



JAWAHARLAL INSTITUTE OF POST-GRADUATE MEDICAL EDUCATION & RESEARCH
(Institution of National Importance Under Ministry of Health & Family Welfare, Government of India)
Dhanvantari Nagar, Puducherry-605 006

Tele: JIPMER
E.mail: purchase@jipmer.edu.in
Website: www.jipmer.edu.in

Phone: 0413-2272380 to 2272389
Fax : 0413-2272067/66
Purchase Section: 0413-2296016



No.JIP/Pur.12(25)LINAC/OeT/2024

Dated: **8 MAY 2024**

CORRIGENDUM

(Department of Radiation Oncology)

THE BELOW CORRIGENDUM REFERS TO THIS

OFFICE TENDER No. JIP/Pur. 12(25)LINAC/OeT/2024

Dated: 16.03.2024

Item Name: Advanced High Energy Linear Accelerator System – 01 No.

It is hereby informed that the following point is amended in the above tender document as follows:

S/N	Existing as	To be Amended as
Pg No. 3 Section I	2. Tender timelines: vi. Closing date and time for submission of online bids: 12.00 Noon on 09.05.2024 vii. Date and Time of opening online bids: 02.30 PM on 10.05.2024	2. Tender timelines: vi. Closing date and time for submission of online bids: 12.00 Noon on 10.06.2024 vii. Date and Time of opening online bids: 02.30 PM on 11.06.2024
Section VIII Technical Specifications		
L (Pg.57)	The TPS and delivery system should be seamlessly integrated with the existing Hospital network system (HIS) and other imaging systems.	The TPS and delivery system should be seamlessly integrated with the existing Hospital network system (HIS) and other imaging systems. Existing HIS network system may be used to establish the same. Relevant permissions for this work will be under the scope of JIPMER.
6 (Pg.58)	Field Size : At least a minimum of 0.4 x 0.4 cm ² for MLC and 0.5 x 0.5 for jaws at SAD of 100 cm	Field Size: At least a minimum of 0.5 X 0.5 cm ² for MLC and 0.5 X 0.5 for jaws at SAD of 100 cm.
12 (Pg.58)	Collimator rotation: Read out accuracy should be within $\pm 0.5^\circ$. The accuracy of collimator isocentre should be within 0.4 mm. Should satisfy the latest AERB norms.	Collimator rotation: Read out accuracy should be within $\pm 0.5^\circ$. The accuracy of collimator isocentre should be within ± 0.5 mm. Should satisfy the latest AERB norms.
13 (Pg.58)	Variation of mechanical and radiation isocenter during complete collimator rotation should not exceed 1 mm in diameter. Please specify the same for the system. This should hold true for all gantry positions. Should satisfy the latest AERB norms.	Variation of mechanical and radiation isocenter during complete collimator rotation should not exceed 1 mm in radius. Please specify the same for the system. This should hold true for all gantry positions. Should satisfy the latest AERB norms.
58 (Pg.61)	The treatment couch table top should be of true carbon fiber with no metallic structures. It should be indexed and should match with the indexing of existing CT simulator model table top. It should be suitable for all modes of treatment mentioned above with six degree of freedom	The treatment couch table top should be of true carbon fiber with no metallic structures. It should be indexed and should match with the indexing of existing CT simulator model table top. It should be suitable for all modes of treatment mentioned above with six degree of freedom including SRS/SRT (Frameless). SRS/SRT

