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Government of Tripura
Directorate of Health Services

No.F.6(17)-CH/MS/GEN/2014 Dated, Agartala, the 27th August,2015

Notice Inviting Re-Tender

In cancellation of Notice Inviting Tender No.F.6(17)-CH/MS/GEN/2014/1612 dated 20.7.2015, a
fresh tender is invited by the undersigned, on behalf of Governor of Tripura, for supply of Machinery Equipments for use of Regional Cancer Centre, Agartala under NPCDCS project from the resourceful/bonafide/ experienced licenced agencies/ suppliers. The detail list of equipments with specifications are enclosed with the Tender form. The tender will remain valid for 1(one) year from the date of issuance. The undersigned reserved the right to extend the validity of tender.

Terms and Conditions

1. The sealed tenders will be received by Speed Post/ Registered Post/ Courier Service/ by hand in the
office of the Medical Superintendent, Regional Cancer Centre, 79 Tilla, PO- Kunjaban, Agartala, Tripura. PIN-799006 up to 16-00 hours of 28.09.2015. Tender received after the due date and time
will not be entertained and undersigned is not responsible for any postal delay.
2. The sealed tenders will be opened on 29.09.2015 at 11.00 AM in the Regional Cancer Centre,
Agartala, if possible.
3. Tenderer or their representative may remain present during opening of the tender.
4. On the top of the left side of the sealed envelope, the tender enquiry number, last date and time of
receipt, address with contact number of Tenderer is to be mentioned.
5. The bidder has to submit the tender in 2(two) bids namely “Technical Bid” and “Financial Bid”.
The two bids should be put in a large envelope and should be sealed. The only one sealed envelope
is to be submitted. The “Technical Bid” should contain all the documents except the price quoted by the bidders. The “Financial Bid” should contain only the rate offered by the bidder. While processing the bid, the “Technical Bid” will be opened first and the eligible bidders meeting the requirement will be considered.
6. The rate of Machinery Equipments should be typed and quoted both in figures and words clearly in
Indian Currency only. The rate of CST and VAT should be mentioned separately and clearly in Financial Bid. The rate of Comprehensive Maintenance Contract is to be submitted in the Financial Bid.
7. The rate should be quoted for F.O.R Door Delivery at Regional Cancer Centre, Agartala.
8. No Insurance charge is admissible and successful tenderer will be responsible for any breakage and
loss in transit for way to destination.
9. Income Tax / Sales Tax will be deducted from the bill as per guidelines of Government, if
applicable.
10. The detail list of equipments with specification and name of manufacturer, quoted by the bidder, is to be enclosed in the Technical Bid.
11. Whenever the tender is submitted by agency/ supplier, the tenderer has to submit authorization letter of the manufacturer to quote for supply of the equipment.
12. Technical Evaluation Committee(s), constituted by the Government, will open, scrutinize and recommend the rate and firm. Thereafter, the rates and firm will be placed to appropriate Purchase Committee for approval and finalization of rate and firm.
13. The tenderer having experience in establishment of same type of work and service set up in India will be preferred during consideration of rate and firm. If any such work exists in India the tenderer should submit the list of establishment and up to date performance report of the work.
14. Joint Ventures and Consortiums are not allowed for Bidding.
15. Preference may be given to a bidder on a single point responsibility for complete sourcing, supply, installation, training the end users and providing warranty services of all the machines clubbed together. Quoted rates of all the equipments, quantity required and involvement up to 10(Ten) years maintenance of the Machines together will be considered during calculation of rates.

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16. The bidder has to provide 5(five) years Comprehensive Warranty for the machines and has to quote five (5) years Comprehensive Maintenance Contract (CMC) after the warranty period (i.e. from 6th to 10th year).
17. The job completion shall include obtaining all required statutory approvals from AERB or any other statutory approval agencies. The bidder should have taken the single point responsibility of preparing the technical drawings, documents, bill of quantity with technical specification, data collection and all required civil, electro mechanical services for the medical equipments. The bidder should be registered in India for the last 10 years.
18. Preference may be given to the bidder who have satisfactorily executed and completed an Oncology treatment Centre including supplying and installation of Linear Accelerator, HDR Brachytherapy, CT Simulator, MRI, CT Scanner etc. in India only.
19. The selected bidders have to supply the spare parts, consumables, radio-active sources and radio pharmaceuticals etc. from the original manufacturer(s) of the item as per requirement of the Institute. The bidder has to submit the price of the consumable etc. from the original manufacturer after receipt of requisition from the Institute. The consumables are to be supplied in time so that hospital services are not hampered.
20. There shall be at least 4(four) preventive maintenance services rendered per year and unlimited breakdown related visits.
21. All the optional items offered shall have similar warranty and CMC like the main item. Items not under warranty should be clearly spelt out.
22. Buy-back cause will be there for both major and minor equipments as per their life cycles.
23. The successful bidder should manage to run all the supplied Radiotherapy and Nuclear Medical Equipments at Regional Cancer Centre, Agartala with their own manpower for three years or till the personnel of the Institute are properly trained to run the equipments, whichever is earlier. Accommodation of the staff will be provided by the Institute.
24. The bidder shall procure, supply, install, commission and train the user’s staffs about the features and operations of the equipments.
25. The bidder shall take complete responsibility for the entire scope of work as one point responsibility. Any major civil, electro mechanical works required to be executed at site for the smooth functioning of the equipments shall be carried out by the bidder without any additional cost.
26. The selected bidder have to enter an agreement with the Govt. of Tripura for Comprehensive Maintenance Contract for a total period of 10(ten) years (5 years warranty and 5 years CAMC) in a non-judicial stamp.
27. CMC should be quoted on fixed amount rather than percentage.
28. The Earnest Money Deposit (EMD) to an amount of Rs. 20,00,000/- (Rupees Twenty lakhs) only shall be furnished in one of the following forms.
a) Account payee Demand Draft.
b) Fixed Deposit Receipt
c) Bankers Cheque

29. The EMD shall be drawn in any scheduled Commercial Bank in India in favour of “Medical Superintendent, Regional Cancer Centre, Agartala”. The Earnest Money shall be valid for a period of 45(forty five) days beyond the 10(ten) years Contract period. The EMD will be released after contract period in case of successful tenderer and that of un-successful tender will be released after finalization of tender.
30. The bidder has to submit Rs.20,000/- (Rupees Twenty thousand) (non-refundable) in the form of Demand Draft in the name of Medical Superintendent, Regional Cancer Centre, Agartala as the cost of tender document during submission of tender.
31. The tender will not be considered unless they submit EMD Rs.20 lakhs and cost of tender document Rs.20,000/- in Technical Bid.
32. 5% of the value of ordered quantity will have to be deposited as security money by demand draft from any Nationalized Bank by the firm within 30(thirty) days time from the date of issue of supply order.
33. The Security money will be released after the completion of supply.
34. The following self certified/ self attested documents should be submitted along with tender in Technical Bid.
i) Up to date Sales Tax Clearance Certificate

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ii) PAN No.
iii) Quality Assurance Certificate like ISI, BIS, ISO or any other approved standard of the
manufacturer of the machine.
iv) Up to date Trade Licence of Tenderer.
v) Authorization Certificate of the manufacturer to quote their product by the tenderer.
vi) Valid D.G.F.T. Certificate, if the machine is imported one.
vii) An undertaking of the tenderer stating that they will execute full supply of ordered quantity
and will abide by the terms & conditions of NIT, if their quoted rate is approved.
viii) Non-Conviction Certificate.
ix) Bidder has to submit a duly notarized affidavit stating that the agency/firm was not black
listed by any Govt. during last five years
x) The bidder should have a minimum solvency of Rs.120 crores certified by his bankers.
xi) The bidder should have average net worth of Rs.120 crores (average of last 5 years).
35. Payment Terms - Through Letter of Credit in a Nationalized Bank. 80% against supply, installation and demonstration and 20% against commissioning.
36. Uptime guarantee of at least 280 days per year, from 9 AM to 9 PM, excluding Sundays & holidays, during warranty and CMC (Comprehensive Maintenance Contract) period. In case of failure the compensation of Rs.30,000/- per day or part thereof the lost period will be payable to the Regional Cancer Centre, Agartala. The time will be calculated 24 hours after the reporting of vendor’s engineer/ company’s assigned person by phone/sms/email, till the engineer handover the machine for treatment. The period will be recorded as 6 month basis (i.e. 1st April to 30th September and 1st October to 31st March)
37. The bidder shall bear all responsibilities and expenditures relating to insurance, transportation, custom clearance, loading, un-loading of the equipments till handing over the equipments to the hospital authority in complete working condition and commissioning (first patient treatment).
38. The bidder shall bear all costs of accessories and consumables required for complete installation and demonstration of equipments. UPS (at least 45 minutes back up), CVT/Stabilizer or any other electrical appliances required for the functioning of all the equipments shall be provided by the bidder. Any software up-gradation should be provided free of cost by the agency.
39. Bidder must provide compliance statement point by point in a excel sheet in a CD and also hard copy duly signed.
40. Equipments are to be supplied within 90(ninety) days in case of the equipments manufactured in India and 180 (one hundred eighty) days in case of equipments manufactured outside India from date of issue of supply order.
41. A penalty @1% on total value of machine will be charged for every week or part of week delay beyond stipulated date of supply. However, relaxation will be entertained only in special circumstances (natural calamities, war or any other situation beyond human control).
42. Any default or breach of contract and non-execution of supply shall lead to forfeiture of earnest money /security deposit of successful tenderer beside such action as may be considered appropriate by the Health & Family Welfare Department including black listing/delisting the tenders for future.
43. In case of legal dispute the jurisdiction will be the High Court of Tripura, Agartala.
44. The Health & Family Welfare Department, Govt. of Tripura is not bound to accept any or all bids. The Department may at any time terminate the tender process without assigning any reason.

Sd/-
26.8.15
Director of Health Services,
Government of Tripura.

Sl. No. List of Equipments Quantity MAJOR EQUIPMENTS
1. Dual Energy Linear Accelerator with Mould Room Accessories & Dosimetric
Equipments

1 No.

2. Single Energy Linear Accelerator 1 No.
3. Multi Channel Brachy Therapy Machine 1 No.
4. CT Simulator with Quality Assurance & Dosimetry Equipments 1 No.
5. MRI Machine 3 Tesla 1 No.

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6. C.T. Machine (Diagnosis) 1 No.
7. PET-CT Machine 1 No.
MINOR EQUIPMENTS
8. Digital X-Ray 1 No.
9. Digital Mammography 1 No.
10. High end USG Machine 1 No.
11. Equipments for Surgical Oncology with Modular OT As per list
12. CSSD, Vacuum Manifold As per list
13. Chemotherapy Beds 10 Nos.
14. Endoscopes As per list
15. Biochemistry, Haematology, Molecular Diagnostic Laboratory As per list
16. Anaesthesia Equipments As per list
17 Hospital Furnitures As per list
*Specifications of equipments are in Annexure-II

Annexure-II
Sl. No.1 - Dual Energy Linear Accelerator

Specification for Dual Energy Linear Accelerator (Linac)

The machine must have the capability to deliver the Photon and Electron beams. It have to be included the facility of IMRT, Volumetric Arc Therapy (VMAT/RapidArc), Image Guided Radiotherapy (IGRT), Electronic Portal Imaging System (EPID), KV Imager with CBCT, Stereotactic Radiotherapy (SRT), Stereotactic Body Radiotherapy (SBRT) and frameless Stereotactic Radiosurgery (SRS) should be also quoted. All relevant components of the system should be CE mark and FDA certified and the certified copies should be submitted with the offers.
Technical requirements should be maintained by the following features:

a) Minimum two photon beams (6MV & 15MV) will be available for routine radiotherapy.
b) Minimum Electron energy should be 4 or more (6 MeV, 9MeV, 12MeV, 15MeV, 18MeV).
c) High dose rate photon beam at least 500 MU/min with different step set up.
d) Respiration synchronized image acquisition.
e) Tight iso-centre alignment of the gantry, IGRT compatible couch, collimator and imager.
f) Automated image acquisition.
g) On line image matching.
h) Off line image matching review.
i) Remote control of imager position /automatic –please specify.
j) Electronic Portal Imaging Device (EPID).
k) Portal Dosimetry license - Optional
l) Dynamic Multileaf
collimator
m) Auto field sequencing
n) Advance dynamic procedure
o) Beam Matching and MLC matching (model) with the LE Linac so that the patient can be transferred immediately when the DE Linac is out of order
p) Kilovoltage X-ray Cone Beam CT (CBCT)
q) Real-time position management
r) Special procedure support- Total body electron treatment. High dose Total skin electron and photon mode
s) Free Flattening Filter (FFF) mode with high Dose rate
t) Volumetric Modulated Arc Therapy Delivery System (VMAT/RapidArc)
u) Machine should perform for SRS/SRT/SBRT applications (VMAT based preferred)

1. Photon Beams

1.1 Energy: 02 (two) Photon Energies of 6 & 10 or 15 MV (10 MV is highly preferable)
1.2 Dose rate: The dose rate for routine clinical application shall be at least 5MU to 600MU with

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standard steps for both the photon energies for flat beams.
1.3 At least one FFF (Flattening Filter Free) beam of 6 MV or 10MV with dose rate of 1400
MU/min or above 2000MU /min respectively shall be quoted (Flattening Filter Free mode option
should be AERB approved for both the energies for the particular model quoted)
1.4 Beam stability should be achieved within 500 millisecond to ensure dynamic applications.
Beam Characteristics: As per IEC standard

1.5 Beam flatness, Symmetry, Penumbra, Leakage Radiation and Neutron leakage shall comply with
internationally recognized standards e.g. IEC or equivalent.

1.6 Field

1.6.1 The field size is defined as the distance along with the radial and transverse axes between the
points of 50% density on an X-ray film taken at 100 cm TSD with minimum buildup. The digital display, light filed size and mechanical display should be accurate to within ±2 mm.

1.6.2 The useful field size shall be continuously variable up to 40 x 40 cm2. The full square field size
shall be no
less than 35 x 35 cm2. The optical field light system should coincide within ±2 mm of the 50 % isodose line on an x-ray film taken with minimum build-up at 100 cm SSD for all photon energies
for field sizes from 5x5 cm2
to 30 x 30 cm2 for 0°, 90°, 180° and 270° gantry angles. Mention the resolution and range of the optical distance indicator (ODI). The digital and mechanical display should be within ±2mm. The concordance set optical field size and measured optical field size 0°, 90°, 180° and 270° gantry angles must be ≤ 1mm for field sizes ≤ 10x 10 cm² and ≤ 2mm for field size> 10x 10 cm².
1.6.3 A detachable block holder should be provided to accommodate 2 trays simultaneously for wedges
and block trays. The spacing above the blocking tray should be at least 8 cm. The size of the blocking trays at least 5 cm large than the maximum field size at the lower position. Specify traction and size of the blocking trays.
1.6.4 Asymmetrical Collimation
Asymmetrical collimation for both pair jaws shall be provided. any pair of jaws shall be capable of crossing the centerline by at least 10 cm as projected at 100 cm TSD. The collimators shall re-center automatically when the symmetrical mode of operation is re-selected.

1.7 Beam Profile
1.7.1 Field Flatness must be equal or less than ±3%
Variation from the mean dose delivered within the central 80% full width Half Maximum region measured at 100 cm TSD at a depth of 10 cm. This specification applies or both the radial and transverse axes of all square field sizes from l0x10 cm² to 40 x 40 cm²
1.7.2 Field Symmetry Specifications
The maximum percent differences at any two symmetrically located points relative to the central
axis shall not exceed ± 2.0% for the longitudinal and transverse halves of the field at 100 cm TSD
and 10 cm depth, at gantry angles of 0, 90, 180 and 270 degrees. Field sizes shall be specified as
10x 10 cm and 40 x 40 cm
1.7.3 Beam Steering
In order to ensure stable beam flatness and symmetry from day to day and at all gantry angles, the accelerator shall be provided with a beam optics system capable of steering the beam dynamically
(i.e. in real time) in both the longitudinal and transverse beam axes. In addition, the steering system
shall be capable of distinguishing between and correcting for angular and positional asymmetry in
both major axes. The system shall be comprised of a dynamic feedback loop between the quadrant symmetry monitoring function of the ionization chamber and steering coils in the bend magnet
system. 1.7.4 Energy Stability
The bend magnet system shall be fully achromatic, with one-to-one imaging for superior transport
and control of the beam from the accelerator. The magnet should have also equipped with or without energy slits fixed at ± 3%, enabling output beams of consistently high quality and precise dosimetry.
1.7.5 Penumbra
The penumbra width shall be as per IEC standard. Penumbra is defined as the width between the

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20% and 80% isodose lines measured for the 10 x 10 cm² field size at a depth of 10 cm for 100 cm
TSD along the major axis.

