Helical Section:</b>   |
| 1. The system offered should have Spiral Capability of at least 120 seconds or better.   |
| 2. The range of Spiral facility in Axial Direction should be 150 cm or better.   |
| 3. The Image reconstruction Time should be at least 20 Images / second or better.  |
| 4. Bolus triggered spiral acquisition should be possible   |
| 5. High Resolution sub mm slice thickness with 32 row acquisition should be offered as standard.   |
| 6. Slice thickness should be 0.625 mm to 10 mm or better.  |
| <b>Main Console Computer Section:</b>  |
| 1. The main console CPU offered should be the Latest Multitasking Processors and a menu driven platform with a RAM size of at least 32 GB DDR2   |
| 2. The Monitor should be the Latest Coloured of at least 24 inches or better and flat screen. There should be a Console with One large 24 inch monitor or better.  |
| 3. The display matrix should be at least 1024 x 1024.  |
| 4. The Hard disk Capacity for both Image and Raw data should be more than 700 GB or better.  |
| 5. It should have a facility to store at least 600,000 Images or better.   |
| 6. The Main Console should have standard software like 3D Volume rendering, MIP, CT Angio, Colour Angio Display, 3D ArtifactSuppressions, Pre-set 3D Reconstruction & Display Protocols, Auto Bone Removal, Endoscopy and Vascular assessment. Direct generation of axial, sagittal, coronal, or double-oblique images from standard scanning protocols. |
| 7. The following software should be offered as standard (MPR, ROI, Volume Calculation, CT Number Measurement of between -8, 000 to + 35000 or better, Window Width, Window Level, Topogram Display, Cine Display etc.  |
| 8. The system should be supported with the archiving facility of DVD & CD in the Main Console.   |
| 9. DICOM facility to send, store, print, receive, Query / Retrieve, MWM, MPPS etc should be standard.  |
| 10. Calcium Scoring Software should be provided for visualization and quantification of calcified coronary lesions volume, calcium mass and total Agatston equivalent score.   |
| 11. Dedicated Metal artifact correction software should be offered.  |
| <b>Resolution:</b>   |
| 1. Specify the System Spatial Resolution.  |
| 2. The low contrast resolution should be 3 mm at 3HU difference or better.   |
| 3. Noise Suppression protocols to maintain LCR at low dose should be standard.   |
| 4. Special Software's (Like MA Modulation in Routine) to ensure Dose efficiency should be standard.  |
| 5. Specify the CT Dose Index   |

**ADDITIONAL ACCESSORY TO BE QUOTED AS OPTIONAL**

**(This may be added by the local hospital as per their requirement). The price for the same to be quoted separately**

**OEM Post Processing Workstation for CT:**

- a. Standalone multi-modality independent workstation with same user interface as the console computer from the same manufacturer as the CT Scanner
- b. Minimum Hardware : 3.0 GHz 6 Core CPU, 32 GB RAM, 1TB SSD, 4GB GPU, standard Keyboard & mouse, 1.5 kVA UPS, 24" 2.3 MP Medical Colour Monitor.
- c. Should be capable of performing CT post processing functions and filming independent of the main console. Two-way data transfer between the operative console and the postprocessing workstation should be possible.
- d. Statistical evaluation tools: Area / volume, Standard deviation, Mean value, Min. / max. values
- e. Image evaluation tools: All advanced post processing softwares like MIP, MPR, CPR, VRT, Image Fusion, Neuro Subtraction, CT angiography for both brain, body & extremities, Table & Bone Removal tools, Virtual Endoscopy, Vessel analysis, Vessel segmentation

**Accessories:**

1. Dry / Laser Imager of any reputed make.
2. Lead Glass of at least 2 ft by 4 ft
3. UPS with 30 minutes back up of suitable capacity to handle CT Computer, Imager, Workstation
4. Single Head Contrast Injector of reputed make with compatible 100 syringes and 500 tubings.