	including SRS/SRT (Frameless) with couch extension.	treatment should be possible with the treatment couch and all accessories required to execute this should be provided.
69 (Pg.61)	The couch top should have the capability to rotate simultaneously for a particular arc along with the arc rotation of the gantry.	The couch should have the capability to rotate remotely for non-coplanar treatments.
70 (Pg.61)	The system for robotic control of couch in all 6 dimensions (all 3 cardinal translational and all 3 rotational). If this system requires an additional couch system the same should be specified and provided. Specify the range of motion that is possible with the 6D couch in the other dimensions. The resolution of the robotic couch shall be 0.1 mm with the movement speed of 16 mm/sec to 25 mm/sec in linear translational movement. The translational and rotational movements range are: X-lateral ± 30 mm or more, Y-lateral ± 30 mm or more, Z-lateral ± 30 mm or more, Pitch (rotation about x-axis) $\pm 3^\circ$ or more, Roll (rotation about x-axis) $\pm 3^\circ$ or more, Yaw (rotation about y-axis) $\pm 3^\circ$ or more, Yaw (rotation about z-axis) $\pm 3^\circ$ or more.	The system should have robotic control of couch in all 6 dimensions (all 3 cardinal, translational and all 3 rotational). If this system requires an additional couch system, the same should be specified and provided. Specify the range of motion that is possible with the 6D couch in all the dimensions. The resolution of the robotic couch movements in all dimensions shall be 0.5 mm. Specify the couch movement speed in linear, translational and rotational directions.
93 (Pg.62)	Mention leaf motion speed. Maximum leaf speed should be within the range of 2.5 cm/sec (for 120 leaves combination) to 6.5 cm/sec (for 160 leaves combination)	Specify the MLC leaf motion speed for all the leaves combination.
142 (Pg.64)	It should be feasible to combine various modes of imaging eg. KV-KV pairs, KV-MV pairs, Fluoroscopic KV imaging, Cine MV imaging etc for image guidance during treatment. Gated arc based on Fluoroscopy KV image acquisition should be provided. Combined (kV-MV) single and continuous image acquisitions, Combined (kV during MV) single and continuous image acquisitions and Combined (IR-KV-MV) single and continuous should be provided. Mention all combinations available. Triggered / Intrafraction imaging KV imaging for both 2D and 3DCBCT, 4D-CBCT	It should be feasible to combine various modes of imaging eg. KV-KV pairs, KV-MV pairs, Fluoroscopic KV imaging, Cine MV imaging etc for image guidance during treatment. Gated arc based on Fluoroscopy KV image acquisition should be provided. Combined (kV-MV) single and continuous image acquisitions, Combined (kV during MV) single and continuous image acquisitions and Combined (IR-KV-MV) single and continuous should be provided. Mention all combinations available. Triggered / Intrafraction imaging KV imaging for both 2D, 3DCBCT, 4D-CBCT.
153 (Pg.65)	The latest version of optical surface guided system based on three or more cameras installed in the treatment room for assisting with patient set up and treatment monitoring to be provided. The latest model cameras available with the quoted model to be supplied.	The latest version of optical surface guided system based on three or more cameras installed in the treatment room for assisting with patient set up and treatment monitoring to be provided. The latest model cameras available with the quoted model to be supplied.
185 (Pg.66)	The treatment Planning system provided must be the latest version as available with the company on the date of purchase. All essential software updates and hardware upgrades required to run all the equipments seamlessly are mandatory during warranty and CAMC period without any additional costs and to avoid obsolescence of the equipments.	The treatment planning system provided must be the latest version as available with the company on the date of purchase. All essential software updates and hardware upgrades required to run all the equipment seamlessly are mandatory during warranty and CAMC period without any additional costs and to avoid obsolescence of the equipment.

186 (Pg.66)	The treatment planning system should have the capability to plan all modalities of treatment as given above	The treatment planning system should have the capability to plan all modalities of treatment including 3D-CRT, IMRT, IGRT, VMAT, SRS, SRT, SBRT and Arc treatments with gating facility. It should have all planning and calculation licenses including those for the cones supplied by the vendor.
190 (Pg.67)	Optimization algorithm should be capable of inverse planning optimal beam directions for the given objectives. Monte Carlo or Monte carlo equivalent algorithm for fast IMRT/VMAT dose calculations. Biological optimization and Knowledge based plans. The above optimization algorithm should be capable of optimization for both coplanar and non-coplanar beam geometries. Adaptive radiotherapy: please specify latest modes of approaches towards acquisition, registration, review, dose reconstruction, etc along with Deformable Image Registration software & QA. Deformable Dose Accumulation, BED, EQD2 Tools, and Adaptation should be available	Optimization algorithm should be capable of inverse planning for the given objectives. Monte Carlo or Monte carlo equivalent algorithm for fast IMRT/VMAT dose calculations. Biological optimization and template based plans should be available. The above optimization algorithm/s should be capable of optimization for both coplanar and non-coplanar beam geometries. Adaptive radiotherapy: please specify latest modes of approaches towards acquisition, registration, review, dose reconstruction etc along with Deformable Image Registration software & QA. Deformable Dose Accumulation, BED, EQD2, and EUD tools. Specify if knowledge based plans are possible.
251 (Pg.70)	Manual Divergent Blocking for Electron applicators with Beam Shaping mold to be offered (50Nos.)	Manual Divergent Blocking for Electron applicators with Beam Shaping mold to be offered (50 kgs)
269 (Pg.70)	The system should be able to record and review the patient diagnosis, stage, clinical history and examination findings. The system should be capable of recording the diagnosis as per the ICD C and ICD 10 system. The complete ICD C and ICD 10 codes should be available in the system without requiring extra input. It should also assign automatic AJCC staging for the disease.	The system should be capable to record and review the patient diagnosis, stage, clinical history and examination findings. The system should be capable of recording the diagnosis as per the ICD C and ICD 10 system. The complete ICD C and ICD 10 codes should be available in the system without requiring extra input. It should also assign automatic AJCC staging for the disease. One such system should be provided.
300 (Pg.72)	Cones of all sizes with all associated gadgets to deliver SRS and SRT	Cones of all available sizes with all associated gadgets to deliver SRS and SRT. TPS should be provided with all planning and calculation license for the Cones supplied by the vendor.
311 (Pg.73)	Daily QA - A real time daily radiation beam output, energy, symmetry and flatness checking dosimetry systems based on air vented ion-chambers with essential software with TG 142 protocol. A comprehensive daily machine QA ion chamber based detector should be provided. Array detector for radiation beam evaluation The device should be ion chamber based with maximum number of ion chambers preferred (greater than 300 ion chambers) Should be able to measure beam energy constancy (electron, photon- FF and FFF), flatness, symmetry, radiation light congruence. Additionally, it should be able to perform MLC and wedge check, light field vs. radiation field congruence	Array Detectors for patient, plan and machine QA – Detecting Field size more than 25 x 25 cm ² . Number of detectors more than 1000. Detectors – Ion chambers or semiconductor. Applicable for photons (FF and FFF) and electrons. Resolution of less than 10mm. Specify the energy range for measurement. Data transfer - wireless or Ethernet. Specify the supporting operating systems and SQL server details, screen resolutions and virtual runtime environments. Necessary phantoms to accommodate the detector, gantry sensor for ring based gantry and reading system (hardware) to be provided. Software - All software for performing MLC QA, CBCT QA, Planar Imaging QA, Winston-Lutz test