1.8 Target and Flattening Filter Specifications
The focal spot size shall be less than or equal to 3 mm in diameter at the x-ray target.
An electromechanically interlocked method of changing flattening filters shall be provided. The mechanism of the method should be elaborated in the offer.

1.9 Wedges
Automated Wedge (Dynamic wedge / motorized wedge) / EDW (Enhance Dynamic Wedge): The mechanism of wedge to be mentioned and License to be provided.

1.1 0 Radiation Leakage
Radiation leakage limits shall comply with the IEC standard.
1.10.1 Neutron leakage: The neutron dose does not exceed 0.2% of the X-ray absorbed dose at the isocenter measured anywhere in the patient plane outside of the maximum useful beam.
1.10.2 Ozone Production: The ozone production rate from various radiation modes (especially high output photon and electrons) and associated electronics shall be stated and additional site ventilation requirements (if any) shall be stated.

1.11 Arc Therapy
The machine shall be preferably capable of performing both Photon and Electron Arc Therapy.
Dynamic arc rotation should be capable in both directions, clockwise and counterclockwise.

Photon Arc Therapy - please specify
1.11.1 The accelerator shall be capable of delivering minimum 0.5 to 16 MU per degree over a preset
gantry rotation up to 360 degrees or any fraction thereof. MU per degree is automatically computed based on the preset total dose and the preset arc segment.

1.11.2 Precision: During dynamic arc treatment, the gantry position should not differ by more than ±0.5° from the desired instantaneous gantry angle, and the dose should not differ by more than 0.20 MU from the desired instantaneous total dose, as specified by the user-preset total dose and arc segment.
1.11.3 Gantry direction of travel: Either clockwise or counterclockwise gantry rotation shall be possible for arc therapy. The MU/degree shall be automatically computed.

2 Electron Beam Characteristics

2.1 Energy: Minimum 4(four) or more Electron energies between 4 MeV to 22 MeV should have
following characteristics:

SIN Energy (Me V) Depth of lonization Values

DSO% D 80
(cm)
01 6 1.90 ± 0.1 cm

02 9 2.95 ± 0.1 cm

03 12 4.l5±0.1 cm

04 15 5.20 ± 0.1cm

05 18 6.10 ± 0.1cm

06 22 6.S0±0.1cm

2.2 Dose Rate:

The dose rate at the isocenter shall be variable from a minimum of 25 MU/min - Please specify and

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to a maximum 600 MU/min. or higher at Dmax for each electron energy with min 5 fixed steps.
The time averaged dose rate should be constant (flatness) to within ± 5%. Higher dose rates upto
1000 MU/min will be highly desired and preferred for one or two energy.
2.2.1 Field Size / Applicators
The field sizes are defined at the isocenter plane, 5 cm from the final Field Defining Aperture.
A set of at least 06 (Six) electron applicators is provided. (6 x 6 cm², 10 x 10 cm², 15 x 15 cm², 20 x
20 cm² and 25x 25 cm²) should be provided.
2.3 Beam Profile
2.3.1 Field Flatness
Shall comply with IEC standard.
2.3.2 Beam Symmetry
Shall comply with IEC standard.
2.3.3 Symmetry shall be monitored and controlled with interlocks to terminate treatment if symmetry is
not within preset (5%) limits.
2.3.4 Source

There shall be an electromechanically interlocked method for changing electron scattering foils
for different electron energies. The method should be elaborately described in the offer.
2.4 X-ray Contamination
For nominal energies up to 10 MeV, the X-ray contamination should be less than or equal to 3%.
For nominal energies greater than 10 MeV the X-ray contamination should be less than or equal to
5%. This specification is defined in water with a 100 cm TSD, at a depth of 10 cm beyond the depth
of the 10% iso dose line, with a 15 x 15 cm² electron applicator.
2.5 The machine shall be capable of delivering photons with the electron collimators attached in order
to take port films. The photon exposure should be limited to less than 20 rads. The low energy photon beam shall be automatically selected when the operator elects to take a port film during electron treatments.
2.6 Electron Arc Therapy - please specify and write limitations
2.6.1 Dose: The accelerator should be capable of delivering a preset dose over a preset arc of 360
degrees or
fraction thereof.
2.6.2 Precision: The maximum variation in integrated dose delivered over an electron arc integrated dose
delivered
over any arc of 90 degrees or greater shall not exceed + 2%. between 45 and 90 degrees shall not exceed + 3%.
2.6.3 Describe collimation system used in electron arc therapy. Electron cones used in fixed beam
electron therapy are not acceptable.
2.7 Dosimeters
2.7.1 Photon Ionization Chamber
A transmission ionization chamber shall be used for the photon mode. The chamber shall incorporate
completely separate collection electrodes consisting of two plates for dose monitoring and a quadrant plate for field symmetry.
2.7.2 Electron Ionization Chamber
A transmission ionization chamber shall be used for the electron mode. The chamber shall incorporate two independent channels capable of monitoring both dose and symmetry. Symmetry monitoring shall consist of a quadrant system.
2.7.3 Dual Channels
The dosimetry system shall utilize two completely independent channels for monitoring accumulated dose (i.e., a primary and a redundant channel). A dose rate channel and a channel for monitoring differential field symmetry shall be provided. The redundant channel will terminate an exposure of no more than 25 MU higher than the machine setting. The system shall also provide a backup timer with a minimum significant time setting of 0.01 minute. The backup time shall be automatically calculated and set at a user-specified value above the expected duration of the
treatment.
2.8 Monitor Chamber

The dose monitoring chambers shall be sealed and shall operate independent of ambient temperature
and pressure. The dosimetry electronics shall incorporate circuitry to permit interrogation of the

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accumulated dose, dose rate, and symmetry channels prior to each patient treatment. This interrogate function shall check cable continuity, electrical calibration and interlock trip levels before each treatment. All dosimetry and patient safety-related interlocks must be sensed and controlled by hardware. Primary software sensing and control of safety-related interlocks is not acceptable.
2.8.1 The dosimeters shall be reproducible to within + 1% or 1 monitor unit, whichever is greater, at any
fixed gantry angle from 0 to 360 degrees.
2.8.2 The linearity of the dosimeters shall be + 1 % or 1 monitor unit, whichever is greater, for
accumulated doses between 50 and 999 monitor units.
2.8.3 Backup Counter
The integral dose shall be retained on a counter, which indicates the monitor units delivered to that
time with the unexpected loss of power or malfunction of the accelerator or dose measuring systems. The dose shall be retained for at least 20 minutes after power interruption.
2.8.4 Dose Rate

The reproducibility of the dosimeters shall be + 1 % or 1 monitor unit, whichever is greater, at a
fixed dose rate. With variations in the dose rate from minimum to maximum, the reproducibility
of the dosimeters shall be + 2%
3 Mechanical Specifications
3.1 Target to Axis Distance
The target to axis distance should be 100 ± 0.2 cm.
3.2 RF Power Source: Klystron or Magnetron
3.3 Wave guide System: Standing or traveling
3.4 The electron gun shall be demountable or filament change option from the accelerator to minimize
cost and down time in case of gun problem.
3.5 Mechanical Isocenter
Considering the mechanical isocenter to be defined by the intersection of the collimator and gantry rotation axes with the table rotation axis, all three axes of rotation should be confined to a sphere
with ~ 2.0 mm radius for a machine equipped with a counterweight.
3.6 Gantry Rotation and Rotation Speed
The accelerator gantry shall be capable of rotation greater than 360 degrees with a variation of the mechanical and radiation iso-centers during rotation of less than ± 1.0 mm throughout the entire rotation. Indicate the rotation range. Indicate the minimum and maximum rotational speed of the gantry. The rotation speed should be continuously variable.
3.7 Scales
Digital scales indicating gantry angle position shall be provided both in the treatment room and at
the control console. Accuracy of the scales shall be ± 0.5 degree.
3.8 End of Collimator to Axis of Rotation Distance
The distance from the end of the lower collimator to the isocenter shall be greater than 44 cm. The bottom of the blocking tray should be greater than 30 cm from the isocenter.
3.9 Height of Axis of Rotation
The height of the isocenter above the finished floor shall be less than 130 cm.
3.10 Collimator Rotation Range
The collimator shall be capable of rotating at least +- 165 degrees with a variation of the mechanical
and radiation isocenter during rotation of less than ± 1.0 mm throughout.
3.11 Scales
Digital scales indicating collimator angle position shall be provided both in the treatment room and
at the control console. Accuracy of the scales shall be ± 0.5 degree.
3.12 Treatment Couch
The treatment couch should be flat, made by carbon fiber with IGRT compatible.
3.13 Motion
Specify the range of motions of the treatment couch. The maximum height of the couch shall be at
least 40cm above the isocenter. The lowest couch position shall be less than 66 cm above the finished floor. Motions (except couch top rotation) shall be both manual and variable-speed motor driven. Specify which motions can be performed simultaneously.

Specification Minimum

Required Vertical ≥ 100 cm

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Lateral ± 25 em

Longitudinal ≥ 145 cm
Turntable Rotation ± 90
3.14 Dimensions degrees
The following couch parameters are
required:
a. Couch Top Width: ≥50 cm
b. Couch Top Length: ≥ 200 cm (may include extension panel (s)
c. Couch Lift Capacity: ≥400lb.
4. Configuration
4.1 The linear accelerator's use for conformal dynamic therapy and intensity modulated radiation
therapy requires a couch top that is designed for precise and repeatable patient positioning. Describe the design of the couch relative to these requirements.
4.2 The couch top shall have side rails with attached universal clamps and immobilization straps.
Patient support panels in the couch (Indexed Carbon Fibre Table Top) shall be provided, with combined dimensions exceeding 70cm L x 45cm W cm to facilitate large posterior treatments at extended distances without moving the patient. The accessory rails beside the patient support panels shall be removable, allowing treatment and port film images without interference from the
rails.
4.3 Convenient scales (digital or mechanical) in metric units shall be incorporated on the couch or on
an in-room monitor which will allow the operator to check the orientation of the couch height and
couch angle with respect to the gantry. Couch positions (except couch top rotation) shall also be displayed at the control console. Accuracy of the scales for vertical, lateral and longitudinal motions shall be within + 2 mm.
4.4 Motorized motions shall be controlled with two hand-held pendants, capable of variable speed
control, mounted to the treatment couch. Controls for motorized couch motions shall also be located
on both sides of the treatment couch. All mechanical motions (gantry, collimator and couch) shall
be capable of being operated simultaneously.
4.5 Radiation isocenter at the table top should be contained within a circle of 1mm radius as the table is
rotated or when it is moved vertically up and down. Any combination of gantry rotation, collimator rotation or couch rotation should not give isocenter deviation of more than + 1 mm radius.
4.6 With a load of 300 lbs. approximately distributed on the couch like a typical patient and the couch
top extended at maximum travel range towards the Gantry, the deflection should be less than 5 mm.
The couch top should stay level under the above load conditions within 2 mm across the entire couch width when the couch is moved laterally.
4.7 Monitor Chamber: Sealed
4.8 Interlocks and Indicators
4.8.1 Dose Rate Interlock
The accelerator should be disabled when the dose rate is not within ± 20% of the expected value within 10 seconds into the treatment.
4.8.2 Emergency OFF Switches
Provision for connecting emergency OFF switches into the interlock chain shall be provided to allow immediate disabling of the accelerator in case of an emergency. There should be at least one emergency OFF switch on the console and four on the treatment unit. Describe the location of all emergency OFF switches.
4.8.3 Wedge Filter Interlocks
The presence, identification, and orientation of the particular wedge filter in use shall be indicated
on the control console and be interlocked against use during electron therapy.
4.8.4 Dosimeter Interlocks
The normal treatment delivery will be designed to terminate upon a prescribed given dose at 100 cm
TSD for a 10 x 10 cm field at the depth of maximum dose. In addition, a timer shall be used as a safety device to terminate treatment in the case of failure of the integrated dose meters. The timer should indicate the treatment time in units of tenths and hundredths of minutes and be accurate to within ± 0.1 minutes. The backup treatment time shall be automatically calculated.
4.8.5 Door Interlock
The treatment room door and appropriate accelerator cabinet doors shall be closed before the

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accelerator can produce radiation.
4.8.6 Rotational Therapy Interlock
To perform a rotational therapy treatment, the arc therapy mode shall be selected on the control console. In addition, there shall be an interlock to interrupt treatment if the dose rate per degree is
too high or too low.
4.8.7 Port Film Interlock
This interlock shall allow partial or complete opening of the collimators from the control console
and limit the total dose delivered to less than or equal to 20 rads. It shall also automatically allow radiographs to be taken with the low energy photon beam for either photon or electron modes. The vendor shall demonstrate that this interlock operates as specified.
4.8.8 Electron Mode Selection
The presence and identification of the particular electron applicator in use shall be indicated on the control console and be interlocked against use in photon therapy (except for port films). This interlock should be in addition to a separate interlock which is required for electron mode selection.
4.8.9 Electron Collimator Interlock
This interlock should prevent accelerator turn-on in the electron mode if the electron scattering foils
and the dosimeter are not in the correct position.
4.8.10 Key Switch Interlock
This interlock should be controlled by a separate key, which must be in the "on" position before it is possible to turn the accelerator on.
4.8.11 Vacuum Interlock
This interlock should prevent high voltage from being turned on if the vacuum in the accelerator
guide is not low enough.
4.8.12 Pressure Interlock
This interlock should prevent high voltage from being turned on if the dielectric gas or cooling
water pressure is too high or too low.
4.8.13 Modulator Interlock
This interlock should prevent high voltage from being turned on if there is a fault condition in the
high voltage power supply or modulator.
4.8.14 Warm Up Interlock
This interlock should prevent high voltage from being turned on during the warm up period when electric power has been turned on.
4.8.15 RF Interlock
In the photon mode of operation, the accelerator should be interlocked such that no RF power can
be applied to the accelerator unless the photon beam converter is accurately and correctly positioned
to prevent the electron beam from being directed toward the patient.
4.8.16 Collision Protection
The accelerator should include protection devices designed to minimize injury resulting from collision of an electron applicator with the patient. Describe these devices.
4.8.17 Symmetry Interlock
A symmetry interlock is required which shall terminate an exposure if the ratio of the maximum
dose off axis in air at two symmetric points exceeds the range 0.98-1.02. The vendor shall demonstrate that this interlock operates as specified.
4.8.18 Excess Dose per Pulse Interlock
This interlock should terminate irradiation if the dosimetry system detects an excess dose from a single electron gun pulse.

5 Protection and Safety
5.1 High Voltage Protection
Interlock systems should be provided to afford maximum protection for personnel against high voltage hazards. Unshielded high voltage contacts should be prominently and appropriately labeled.
In addition, a manual grounding system should be made available in the modulator enclosure and
near other high voltage sources.
5.2 Accessory Weight
The weight of any single accessory attachment to the machine should be less than 20 lb.