**Turn key :** (to be given by the local hospital as per the space and local requirements)



## 128-Slice CT Scanner Standard Technical Specification

| <b>Technical Specification</b>  |  |  |
|---|--|--|
| State of the art Whole body 128 Slice CT Scanner having capability to perform both axial and spiral mode system for data generation/acquisition. The quoted model should have latest iterative reconstruction technology for dose reduction. Quoted model should have all latest applications & upgrades as available with the vendors at the time of applying. The quoted model must be Latest Generation & Version released by the vendor. Further undertaking for 10 years' service and spare parts availability to be submitted on authorized letterhead. |  |  |
| <b>S. No.</b>   | <b>GANTRY</b>                              |  |
| 1.1   | Aperture                                   | ≥ 70 cm  |
| 1,2   | Scan field                                 | ≥50 cm   |
| 1.3   | Integrated Display Panel                   | Gantry front showing patient and/or machine information.       |
| 1.4   | Laser Lights                               | The gantry should have 3D positioning Laser lights             |
| 1.5   | Gantry Physical/Digital Tilt               | ± 24 degree or better  |
| <b>2</b>  | <b>X-RAY GENERATOR</b>                     |  |
| 2.1   | Output capacity (actual and not effective) | ≥72 kW   |
| 2.2   | Continuous Helical / Spiral Time           | ≥100s  |
| <b>3</b>  | <b>TUBE ASSEMBLY</b>                       |  |
| e.1   | Tube Voltage                               | 80-135 kV or better  |
| 3.2   | Tube current range                         | 20-600 mA  |
| 3.3   | Dual Focal spot size                       | (as per IEC 60336: 2005)                                       |
| 3.4   | Tube Heat loading capacity                 | ≥7.0 MHU or higher   |
| 3.5   | Scan time for full 360-degree rotation     | ≤ 0.35 sec   |
| 3,6   | Tube cooling                               | ≥1000 KHU/minute or better                                     |
| <b>4</b>  | <b>DETECTOR</b>                            |  |
| 4.1   | Number of slices                           | Ability to acquire / generate 128-slices / 360-degree rotation |
| 4.2   | Pitch                                      | Pitch should be Freely selectable between 0.5-1.5 or more      |
| 4.3   | Range of slice thickness (Axial Mode)      | 0.625 — 5mm or better  |
| 4.4   | Number or physical rows                    | 64 physical rows or more                                       |
| 4.5   | Detector width                             | 38 mm or more  |
| <b>5</b>  | <b>PATIENT TABLE</b>                       |  |
| 5.1   | Maximum load capacity                      | ≥ 200 kg,  |

|           |   |  |
|-----------|---|--|
| 5.2       | Scannable range   | ≥ 1500 mm  |
| 5.3       | Longitudinal table speed  | ≥ 150mm per sec  |
| 5.4       | Table Positioning   | Reproducibility of table positioning (mm) should be +/- 0.25 mm or better  |
| 5.5       | Table dimensions  | Specify the width and length of the table, distance between gantry front and table base (minimum and maximum should be specified)  |
| <b>6</b>  | <b>SCANNING PARAMETERS</b>  |  |
| 6.1       | Cardiac imaging   | The quoted system should be able to generate image with single or multi sector reconstruction for patients with heart rates ranging between 60-100/min. and with temporal resolution of 175ms or better for single sector recon and 44ms or better with multi sector reconstruction will be preferred. |
| 6.2       | Iterative reconstruction based single exposure metal artifact reduction           | (iMAR / SmartMAR / O-MAR / SEMAR) or equivalent should be offered as standard  |
| 6.3       | 4 D dynamic scanning  | like – Jog Mode/Volume Helical Shuttle/Flex 4D Spiral or equivalent scan techniques with minimum 8cm coverage or more  |
| <b>7</b>  | <b>APPLICATIONS TO BE INCLUDED IN STANDARD PACKAGE</b>                            |  |
| 7.1       | Metal Artifact Reduction (MAR) software   | Metal Artifact Reduction (MAR) software  |
| <b>8</b>  | <b>PATIENT COMMUNICATION</b>  |  |
| 8.1       | Integrated patient intercom   | There should be Integrated patient two-way communication system capable of playing recorded audio  |
| 8.2       | Automatic Patient instruction   | A standard set of commands for patient communication before, during, and after scanning should be available in English and Hindi language  |
| <b>9</b>  | <b>PATIENT REGISTRATION</b>   |  |
| 9.1       | Pre-registration  | It should be possible to do pre-registration of patient at any time prior to scans   |
| 9.2       | Emergency registration  | Special emergency registration should be possible  |
| 9.3       | HIS & RIS integration   | It must transfer patient information from departmental RIS & HIS via DICOM Work list   |
| <b>10</b> | <b>OPERATOR CONSOLE WITH TABLE</b>  |  |
| 10.1      | Operator console should be supplied with chair & monitor adjusting bracket/stand. |  |
| 10.2      | Storage   | Minimum of 4,00,000 images with matrix size of 512x512 should be able to store on console  |
| 10.3      | Display   | 19" or more high resolution Medical grade LED/LCD/TFT monitors with a display on 1024X 1024 or better  |

