

MAHAVIR CANCER SANSTHAN AND
RESEARCH CENTRE

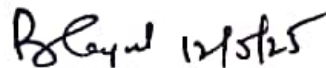
Tender Ref. No. PD/119

Date: 12.05.25

Quotation are invited from the reputed supplier/manufactures for the Item below. Interested parties may send quotation in sealed envelope by regd. Post, Courier or drop it to the tender box which is kept in Room No.3, Ground Floor, A Block, of Mahavir Cancer Sansthan, Phulwari-sharif, Patna. The terms Condition should be mentioned in the quotation addressed to the Director, Mahavir Cancer Sansthan, Phulwari-sharif, Patna – 801 505, within 10 days, from the date of issue of this advertisement. The tender Number should be mentioned on the envelope

The sansthan reserve the right to cancel the Tender/Quotation at any any stage without showing any reason thereof.

Sr. No.	Item description
1.	New Linear Accelerator


Director (Administration)

Technical specifications for high Energy Linear accelerator

General:-

- The Linear Accelerator proposed to be purchase must be procured from the original manufacturer with FDA, CE and AERB marked approval.
- Make and model number of the LINAC must be clearly stated.
- It should be one of the latest Models capable of delivering at least triple photon energy in which at least one unflattened and multiple electron energy (minimum 5).
- Equipment should be capable of 4D respiratory gating; superior technical features and technology will be preferred.
- The system should include and the basic platform must accommodate, besides conventional modes of radiotherapy comprehensive facilities for delivering the 3DCRT, IMRT, IGRT, VMAT, Single and multiple arc treatments, 4D Gated arc therapies, frameless SRT, FFF delivery mode for VMAT/SRS/SBRT etc.

Photon Beam Characteristics:-

- Energies: - 6MV, 10 MV & 15 MV.
- Flattening Filter free Energies: - 6MV or 10 MV or Both.
- Variable Dose rate selection.
 3. a Dose rate of 600MU/ min or more for treatments with flattening filters should available.
 3. b without flattening filters dose rate must be at least 1400MU/ min for 6MV beam or more and for 10MV FFF beam it should at least 2400 MU/min. or more. Also specify if higher dose rate is available as it is desirable for SRS/SRT.
- 4. Field size:-

Minimum – $0.5 \times 0.5 \text{ cm}^2$

Maximum – $40 \times 40 \text{ cm}^2$

at SAD of 100 cm.

4.a Field congruence for field size $5 \times 5 \text{ cm}^2$ to $30 \times 30 \text{ cm}^2$ at different gantry angle at 100 cm to be $< \pm 2 \text{ mm}$.

4. b Set optical field and measured optical field must be agree within $\pm 1 \text{ mm}$ field up to $10 \times 10 \text{ cm}^2$ and same should not exceeds $\pm 2 \text{ mm}$ for larger field.

5. Specify the %DD at 10 cm depth in tissue equivalent material for all the energies as per the BJR/ AAPM Protocol.

6. Collimator:-Independent asymmetric collimators should be provided .specify the range of travel with respect to the isocentre.

6. a collimator rotation range should be specified.

6. b variation of mechanical and radiation isocentre during complete collimator rotation should not exceed $\pm 2 \text{ mm}$ in diameter. Please specify the same for the system. This should hold true for all gantry positions.

7. The field flatness for all the photon energies (ratio of central value to that of 80% isodose) at 100 cm SSD at 10 cm depth at a plane perpendicular to the central axis should be within 3% with treating with flattening filter.

8. The field symmetry for the longitudinal and transverse axes at 100 cm SSD at 10 cm depth for different gantry angles should be within 2%.

9. Penumbra: Measured as the width between 20-90 % isodose lines at a depth of 10 cm at 100 SSD must be below 10 mm. State the values for both flattening filter and flattening filter free modes.

Electron Beam Characteristics:-

- Five or more clinically useful electron beam energies shall be provided. The lowest energy 4 or 6 MeV and the highest energy shall be 15 MeV or above.
- The dose rate at the isocentre shall not be less than 1000MU/min for each election.
- HDTSE (High dose Total Skin Electron) mode for total skin electron therapy should be

available. The Maximum dose rate for the HDTSE mode should be 2500MU/min.
Minimum two energies should be available for HDTSE. (Between 5 MeV -10 MeV)

- Variable size applicator for minimum size of 6 x 6 cm² or less and maximum size 25 x 25cm² or more (minimum 5 applicators).
- Each applicator should be able to support custom cerrobend cut outs for field shaping.
- Field congruence for each electron beam must be with the optical field for various collimator and gantry positions must not be more than 2 mm at isocentre.
- Stability of field flatness during rotation of the gantry should be $\leq 5\%$.
- The cross beam profile at Dmax along X-Y & diagonal axes should be $\leq 2\%$ for 10 X 10 to 20 X 20 cm² fields for all electron energies at all gantry position.
- State the peak value of the dose in the plane perpendicular to the beam axis at Dmax depth for each electron energies and field sizes.
- The Penumbra should be between 20 % to 90 % isodose lines.