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5.3 Couch Lift
It should not be possible to raise the treatment couch top above isocenter without releasing an interlock switch. In addition, a means to lower the couch in the event of a power failure shall be provided.
5.4 Control Features
5.4.1 Console
A computerized control console shall be located outside the treatment room. This console shall provide controls that must be activated in order for the accelerator to become operational in any of
its various modes of operation and also provide displays of accelerator parameters. The following
shall be present:
5.4.1.1 Power Off: Turns off all electrical power, including power to the computer, except for that power needed to maintain the accelerator in a "Stand By" condition.
5.4.1.2 Power On: Turns on electric power to the accelerator.
5.4.1.3 Total Dose: Sets the desired total dose for patient's treatment.
5.4.1.4 Time: Sets time for patient's treatment. Time shall be used as a back-up in case of failure of total dose interlock. Backup time shall be calculated automatically with provision for manual reset.
5.4.1.5 MU/Degrees: Sets the desired MU/degree for rotational therapy.
MU/degree shall be calculated automatically with provision for manual reset.
5.4.1.6 Mode Selection: Selects x-rays or electrons for treatment.
5.4.1.7 X-ray Energy: Selects photon beam energy.
5.4.1.8 Electron Energy: Selects electron beam energy.
5.4.1.9 Radiation On: Turns on accelerator and radiation is produced.
5.4.1.10 Interrupt: Immediately stops treatment.
5.4.1.11 Complete: Indicates that desired dose has been delivered. In addition, the operator should be alerted if radiation terminates for any reason other than reaching the set integrated dose. In such cases, the
dose remaining to be given shall be indicated.
5.4.1.12 Arc Therapy: Enables the accelerator to perform arc therapy.
5.4.1.13 Wedge: Requires that the presence, identification and orientation of a wedge must be confirmed at the control console.
5.4.1.14 Port Film: Opens jaws completely or partially, as selected by the operator, and limits the amount of radiation to be delivered to less than or equal to 20 rads. This shall be operational in both the photon and electron modes but allow only the production of low energy photons. Once the port film
has been completed, it should be possible to return the collimators to their original setting automatically.
5.4.1.15 Special Procedures: Prohibits accidental selection of procedures such as electron arcs or high dose rate electron irradiation by providing an "extra step" in selection procedure. Describe mechanism
used.
5.5 Control Console Monitors
The following monitors and displays should be available at the control console, and with the exception of a back-up dose counter, it should be possible continuously to visually observe the
value being registered on these counters and displays from the position of the operator.
5.5.1 Dose Rate Indicator: Indicates the dose rate at maximum buildup for a 10 x 10 cm field at 100 cm
TSD.

5.5.2 Dose Counters: Two counters which count integral dose detected by each of the two dosimeters.
5.5.3 Mechanical Total Dose Counter: In case of power failure, a means of preserving the total dose
delivered to the patient under treatment when the power fails for an indefinite time period should be provided.
5.5.4 Total Time Counter: Counts total treatment time in 0.01 minute increments up to 9.99 minutes.
5.5.5 Angle: Indicates position of gantry in degrees with precision of ± 0.5 degrees.
5.5.6 Symmetry: Indicates beam symmetry in both major axes.
5.6 Control Console Adjustments
It should be possible to adjust the following parameters at or near the control console:
5.6.1 Dose Rate: Permits the change of radiation output of the unit.
5.6.2 System Calibration and Servicing
A separate mode of operation shall be provided which is used to monitor accelerator parameters and facilitate adjustments to those parameters. While in this mode of operation, the operator shall be
able to accomplish the following from the control console:

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a. Monitor machine parameters including both input and output signals
b. Display interlock status, and override interlocks
c. Adjust equipment timing
d. Perform computer diagnostics
e. Control all mechanical motions from the console, either by automatically moving multiple
mechanical devices simultaneously to preset positions or by moving individual devices manually
f. Select dose to 9999 monitor units
g. Select time to 99.99 minutes
h. Operate the machine for at least two hours without stopping for the purpose of dosimetry
measurements
I. Calibrate mechanical motion scales
j. Selectively turn off various accelerator servo systems
k. Operate the system calibration and servicing mode remotely within the treatment room
using the hand pendants. When leaving this mode of operation, all overridden interlocks
shall automatically be re-enabled to ensure patient and operator safety. This mode of
operation shall be interlocked against unauthorized use.
5.6.3 Event Logging
During clinical operation, the accelerator shall record relevant equipment parameters for later review in the event of abnormal machine conditions such as dosimetry interlocks, minor interlocks,
etc.

5.6.4 Gantry Angle and Collimator Size: Permits changes in the gantry angle and collimation field size. It
should also be permitted automatic setting of field size.
5.7 Accelerator Parameter Checks
The following accelerator parameters should be monitored at or near the control console. A separate BNC connector should be provided such that each of the following voltage wave forms can be monitored via an oscilloscope:
a. Reflected RF pulse
b. Klystron current
c. Gun current

d. Charge current
e. Pulse forming network volts
In addition, a connector for a multi meter should be provided at or near the control console with an appropriate switch such at that one of the following voltages can be displayed:

a. Gun current

b. Pulse forming network
voltage
c. Electron gun heater voltage

d. Power tube heater voltage

e. Power tube frequency

f. Charging current

g. Vacuum pump current
5.8 Dosimetry System
There shall be a separate, completely independent indicator of the accumulated dose and dose rate at
the control console. It should be possible to set accumulated dose and dose rate. The system shall
warn the operator if the set dose exceeds a preset maximum value. This value shall be determined by
the user.

In addition, a safety timer shall be incorporated to prevent irradiation from the accelerator after a
fixed period of time, which shall be calculated automatically or determined by the operator. To prevent possible overexposure due to a malfunction of the ionization chambers, an interlock system shall be incorporated to prevent the operation of the accelerator should there be a fault with the ion chambers. The status of all dosimetry interlocks and integrity of ion chambers shall be checked immediately prior to initiation of each treatment. The nature of the interlock system shall be such

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that a positive indication of the malfunction of the ionization chambers shall be visible at the control console. In addition, failure of the accumulated dose indicator or a portion of the system controlling
this indicator shall prevent operation of the accelerator but shall retain the last recorded accumulated
dose indication.
5.9 Quality Assurance Procedure
An automated means of operating the accelerator at all clinical energies (photon and electron) to perform a series of daily quality assurance checks shall be provided. This series of checks shall be defined by the hospital and shall be capable of being edited. In addition, critical accelerator operational parameters shall be recorded for each of the QA test runs, and a report of these parameters shall be printed at the end of the daily QA procedure.
5.10 Treatment Room Control Pendants
To simplify mechanical motion control and expedite patient set-up, the motorized mechanical motion control system of the accelerator shall be computerized such that gantry rotation, collimator rotation, collimator jaw settings, and treatment couch vertical, lateral, longitudinal and turntable rotation about isocenter can be operated with either of two hand-held pendants capable of continuously variable speed control. If two operators are in the treatment room, both pendants shall
be capable of being used simultaneously.

To prevent possible damage to mechanical device motors when both pendants are being used, the computer system shall prevent conflicting commands from being sent to the same mechanical device (e.g., simultaneous couch up and couch down commands cannot be issued). The hand pendants shall each have a hardwired motion-enable switch which must be depressed to activate these motions.

5.11 Treatment Room and Console Position Displays

For accuracy of patient set-up, digital displays of gantry rotation angle, collimator rotation angle, collimator jaw settings (symmetric and asymmetric), and treatment couch vertical position, lateral position, longitudinal position and turntable rotation angle about isocenter shall be provided both in
the treatment room and at the operator console.

Accuracy of collimator and gantry angle displays shall be ± 0.5°, with a resolution of 0.1°. Accuracy of collimator jaw position displays shall be ± 1 mm with a resolution of 1 mm. Accuracy
of the couch vertical, lateral and longitudinal displays shall be ± 2 mm with a resolution of 1 mm.

6 Miscellaneous
6.1 Beam Data

Representative photon and electron central axis profile dose curves, as well as flatness and symmetry profiles measured on the accelerator to be installed shall be provided. These curves need
not be warranted by the vendor for clinical use.
6.2 Beam Blocks and Shadow Trays
An accessory set of pre-shaped, screw-on blocks and shadow trays shall be delivered with the machine. At least 10 shadow blocks, of at least 1/10th value layer 5% Transmission 5 HVL or please specify, shall be included.
6.3 Gantry Relocation
The vendor should provide the means to mechanically secure the accelerator gantry in the four cardinal positions (0, 90, 180, and 270 degrees).
6.4 Field Illuminating Light
A field illuminating system should be provided for both photon and electron modes. The edge of the defining light field should coincide to within ± 2 mm of the 50% isodensity line on an x-ray film taken with minimum build-up for any field size at one meter and any angulation of the gantry or collimator system.
6.5 TSD Indicator
An optical distance indicator which indicates the SSD to at least ± 4 mm over the 80 to 150 cm range shall be provided. Accuracy at 100 cm shall be ± 1 mm. A mechanical indicator which indicates the SSD to within ± 2 mm maximum error over the range 90 to 110 cm should be provided.

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6.6 Front and Side Pointers
A mechanical front pointer shall be provided to locate the isocenter of the machine to within ± 2
mm. This accuracy shall apply to any orientation of the machine. A range finder shall be provided to locate the target to surface distance on the patient to within ± 5 mm.
6.7 Laser Localizer Lights
Total 04 (four) laser should be provided. One laser installed in the ceiling and two on the walls whose beams shall intersect at isocenter. The diameter of the laser beams as shown on a phantom located at isocenter shall be less than 1 mm. In addition a sagittal line laser shall be provided. Blue
or Green color laser will be preferable.
6.8 Optical Back Pointer
An optical back pointer should be provided.
6.9 Accessories
Various accessories are required to modify the dose distribution or assist patient set-up.
a. An arm board which may be attached to the side rails of the treatment couchfor use in breast
set-ups shall be provided.
b. A mechanism to support the patient's hands shall be provided.
c. Mechanism to immobilize the patient shall be provided.
d. Mechanism which may be attached to the treatment couch and capable of supporting an TV
pole shall be provided.
e. Spare Parts Kit and Required Tools
A spare parts kit consisting of assorted printed circuit boards, relays, lamps and a container
of dielectric gas shall be provided. Specify inventory. Include a spare pendant control module as part of the inventory.
f. Bending Magnet
Electron energy spread shall be within 3% of the nominal energy as the beam strikes the x-
ray target (for photon beams) or the scattering foil (for electron beams). Precautions shall be
made in the selection of materials in the bending magnet system to reduce the neutron production above photonuclear thresholds.
g. Vacuum System
Specify the type of vacuum pumps used.
h. Dual Photon Energy Production
Describe the method used to produce the low and high energy photon beams.
i. Data Link to Field Service via Modem
The vendor shall provide a computer link to connect the accelerator to the Field Service facility for efficient off-site analysis of pertinent files, if available.
j. All screens associated with equipment must be flat panel and not less than 18 inches.
7. Dynamic Multileaf Collimator
Performance Specifications – Full details to be provided – Please specify.

8 Electronic Portal Imaging Devices with Portal Dosimetry (Optional) License
8.1 MV Imager Specifications – Full details may be provded
Performance Specification – Please specify.

8.2 To be provided software and license for portal dosimetry for IMRT QA to check the machine
fluence
of the planned treatment and auto verification with the planning fluence
8.3 Necessary QA tools for EPID should be provided.

9 Volumetric Modulated Arc Therapy / RapidArc:

The system should have support volumetric modulated arc therapy treatments, delivering comparable or better dose distribution as IMRT. VMAT Delivery for a single linear accelerator with the capability to simultaneously modulate
aperture shape, dose rate, and gantry speed continuously through 360 degrees of gantry rotation, during an arc beam delivery. When coupled with VMAT Planning and a VMAT -compatible information system, the

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accelerator has the capability to generate IMRT-quality dose distributions in a single, optimized arc around the patient.

FEATURES

- Latest version of Inverse Planning software for VMAT/RapidArc should be offered
- Simultaneous modulation of MLC aperture shape, beam dose rate, and gantry rotation speed during
beam
delivery
- Radiation beam is continuously and smoothly modulated for dose rate
- Provides IMRT-quality dose distributions in a single arc delivery in less than 2 minutes.

Includes VMAT max Programmable MU option, for continuously deliverable beam doses up to 1999 MU in
a

single field of a VMAT or VMAT SRS plan. Also includes maximum Programmable MU option, for continuously deliverable beam doses up to 1999 MU in a single field of a Large Field lMRT or Fixed plan

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10 Image Guided Radiotherapy (IGRT) (latest amorphous silicon technology) system – Full details
specify

10.1 kV Imager Specifications – Specify details.

10.2 kV CBCT Specifications Please specify in details.

10.3 Optical Imager Specifications – Please specify in details.

10.3 Quality assurance kit: The following QA device should be provided:
* Water phantom Calibration kit for volume CT calibration. Shall also provide a reduction in CBCT
image ring artifacts in addition to image quality improvements.
* Geometric calibration and QA phantom designed for kV to MV isocenter alignment and other
calibration activities for the IGRT system. Utilizing the phantom in conjunction with the specific associated software tools delivered with the system enables fast calibration of the kV to MV X-ray isocenter, and flex map calibration for Volume CT imaging.
* Adopter Kit to support the single ball bearing phantom which is used to calibrate the imaging
software to the mechanical isocentre.
* 2D image quality phantom use for 2D kV image quality to determine the low contrast and spatial
resolution of 2D kV images. This Test Tool shall be used for the 2D image quality of the Customer Acceptance Test, and shall be used to monitor image quality later.
• Daily QA Phantom for kV and MV projection imaging and kV Volume CT checks
Laser and light field coincidence in addition to provide spreadsheet for recording and analyzing
trend results
* Volume CT QA phantom to enable measurement of high resolution and contrast resolution and
other
image quality parameters of the Volume CT images acquired on the IGRT workstation.
• Vendor specific QA manual should be provided.

11 Treatment Planning System (TPS) – for both dual energy and single energy Linacs (total 2 Linacs)
Should be PC based from branded company and with proper software, interface. Treatment
planning
computer must deliver latest version (at the time of commissioning) of planning software for
practical 3D,
4D and 2D treatment plan for photon and electron beams.
Optional – 6 workstations (2 contouring 2 Planning 2 Review (offline) to be provided which
include independent treatment planning software license and dose calculation license.
One teaching box computer set to be provided with treatment planning software for academic training
purpose only and not to be used clinically.
Vendors should be offered the latest version for all software related items. Treatment planning system should include following treatment techniques software-
* 3D Conformal Radiotherapy planning
* Interactive IMRT planning
* VMAT planning
* EPID

* IGRT including CBCT planning
* 4D planning system
* FFF beam planning
* DICOM / RT compatibility
* Deformable Registration Lcence

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* Oncology Management System
* Offline portal image check
* Portal dose verification software mandatory
* Customizable radiotherapy report system

Planning should have following features:
Contouring with standard contouring tools including auto-contouring features
Virtual simulation

All available Licensees should quote for Latest models with hardware & functional switches Please specify your calculation algorithm
Image registration, Field set up and Plan evaluation

Description:
3D External beam
* 3D Fast Photon and Electron Dose calculation with homogeneity correction.
* 3D Multi-pass scatter dose calculations.
* Advanced 3D CT Computerized Simulation
* Image Processing and Anatomical Modeling
* CT/MRI/US /PET-CT Image Acquisition and fusion features
* Treatment Field Design and Visualization
* Full 3D Visualization of Treatment Set
* Irregular Field Calculation
* Volumetric Image Cube (VIC)
* Network: DICOM RT Export, Import, and Communicator to manage DICOM files
* Digitally Reconstructed Radiograph (DRR)
* Dose Volume Histogram (DVH)

11.1 Hardware Specification for TPS
Provide specifications for latest version hardware's
Any Brand which is suitable for vendor specific TPS System but it should be mentioned
in the offer.

* System processor:
* Memory:
* Video card:
* Hard drive:
* Tape drive:
* DVD/CD-RW:
* Modem:
* Monitor: 20" TFT flat screen
* Operating system:
* Miscellaneous : Keyboard, mouse
* Printer: 04 nos (four) Color, Standard Laser Printer

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Networking System:
Latest version of networking software with standard server to be provided and installed for
local area networking compatible with the TPS, Machine, treatment console, CT Simulator & MRI.

12 Spare parts availability
Standard spare parts should be provided with the machine and provided the list in offer.

13 Image and Data Server
High capacity image & data server should be provided with necessary software

14 Digital Camera
One digital camera with medium resolution should be provided

15 Uninterrupted Power Supply (UPS)
UPS should be provided and mention the backup time in offer.

16 Chiller:

Machine suitable water chiller with connecting copper piping should be provided.

17 CCTV

CCTV should be provided with 03(three) viewing angle

18 Communication system with patient and control console
Two way communication systems should be provided with simultaneous bidirectional communication features.

Quality Standard: Valid FDA & CE must be submitted with the offer for whole systems

Warranty & CMC:-
• Software Service Agreement (SSA) with Hardware upgradation within 5 years is
considered as mandatory.
• After 5 years both CMC & SSA.
Technical Committee has agreed to the point as long the new model meets Tender Specification and AERB approval shall be obtained by the vendor before shipment

Workstations of Linear Accelerator are to be well equipped with hospital furniture.