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| 10.4      | DICOM DVD/CD/USB   | Should be able to export DICOM format with DVD/CD/USB other than png, jpg, avi, movie etc.   |
| <b>11</b> | <b>IMAGE POST PROCESSING</b>   |  |
| 11.1      | <p><b>Standalone workstation (quantity – 1)</b></p> <p><b>Additional 1 workstation may be taken as OPTIONAL depending upon the requirement of the local institution</b></p> <p>The price of 1 unit to be quoted separately</p> | <p><b>RAM:</b> 64 GB or Better</p> <p><b>Monitor:</b> Clinical Grade Monitor With 2MP (1024 X1024) or Higher.</p> <p><b>OS:</b> Windows 10/Linux, 64 bit</p> <p><b>SSD:</b> 1TB or Better</p> <p>CD/DVD/USB drive</p> <p>All basic and advanced software asked in the specifications should be available on all workstation(s)</p> <p>The software should also include reputed antivirus software of a perpetual type or renewed by the supplier</p> <p>Filming also should be possible from this client / node / workstation.</p> |
| <b>12</b> | <b>Basic &amp; advanced capabilities with exact same license on each</b>   |  |
| 12.1      | MPR  | Real-time multi-planar reconstruction  |
| 12.2      | ROI Evaluation   | Parallel evaluation of multiple ROI In circle, irregular and polygonal forms   |
| 12.3      | Statistical Evaluation   | Area/ volume, Standard deviation, Mean value, Image annotation and labeling, Angle measurement, Distance measurement Histogram, rime intensity curves, Peak enhancement images, Time-to-peak images.   |
| 12.4      | 2-D  | 2D, including image zoom and pan, image manipulations. reversal of grey-scale values, and mirroring; and advanced bone correction  |
| 12.5      | 3-D  | MIP, Min IP, VRT and other advanced 3D applications and color-coding for different tissues.  |
| 12.6      | CT Angiography   | Automatic table and bone subtraction in a angiography, Single click bone removal, manual and automatic vessel tracking, Carotid Stenosis measurement, Single energy calcium removal should be available either on main console or on work station  |
| 12.7      | CT Perfusion   | Software for advanced cerebral perfusion study with stroke protocol and summary maps of the perfused area brain with minimum 8cm coverage to cover whole Brain perfusion.  |
| <b>13</b> | <b>IMAGE RECONSTRUCTION</b>  |  |
| 13.1      | Recon speed  | Minimum 23 images/sec for  |
| 13.2      | Recon Matrix   | 512 X 512& 1024 X 1024   |
| <b>14</b> | <b>IMAGE QUALITY</b>   |  |

