

CLIENT NAME:

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MEMORIAL HOSPITAL ,
MEDICAL COLLEGE AND
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RADIOLOGY TENDER

TENDER DOCUMENT:

SVKM/TMPMH/X-RAY/004

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Section 2- Specification

1. Digital X-rays

Description: A cassette-less digital radiography system for all skeletal, chest and abdominal examinations. The Unit should be completely integrated system (integrated X ray generator and image acquisition control console).

1. Technical characteristics / General	
Item	Description
1.01	Floor mounted multi-purpose digital X-ray system with single portable detector
1.02	Angulated exposures as well as free exposures possible
1.03	Automatic Exposure Control with 3-field Amplimat chamber
2. Detector / Bucky unit for vertical Stand	
Item	Description
2.01	Detector type: Amorphous silicon TFT X-ray sensor with scintillator
2.02	Standard Size 35x43cm or more
2.03	Image matrix size: ≥ 2300 pixels x 2800 pixels or more
2.04	The A/D conversion provides at least 14 bits/ pixel or more
2.05	Pixel size: ≤ 0.150 mm or less
2.06	Image resolution should be 3.2 lps/mm or more.
2.07	No active cooling needed for detector
2.08	Weight of detector < 5 Kg or less
3. Image processing subsystem & operator's console	
Item	Description
Hardware	
3.01	RAM storage capacity ≥ 2 GByte
3.02	Hard disk storage equivalent to approx. 6700 images
3.03	Image storage on CD-R
3.04	19" color TFT monitor
Image processing	
3.05	Automatic detection of exposed area (auto-shuttering)
3.06	Pred-defined, anatomically specific processing sets
3.07	Customizable processing sets
3.08	Auto-ranging (WL/WW)
Connectivity	
3.09	DICOM Storage / Commit
3.10	DICOM Export
3.11	DICOM BWLM
3.12	DICOM MPPS
3.13	DICOM print
System functionality	
3.16	Fully customizable patient work list

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3.17	Manual input possibility for patient data
3.18	Automatic and fully customizable film labeling possible
3.19	Image rotation and mirroring
3.20	Image zoom and pan
3.21	Annotations (free text as well as predefined text)
4. Patient Support – Table	
Item	Description
	Radiographic table with floating tabletop, removable grid and three AEC measuring chambers. It should be possible to move detector and tube in synchronized way (tracking) for table examination.
4.01	- tabletop dimensions 800 x 2200 mm or more
4.02	- Maximum patient weight: 180 kg or more
4.03	- table height: 760 mm or lower
4.04	transverse: ± 85 mm or more
4.05	Longitudinal: ± 235 mm or more
4.06	Transparency <1.2 mm Al equilibration
4.07	grid: 36-45 line/cm, 8:1
5. Digital vertical Stand	
Item	Description
5.01	Vertical movement : More than 130 cm
5.02	Patient stretch grip should be supplied
5.03	grid: 36-45 line/cm, 12:1
6. X-Ray tube	
Item	Description
6.01	It should have an option of Coupling & De - coupling
6.02	Rotation of tube around vertical axis $+90^\circ$ to -90°
6.03	X-ray tube rotation $\pm 120^\circ$
6.04	- Collimator with light beam
6.05	Maximum vertical lift should be at least 150 cm
7. X-ray generator & Tube	
Item	Description
	Generator and Tube
	Generator
7.01	Nominal Power: 40 KW or more
7.02	Tube Voltage Range: 40 - 125KV
7.03	Tube max. Current: 300 mA , 600 mA or more
7.04	mAs range: 0.5 - 500 mAs more
	X-ray Tube
7.05	Focal Spot: 0.6 / 1.2 mm or less
7.06	Focal spot powers: 25 / 50 Kw

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7.07	Anode heat storage capacity \geq 300 KHU or more
7.08	Anode angle : 12°
8. Options and Accessories	
Item	Description
8.01	Lead Glass : 150 X 100 cm - 1 No
8.02	Stabilizer for full system
9. Regulatory/Quality Certification	
9.01	The quoted model should be AERB type approved, BIS/ CE/US FDA certified. Copy of certificates should be provided with tender bid.
9.02	Quote with 3 years warranty on the system.
9.03	Kindly state the USP's of your unit separately. The same will be considered for evaluation.