Sl. No. 2

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Specifications for Single Energy Linear Accelerator with Beam Matching and MLC matching model with the High Energy Linac
The Model quoted shall be latest and not more than 7 years old in the international market (FDA approval date) with all necessary approvals like FDA, CE & AERB (all valid copies to be enclosed with the offer).

Single photon energy, Linear Accelerator is required with the following specifications:

The minimum requirements are:

Linear Accelerator technology requirements:
- Single Energy 6 MV Photon Energy
- With Electrons (4 nos. or more), if available, can be quoted as an Option.

The machine MUST have the latest technology such as:
- Klystron / Magnetron as the RF power source
- Standing / Travelling Wave Accelerator guide
- Dynamic beam steering
- Digital dose control
- Unsealed/sealed Ionisation chamber
- Dose rate should be selected in fixed steps for 6 MV photon energy beam
- High dose rate support for efficient delivery of stereotactic- SRT & SBRT and Intensity
Modulated Radiotherapy treatments. (Optional)
- Computer controlled
- Diode/Triode Electron Gun.

Photon Energies:

One Photon energy - 6MV

Dose rates for 6 MV Photon Beam:

Photons energy must have a dose rate of minimum 500 MU/ min.

Arc Therapy facilities:

The linac must be able to provide arc therapy facilities for photons clockwise and counterclockwise. The dose rate should be at least 0.5 to 10 MU per degree.

Field size:
0.5 x 0.5 cm to 40 x 40 cm field size collimation continuously variable must be provided (the full square field shall be at least 35 x 35 cm)
Wedge systems:

A dynamic / motorized wedge system providing various angles must be provided. The hard wedges providing 15, 30, 45 and 60 degrees must also be provided.

Patient table:

The patient table must be of extended travel range providing a lateral travel range of + 25 cm, a longitudinal travel range of 150 cm and a vertical travel range of at least 100 cm.
The patient table should also have the following features;
- Fully carbon fiber table top.
- shallow floor pit for full extended-travel range.
- emergency off buttons on the both sides of couch
- precision end-panel interface allows for stereotactic accessories to be easily and securely mounted

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- a complete line of Indexed Immobilization accessories.
- Please enclose the complete Patient table specifications along with the tender
- Treatment table offered along with the Linac should have the same specification to the table
supplied along with the simulator.
- Table top should be fully carbon Fibre table top

Collimator Jaws:

Both X and Y collimator jaws {upper and Lower} should be independent and should have asymmetrical collimation.
Advanced Dynamic Procedure:
Should include Arc Dynamic MLC treatment and dose dynamic MLC treatment.
Should include Step & Shoot and Dynamic IMRT (Sliding Window) treatment.
Dose dynamic MLC treatment and static IMRT fields.
Automatic delivery of Multiple Co-planner fields in sequence should be possible in the Linear Accelerator.
MLC should deliver dose dynamically, efficiently and smoothly.
Accessories for Low energy Linac – please specify details.

Multileaf Collimator (MLC): MLC 120 or 160
An integrated Multileaf Collimator shall be provided with 40 pairs or more. The isocenter resolution of the leafs shall be 5.0 mm or less. The design shall be such that in case the MLC fails, conventional treatments will still be possible.
This MLC shall have the following capability to perform from day one:
a. Step and shoot and Sliding window/Dynamic IMRT
b. Forward and Inverse IMRT delivery
c. VMAT / Volumetric Arc Therapy - Optional
d. Conformal Arc Therapy
e. Large Field IMRT
f. IMRS or VMAT based SRT/SBRT shall be possible. - Optional
All claims may be required to be proved with internationally accepted papers/journals.
Digital Portal Imaging::-

The Portal Imaging system shall replace the necessity of portfilms, therefore the system must be capable of producing Images at 6 MV photon energy. The system shall be using latest electronic imaging device (Solid state flat panel detector). The imaging system should be Retractable /manual/motorized counterweight-mounted supports arms fixed on the counterweight. Should be able to take images at any gantry angles from control room.
“Please note removable type portal imaging systems will not be considered”
Portal imaging system should be fully integrated with the Linac gantry.
Portal Imaging system should be Solid state/ Camera Digital based (Amorous silicon Panel) with resolution minimum 750 x 1024 matrix or higher.
Record and Verification:
The system shall be able to connect with the existing / R&V of High Energy LA system.
All the mentioned below equipments should be fully integrated in both Images and all data’s with the current systems in the department as mentioned below:
1. High Energy Linear Accelerator to be procured
2. CT-Simulator
3. Treatment Planning System
4. CT Scanner and MRI
Remote Diagnostics:
Remote Diagnostics should be part of the Linear Accelerator. The supplier should provide online support such as Diagnostics and Morning Checkout etc.
Beam Matching:

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This low energy Linac should be beam matched with the quoted high energy Linac so that patients can be easily transferred from the high energy Linac to the low energy Linac without re-planning, if the high energy Linac is out of order for some reasons. MLC matching and Beam Matching of this low energy linac with High Energy Linear Accelerator is considered as optional.

Warranty-
Warranty clauses mentioned in Item No.1.4 of General Terms & Conditions for all items will be applicable.
With 95% uptime warranty for 280 working days basis.
Service engineer – Factory trained on Linear accelerator should be based in Kolkata.

Spare Parts
Offer should include complete standard spare parts kit for the Linear accelerator. The list of items to be supplied should be included.

Performance certificates

The suppliers should provide with latest performance certificates of dynamic IMRT & RapidArc/VMAT performance on the quoted model, certifying the after sales support, Spare parts supply and equipment performance from the date of installation from atleast 5 user’s of linear accelerator in India along with the tender without fail.

International and AERB Approvals
All approvals such as FDA, Type approval from BARC, IEC etc should enclosed for the quoted model. Complete list of installation for the quoted model in India should be submitted

General conditions:

1. Warranty offered should be comprehensive inclusive all parts.
2. Quote all options for Linear accelerator which can be upgraded in the future.
3. If 95 % uptime is not maintained, penalty clause the warranty will be extended by double the
number of downtime days.
4. Model offered should be the latest and spare parts and service support for 10 years from the
date of installation.
5. Estimated time for shipment should be provided.
6. On site training for the operators for one week to be provided. Training for Two Physicists, Four
Radiation Oncologists and Two Radiotherapy Technologists should be provided in a good clinical site one week in India and one week in abroad.
7. 4 Red Laser system, CCTV, UPS and Chiller system should be included in the offer.
8. Technical Committee has agreed to the point as long the new model meets Tender Specification
and AERB approval shall be obtained by the vendor before shipment
9. Warranty & CMC:-
• Software Service Agreement (SSA) with Hardware upgradation within 5 years is
considered as mandatory.
• After 5 years both CMC & SSA.
10. FFF either 6 or 10 to be offered instead of Two FFF energy
11. Workstations of Linear Accelerator are to be well equipped with hospital furniture.

Sl. No. 3: HDR Brachytherapy
Specifications

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Provide a HDR Brachytherapy machine (Minimum 18 channels & above at a time and functional (activated) same as number of channels and preferably backward stepping source technology with Cobalt 60 / Iridium-192 source based models with all standard Applicators one set each (for Esophagus, Nasopharynx, Vagina, Cervix, Endometrium, Rectum, Tongue, Prostate, Skin and Surface, Needles Implant tubes, Templates for Prostate, Gynae and Breast) to be integrated with your offered Linacs in the same / separate TPS & OIS. The Co-60 based Brachy is preferred due to the logistics issue of the Co-60 source. However, if the vendor does not have the Co-60 based Brachy machine, then they can quote the Iridium-
192 based Brachy and then they have to supply total ten (10) Ir-192 sources in the package
(to be delivered on two Ir-192 sources per year basis till the end of five years after the delivery of the machine). Well Type chamber including electrometer with calibration certificate for measuring source strength for Co 60 and Ir. 192” shall be inserted after the last
line of the Para under the heading. Next five years will come under CAMC.

GENERAL CONDITIONS & REQUIREMENTS
o Dedicated USG Machine with dual Head, Transverse, Transducer Probe for Guided
Brachytherapy.
o Transportation Couch.
o Brachytherapy Couch with Integrated C-Arm.X Ray
o Template 1(one) set for each site.
o 100 Nos Needle(50 needles 16cm or less)Permanent is required.
o Permanent applicator needed.
o Brachy TPS & OIS should be separate.
o Applicator should be MRI/CT compatible.
o Two additional gynae sets.

In the above specifications wherever the word ‘shall’ is mentioned, it is taken in the meaning that the required feature / facility / procedure / specification / standard is mandatory.

All claims regarding meeting of the specifications shall be duly supported by appropriate, latest technical catalogues / brochures from the manufacturer. Simply stating that the equipment meets the specifications is not sufficient and any such quotations will be summarily rejected. During the warranty period, software up gradation for the purchased clinical capabilities shall be provided free of cost wherever applicable.

The machine shall be AERB type approved (TAC) or with a NOC from the regulatory body.

The vendor shall give a minimum of Two years comprehensive, on-site warranty for the entire Linac systems (inclusive of vacuum and non-vacuum parts, all locally supplied items) from the principals. Pro-rata warranty is not acceptable. Similarly Comprehensive Maintenance Contract offered by the local agents is also not acceptable.
CMC/ AMC:
As mentioned in General Terms & Conditions.

UPS System with the power rating as required for both the Linacs with a back-up of minimum 20 minutes shall be supplied. UPS systems should take care of Linac, all computer terminals, workstations / accessories wherever applicable. Provide all the details.

The Chiller systems (back-up Chiller Config) (Imported / Export Quality) shall be provided along with the machine by the principals.

A closed-circuit color TV system and a patient calling system shall be supplied for both the Linacs. Internet broad band connectivity for remote servicing shall be provided by Purchaser.
“Last Man Out Switch” should be installed in all the Radiotherapy bunkers by the vendor, as per AERB guidelines.

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Site Preparation & AERB:
• Vendor has to provide all support on Site Layout drawing/preparation, so that the same plan can be submitted to AERB for approval.
• Any modification/changes on plan has to be done by the vendor.
• Periodical site visit and support to be done by Vendor’s experienced engineer.
• Installation and commission will be done Free of cost.

Workstations of HDR Breachytherapy are to be well equipped with hospital furniture.

Sl. No. 4: CT SIMULATOR

SPECIFICATIONS
Wide bore Multipurpose multi-slice CT (minimum 16 or more slices per rotation)

CT SCANNER SPECIFICATIONS

Whole body multi-slice CT (minimum 16 or more slices per rotation)
1 GANTRY

I)Gantry aperture should be minimum 80 cm or more.
ii)Gantry tilt should be at least +/- 30 degree.
iii) Scan field of view should be 50 cm
iv)Metal free scanable range should be at least 150 cm.
v) Should be completely air cooled gantry without the need for any external cooling system.
2 X-RAY GENERATOR

High frequency x-ray generator with an output of at least 60 KW and above. Please give details
Continous spiral capacity of 60s or above
Specify mA at small and large focal spots
3 X-RAY TUBE

I) Tube current range should be more than 500mA or above.
ii) Tube voltage should be 80- 140 kv.
iii) The x-ray tube should have anode heat storage capacity should support the miminum mA
of 500 mA or above at 120kVp.
iv) The anode peak heat dissipation rate should be 2000KHU/min or more.
v) The x-ray tube should have dual focal spot (please specify the size of each focal spot) - smaller the better.
vi) The maximum mA in small focal sport at 120 kVp should be more than 300 mA
4 DETECTOR SYSTEM

The detectors should be solid state, preferably rare Earth material. Please give details
It should be free from repeated calibrations.
The detector system should be able to acquire at least 16 slices per rotation.
The number of elements should be at least 15000 KHU/mt or above with minimum of 800 detector elements/row
5 PATIENT COUCH

The scanning table should metal free
i) The table should be able to bear weight up to 180 kg or more with positioning accuracy of +
or - 0.5mm

ii) The table should have metal free range of about 150 cm.
iii) RT table top with cabonfibre with TG 66 compliance should be provided Indexed Couch similar to Linear Accelerator Type
6 CONTROL CONSOLE

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I) It should have minimum 19" (flat Panel) colour monitor for display of an 1024 X 1024 matrix or more
ii) All function viz scanning, image reconstruction, film documentation, MPR, CT, maximum intensity
projection, 3D with SSD etc should be possible from main console and work station.
iii) The Image storage of 200GB or more for atleast 1,00,000 images in 512X512 matrixes uncompresses or

better. (Please qoute the latest configuration)
iv) MOD /DVD/ CD facility for archiving must be available.
vi) The image reconstruction speed should be at least 16 images/s and real-time
7 CT- SCAN PARAMETERS
I) The slice thickness should be users selectable from 0.625mm to 10 mm. Sub mm slice thickness should be available for 16 slice mode scanning and acquired thickness and
ii) KV Range: 80 to 140 KV
iii) mA 20 to 500 mA or better in increment of 5mA or better.
iv) Scan time for full 360 degree rotation should be minimum 0.5sec or less.
v) Scan field view should be 50 cm or more.
vi) Display field of view with wide FOVshould be 60 cm or more.
vii) Retrospective reconstruction should be possible on raw data files with change in parameter such as FOV.
viii) The following scanning mode should be possible Scanogram: Axial and Spiral. It should
be possible to mix spiral and axial mode. Specify how many modes can be mixed.
ix) Pilot Scan: The pilot scan field size should be more than 1000 mm long. The reconstruction time for pilot scan should be not more than 3 seconds for a 512 matrix.
xi) Iterative reconstruction (raw data based) capability should be provided for dose reduction.
- Optional
8 IMAGE QUALITY
I) High Contrast Spatial Resolution: It should be 15 lines pair per cm or better maximum at
0% MTF X-Y axis with Spiral and Axial mode scans and for full 50 cm FOV
ii) Low Contrast Detectability: Please specify
iii) Spiral Parameters: pitch should be freely selectable, and same image quality be available
with extended pitch. Inter scan delay in different group of spiral should not be more than 5 seconds.
iv) Mention CTDIw for head and body Phantoms
9 CT-SIMULATION WORK STATION
1) GENERAL:
a) The workstation should have advanced CT simulation tools for radiation therapy treatment planning including workstation that can control the laser marking system.
b) Any CT-simulation workstation that cannot control the laser marking system is not acceptable and liable to be rejected.
c) The vendor should give a completed description about the laser marking system offered
and how the CT- Simulation software integrates with it and TPS.
d) All necessary calibration / quality assurance phantom / check device should also be provided.
e) The workstation should be able to provide complete volume definition and geometric beam placement for radiotherapy.
f) It should have complete compatibility and error-free networking with the CT scanner computer and TPS.
g) The CT-Simulation should generate digitally reconstructed radiographs (DRRs) in a true volumetric
environment.
h) It should be possible to overlay the beams on any DRRs or on any slice (obtained and reconstructed).
i) It should be possible to load over 500 CT images per patient for reconstruction and simulation.