|           |   |  |
|-----------|---|--|
| 14.1      | High contrast Spatial Resolution for entire width of detector | It should be not less than 15 lines pair per cm or better maximum at 0% or 2% MTF X-Y axis for beam collimation not less than 20 cm on Catphan Phantom   |
| 14.2      | Low-contrast resolution                                       | The low contrast resolution for CATPHAN should be at least 5mm at 3 HU with 10mm slice on 20cm Catphan phantom. Please mention the dose at which the resolution is achieved,   |
| <b>15</b> | <b>DOSE REDUCTION TECHNIQUES</b>                              |  |
| 15.1      | Pre-patient collimation                                       | There should be pre-patient collimation to reduce unnecessary dose to the patient  |
| 15.2      | Advanced Iterative Reconstruction                             | Latest Iterative reconstruction should be offered with all imaging protocols.  |
| 15.3      | Cardiac Scanning  | Step and shoot technique during cardiac scanning for dose reduction, or a similar alternative technology should be available with arrhythmia correction  |
| 15.4      | Organ Dose Modulation   | Advanced dose limiting for critical organs using ODM/x-CARE or equivalent should be offered as standard  |
| 15.5      | 3D Dose Modulation  | Tube current modulation along Z-axis for different patient size and organs should be offered as standard   |
| 15.6      | Pediatric & Infant Imaging protocols                          | Low dose protocols must be provided  |
| <b>16</b> | <b>NETWORKING</b>   |  |
| 16.1      | DICOM   | Dicom Storage (Send/Receive)   |
| 16.2      | DICOM   | DICOM Modality Worklist User   |
| 16.3      | DICOM   | Modality Performed Procedure Step (MPPS)   |
| 16.4      | DICOM   | DICOM Print User   |
| 16.5      | DICOM   | Query/retrieve user and provider   |
| 16.6      | Integration with department RIS and HIS                       | Integration with departmental RIS and HIS must be done. Any licenses or software needed for the same is to be provided by the vendor   |
| 16.7      | Transfer to network nodes                                     | Automatic transfer to all network nodes.   |
| <b>17</b> | <b>DICOM USB/CD/DVD Writer</b>                                | DICOM images USB/CD/DVD Writer   |
| <b>18</b> | <b>ACCESSORIES</b>  |  |
| 18.1      | Dual head pressure injector                                   | <p>Dual head pressure injector (of any make) with Synchronization with CT Scanner, with dual flow with 100 nos of Syringes of 200 ml &amp; 300 sets of necessary tubing (with check valves to prevent saline and contrast mixing) and connectors.</p> <p>Unit price for disposable syringe and tubing set should be quoted separately and the same should be valid during warranty period.</p> |

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|------|--|--|
| 18.2 | Dry Laser Camera/Printer   | Camera / printer should be of Agfa or Fuji or equivalent with Resolution: 16 bits/ 500 dpi or more with minimum three ports. Support Multiple Film Sizes: one of which must be 17"x14". DICOM 3.0Compatible. To be supplied with 500 films of 17"x14"  |
| 18.3 | UPS Power  | Full Load UPS including CT, Workstation Server, Client & Pressure Injector for 30 Min backup with maintenance free batteries. It should be covered under 5 years warranty followed by duration of CAMC.  |
| 18.4 | Standard Patient positioning accessory and restraining device  | All standard Accessories pertaining to patient comfort and desired study like head holder, coronal head rest, arm rest, cushions, and pads, IV pole.   |
| 18.5 | Lead Glass   | Lead glass of size 200 x 100 cm or better should be installed between examination room and console room as on site.  |
| 18.6 | Multi Parameter monitor  | One Multi parameter monitor of 10 inch or higher for patient vitals (BP, ETCO2, SPO2, Pulse, IBP etc) should be provided, it should have all connecting accessories for adult pediatric & neonates) also should have IBP interface cable-2nos, and IBP disposable transducer 10nos, IBP Y cable-2 nos *All accessories should be for neonates, pediatric & adult separately) |
| 19   | <b>ONSITE TRAINING</b>   | In house training should be provided for technical staff and radiologists from an application expert from the principal manufacturer for a minimum period of 4 weeks.  |
| 20   | <b>ADDITIONAL ACCESSORIES (may be added or modified or be made mandatory by local institution as per their requirement)– These may be provided on additional cost, the price of which should be separately mentioned</b> |  |
| 20.1 | Compatible syringes with necessary tubings (with check valves to prevent mixing of saline and contrast) and connectors for the Dual head pressure injector   | 1000 (unit price of each to be quoted separately)  |
| 20.2 | Furniture  | Five revolving chair and five non-revolving chairs of good quality and make such as Godrej etc should be provided.   |
| 20.3 | Furniture  | Adequate wooden storage in CT console room and gantry room should be provided. Vendor shall do this as per requirement of user department.   |