2. X-RAY MACHINE – Analog 500 mA HIGH FREQUENCY

X-RAY GENERATOR:

- High frequency X-Ray generator
- Inverter frequency – 20 KHz or more
- Output power 50KW or more
- KV Range – 40 to 150KVp
- mA range – 125 to 600 mA
- 500mA @ 100KV, 400mA @ 125KV, 320mA @ 150 KV
- mAs range – 2 to 800 mAs

X-RAY TUBE:

- Rotating anode
- Focal spot :- small – 0.6 x 0.6 mm & Large - 1 x 1 mm
- One pair of High-tension cable (at least 8 meters)
- Collimator with full field illumination and angle indicator

TUBE STAND:

- Travel range: 195 cm ($\pm 10\%$); movement arrested with electromagnetic brakes
- Vertical travel: 135 cm ($\pm 10\%$); movement arrested with electromagnetic brakes
- Column rotation: 360°; from + 180° to -180° in 90° increments
- X-ray tube rotation: $\pm 180^\circ$; locks at 0° / +90° / -90°

TABLE:

- The table should be horizontal floating type
- Bucky table with floating table top with immense flexibility and ease in positioning
- Table top positioning with release of electromagnetic brakes controlled with a foot
- Operated lever
- Table Height – 75 cm ($\pm 5\%$)
- Table top – 218 x 80 cm ($\pm 10\%$)
- Table top should be made up of low radiation absorption, water proof material, stain free
- Longitudinal Travel: ± 40 cm ($\pm 2\%$)
- Transverse Travel: ± 12.5 cm ($\pm 2\%$)
- Electromagnetic locking of the table movement

MOTORIZED BUCKY

- Grid 10.1, 60 lines / cm, focused at 115 cm
- 65 cm travel; movement arrested by electromagnetic brakes

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- Tube shall be centered to bucky in transverse direction eliminating need for positioning table for every exposure
- Suitable for cassettes in cm and inch formats and should be capable to accommodate 14"x17"

VERTICAL BUCKY:

- In built Motorized Bucky
- Tilt able Bucky

DIGITAL UPGRADABILITY:

- Wireless cassette size detector for fast workflow and instant image capture.
- Amorphous Silicon (ASi) flat panel detector
- It should fit into standard Bucky tray
- Cesium Iodide (CsI) Scintillator
- Detector Size of 35 X 43 cm (14 X 17 inches)
- Should have spatial resolution of 2.5 lines pair/millimeter or better.
- Detector Quantum Efficiency (DQE) should be 65% or more @ Zero Line Pairs.
- The active matrix size should be 2 k X 2k or more.
- Should have a minimum image depth of 14 bit.
- All required software and hardware for digital upgradability shall be provided.
- The software provided should be licensed to the life time of the equipment.
- The rate offered should be inclusive of onsite upgradability.

STANDARD ACCESSORIES

- Three-fold X-ray protection barrier – 1no.
- Lead apron 0.5mm lead equivalence with thyroid guard – 2 no.
- Should be supplied with chest stand

Safety standards: BIS and AERB safety code or equivalent.

Documentation:

- User manual in English language
- Service manual in English language
- List of important spare parts and accessories with their part number and costing.
- Calibration/ Inspection Certificate from factory
- Log book with instruction for daily, weekly, monthly and quarterly maintenance checklist.
- The job description of the hospital technician and company service engineer
- List of equipment's available with the supplier for carrying out preventive maintenance and calibrations as per service /technical manual.