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j) Remote access to be provided for using the simulation workstation from LAN connected
PC

2) HARDWARE:
a) Hardware specification should be mentioned clearly the system should be running on a high-
end workstation platform with more than 24 GB/latest model with highest GB memory
b) The user interface should be windows based and menu driven. Display should be on a 19”
or more LCD Flat panel display monitor of high resolution of 1024x1024 pixel or more should
be provided.
e) The archiving media should be a DVD and DAT -TAP. Sufficient number for all days except Sunday.
f) Networking with TPS – All the software with licenses required should be included
3) SOFTWARE:
(i) Complete software doing all the functions of CT simulator as per requirement and should
have following features:-
a) The software should have high memory to facilitate large data processing - minimum of
more than 16 GB
b) On the monitor screen it should be possible to view at least 36 images or more
The standard screen layout should consist of one main view port and three sub-view ports for frequent usage of other images, quick manipulation of images, or for displaying reference views.
c) mage manipulation such as changing window width and window level, hot keys activated automated study archive, deletion, screen layout changes, disk space display, archiving, and graphic overlays such as annotation.
d) It should be possible to simulate all kinds of teletherapy machines in the simulation workstations. It should conform to IEC and other international standard norms and support cobalt therapy, linear accelerator of all type
e) It should be possible to visualize interactive reference views in axial, coronal, sagittal, isocenter image planes and in any oblique directions with overlay of beams on DRRs.
f) DRR must provide fully divergent beam’s eye view of 512x512 matrix.
g) It should be possible to simulate all kinds of teletherapy machines in the simulation workstations. It should conform to IEC and other international standard norms and support cobalt therapy, linear accelerator of all typ
h) Facility for multi modality fusion to accept the data from other DICOM compatible and DICOM supporting modalities such as MRI/CT/SPECT/PET should be able to fuse them. i) Anti Virus soft ware for entire network with time to time up gradation if CT & Workstations are MS windows basesed systems
j) 4D respiratory image sorting with phase registration should be completely automatic and should be provided in the workstation.
4) CONTOURING and MULTIMODALITY INTEGRATION
i) Auto Segmentation of organs such as liver, eye, lungs, spinal chord etc should be standard ii) System should posses capability to interegrate multiple modalities (CT, MR, PET,NM) and correct for the positioning difference - and contouring shoul be freely possible in any of these modalities. There should seamless integreation possible between these modality images during the contouring session.
iii) Volume definition should be possible using volume segmentation using threshold. Free hand contour tracing, contour editing. 3D anisotropic margins etc and any other advanced tools.
iv) System must be able to contour in axial, saggittal, coronal and oblique projections.
v) It should be possible to do manual, semi-automated, fully automated contouring/segmentation in the images by defining volume of interest.
vi) Mention the time taken for automated contouring with a single mouse operation for 50 slices.
vii)The software should have facility for automated uniform or non-uniformmargins. For example it should be possible to expand the clinical target volume (CTV) on all three dimensions by same magnitude or by different magnitude to define the planning target

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vii) It should be possible to copy one organ to another with margin, and margins of segments to reject or accept.
ix) It should also be possible to interactively edit the contours with user’s choice of segments to reject or accept.
x) Interpolate algorithm should be available to provide interactive, shape based interpolation i.e. after contouring only in selected slices. The algorithm should automatically interpolate the closely fitting contour in other slices.
xi) Interpolated contour may be edited; accepted or rejected.
xii) Tracking of source to skin distance should be possible.
xiii) Contouring and editing and extraction of wall should be possible.
xiv) Dynamic contouring on 4D multiphase data should be possible in different orthogonal planes simultaneously.
xv) Single head pressure injectors with 50 sets per year for five years
5) ISOCENTER MANAGEMENT
a) The software should support separate isocenters for multiple target volumes or general regions.
b) Marked and final isocenters should be reported and displayed in the localization package
for easy confirmation of a physical simulation session.
c) Hardcopy of the isocenter coordinates should be possible for record of the simulation session (Dicom-RT IM)
d) Isocenter positioning should be automatic.
6) 3-D VIEW AND VOLUME RENDERING CAPABILITIES
a) Post processing features like volume rendering, real-time multi-axial volume reconstruction, 3-D surface rendering. Colour 3D should be available.
b) It should allow completed 3D volume to be defined including complex 3D volumes, user selectable multi- image views, beams eye view, room eye and DRR.
c) DICOM Radiotherapy plans and data structure with import/export of data should be possible.
7) BEAM PLACEMENT AND DEFINATION
a) It should support extensive beam shapers (shielding blocks etc) and beam definition methods
b) Manual or automatic beam placement tool.
c) Tools for real time checking of machine geometry.
d) Beam shaping should be possible in multiple ways like automatic shielding block definition conforming to selected volume, definitions aperture or shielding manual free hand definition, automatic collimator jaw or multileaf position definition.
e) It should be possible to define this asymmetric collimator feature, where both the X- and Y-axis of jaws are asymmetric, in the CT simulation software. Similarly the software should allow multi-leaf-collimator placement up to 40 pairs or more.
8) DRR FEATURES
a) Interactive DRR calculation mode must be available.
b) Automatic window width/level selection for DRR.
c) DRR should be interactively updated when the isocenter position is modified.
d) Should be possible to highlight or suppress different density region in the DRR. e) Printing of DRR images should be possible. DRR should be user defined.
f) Marco function to save a series of frequently used steps should be available.
g) Specify DRR image enhancement tools to improve DRR image quality.
h) Reconstruction of DRRs should be real-time or in sub-seconds.
i) Direct printing of DRR on laser film should be possible.
j) Real time display of DRR as beam parameters changes.
9) DEPTH CONTROL
a) System should support depth control mode creating a DRR from slab of 3-D mode, perpendicular to beam axis.
b) DRR must be calculated over a user-defined thickness.
c) Depth control in oblique projections must be possible.

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d) Should be possible to merge two DRR image on the same beam.
e) Cross-hair display on DRR to provide scale information.
10) DATA IMPORT / EXPORT
a) System should be able to export image volume and plan data in DICOM 3.0 standard along
with all
Radiotherapy specific data and private objects, DICOM RT plans and data sets.
b) System should be able to import DICOM RT data to the linear accelerator of any vendor
c) CT simulator system should be fully integrated with the existing TPS.
d) The vendor should inspect and will be responsible for complete integration.
e) All Import and Export Licenses should be provided.
f) LA, CT- SIMULATOR and TPS should be well connected for Data Transportation
DICOM 3.0 compatible dry chemistry laser camera integrated with main console / workstation-> more than 600 DPI with 2000 Laser films
10 ACCESSORIES:

UPS -> For whole system should be provided with 30minutes back up. Please specify the make and model of UPS
Laser Camera -> Laser camera of more than 600 DPI with 3 drawers with 2000 films with cabinet for storing laser films
Depending upon the Linear Accelerator Model 4D Motion Management Hardware & Software should be quoted as optional
11 WARRANTY / GUARANTEE
The system should have the warranty / guarantee for 1 year including Tube and other assessories. From the date of commissioning or equipment is ready for clinical use
12 CMC

Warranty clauses mentioned in Item No.1.4 of General Terms & Conditions will be applicable for all items.

LASER MARKING DEVICE:

Laser Marking System used in CT/virtual simulation. Should include three red moving lasers (two sidewall cross lasers with a movable horizontal line and one overhead laser with a movable sagittal line) with hard-wired keypad/terminal, infrared remote control and personal computer.
Training: Application specialist has to train machine users for one week.

Quality Standard: Valid CE and FDA Certificate of the offered model must be submitted with the offer.

Warranty- Two years from the date of installation and handover.
Workstations of CT Simulator are to be well equipped with hospital furniture.
Dosimetry Equipments

Relative Dosimetry

*Radiation Field Analyser (RFA)

Relative dosimetry 3D water scanning system for commissioning a treatment planning system. System requirements include:
A minimum scanning range of 40x40x40cm
A minimum scanning resolution of less than 0.2mm
All measurements to be taken without shifting water tank allowing a diagonal 40x40cm measurement at 30cm depth without tank shift optional.
An automated setup routine that includes automatic leveling, automatic centering and automatic water surface detection optional
License to export measured data to all treatment planning systems
Unlimited workstation license for software
Compatible with all scanning chambers available in the market

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Provision of keeping wheels of the water tank outside the base plate of lianc couch to avoid any damage to couch base plate.
Should have provision of step by step or continues scan modes.

*Software features must include:

Adaptive scanning to measure profile with higher resolution at penumbra region
step-by-step scanning capability
Positional accuracy and Reproducibility ± 0.1mm
Automatically generate scans required to commission any planning system. Searchable scan database that can also export in text file format
Data processing including the ability to roll back layers of data processing as needed
Batch processing multiple scans together
Export and import data from excel spreadsheet
All leading protocols for analysis

*RFA Lift Mechanism

The motorized 3D water phantom should be supplied with a specially designed, high precision electro-mechanical lift table/carriage on wheels with atleast 500mm range of movement to allow for height adjustment of the water tank during measurement.

*RFA Reservoir

A separate /integrated bi-directional water reservoir to be provided to fill and drain the water from the RFA Flow Rates ≥ 8 litres per minute.
*Detectors with RFA

2 nos 0.1 to 0.1cc chambers with calibration certificates to be provided for measurements with RFA.
A stereotactic diode detector for measurements for SRS measurements to be included
The corresponding setup caps and holders for all the chambers including the Farmer type and Parallel plate to be provided.
Please provide Linear Detector Array will resolution 5-10 mm
Please provide holders and adaptors for all commercially available chambers and dios

Absolute Dosimetry

*Electrometer
Reference class, high performance electrometer. System requirements include:
Less than one minute warm up time
Batteries/ power cord/ USB powered
Leakage should be less than 0.01 fA
Bias voltage range should be at a minimum ±400V with ≥ 50 Volt increment Non-linearity should be +/- 1%
Long term stability should be <± 0.5%
Repeatability should be ± 0.5%
Accuracy should be ± 0.1%
Portable and lightweight (no more than 1 kg) connector Type – TNC/BNC compatible with existing system in the Department

Software features must include:

Configurable design
Auto Start/Stop feature that starts data acquisition automatically when the beam is detected, and stops data acquisition automatically when the beam turns off
Detector library stores calibration factors
Data logging capability
4 Nos. 30 meters of Triaxial dosimetry cables for connecting the electrometer to the chambers to be provided.

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High precision magnetized spirit level – Dimension, Sensitivity, Level axis, Horizontal, Vertical, inclined – Please specify

0.6cc Farmer type Chamber with ADCL Calibration and a Parallel Plate Roos type chamber with ADCL calibration for electron measurements to be provided.
Connector Type – TNC/BNC compatible with existing system in the Department

*1D Scanner
1D water tank for point dose measurements for monthly and annual QA. System requirements include:
A minimum scanning depth of 30cm
Automatic water level detection - optional
Tank dimensions to support all common electron cones
Integrated control panel
Positioning accuracy no less than ±0.01 cm
Positioning repeatability no less than ±0.01 cm
PC software to be included
Option for PDD curve analysis
Should include holders for Farmer type chamber, Parallel Plate chamber, and a universal chamber holder.
Please provide holders and adaptors for all commercially available chambers and dios

*RW3 Slab Phantom

A water equivalent phantom of different thickness has to be provided for absolute measurements in photon and electron beams in external beam therapy. The phantom should be of 30 x 30 cm size consisting of 29 plates of 10 mm thickness, 1 plate of 5 mm thickness, 2 plates of 2 mm thickness, and 1 plate of 1 mm thickness. All these slabs have to be precisely machined to ensure free of contaminants and air bubbles. Along with phantom, dedicated chamber adapter plates of 2 cm thickness for 0.6cc Farmer chamber and Parallel plate chamber are to be provided.
Please provide holders and adaptors for all commercially available chambers and dios

*Digital theromometer with calibration certificate to be provided
*Digital Barometer with calibration certificate to be provided
*A digital pressurized ion chamber survey meter with calibration certificate to be provided.
*A laptop with preloaded softwares to be provided for use with all the equipments provided for dosimetry purpose.
*A ISO- Align system for Laser alighment QA, field-size QA etc, to be provided.
*A D10-D20 phantom to be provided
*Brass built up caps to be provided.
*1 pack of gafchromic films size 14X17 to be provided.

*Patient specific QA for 3DCRT/IMRT/RapidArc/SRT/SRS

Cylindrical array for mearusing dose distributiuon of rotational modalities and conventional IMRT/RaipdArc and comparing with a patient plan from the Treatment Planning System. System Requires include:-
i) Must have a cylindrical design with a helical detector geometry.
ii) Detector size must be no more than 1x1mm.
iii) Array length must be no less than 20x20cm.
iv) Device should be able to measure and analyze up to 35cm long measured dose map.
v) Number of detectors must be no less than 1000.
vi) Device should have capability to measure and compare gantry angle with TPS data
without the need of any external inclinometer to be attached to linac gantry.
vii) Device should be compatible with IMCR, VMAT/ RapidArc/ SRS and FFF delivery
systems.

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viii) Must be able to calibrate the device on site without dis-assembling the device.
ix) Single cable connection to the device.
x) An additional plug enabling detectors and film inserts insde the phantom to be provided.
Software features must include:-

i) Gamma / DTA analysis
ii) Film analysis software
iii) PDF reports.
iv) Control point analysis.
v) Open file format for easy export.

All the necessary cablings should be supplied for both the dual energy and single energy linacs.

Quality Certificate:- FDA/ CE certificate to be submitted with the offer.
Warranty:- 2 years.

Specification for Immobilization & Mould Room items
DESCRIPTION Qty
PATIENTS MOBILIZATION SYSTEM:
CONSISTS OF 1 SET

Complete set (2) of Base plates & High Pressure Laminates with all Head
Supports
Block 20mm in Reg Density * 1
Wedge 9 Angle in Reg Density * 1
Block 20mm in Carbon Fiber * 2
Wedge 9 Angle in Carbon Fiber * 2
Blue cushion Thorax Abdomen- wedge 0 3
Thorax Abdomen wedge 5 degree 3
Thorax Abdomen- Arm rest – Low 3
Knee & leg positioning cushion- low 3
Knee & leg positioning cushion- Base plate extension 3
Grip pole- Complete system * 3
Side Panels for Vacuum cushions (set of 4) 3
Leg separator Low * 3
Indexer Knobs for Vacuum cushion (set of 2) * 3
Indexing with two pin bar accessories (Two pin bar to be provided by
customer) *

3

Water Suspan – ex Large * 1
Vacuum Cushion system: Consist of
Vacuum station 1 no *
Hose with female adaptor 1 set
Cushion Manager 2 no
Patch Kit 1 no
Valve cover (Pack of 10) 1 pack
Imported Nylon cushion 5 no

1

Thermoplastics
Precut for Head

10

Precut for Head/Neck 10
Precut for Pelvic Prone 10

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Precut for Pelvic Supine 10 UPGRADATION KIT FROM AIO TO SBRT
CONSIST OF:

3
SETS

Indexed knee support
Indexed foot support
Pressure belt with manual pump
AIO indexable knee & foot support
Two pin Index bar
trUpoint ARCH (or equivalent) Starter Kit.
Includes Frame, Acrylic Base plate, Storage Base, 1bx of SRS Thermoplastic, 10 Custom Head Supports Impression Putty, 12 Bite

trUpoint ARCH (or equivalent) Starter Kit.
Includes Frame, Acrylic Base plate, Storage Base, 1bx of SRS Thermoplastic, 10 Custom Head Supports Impression Putty, 12 Bite Cups, 12 Bite Trays and a Putty Dispenser

3
SETS

Package for performing frameless SRS, SRT, SBRT should be quoted.

Warranty-
Two years from the date of installation and handover (except consumables).

Quality Certificate: FDA / CE certificate to be submitted with the offer.

Training:- For both the Dosimetry and Immobilisation items, proper onsite training for minimum seven days have to be provided by the vendor to the RT dept staffs at Regional
Cancer Centre, Agartala...
Sl. No.5: MRI Machine

Technical specification of a new, state of the art, 3T MRI scanner

Sl Tender Spec

Description
Whole body 3.0 Tesla Magnetic Resonance Imaging system optimized for higher performance in cardiac and neurological examinations with short superconducting magnet, high performance gradients and digital Radio frequency system. The system should have 32 channels RF system.
The system should be totally new and should not contain refurbished or having recycled items.
The features should be minimum of that launched at the latest RSNA.

1 MAGNET
3.0T active shielded super conductive magnet with best homogeneity. Field stability over time should be < or equal to 0.2 ppm/hr
Length should be short with at least 70cm bore.
It should have facilities of better illumination ventilation and designed to avoid patient claustrophobia.
The homogeneity of the magnet should be mentioned in relation to 10, 20, 30, 40 cm DSV. Automatic shimming in phantom should be better than 3.5ppm in 40 DSV.
Please specify upto what FOV gradient linearity is maintained.
Magnet should be shielded from external interferences. Smaller fringe field preferred 5 Gauss and 10 Gauss Line in X, Y, Z axis specify yours Quote value for 5 gauss and 10 gauss line. The 5 Gauss line will have to be marked.
Cryogen vessel ‗to be of Helium only with appropriate super thermal shielding and refrigeration facility for minimum Helium boil-off, Specify the Helium tank capacity and boil-off rate. Helium level monitoring equipment in the magnet and facility for appropriate quick shutdown of

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the magnet in The event of emergency

Helium refill time should not be < 2years. Please mention the helium refill time.
Noise level inside the examination room should be minimum as possible. Specify db level Noiseless MRI system
Physiological signal display on Gantry
Built - in 2 way Intercom facility to communicate with patient is required
Emergency helium release button should be provided at least in two places [inside MR examination room and console room]
Technical specification of a new, state of the art, 3T MRI scanner
2 SHIM SYSTEM

High performance and highly stable shim system with global and localized manual and auto-shimming for high homogeneity magnetic field for imaging. Specify time for shimming. Quote
the number of shim coil used

Off-centre shimming should be possible.