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|---|---|--|
| 20.4  | Radiation protection devices  | Light Weight lead aprons (0.25mm Lead equivalent) with hangers - 4 Nos.<br>Lead apron stand — 1 No.<br>Thyroid Shields – 2 nos.<br>Gonadal Shields – 2 nos.  |
| 20.5  | Crash Cart  | One good quality crash cart . 4 medium size dustbin for medical waste as per color (yellow (1) ,red(1) , blue(2) ), Also one stainless steel IV stand , one steel trolley (dressing trolley) big size. |
| 20.6  | Mic system for patient  | Mic system for calling patient should be provided with speaker in patient sitting area.  |
| 21  | <b>CERTIFICATION</b>  | System offered should have AERB type approval, CDSCO Certification Or FDA Certification Or CE Certification at the time of submission of the bid.  |
| 22  | <b>OTHER REQUIREMENTS</b>   |  |
| 22.1  | Software for Remote Diagnostics Service and reputed antivirus solution of perpetual type or renewed by the supplier over the internet line at no extra cost to the user. Internet connection to be provided and maintained by the vendor. |  |
| 22.2  | CT machine must be seamlessly connected with existing PACS, HIS/RIS of the local institution, with all necessary hardware or software required for this purpose should be provided by vendor at no additional cost.                       |  |
| 22.3  | One good quality crash cart . 4 medium size dustbin for medical waste as per color (yellow (1) ,red(1) , blue(2) ), Also one stainless steel IV stand , one steel trolley (dressing trolley) big size.                                    |  |
| 23  | <b>ADDITIONAL APPLICATIONS (may be added or modified or be made mandatory by local institution as per their requirement)– These may be provided on additional cost, the price of which should be separately mentioned</b>                 |  |
| 23.1  | ECG Gating  | Prospective & Retrospective ECG trigger facility. It should be provided with all the accessories required for adult and pediatric cases.   |
| 23.2  | Stroke Analysis & Quantification  | Stroke Analysis & Quantification software made by OEM  |
| <b>Turnkey (Suggested broad guidelines provided – To be modified as per the requirements and norms of the local institution)</b>                          |   |  |
| All work related to turnkey , civil, electrical and AC should be vetted by and should be executed in consultation with user department.                   |   |  |
| The machines are to be installed on the turnkey basis. The details of TURNKEY are provided below.   |   |  |
| <b>Turnkey rooms scope:</b> CT Gantry room, Common Console room, Common Electrical room, Common patient waiting area cum preparation room and store room. |   |  |