	<p>and LINAC start-up behavior. Should transfer the data measured wirelessly to the dedicated software for online verification. Should support Varian, Elekta C-Arm Linear accelerator and Ring gantry linear accelerator The data acquired should be transferred to a database and accessible over the network for review. Necessary software to analyze the measured parameters over a period of time, generate reports, notify deviation from tolerance values to be provided. Storage box for safe storage and transport to be provided.</p>	<p>QA and spoke test analysis as per TG-142 protocol should be quoted. Solution for light field vs. radiation field congruence test should be quoted. Daily QA detector - Should be able to measure beam energy constancy (electron, photon- FF and FFF), flatness, symmetry, radiation light congruence. Should transfer the data measured wirelessly/with cables to the dedicated hardware/software for online verification. Should support Varian, Elekta C-Arm Linear accelerator and Ring gantry linear accelerator. The data acquired should be transferred to a database and accessible over the network for review. Necessary software to analyse the measured parameters over a period of time, generate reports, notify deviation from tolerance values to be provided. Specify the number of detectors used for measurement. Storage box for safe storage and transport to be provided.</p>
<p>312 (Pg.73)</p>	<p>Water Phantom One dimensional, stand-alone water phantom for absolute dose measurements according to IAEA TRS-398/483 dosimetry protocols. Inner dimensions of the phantom should be more than 30 cm in all directions. The measurement depth should be motor controlled with varying steps in the range of 0.1mm to 100mm steps and read out on the incremental encoder with integrated display. Should have provision to store depths of measurements for different treatment machines and control the depth from the console. Leveling mechanism for the water phantom to be provided Detector holders for farmer chambers, parallel plate chambers, cylindrical chambers (small and nano ion chamber) available in the department to be provided. Storage box with wheels for safe transport and storage.</p>	<p>Water Phantom- One dimensional, stand-alone water phantom for absolute dose measurements according to IAEA TRS-398/483 dosimetry protocols. Inner dimensions of the phantom should be more than 30 cm in all directions. The measurement depth should be motor controlled / manual (specify) with varying steps in the range of 0.1mm to 100mm steps and read out on the incremental encoder with integrated display. Should have provision to store depths of measurements for different treatment machines and control the depth from the console. Leveling mechanism for the water phantom to be provided. Detector holders for farmer chambers, parallel plate chambers, cylindrical chambers (small and nano ion chamber) available in the department to be provided. Storage box with wheels for safe transport and storage.</p>
<p>Heading for 314 to 325 (Pg.74)</p>	<p>3D EPID Dosimetry</p>	<p>3D EPID Dosimetry (Along with LINAC)</p>
<p>332 (Pg.74)</p>	<p>CTDI Acrylic Phantom for CT dose measurements. Adult head phantom with 5 holes and acrylic rods for plugging. If a separate paediatric head phantom is available with the vendor, the same to be included in the quote. Body phantom with 4 holes and acrylic rods for plugging. The holes should be compatible with the IBA DCT10-RS chamber. Etched crosshairs on the phantoms for alignment. Carrying case for head and body phantom</p>	<p>CTDI Acrylic Phantom for CT dose measurements: Adult head phantom with 5 holes and acrylic rods for plugging. If a separate pediatric head phantom is available with the vendor, the same to be included in the quote. Body phantom with 4 holes and acrylic rods for plugging. The holes should be compatible with the IBA DCT10-RS chamber. Etched crosshairs on the phantoms for alignment. Any other phantom equivalent to this may be specified. Necessary carrying case to be provided.</p>