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3. X-RAY MACHINE WITH IITV

S.No	Details /Specifications
1	Generator:
a	Output: 80 kW or more
b	Frequency: 50 kHz or more
c	Radiography
i	Tube voltage ≤ 40 kV to ≥ 150 kV
ii	Tube current ≤ 10 mA to ≥ 800 mA
iii	mAs ≤ 0.5 to ≥ 800 mAs
iv	Time ≤ 1 ms to ≥ 5 sec.
d	Fluoroscopy
i	Tube voltage ≤ 50 kV to ≥ 110 kV
ii	Tube current ≤ 0.3 mA to ≥ 20 mA
iii	Continuous fluoroscopy time 10 min to more
e	Automatic exposure setting should be available.
2	X-ray tube:
a	Anode heat capacity: 750 KHU or more
b	Focus size: Dual focal spot. Small focus less than 0.7 mm and large focus less than equal
c	Tube rotation: +/- 90 degree
d	Tube cable: should be included inside cover
3	Collimator:
a	Method of adjustment: Automatic and manual
b	Beam hardening filter: Selectable from Cu0.1mm, Cu0.2mm
e	Virtual collimator: should be available
f	Full field localizer: should be available
4	Table:
a	Type Remote controlled RF type
b	Table height: Adjustable from less than equal to 48 cms to greater than equal to 98
c	Table tilting angle: Motorized -90 degree to +90 degrees. Selectable auto stop at 0 system and table side
d	Table tilting axis: Should be configurable at center or head end of table
e	Dimensions: 2100 mm X 765 mm or larger
f	Shape: completely flat without side rails
g	Imaging Longitudinal travel range coverage: 1600 mm or more @ 9 cm/sec
h	Transverse of table top: 25 cms or more
i	Non radiolucent length: 95 mm or less

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j	Maximum patient load at horizontal 300 kg or greater
	Table position

k	Maximum patient load at any Tilting position:180 kg or greater
l	SID choices: 2 or more
m	Maximum SID: 150 cms or more
n	Shortest SID: 115 cms or less
o	Bedside controls: Should have table top up-down, table to tilt, table top lateral slide, move to parking position
p	Oblique angle of imaging unit: +/- 40 degrees or more
q	Grid removability: Should be removable
r	Safety touch sensor on the column Should be available
s	Safety touch sensor under table Top : Should be available
5	Flat panel detector
a	Size: 43 cm X 43 cm or greater
b	Pixel pitch: less than 150 microns
c	Resolution: 3.4 lp/mm or more
d	FOV choice: 4 or more
e	Maximum FOV: 42 X 42 cms or more
f	Minimum FOV : 15 X 15 cm or less
g	Amorphous silicon detector with CsI Scintillator
h	High performance fiber optic connection to digital imaging system
i	Matrix: 2800 X 2800 or better
j	Digitization depth: 16 bits or better
k	DQE: greater than or equal to 65% (at 0.05 lp/mm)
l	Density resolution: gray scale 60,000 or more
m	Serial Radiography (fps): 8 fps
n	Fluoroscopy
i	pulsed fluoroscopy: 30 fps
ii	Loop record: 400 frames or more should be recorded
iii	Last image hold record should be available
iv	Fluoro storage ≥ 1000 frames/run
6	DSA
a	Online DSA with pixel shift and peak opacification
b	Injector interface with exposure release synchronization

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7	HDD
	Windows based with hard disk capacity of 500 GB or more
8	Image processing
	Image enhancement software for fluoroscopy and radiography
9	Post image processing
a	Density adjustment
b	Contrast adjustment
c	Black/white reverse
d	Automatic optimization
e	Gamma processing
f	Horizontal/ vertical reverse
g	Noise filter processing
h	Edge enhancement processing
i	Magnification (should be up to or more than 2)
j	Multi image display (should be 2 X 2 or 4 X 4)\
k	Annotation
10	Measuring processing: Distance and angle should be measured
11	Output to network Dicom 3
	Dicom storage, Dicom print, Dicom media storage, Dicom MVM, Dicom MPPS, Dicom
12	Dose management
	DAT meter should be available. Calculated area dose value should be transferred to
13	Patient registration HIS/ RIS/ manual, configurable registration page.
14	Organ programmes 1000 or more, customizable including x-ray and image processing
15	Console
a	Main console
	Main console with two 19 inch or larger flat medical grade display monitors, flicker free, image and reference image display, antiglare surface, matrix 1280 X 1024 or better, maximum brightness 800 cd / mm or better. Light sensor for automatic calibration/alteration
b	Light console: Complete with touch panel full system model
c	Ceiling suspended monitors: Two in number each with 19 inch screens
16	Standard Accessories
a	Foot rest
b	Foot witch for fluoroscopy and acquisition in machine room
c	Hand grips
d	Compression cone

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e	Protective shield for fluid spills
f	Wall holder for storing grids
g	UPS for complete system for 30 mins
h	Lead glass 2000 X 1000 mm size
i	Ceiling suspended X-ray tube with FP detector wall stand . X-ray tube: 750 KHU or more
17	AERB: Type Approval Mandatory
18	US-FDA/CE: Mandatory