Auto shim (global and voxel shim) should take minimum time to shim the magnet with patient in position.

3 GRADIENT SYSTEM

Activity shielded Gradient System with strength of at least 44 mT/m with slew rate of
200T/m/sec. Quote the minimum rise time at 44mT/m. The rise time should not be more than 250 microsec. to reach the maximum gradient strength.

These true slew rates should be available in each axis independently, for overall better duty cycle performance of the gradient.

The duty cycle should be 100 percent.

The Gradient system should have provision for eddy current compensation. Mention level of Eddy current compensation in %
Field of View should be at least 45 cm in all three axes.

Minimum TE & TR in 2D/3D should be specified in relation to the sequences.

Minimum Slice Thickness in 2D & 3D should be specified in relation to the sequences.

Echo Train length in both Spin echo and Gradient Echo should be at least 255 or more.

The measurement matrix should be from 128x128 to 1024x1024 in both 2D and 3D imaging as well.

4 RF SYSTEM

A fully digital RF system capable of transmitting power of at least 25 KW or more (Dual) with a combination of RF power amplifiers. System should be capable of Multi Transmit with Multi amplifier driving /true shape for better B1 homogeneity. Specify transmitter frequency range (xx-
xx MHz)

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It should also have at least minimum of 32 independent ADC hardware RF channels with each having bandwidth of 1MHz or more along with necessary hardware to support Quadrature/CP
array coils. (capability of faster reconstruction, please specify)

It should support Parallel acquisition techniques like ASSET/SENSE/iPAT with a factor of at
least 4. Higher sectors if available should be offered optionally.

5 RF COILS
The system body Coil integrated to the magnet must be quadrature /CP. In addition to this coil, following Coils (preferably be with equal number of elements as the channels) be quoted:- Please specify the coverage thorax to pelvis 45cm or more. RF coils in addition to main body coil
(Transmit / Receive or receive coils) auto tune, array or no tune coils. Coils for the following applications should be available with the system. Circular polarized (CP) Array coils should
included in the offer. Coil / RF design should support compatibility to coils manufactured by other manufacturers. If one coil can cover multi applications please mention it. Please confirm that the system can adapt to coils developed and manufactured by other manufacturers. Please substantiate this with examples. Please specify the measures taken to prevent dielectric artifacts? (Quadrature design & EPI compatible) in addition to main body coil. All array coils should be compatible with parallel imaging technique/s. Please specify the number of channels and elements available for each coil. Please mention the true acceleration factor for each of the array coils.
a) 32 channels or more head coil-capable of multi frequency MR spectroscopy (H1)

b) Neck phased array 8 channel or more

c) Neurovascular coil of 16 channels or more

d) Spine phased array coil 32 channels or more

e) Body phased array coils 32 channels of more (single or in combination)

f) Dedicated Coil for peripheral angiography 32 channels or more as optional (Price to be quoted separately).

g) Dedicated Carotid coil-Optional (Price to be quoted separately)

h) Breast coil 7 channel or more

i) Dedicated Phased array coil for faster and high resolution Cardiac imaging as optional price –
32 channels or more;

j) Shoulder coil – Multi channel (8 channels or more) flex loop or rigid type – 2nos. (One large
and one small)

k) High resolution knee coil 12 channel or more

l) High resolution foot/ ankle coil – 8 channel or more

6 PATIENT TABLE -
The table should be fully motorized, MRI Compatible computer controlled table movement in vertical and horizontal directions Position accuracy should be +/- 1.0 C mm or better.

Should be able to take at least 140 kg load.
Table or Table top should be detachable type for emergency evacuation. Please specify availability of detachable table.

The table should have facility for manual traction in case of emergency.

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Cushions and other patient comfort accessories. All parts of the table should be protected from liquid spill

The table should have patient auto alarm system.

The CCTV system with LCD display to observe the patient.

The table should deliver the protocols for automatic bolus chasing in peripheral angio with automatic table movement.

Separate MR compatible patient trolley and wheel chair for patient transport to the magnet.

Two way communication should be possible with the patient from the console room.

7 COMPUTER SYSTEM IMAGE PROCESSOR / OPERATOR CONSOLE

Computer should be latest in the industry, fast and efficient
One color console for acquisition, all calculations, post processing etc Console must have full
colour with user define protocols with programmable inter scan delay

Necessary image processor with large RAM for ultra-fast image reconstruction should be
provided It should be at least 8 GB RAM. Please specify RAM and reconstruction speed in
images per second for full FOV 256 matrix. Higher will be preferred.

Computational Speed to match the single shot Echo Planar Imaging (EPI). Interactive angiogram, multi-planar three dimensional (3D) reconstruction, surface rendering, dynamic Imaging, vascular Imaging/angiography. functional imaging, DTI etc. The main host computer should have at least 18-inch or more TFT/LCD type color monitor.

The main console should have facility for music system for the patient in the magnet room.

Filming and adequate storage for images and other applications..
Total hard disk memory to be sufficient to store at least 250,000 images of 256 x 256 matrix data size.. Systems offering higher' storage will be preferred. The system should have CD/DVD archiving facility on the main console and work station.

Dual DVD write/CD Read/Rewrite drive for writing of images, spectra and raw data along with the necessary software for reading the Images and spectra on DVD/CD storing capabilities. Provision for archival of k-space data and raw (unprocessed) images.

There should be a provision of retrieval of the reconstruction data (raw files) in an user friendly
manner.

DICOM interface to hook DICOM dry/laser camera capable of storing printing 1024 x 1024
matrix size images at least in 16 format without loss of digital resolution.

The system should be capable to connect to PACS through RIS/HIS at no extra cost. Highest version of DICOM connectivity be provided.

8 WORKSTATION
Two workstation with post processing tools and an image stroage server as specified below. The server should have image storage capacity of 3 Tera bytes, and at least 64GB RAM. Necessary Workstation hardware to be includedwith 18" or more TFT/LCD Medical Grade (2 megapixel or more resolution) monitor with dual processor, separate hard drive with image storage of at least
2.5 lakh images (256 x 256 matrix) with CD RW or DVD RW. DICOM 3.0 compatibility and interfacing with other modalities must be possible.

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All necessary software including post-processing software for all offered applications (point no. 9,10) including evaluation for fMRI, perfusion (Contrast perfusion and T1 perfusion), diffusion, DTI with fibertracking, cardiac evaluation, and other associated post processing like MIP, MPR, surface reconstruction should be provided.

The workstation should have the following features:
1. Cardiac perfusion analysis & Processing of Real Time BOLD imaging data, with colour metabolite mapping, quantification of the CSF flow date.

2. Should mention whether software for vascular properties like IAUC, KEP is available.

4. Necessary and adequate hardware and software for sending and receiving the patient data{text + images}. Printing of films should be possible from both main console and workstation. Workstation should also be able to function independent of the main console.

5. Post processing of the MRS data including for CSI with paramagnetic metabolic mapping.

6. Capability to calculate colour display of real MTT, real CBV, and real CBF.

7. Compatibility with data from other MRI system for post processing.

8. Output in the form of jpeg, avi / equivalent formats should be possible.
Cardiac Package-.:The workstation should have display of Cardiac cine images in movie mode with rapid avi creation and should have comprehensive cardiac post processing software including for coronary MRA with regular free upgrades in future. Calculation of ventricular area and
volume, stroke volume, ejection fraction and relative ejection fraction, Time volume diagram generation, filling rates and myocardial wall motion, Graphic display of output calculation of flow and velocity parameter with colour coded display of velocity parameters.

9 DATA ACQUISITION
The system should be capable of 2D and 3D acquisitions in conventional, fast & ultra-fast spin
echo and gradient echo modes so that real- time online images can be observed if needed.

2D multi-slice imaging should be possible in all planes (axial, sagiltal, coronal, oblique arid
double oblique).

1024 x 1024 matrix acquisition for all applications

Half Fourier or other techniques to reduce scan acquisition time while maintaining adequate SNR

3D volume, multiple contiguous slabs, multiple interleaved and multiple overlapping slabs

Slice thickness in 2D and partition in 3D to be freely selectable

Dynamic acquisition (serial imaging) with capability to initiate scan sequences either from the magnet panel or from the console.

Dynamic acquisition‘ number of repeat scans with delay time either identical time interval or selectable.

Auto slices positioning from the localizer images.

Maximum -off centre positioning both anterior-posterior and lateral direction and should be selectable.

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Gating: physiological signals like ECG, pulse, respiratory, external signal triggering (interface for triggering input pulse from external source).
Simultaneous acquisition, processing and display of image data in 2D multi-slice mode. Selection of voxel from oblique slices should be possible while doing spectroscopy.

The application software for image smoothing and edge sharpness etc. for improvement in image resolution should be quoted.

Artifact reduction/motion correction techniques/imaging enhancement/image filtering/image subtraction/addition multiplication/division techniques:
Flow 1st and 2nd order flow artifact compensation.
Presentation slabs: a number of relocatable saturation bands to be placed either inside or outside the region of interest.

Magnetization transfer saturation: Off resonance RF pulses to suppress signals from stationary tissue in FOV phase contrast capability in 2D & 3D mode.
Breath Hold Acquisition for Cardiac and Abdominal Imaging must be possible.
Fat saturation techniques: frequency selective RF pulses to suppress fat signal in the measured image FO. ROI selective (regional) fat suppression should also be given.

Magnetization transfer saturation; OFF-resonance RF pulses to suppress signals from stationary issue in FOV.

Phase contrast capability in 2D and 3D mode.
Image intensity correction.
Breath hold acquisition
10 EPI MODE
Single and multi shot EPI imaging techniques.
Data acquisition in all three standard planes (axial, sagittal coronal) and oblique and double oblique planes

Multicoil acquisition in order to optimize throughput increase and increased effective FOV. Individual acquisition of every coil should be mentioned.
Higher matrix acquisition capability in single shot EPI, Acquisition time, TR TE and slice thickness should be clearly mentioned and supported by data sheet reference.

Added under Para: 10 EPI MODE

BOLD, SWI, T2 Perfusion (with all post processing licences as standard). Offer realtime Functional MRI as standard. (Hardware for paradigm generator). Quote Susceptibility-weighted Phase Imaging to differentiate calcification & haemorrhage

11 IMAGING SEQUENCES
The system should be capable of selecting TR and TEs as per requirement in majority of the
pulse sequences.

Spin echo (SE); multi-slice single echo, multislice multi- echo(B echo or more) with minimum
TR and TE. SE with symmetrical and asymmetrical echo intervals: MT-SE imaging sequence.

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Inversion recovery (IR) including short TI, modified IRSE, FLAIR, DIR (Double Inversion Recovery) MT and FLAIR.

Gradient echo (GE) 3D gradient echo with shortest TR and TE, free choice of flip angle selection while maintaining SNR

Fast Sequences

Fast spin echo in 2D and 3D mode TI, T2 and PD contrast capable of acquiring maximum number of slices with a given TR a minimum TE. echo train should be at least 128 or more in fast spin echo mode.

Half Fourier acquisition capabilities should be available with/ without diffusion gradients and in combination with fast spin echo.

Fast inversion recovery with spin echo.

Fast gradient spin echo, IR multi-slice multi-echo mode with maximum turbo factor Sequences should incorporate RF focusing to acquire ultra fast gradient spin echo.

Fast gradient echo sequence should be provided to acquire images in ultra-fast 2D and 3D mode.

Fat and water suppressed imaging sequences including the sequence which should give 4 contrast (in phase, opposed phase. FAT and Water) images in a single acquisition to be quoted as standard. EPI optimized sequences for T1, T2, PD imaging. perfusion, regular diffusion values {5b, 3 directions), EPI-FLAIR. CPI-IR, IPI-FLAIR diffusion tensor. EP1-MT-FLAIR, tensor diffusion (5b values in minimum in six directions) for diffusion studies. Suitable artifact/fat suppression techniques to be incorporated in the sequence to have optimum image quality. There should be capability of generation of ADC map (isotropic and anisotropy from the regular diffusion and tensor data). Facility of online generation of ADC map should be there. Optimized sequence package for special applications.

MR angio; 2D/3D TOF, 2D/3D Phase contrast (with and without gating) magnetization transfer saturation, black blood angiography for cerebral, pulmonary, abdominal and peripheral vessel For peripheral angio moving table angiography should be offered so that complete limb can be examined in one go Bolus tracking software package should be offered. Sequences for breath hold angiography with contrast enchainment should also be offered.

NON Contrast Angiography like Native, Inhance, Trance for whole body applications to be quoted as standard.

Contrast bolus tracking (including single shot whole body MRA, interactive and automatic, etc.

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The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, multislice 2D, 3D Spectroscopy covering all organs (Liver/Prostate/Breast – please define and also the Chemical shift imaging in 2D/3D. The complete processing / post- processing software including color metabolite maps should be available. Full comprehensive cardiac sequences which includes, (a) MR cardiology package for evaluation of heart in long and short axis with black blood cardiac imaging, (b) package for- prospective and retrospective gating, etc. Advanced Cardiac Applications: morphology, wall motion, perfusion imaging myocardial viability imaging, Cardiac functions including EF, ED/ES volume, Cardiac output, and wall thickness. This processing can be in workstation or console.

Sequence package for diffusion study including DTI (tractography) in organs like brain, kidney, musce, heart, etc

Perfusion study in organ systems like kidney, brain, heart etc. Evaluation package for calculating CBV, CBF, MTT, perfusion map etc. Post processing of perfusion should be available in console also.

Sequences for MRI imaging of joints with Metal implants like WARP/Maverick should be offered

Fat and iron quantification software for Liver should be offered as standard
Hardware and sequences for MR elastography of liver should be quoted as standard

Contrast Kinematics likeTWIST / TRICKS / 4DTRAKshould be offered.

Color T2 mapping of cartilage should be offered as standard
Image fusion should be offered
Whole body imaging of 200 cm should be offered

Programming environment under research agreement should be offered for creating and modifying pulse sequences and working on the system.

Flow quantification in vessels and CSF, hepatobiliary system.
MRI neurofunctional imaging sequence including BOLD/ Mosaic etc.
Optimized breath hold sequences for abdominal studies including angiogram.
Sequence package for functional mapping of brain.

Internal ear imaging. 3D acquisitions like CUBE. SPACE, VISTA to be quoted as standard.

Susceptibility Weighted imaging should be provided as essential.

Clinical application of high SNR even in small FOV should be available. Specify the details (The smallest FOV and the technique).

Non Contrast perfusion Imaging software like ASL and its post processing should be offered

MR Cholangiography and Pancreatogram: Both breath-hold and respiratory triggered - Specialized sequences and processing to perform MRCP.

Pulmonary 2D/3D MRA sequence, including single breath hold sequence.
MR ventriculography and cisternography, Myelography.

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Silent Scan Package as standard: Please specify

MR Elastography

Fat and iron quantification software for Liver should be offered as standard

Parallel acquisition technique such as SENSE/SMASH/ASSET/iPAT, ARC and other new sequences to be quoted as standard.

Specify the factor by which the acquisition time is reduced for similar acquisition with and with out parallel imaging technique. A scan time reduction factor 4 for head, body, cardiac, angio and ortho application is required.

Flow quantification packages for CSF with dynamic CSF flow imaging, aqueduct. and spinal
canal In-line motion correction for uncooperative' patients/pediatric applications, that is motions/patient movement correction sequence and algorithm (not just faster scanning or
parallel imaging techniques) for non-cooperative/sick patients/children should be provided..
12 POST PROCESSING AND EVALUATION:

3DMultiplanar reconstruction (MPR) in any arbitrary plane including curved planes with freely selectable slice thickness and slice Increments.

3D Surface reconstruction and evaluation on reconstructed images with minimum time.

MIP in 2D and 3D mode, targeted/segmented MIP in any orthogonal axis with minimum
processing time and capable of displaying in cine mode.

Full cardiac evaluation Operator selective or automatic contour mapping and calculation of Cardiac parameters like wall thickness, stroke volume EF, filling rate myocardial wall motion including display of data in label, graph and in cine mode. Blood flow quantitation, velocity mapping, pressure gradient quantification shunt quantification, regurgitation calculation, stenosis blood flow, etc. These should be usable on main or on the work station. Evaluation and display of diffusion images, fMRI reference of EPI optimized sequence
Full Perfusion imaging with necessary post processing with time intensity graph and other statistical parameters.