<p>336 (Pg.75)</p>	<p>Radiation Field Analyzer (RFA) Latest design with large scanning volume of with calibrated positions scale on each arm to indicate mechanical position of detector to be driven by high precision motors preferably brush less and position feedback potentiometers for higher position accuracy which should be ± 0.5mm. An Integrated floating leveling mechanism must be available for faster leveling of the water phantom. A local control should be available for easy positioning of the detector at Isocenter with fast and slow movement features. Side windows may be provided for more accurate measurements by rotating the gantry on either side. The water phantom should have the possibility of mounting the Detector arrays and other detector including standard detectors from all manufacturers. Data Analysis Software: Should be the latest release and user-friendly windows driven loaded on normal computers compatible with the latest windows operating software as well as older version. Software should be multitasking i.e. with acquisition in the back ground it should be possible to analyze data in the front. It should be backward compatible with earlier version and easily upgradeable for future compatibility of newer techniques. A Simple to operate automated RFA water phantom Lifting carriage (Lift Table for positioning of the water phantom) manual or electrically along with a separate water reservoir to store water when not in use should be provided along with the system. Two-way water pumping mechanism should be quoted and supplied. Detectors: Appropriate small volume ion-chambers (0.125 cc or less or Pin-point chamber), a reference detector shall be supplied for smaller fields. All detectors should be water proof without sleeves and be capable of being used in water for prolonged time. All Ion Chambers should be provided with the calibration certificates as required for calculation of Dosimetric data. A Latest model laptop with required hardwares and softwares with licenses to use RFA systems, suitable to operate the dosimetry system should be provided along with the systems</p>	<p>Radiation Field Analyzer (RFA) - Require state of art motorized 3D Automatic Rectangular water phantom for fast, precise and accurate measurement for Acceptance and commissioning of tele-therapy & C-type and O-type Digital Linear Accelerator machine after installation. Measurements after repair or replacement of major treatment unit components. Beam data input for commissioning primary & secondary Treatment Planning System. Periodic quality control. Necessary accessories should be supplied along with motorized 3D rectangular water phantom to measure easily and accurately pulsed photon, electron from all types of accelerators and measurement of continuous radiation from tele-cobalt machines. The motorized 3D rectangular water phantom should have three axis motions with three independently controllable arms. It should have a remote-controlled 3D acrylic water tank with minimum 15mm thick walls supporting a scanning range of more than 48 cm\times48 cm\times 40 cm. The phantom should have calibration free, high speed stepper motor for superior positioning accuracy of 0.1mm. There should be a dedicated detector positioning device to quickly mount the ionization chambers and solid-state detectors in water phantom and automatically align the same to their effective point of measurement. There should be a software-controlled option to automatically set the chambers at the EPOM recommended by international protocols. The motorized 3D rectangular water phantom should be supplied with a specially designed, high precision electro-mechanical lift table/carriage on wheels with at least 500 mm range of movement to allow for height adjustment of the water tank during measurement. The RFA wheels should be out of the base plate/turntable. There should be an integrated water reservoir for storing water before and after use to avoid water spillage in the LINAC couch & base plate area. An integrated control option should be available for lifting the water tank up and down & to control water pump. The Control Pendant preferably should be wireless and have the facility to fill the water in slow & fast mode. The water should be automatically filled exactly to desired level. It Should have automatic virtual & true water level technology with auto-center & Beam alignment features. The measured Data from the Water Phantom should be able to transmit the information through wireless technology to the Control system. There should be an integrated / separate dual channel electrometer with user selectable measurement time for fast and precise measurements. Preferably with necessary software the dual channel electrometer should be used for absolute dosimetry. There should be an option for radiation</p>
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		<p>beam center check which will adjust the chamber accurately for precise data measurement. There should be an option to check and correct for the beam inclination. There should be an inclined bottom to drain water without adjusting the tank physically. There should be a deconvolution algorithm for photons for both FF & FFF profiles for the offered field chamber, preferably based on AI to reduce the volume averaging effect along penumbra. Preferably there should a dedicated / paperless tool for SSD set up without water & water level indicator in the Reservoir. There should be an option to choose a set of reference data (PDD & Profiles) which can be compared periodically with standard deviation and with Gamma. Automatic water evaporation check and auto fill feature through software is preferred. FFF Analysis using Inflection point option should be available and AERB analysis of FFF profiles should be automatic and paperless. Software should have some special modules like Beam Adjust modules, Beam Inclination for fine beam data collection for TPS. In-built TPR option should be available without any hardware. In built thermometer and barometer are required and they should have the option to be calibrated using the reference. There should be dedicated software to do output factor measurement. Additionally, the determination of the exact beam center for small fields should be automated. Software license should be used in at-least 5 number of systems simultaneously.</p>
341 (Pg.75)	<p>In order to fully and optimally utilize the equipment, training on the offered LINAC for two physicists and four radiation oncologists for a minimum period of two weeks in a reputed institution where such advanced installations are available and in clinical use for a long period of time. For TPS, another two weeks training at a reputed center in a developed country where such a system is used. Training for SRS/SRT, motion management hardware and software for four oncologists. Dosimetry, planning and quality assurance for two physicists. Four technologist to be trained in treatment execution.</p>	<p>In order to fully and optimally utilize the equipment, training on the offered LINAC, SRS/SRT and TPS for two physicists and two radiation oncologists for a minimum period of one weeks in a reputed institution where such advanced installations are available and in clinical use for a long period of time, this training to be given in any developed country. On-site training for two weeks in Dosimetry, planning and quality assurance for all physicists. Four Oncologists, two Physicists, two Technologists to be trained within the country in a well-established radiotherapy center for two weeks.</p>
352 (Pg.76)	<p>Thermoplastic masks for exclusive use with this system (60 nos.)</p>	<p>Thermoplastic masks intended for exclusive use for SRS/SRT (60 nos.)</p>
(Pg.76)	<p>Turnkey Requirements</p>	<p>Turnkey requirements: The permissions and approvals from the local authorities regarding civil constructions should be obtained by the successful bidder. Necessary documental support will be provided by the Institution.</p>