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|---|
| All machine installations and plans to be AERB compliant.   |
| Vendor should provide the wooden customized Storage cabinets in CT gantry room as well as in console room as per the requirement of user department.  |
| 5 height adjustable revolving chairs and 5 non-revolving chairs (godrej etc) and 1 stools- each of reputed brand and one foot step of stainless steel.  |
| Addressable Fire detection and fire-fighting system be provided and integrated with hospital system.  |
| Robust Pest/ Rodent control solution for lifetime be provided to protect the installed equipment/ accessories/ electrical cables etc. at no extra cost.   |
| Vendor shall connect the entire CT machine with existing RIS and PACS, printers of the local department for this all required network wiring, ports , switches for entire equipment , workstation, should be provided.  |
| Vendor shall provide the oxygen and suction panel and connect it with existing line of the hospital. All accessories related to this should be provided.  |
| <b>Air Conditioning:</b>  |
| The requirement (tonnage) of air conditioning system must be clearly stated. Air conditioning must be provided for the CT Gantry room, Electrical room, Console room and patient waiting/ preparation room. The temperature of the AC rooms must be maintained at 180C and patient waiting cum preparation area at 200C. Humidity to be kept at 50-60% hours at all times. The AC should be of ductable split type and prevent possibility of water leak; The system must have in built redundancy and back up to cover for breakdown.<br>Temperature display monitor should be installed in gantry room. |
| <b>Civil Work:</b>  |
| Areas should have complete wall to wall vitrified non-slippery tile flooring, Kajaria or Johnson & Johnson make. Wooden doors with proper lead protection as per AERB recommendations. For flooring of CT Gantry room good quality granite marble stone flooring should be provided.  |
| Civil construction work including construction/modification/demolition of brick wall if any, plastering, finishing work, putty work, acrylic emulsion on walls/ceiling should be done as per site requirement and matching decor. All brick walls should have tiles installed up to false ceiling.  |
| False ceiling – Armstrong metallic false ceiling and gypsum board 12 mm false ceiling wherever required as per site requirement.  |
| Complete water proofing work of the roof of entire CT area with installation of sturdy floor tiles should be provided. Vendor should inspect and discuss with the user department.  |
| <b>Electrical Work:</b>   |
| Specify the total load requirement i.e. required for the machines, air-conditioning, room lighting and accessories. Load will be provided by the Institute up to the main distribution panel. The panel is to be installed by the firm as per requirement of the unit. The firm shall provide electrical supply cables and required switch gears upto the main distribution panel.  |
| Light fixtures should be provided with fluorescent lamp with mirror optic reflectors. Additional/ backup illumination to be provided in the gantry room, electric room console, patient waiting cum preparation area, seminar room and department offices, to cover for outages in emergencies.   |

Adequate number of wall sockets/ switches to be provided in the rooms. All such sockets / switches should be high quality.

Provision of proper earthing as per power load shall be the responsibility of the vendor.

Fire Safety: Facility should be equipped with firefighting/ extinguisher system and addressable fire alarm be linked to the existing central fire alarm system of the concerned room in consultation with Fire Safety Officer. Fire safety signage be installed in consultation with the fire officer.

**Warranty:**

Sixty months from the date of satisfactory installation. The warranty shall cover complete CT machine including their X Ray tubes, all accessories, turnkey including, Air Conditioning, Electricals, Civil, furniture, fixtures, computers, servers/ workstation, displays and all other information technology (IT) items supplied and installed with the machines etc. During the warranty period, the protection of equipment and cables from pests/ rodents will be the responsibility of vendor. The cost of the periodic QA tests/ checks as per the AERB norms to remain vendor's responsibility during the warranty and CAMC, at no additional cost to the user.

Comprehensive Maintenance Contract (CMC) for next 5 years, with terms, conditions and coverage be same as warranty, and must be quoted.

**Certification System** offered should have AERB type approval, CDSCO Certification Or FDA Certification Or CE Certification at the time of submission of the bid.

**Instructions To The Vendors/Suppliers:**

All bidding companies must visit the site to ascertain the available space/ scope of work before quoting models of their machines & confirm the specifications. No additional space will be provided. Installations must comply with the AERB norms. The vendor to assist the user department in obtaining the AERB approvals.

The compliance statement must be filled strictly under the headings given in the tender. Each specification corroborated in the compliance statement must give the page number where it is listed in the product data sheet. Incompletely filled information will not be considered.