Flow quantification and evaluation for vascular (high and low). CSF, bladder outlet and cine display Full Fledged Advanced Functional MRI: Whole brain coverage using high temporal resolution T2* - weighted BOLD) imaging Single-shot EP1 for multi-slice imaging. Complete fMRI processing software, Automatic real-time processing of functional BOLD MR data sets into functional activation map
Full post processing for SVS, CSI, metabolic mapping with colour coding
Image statistics: measurement of distance, area, volume (2D and 3D), angle, SD, mean, image addition subtraction, multiplication, division, interpolation, segmental, threshold, histogram
(ROC) Evaluation features like zoom, rotation, scroll, image synthesis, multi point T1 and T2 calculation (more than 8) window searching, text dialogues graphics. Sorting, searching,
archiving, recalling, etc.
13 UPS - The system should be provided with the suitable UPS system for the complete system
(MR + accessories except chiller supplied) with at least 30 minutes back up. Chiller to be provided. Give details.

14 DOCUMENTATION

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The dry imager system should have digital DICOM 3.0 dry chemistry camera with resolution of
16 bits/ 600 dpi or more. The system must have at least three online film sizes, and should be
capable to print on any of the 8 x 10, 10 x 12, 1l x 14, 14 x 14 x 17 sizes. The system should be freely configurable by the user, to use any of the above mentioned size.

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A color laser printer for printing color images and protocols on plane in 1200 dpi resolution and more than 20 ppm.
16 ACCESSORIES-
Storage box for all coils
Must have independent dual Syringe Pressure injector with following Features; Non-ferrous, automatic syringe size detection, performs singe/dual phase contrast injections, provides Saline
flush delivery and allows timed contrast delivery Must be compatible with 10, 15, 20 & 30m1 pre-filled contrast syringes and additional 200 syringes and connectors for both saline &
contrast should be provided) Must be able to observe progress of injection and view injection result
MRI Compatible ECG electrodes (1000 nos.)

MRI Compatible Anesthesia Machine with integrated Ventilator, 2 vaporiser, circle absorber

a) Capable of ventilating adult, pediatric and neonates.
b) Soft ware for ventilation should support Volume control, Pressure control and Pressure support modes.
c) Should have oxygen, nitrous oxide and air flow meters
d) Isoflurane and sevoflurane vaporisers
e) All safety alarms
f) MRI Compatible 2 sets of laryngoscope:4 sizes blades- Neonatal, paediatrics, adult, extra large.
g) MRI compatible Magill forceps: Adult & paediatric size- Two each.
h) Stylet for endotracheal tube: Ault, paediatric size- Three each
i) MRI compatible Clamps 2 Nos: Either towel clip or artery forceps.
j) MRI Compatible two IV stands.
k) MRI compatible suction apparatus - 2 Nos

m) One MRI compatible monitor in MRI Room with following modules provision to monitor –

Heart rate
ECG

NIBP – Size of Cuffs (adult & pediatric neonatal)
Oxygen saturation – Pulse oximeter with adult, pediatric probe, and neonatal probes - 2 sets (with the spare probes), Should have plethysmograph perfusion factor.

MRI compatible infusion pump – 1 Nos. Arrangement of Gas lines in recovery room and magnet room – MRI compatible high pressure gas outlet for Oxygen Air Nitrous Oxide with MRI compatible indexed system.
Vaccum suction

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Non magnetic IV stand. Two non-magnetic patient transfer trolleys should be provided Metal detectors three in number, two of which are hand held. Phantoms to be provided for regular QA studies. Complete manuals and other necessary documentation‘s should be provided.

17 TRAINING- Qualified personnel nominated by the deptt, should be given application training
by the vendor at site for a minimum of 7 days.

18 STANDARD AND SAFETY: Should be FDA or CE approved product.
19 Warranty:
Warranty clauses mentioned Terms & Conditions of NIT shall be applicable
Please attach a complete list of spares which would be provided with the equipment.

20 SERVICE – Warranty clauses mentioned Terms & Conditions of NIT shall be applicable.

All necessary interconnecting interfaces, cable, modules, and other hardware and software to
fully integrate the system for full operational status.

21 Suitable generator to run MRI with all accessories.

22 SPECIAL CONDITIONS – In case the company can offer any other technical features which
are better than these specifications of would be available at the time of machine is installed.
Point wise technical compliance report supported along with the original product data sheet must
be submitted in all truthfulness and shall be the essence of the technical bid. In the absence of
this the offer may liable to be rejected. The offered unit must be FDA/CE approved. All
operating, service and technical manuals of main and sub system must be supplied in duplicate.

23 MR compatible Trolley and Wheel Chair are to be provided.
24 Workstations of MRI machine are to be well equipped with hospital furniture.

Sl. No.6: CT Machine
Specification required for State of the art 64 Rows detector 128 Slice CT Scanner.

S.no Tender Specification
128 SLICE CT SCANNER

Tender Specification
FOR 128 SLICE CT SCANNER for ALL PURPOSE SCANNING INCLUDING CORONARY ANGIOGRAPHY

1 Installation of top of a line Spiral Multi-Slice CT Scanner with capabilities of acquiring
128 slices per 360 degree in body and Cardiac Scan.

2 Mandatory Essential features:
I Scan Time

The scan time for one gantry rotation of complete 360 deg. Should be 0.4 sec or better.
Faster rotation time will be given weightage.
II Detector

a) Detector should have facility to acquire 128 slices simultaneously in one rotation

b). The detector shall have at least 64 rows with each row having at least more than
650 elements

c). The detectors shall be large area detector with a Z axis coverage of 40mm per rotation for all applications.

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d). The detectors shall cover 38 more mm per rotation for standard and cardiac
scans.

III Matrix Size

a) Display Matrix of 1024 X 1024 or more.
b) Reconstruction Matrix of 512 X 512,.
IV Slice Thickness for Spiral Mode:
a). 128 slice acquisition with minimum thickness of 0.625 mm or less with minimum
slice thickness of 1.25 mm or better. Helical mode 0.55mm to 5mm
b). Any variable slice thickness from 0.625mm -10 mm in spiral mode and 0.625 mm-10mm in axial mode

V Gantry:
a) Gantry Aperture: 70 cm or more
b) Gantry Tilt: +/-30 deg
c) Scan Field of View: 50 cm or more
VI Scanning Capability:
a) True 3 -Dimensional Cone beam correction technique shall be available in all modes
of acquisition such as axial, spiral, 128 slice mode, and also in various application
studies for whole body and cardiac.

b) The ECG gated acquisition shall have high accuracy of real time monitoring and
adapting continuously Heart rate changes into the ECG trigger delay during each scan. Prospective ECG gated axial Cardiac scanning mode should also available as standard.

c) The acquisition shall be 128 slice modes for all studies including cardiac. Step & shoot or an equivalent algorithm during cardiac scanning for dose reduction will be an essential requirement.
d) Dose modulation shall be available for all types of studies including ECG gated tube current modulation.

e) Pediatric and infant base protocols shall be available based on the infant weight.
f) Real time contrast monitoring acquisition with auto scan initiation protocol and
with auto injector trigger

g) Latest Iterative reconstruction technique launched by company used for low dose
scanning should be offered as standard. For Example ASiR, IDOSE4 SAFIRE, AIDR
etc Please mention if the latest Iterative reconstruction technique has any improvement
on image quality, spatial resolution etc

VII Resolution
a) The High contrast Resolution should be at least 19 lp/cm for 128 slice mode.
(Specify the phantom used, scan time, mA, Filter for image reconstruction scan field
dose slice and MTF),

b) The low contrast resolution should be at least 5 mm at 3.0 HU/3 % contrast. Dose to
be given in mGy for Standard Algorithm at 10 mm slice thickness as well with with iterative dose reduction technique at 10 mm slice thickness. Measurement to be based
on 20 cm CATPHAN. (Specify scan time, mA, filter for image reconstruction, scan
field, slice).

Desirable features as detailed under:

3 Pitch: to be freely selectable in auto mode and also manual 0.15 -1.5 higher pitch
scanner will be given preference

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4 Patient Couch: The table should have a metal free scan able range of at least 160 cms

5 X-Ray Generator:

The Generator should be of high frequency type and having output of 70 KW and more
with max current of 600 mA or more. Mention kV selections

6 X-ray Tube:

Tube of high heat storage capacity 7.0 MHU or more.

Peak Heat dissipation rate of Anode should be at least 1000 Khu/min.

7 Operator Console:

a) It should have two numbers of large 18” or 19” or more high resolution LCD monitor
with a display 1024 X 1280 matrix or more. Dual monitor console one for scanning and
one processing will be given preference.

b) The System should be user friendly with all functions menu driven. It should be
modern user interface.

c) All functions including scanning image reconstruction film documentation, archiving, transferring, Direct MPR,Angiography, maximum intensity projection, volume rendering, 3D SSD, CTAngio, vessel measurement, small volume quantification,
Virtual endoscopy software for visualization of vessels and air filled structures and Colonography software for virtual endoscopic, colon study, Dental Planning software
for panoramic views and cross-sectional cuts of mandible/maxilla and Brain & Body Perfusion, Lung Nodule Assessment should be possible on this operating console and
on the independent workstation simultaneously.
8 Computer System & image processor

a) 64 Bit/32 Bit main CPU with at least 8 GB RAM memory or better.

b). High speed CPU using Pentium IV ore better running at 2.6 GHz or better, Multi
core processor will be preferred

c). Hard disc of 500 GB Or more.

d). Image storage of 150,000 or more of 512 matrix

e) CD archive with 600 or 700 MB capacity Discs

f) Image Processor: Operating system shall be windows or Linux based. Antivirus protection for Windows based system is must to be provided.

g) The image reconstruction time should be at least 25 images / per second (or frames
per second FPS) or better for all types of acquisition modes including Cone beam correction, Neuro Imaging studies and 512 matrix. and standard pitch

9 Workstation

a) One independent state of the art multimodality workstation with software licenses
for all functions including reconstruction film documentation, archiving, transferring, Direct MPR,Angiography, maximum intensity projection, volume rendering, 3D SSD, CTAngio, vessel measurement, small volume quantification, Virtual endoscopy
software for visualization of vessels and air filled structures and Colonography software
for virtual endoscopic, colon study, Dental Planning software for panoramic views and cross-sectional cuts of mandible/maxilla, Lung Nodule Assessment including for and Brain & Body Perfusion.

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b) It shall be independent fully and be DICOM 3.0 compliant for multi modality study review.
c) The computer shall be the latest state of art processor working on latest windows or Linux base platform for ease of use.
d) It shall be a high speed CPU with a speed of 2.6 GHz or better and with an
independent Hard disc storage capacity of 300 GB or more.

10 Spiral/Helical Technique:
a) Scan length of at least 80 sec continuous more, higher specifications will be given preference.
b) Should have facility of Multi-spirals bi-directional spirals and back-to-back spirals.
11 Software: DICOM 3.0 capability
a) Software for cerebral perfusion study with stroke protocol
b) MIP, Volume MIP, CT Angio software with quantitative vessel analysis, Virtual endoscopy software for visualization of vessels and air filled structures and
Colonography software for virtual endoscopic, colon study, Dental Planning software
for panoramic views and cross-sectional cuts of mandible/maxilla and Brain & Body Perfusion, Lung Nodule Assessment.
c). Volume rendering technique with axial cross reference imaging along with measurement tools on volume rendered image 3D, 3D Small volume measurement package MIP Slab viewer
d) Calcium Scoring software for coronary arteries.
e) Complete cardiac package with ECG gated studies (prospective and retrospective tagging)
i Cardiac review with analysis functions such as Ventricular motion, short axis/ long axis view, central stenosis analysis, regional wall motion studies.
ii Coronary angio,
iii Auto coronary tree extraction
iv. One touch volume rendering of the whole heart,
v. ECG gated dose modulation,

vi Cardiac study reconstruction must be high speed of atleast 20 images per second

viii Prospective ECG Gating cardiac scan
12 Special Features required:- Optional
13 OTHERS

a) Software for Remote Diagnostics Service over a telephone line
b) ECG Gating gadgets.
c) System must be PACS interface ready without any new hardware or software.
d) Fully DICOM 3.0 compliant including:
i) DICOM Modality worklist, with automatic procedure selection
ii) Capability from HIS- RIS interface..
e) Dose saving protocols must be available including:
i) automatic tube current selection suited for selected exam
ii) Dynamic on the fly tube current modulation while scanning.

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iii) ECG gated dose modulation to reduce dose during undesired cardiac phases.

iv) Dose displays such as CTDI volume, DLP, Dose efficiency

14 Hard Copy Unit:

A Dry Camera with Digital Interface and control integrated with main console and workstation, Camera should print on 14” X 17” film size, at 500dpi and a Colour Laser Printer for Printing Coronary Scans.

15 Patient Accessories: All patient positioning accessories, restraining straps including
coronal head holder, head rest should be included

16 Accessories:

Dual Head Pressure Injector with 500 syringes

Full system UPS for entire CT system with 30 minutes backup.

17 TRAINING- Qualified personnel nominated by the deptt, should be given application
training by the vendor at site for a minimum of 4 weeks.
18 Both CE marked and FDA approved AERB Type approved

19 Quality Assurance Certificates, room layout plan are to be approved from AERB

20 Provision for Radio Frequency Ablation (RFA) should be kept as third party item –
Please specify

21 Interventional CT fluoroscopy software / hardware, Robotic arm, site biopsy with
inroom monitor is to be provided.
22. Workstations of CT machine are to be well equipped with hospital furniture.

Sl. No.7: High end USG Machine
Specification of High End Color Doppler System with Fusion

1 The System must be top-of-the line, latest and state of the art with fully digital technology to
incorporate the facility of 2D, M-Mode, M-mode, Color Doppler, 2D/Doppler optimization. Adaptive Doppler/Color, Color Power Angio and directional CPA, contrast imaging, PW Doppler, CW Doppler, Real time 3D (4D imaging) 2D Fetal echo, Elastography imaging, panoramic imaging
2 System must have convex and cardiology transducer with either single crystal technology or
purewave technology of matrix for excellent grayscale image quality of difficult to image patients.
3 system should have dedicated presets for application- Abdominal, Obstetrics &
Gynaecology, vascular, paediatric, small parts, MSK, fetal Echo, urology, TDC,
interventional radiology
4 System must be offered with a minimum 19 inch High resolution flat panel Medical grade
display monitor with nearly infinite position adjustments.

5 System must be offered with 4D imaging with quantification software for general imaging
and obstetrics & gynaecology applications.

6 System should have tomographic ultrasound imaging quantification to analyze multiple
parallel slice of a volume data set, Review of 3D/4D, color 3D data set

7 System should have at-least Four univerasl active probe ports with electronic switching
facility.
8 System should have minimum 1000 frames per second or more. Please specify through data
Sheet.

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8 The system should have 2 Lac or more digital processing channels.

10 System should support multi-frequency/broad band probes spanning a frequency of 2-16
MHz of even better

11 B mode & color mode should be available simultaneously side by side real time display.
Digital zoom facility for region of interest in real time and frozen.

12 Image storage facility on inbuild hard disc or CD/DVD-Rw facility should be available. In
built hard disc with capacity of 500 GB. System should have extensive image management capability including thumb nail review, cineloop editing etc.

13 Auto trace & automayic Doppler calculations should be available in Live & frozen images.

14 Should have the state of the art Transmit Real time Compound Imaging Technology with
multiple transmitted lines of sight, wherin Multiple Coplanar images from different viewing angles are obtained and combined into single compound Image at real-time frame rates for improves visualization.

15 System must be offered with speckle Reduction imaging technology to remove speckles and
clutter artifacts.

16 System should be capable of scanning depth of 30 cm.

17 System must be offered with a 2D frame rate of least 1000 frames/second.

18 System must be offered with user friendly high resolution user interface 9 " touch panel and
backlit keyboard. User friendliness will be given priority.

19 Fully optimized CEUS mode should be available with simultaneous acquisition of B-mode
and Contrast images in real-time in full screen or Side-by-side display. Micro-vascular
Imaging, and persistence imaging should preferably be available to assess slow micro-vessel perfusion
20 System should have THI & should be able to work in combined mode of harmonic imaging
and real time compound imaging to get excellent image quality

21 System should be capable of FUSION / navigation to allow Fusing real time ultrasound
images with images acquired from other imaging modalities such as eg. CT,MRI,PET.