Optical Field system:-

- An optical distance indicator (ODI) which indicates the SSD from 70 to 150 cm with an accuracy of ± 1 mm at isocentre.
- A mechanical indicator to indicate SSD from 75 cm to 120 cm with an accuracy of ± 1 mm at isocentre should be provided.

Multileaf collimator (MLC):-

- MLC should be capable of performing.
- Step and shoot IMRT
- Dynamic IMRT
- Volumetric arc IMRT
- Gated Rapid Arc
- The MLC systems quoted have at least 120 leaves or more (60 pairs or more).

- The resolution of the MLC leaves shall be 0.25 cm
- The over travel distance of the MLC leaves should be at least 10 cm or more.
- Leaf positioning accuracy should be ± 1 mm.
- Leaf position reproducibility should be ± 0.5 .
- Please specify inter leaf transmission.

Lasers:-

- The vendors shall quote 04 green lasers only (two side wall lasers, one ceiling laser and one sagittal laser).

Couch system:-

- Indexed Couch top should be completely made of Carbon fiber.
- It should have the capability for remote controlled robotic positional correction facility in three translational and rotational axes with respect to the 6D shifts derived from the integrated KV cone beam CT and orthogonal KV images acquisition system.
- Specify the range of travel movements in the lateral and cranio-caudal direction.
- It should have a free floating facility for the table top with simultaneous lateral and longitudinal motions.
- Specify the range of vertical movements in terms of height above and below the isocentre and lowest position from floor.
- Specify the range of rotation around the isocentre and directions.
- All motions of the couch should be displayed in the treatment room and control console.
- The control system should have the capability to operate all motions simultaneously for the gantry, Collimator and couch from the in room system as well as from the console.

- Accuracy of all motions should be within ± 0.5 mm and ± 0.4 degree.
- Lift capacity of the table top and extent of sagging at maximum load must be specified.

Safety:-

- Specify details of anti collision mechanism for gantry.
- Specify the different situations of all beams off interlocks.

Rotational/ Arc Therapy:-

- The system should be able to deliver a preset dose delivered over an arc of 360° or any fraction thereof.
- A range of variable dose must be available which must be specified.
- The system should be able to deliver 4D gated volumetric modulated Arc radiotherapy plans with single multiple and partial arcs in any combinations.
- Multi-isocentric arc planning and delivery should also be possible.
- Gantry motion shall be possible Clockwise and counter clockwise if arc therapy. MU/ $^\circ$ shall be computed automatically.
- The system should be capable for continuous modulation of dose rate, gantry speed and MLC motion during rotational IMRT. Jaw tracking during rotational IMRT delivery be available.

Leakage Radiation:-

Leakage radiation must be comply as per AERB protocol.

Electron contamination:-

The level of electron contamination must be within IEC/AERB notified vales.

Wedges:-

A motorized / dynamic/ virtual wedge that can introduce any wedge angle from 0° to 60° must be provided. State the maximum possible treatment field size at 100 cm SSD

for all wedges.

Main Control console:-

Fully Advanced computerized control console should be provided outside the treatment room.

Portal imaging system:-

- Advanced Solid state amorphous silicon Electronic Portal imaging device (EPID) –Flat panel size at least 43 x43 cm². Specify the size of the display matrix and resolution.
- The EPID must have advanced integrated software for verification with simulation images and TPS-DRR images & evaluation tools to determine systematic and random setup errors.
- EPID must be able to give real time/fluoro mode image.
- EPID should be able to do portal Dosimetry.
- This should provide an integrated view of other imaging modes like KV imaging and CBCT.

Treatment Planning System:-

- Latest advanced treatment planning system with latest software should be offered.
- At least any two dose calculation algorithms –AAA, CCCS, Monte Carlo or Monte Carlo equivalent algorithm (ACCUROS XB) for fast IMRT/VMAT dose calculations.

Contouring tools:-

Latest contouring workstations and Oncology Information System.

Image Guidance for image Guided RT:-

1. The system should be based on 4D KVCBCT.
2. The KV Flat panel Director , MV Flat panel Director should be mounted on robotic arms that can be moved automatically without manual intervention using hand pended in the treatment rooms as well as remotely from the control console.
3. System should have automatic KV filter selection.
4. Compatible with 6D robotic couch.
5. It should be feasible to combine various modes of imaging.
6. Matching of the arbitrary KV and MV image Pairs should be Possible.
7. Image verification tools eg; - Blend image, split window, moving and & complimentary colour blending.
8. System should be fully DICOM compliant with CT/MRI.

Respiratory Gating:-

- Advanced Motion Management System with comprehensive solution with prospective and retrospective gating with all associated accessories interfaces, advanced soft ware, hardware for full functionality.
- Vender should offer Active Breathing coordinator devices with at least two year consumable items.

Essential Accessories:-

- UPS system.
- Chiller system.
- Closed –circuit colour TV system.
- Camera
- Last man switch
- Server.

Quality assurance:-

1. Integrated automatic self-check tool to verify the critical functions of the machine performance.