<p>404 (Pg.81)</p>	<p>Recommended makes of Equipment for Electrical works MCB/MCCB/RCCB/RCBO - HAVELLS/HAGER/LEGRAND Distribution boards - DIGITAL – MECO/RISHABH/L&T/HPL Control switch/Indication lamp/Push button - L&T/SIEMENS/TEKNIC/KAYCEE CTs (epoxy resin cast) - AE/KAPPA/PRECISION/KALPA PVC conduit & accessories - PRECISION/AVONPLAST LT cables - POLY CAB/HAVELLS/KUNDAN Modular switch & switch box [UL, CE certified] - CRABTREE/LEGRAND/MK Industrial type sockets/Tops - CLIPSAL/HENSEL/LEGRAND FRLS PVC ins. Multi-strand copper wires/conductors - POLY CAB/HAVELLS/KUNDAN Light fittings - WIPRO/PHILIPS/HAVELLS/CGL Cat 6 utp cables - D- LINK/AMP/3COM/NETGEAR RJ 45 Computer Jack - D-LINK/AMP/3 COM/NETGEAR</p>	<p>Recommended makes of Equipment for Electrical works MCB/MCCB/RCCB/RCBO- HAVELLS/HAGER/LEGRAND OR EQUIVALENT Distribution boards - DIGITAL – MECO/RISHABH/L&T/HPL OR EQUIVALENT Control switch/Indication lamp/Push button - L&T/SIEMENS/TEKNIC/KAYCEE OR EQUIVALENT CTs (epoxy resin cast) - AE/KAPPA/PRECISION/KALPA OR EQUIVALENT PVC conduit & accessories - PRECISION/AVONPLAST OR EQUIVALENT LT cables - POLY CAB/HAVELLS/KUNDAN OR EQUIVALENT Modular switch & switch box [UL, CE certified] - CRABTREE/LEGRAND/MK OR EQUIVALENT Industrial type sockets/Tops - CLIPSAL/HENSEL/LEGRAND OR EQUIVALENT FRLS PVC ins. Multi-strand copper wires/conductors - POLY CAB/HAVELLS/KUNDAN OR EQUIVALENT Light fittings - WIPRO/PHILIPS/HAVELLS/CGL OR EQUIVALENT Cat 6 utp cables - D- LINK/AMP/3COM/NETGEAR OR EQUIVALENT RJ 45 Computer Jack - D-LINK/AMP/3 COM/NETGEAR OR EQUIVALENT</p>
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OFFICER INCHARGE OF PURCHASE

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