22 The system shall be capable of providing a “ GPS” alike functionality. This allows the
operator to mark a specific point of interest within the image (e.g. Liver lesion). While moving the transducer, the system indicates position and distance relative to the
marked target.

23 The system should be quoted along Elastography imaging for Breast & Thyroid on
appropriate probe and convex probe for liver.
24 The system should be DICOM ready.

25 System should have inbuilt Gel Warmer

26 Following probes to be quoted as standard

a) 1-5 MHz Convex Transducer with +/- 1 MHz variation accepted for General Imaging, Renal.
OB/GYN, abdominal imaging with capabilities of CEUS. Must have Tissue Harmonic
Imaging. Probes must have compatibilities of Elastrography Imaging of Liver.

b) 4-12 MHz Linear Array Transducer with +/- 1 MHz variation for entirely covering
frequency range accepted for Vascular, breast, Musculoskeletal, small parts, elastography imaging.
c) Broad band Endocavitary Probe for TV/TR Application with frequency range between 5 to 9
MHz with reusable biopsy guide

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d) 2-6 MHz Broadband 4D volume transducer
e) 5-16 MHz Matrix Linear probe
27 Warranty: Standard 3 years warranty of complete system along with all probes &
accessories equipment supplied i.e. Camera, UPS etc. The warranty should start from the day
of complete satisfactory installation of equipment.

28 SERVICE – After warranty CMC for next 7(seven) years for complete system with all
probes and all that is supplied with the system including Camera, UPS, etc.
29 TRAINING- Qualified personnel nominated by the deptt, should be given application
training by the vendor at site for a minimum of 7 days.
30 Workstations of USG machine are to be well equipped with hospital furniture.

Sl. No.8: Digital X-Ray
Digital Radiography Ceiling Suspended Dual Detector System Specification:

A fully digital radiography system capable of detector exposure in vertical, horizontal and oblique positions to perform all skeletal body and chest radiography.
The Digital Radiographic system should provide high clinical versatility, improved
workflow, State of the Art Image Quality and should be a Reliable and Easy to use system.
A general-purpose digital radiographic system with a dual detector, high frequency
generator, Image Acquisition system, wall stand and radiographic table.
1 Generator
a Generator should be of latest technology with high frequency technology for constant
output.
b Output should be 64KW or more.
c KVP range 40KV – 150 KV or better.
d Output at minimum 80KV should be 800MA or more.
e mA range 10 to 650 or better
f Exposure time 00.1 to 2 sec or better
g It should have automatic exposure control device
h It should have digital display of KVP, mAs, mA & ms.
I Anatomical programming radiography for Adult & Pediatrics should be possible.
j Over loading protection feature should be available
2 X-Ray Tube
a The X – Ray tube should be rotating anode high speed, compatible with the generator (both
from same manufacture) and must have dual focus.
b Tube Anode heat storage capacity should be 300 KHU or more.
c Target angle – Please specify.

d Tube anode speed should be 10800 rpm or better
3 Collimator

a Focal spots of the following sizes:
b ● Large focus: 1.25 mm or less
c ● Small focus: 0.6 mm or less

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d Measuring tape provided with collimator.
e Multi leaf collimator having halogen lamp/bright light source and auto shut provision for the
light.
4 Horizondal Digital Elevating X-Ray Table
a Motor driven, adjustable height floating table top of carbon fibre or equivalent material.
b Specify the Table Height
c Compact bucky table with fixed digital flat panel detector.
d The table should allow quick and easy positioning of the patient there by saving time.
e Maximum Patient weight capacity: Should be more than 170 kg
f It should have flat top of carbon fiber
g Specify the Tabletop outside dimensions
h Foot switches on both side of the table for adjusting height, longitudinal/side to side
movements, locking.
5 3D Ceiling Suspension
a High precision telescopic column with self-aligning bearings
b Provision for manual override
c Electromagnetic brakes with fully counter balanced mechanism
d Color coding for all directions of movement
e Longitudinal movement >=280 cm or more
f Vertical movement range >= 150 cm or more
g Lateral movement >=190 cm or more
h Tube rotation (horizontal and vertical) continus detent 180/+ 135 degrees.
i Indexed tube/collimator rotation about both vertical and horizontal axes.
j electronic SID and angulations display
k Patient side adjustment of KV and mAs
l Collimator lamp with programmable switch-off timer
p Field of view selection (preprogrammed field views)
7 Digital Wall Stand with Vertical Bucky
a The unit should be provided with vertical bucky having tilting facility (- 20 deg. to 90 deg)
with removable grid for SID of 180 cm
b It should have Provision to do chest radiography without grid.
c It Should be compatable for removable flat panel detector.

d It Should have automatic exposure control.
e Wall stand should have digital display of SID/GRID and detector tilt.
8 Flat panel Detector 2 Numbers for Table & Wall stand
a Digitial detector should be a single panel (non-tiled) amorphous silicon TFT flat panel
detector with a Cesium Iodide scintillator.

b Detector should be removable and it should be compatable for table and wall stand.
c Detector should be equiped with lowest noise characteristics and best resolution.
d It should have DQE 65% @ Zero Line Pairs or more for best Image Quality.

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e The Flat Panel Detector active area should be square in shape with minimum active area
size should be 40cm x 40cm or more or please specify
f Image Matrix should be 2000 x 2000 pixel or more
g Detector Pixel size should be 200 microns or less
h Image depth should be14 bit or more
i Separate grids should be provided for vertical and horizontal applications.
j Grid ratio to be atleast 13:1 Table Stand – Please specify
k Storage box for safe storage of additional grids to be provided
9 Image acquisition (Operating Station)
a It should have high resolution LCD Monitor of minimum 19 " size or more (fully flat) with
minimum 1024x1024 or more display matrix with anti reflective front screen.
b Operating console should have facility for patient identify entry viewing and processing
image, documentation.

c System should have auto protocol select
d Preview image should be ready in less than 4 seconds
e It should have a imge storage disk of 70 GB or more
f This system should have ready DICOM interface and networking capability with
RIS/HIS/PACS.
g Post processing function like viewing and reprocessing, hard copy documentation and
onward transmission should be possible.

h Image processing functioning like mirroring, zoom, move and windowing filter should be
possible including facility for measurements.
10 Essential Accessories:
a UPS, digital dry processing camera
b Foot switch for adjusting the height of the stand or the table

c Lateral cassette holder

d Patient support bar for vertical stand
11 Advanced Applications (optional)
a The system should have an image harmonizing technology to eliminate the under & over
exposed areas of the image.

b Quoted model should have the provision of US FDA approved Dual energy advanced
application.
c Quoted model should have provision of fully automated image pasting advanced application

12 Other Terms and Condition

a Quoted company shold have mininum 100 Crore turn over per year
b Out of 3 major components of the Digital Radiography system (Detector, Tube and
Generator) at least Two components – Please specify type of detectors Generator and Tube
and 3D ceiling suspension from same roof should be from the single manufacturer
c The quoted model should be AERB type approved and CE or FDA certified Quality
Assurance Certificate
d quoted company should have minimum install base of 5DR system per year from last
5years.
e Quoted company service department should be ISO certified

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13 Warranty: Standard 5 years warranty of complete system along with all accessory
equipment supplied i.e. Camera, UPS etc. The warranty should start from the day of complete satisfactory installation of equipment.

14 SERVICE – After warranty CMC for next 5 years for complete system and all that is
supplied with the system including Camera, UPS, etc.
15 TRAINING- Qualified personnel nominated by the deptt, should be given application
training by the vendor at site for a minimum of 7 days.
16 Workstations of Digital X-ray machine are to be well equipped with hospital furniture.

Sl. No.9: DIGITAL MAMMOGRAPHY
Sl. No. TECHNICAL SPECIFICAT

General description: State of the Art Large field of view digital mammography system for general screenin

The system should consist of:
1. Large field digital flat panel detector.
2. Ergonomic examination gantry designed for mammography applications with motorized movements.

3. Integrated digital acquisition system with user console and flat panel monitor.
4. Dual track mammography X-ray tube with additional beam filters and automatic collimator.
5. High frequency generator.
6. Exposure control system and selectable dose modes.
7. Radiation shield and a mammography image receptor grid.
8. Motorized compression device and compression paddles.
9. FFDM based stereotaxy availability.
10. Upgradable to advanced applications.
11. Magnification device.
12. Should have CE& FDA approval. Equipment should be AREB approved TECHNICAL SPECIFICATIONS
1 X-Ray Generator
High frequency generator type.
4.0kw or more generator power.
kV range: 20 to 35 or more in 1 kV steps.
mAs range: 0 to 500.
mA range: up to 100 or more.
Exposure monitoring generator and tube load pre- exposure display of the exposure parameters.

Displayed parameters kV, mAs, target filter, density selection Auto record of the exposure parameters for each

2 X-Ray tube
Dual track mammography X-ray tube with additional beam filters and automatic collimator.
Spot size large focal spot: 0,3 mm.

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Rotating Anode.
Anode heat storage capacity should be 300kHU or more Anode heat dissipation: 40kHU/min.
Beam filters: Mo and Rh.
3 Gantry assembly
Isocentric system.
Motorized rotation and vertical movement.
Rotation angle: -+180 to -165 degree.
Distance floor to image receptor:-65 to 150 cm. Source to image receptor distance (SID): 66 cm. Automatic decompression after exposure. magnification stand with dedicated paddles. Magnification facotr: 1,5 & 1.8
Motorized & Manual compression.
Large paddle facility
Regular 19 x23 sliding paddle.
Square spot sliding compression paddle.
Round spot sliding compression paddle.
4 Exposure control
Both manual and Auto mode (Automatic Technique selection) should be available.
Parameters controlled: kV mAs, filter.
5 Automatic technique selection
Parameters: Anode track, filter, kV mAs, Virtual cell and dose should be chosen automatically
Different modes should be available for selection
6 Collimator

Molybdenium & Rhodium Beam filter should be available.
FOV can be modified manually and can also be selected automatically based on the paddle and magnification

7 Flat panel detector
Direct / indirect conversion type solid state flat panel detector. Type: Amorphous Selenium / Silicon

Detector size: 24 x29 cm or more
Pixel size: 100 um or less
Image depth should be atleast 14 bit.
Operating temperature: app 15 to 35 degrees Celsius.
DQE at 0LP/mm should be 60% or more
8 Digital acquisition system
Local storage capacity: 8000 images & more.
Image annotation & Measurement functions possibility
Automatic dose (Skin dose and average Glandular Dose) annotation Automatic windowing. Multi format display.
Zoom and roam & Image invert facility

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Print layout for multi format printing.
Integrated CD R/W.
9 Connectivity
DICOM SEND (storage provide).
DICOM storage commitment (storage commitment user). DICOM Print (basic grayscale print user).
10 Printer interface

Basic Grayscale print user.
Validated printer list for hardcopy diagnostic.
11 Grid/ Breast support assembly
Grid ratio:5:1
Removal and installation of the grid/ breast support motorize Low attenuation carbon fiber support.
12 Accessories included

Pair of dual foot pedals.
Radiation shield with 0,3mm Pb equivalent
Face shield.
Large paddle- 24x31cm.
19x23 cm sliding paddle.
Square spot sliding compression paddle.
Round spot sliding compression paddle.
Remote service modem.
Quality control toolkit.
User manual and technical documentation.
UPS for power supply.
13 Display workstation
Mammography diagnostic workstation.
Two high contrast and resolution 5 MP LCD B & W monitors. Multi-modality viewer to display U/S, DX, MG, CT. Customizable having protocols.
Dedicated mammography keypad.
Customizable functions buttons.
Patient list management tool.
User selectable auto contrast modes.
14 FFD based stereotaxy Unit (Quote as Optional)
Digital stereo tactic breast biopsy.
Positioning at any angle +/-90 deg should be available.
Decubitus Biopsy table for patient positioning during srereotaxy procedure.
15 The system should be CE& FDA approved including the biopsy system
16 Advanced Applications:
I CAD Solutions-CAD solution should be FDA approved.
II FDA& CE approved Tomosynthesis - 3 D Mammography. Tomosynthesis should be available for Screening

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Tomosynthesis acquisition time should be less than 10 secs.
Tomo Sweep angle should be 25 degree or more for better coverage
Tomo resonstruction planes should be o.5 mm.
III Contrast enhanced mammography facility should be CE& FDA approved
17 Warranty: Standard 5 years warranty of complete system along with all accessory equipment supplied i.e. Ca
installation of equipment.

18 SERVICE – After warranty CMC for next 5 years for complete system and all that is supplied with the syste

19 TRAINING- Qualified personnel nominated by the deptt, should be given application training by the vendor

20 Workstations of Digital Mammography machine are to be well equipped with hospital furniture.

Sl.No.10: PET-CT Machine (Nuclear Medicine Equipment)
Technical specifications of 64 Slice CT/PET Scanner –

Primary vendor shall be responsible for:
• Site Preparation: Design, planning and construction on turn-key basis, adhering to all the
prescribed safety guidelines and regulations.
• Supply, Installation, Commissioning
• All the Application, Operating and Service manuals in duplicates should be provided by the
vendor at the time of handing over the machine. At least one of these manual sets to be
provided in computer readable format, preferably as Word for Windows format document.
• AERB Registration and site approval
Any options or added facilities not indicated in the specifications may also be given. Any improved modifications or updated versions of the system can be included in the quotations.
1. General

2. A latest technology whole body Positron Emission Tomography system with integrated
minimum of 64 slices per rotation DICOM ready and true isotropic volume acquisition spiral
CT scanner designed for providing volume measurements of metabolic and physiological processes using positron emitters, as well as for producing accurate structural and anatomical
fusion images and making attenuation maps for CT based attenuation correction.
• The system should have capability for simultaneous data acquisition, processing, image
reconstruction & analysis and fusion of PET with CT images.
• The system should operate on 220 (± 10) V A/C (Single phase) 50HZ or 440V (± 20) A/C (3
phase) 50HZ.
• Type approval certificate/NOC from AERB, Mumbai for the quoted model must be attached
with the technical bid or else the bid will be summarily rejected.

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• For acceptance of the equipment, all the QA tests as per NEMA guidelines and to fulfill the
AERB requirements will be done and demonstrated by the company engineer(s) and all the required phantoms will need to be arranged by the vendor and submit a detailed report in stipulated time frame. The company will also arrange such phantoms during periodical QA

tests.

• All the Application, Operating and Service manuals in English language in duplicates should
be provided by the vendor at the time of handing over the machine. At least one of these
manual sets to be provided in computer readable format, preferably as Word for Windows
format document.
• Any options or added facilities not indicated in the specifications may also be given. Any
improved modifications or updated versions of the system can be included in the quotations.

2. Gantry and Detector
i. Gantry should have integrated PET & CT hardware.
ii. The PET scanner should employ non-hygroscopic high light yield (≥ 80%) and low decay
time scintillator material like LSO or LYSO crystals for detecting 511 KeV gamma photons
in coincidence
iii. Ring diameter should be ≥ 80 cm.
iv. The patient gantry aperture should be ≥ 70 cm and uniform for both PET and CT.
v. It must be capable of acquiring 45 or more transverse cross sectional slices, simultaneously
without undergoing any axial motion
vi. Axial Field of view should be 15 cm or more.
vii. The transverse field of view should be ≥ 50 cm
viii. The separation (center to center) between slices acquired simultaneously without any axial
motion should be ≤ 5 mm

ix. The scanner must have low power laser lines orthogonally mounted on the gantry for patient
alignment and auto-contouring. The laser should be mounted in such a way that the patient
can be positioned form either side of the gantry and the patient bed.
x. The scanner must have a detection configuration of a continuous ring around the patient. It
must not have "gaps" of detection or areas of decreased sensitivity around the ring of
detection
xi. Integrated CT simulation software for conformal therapy planning with laser system
(one moving & 2 fixed lasers of green colour) to be provided. It is to be connected with
main TPS in the radiotherapy department through Ethernet wiring. A separate viewing monitor is to be provided in TPS room.
xii. Efficient Gantry cooling system for continuous running of the machine

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3 CT Specifications
i. Multi detector CT having capability of minimum 64 or more slices
ii. Rotation time should be ≤ 0.5 sec
iii. Multiple pitch factor settings should be available
iv. Image slice width should be from ≤ 1 mm to 10 mm
v. Detector coverage should be at least 24 mm
vi. Low contrast detectability should be at least 4 mm @ 0.3% on 20 cm CATPHAN phantom.
vii. High contrast resolution should be better than 15 lp/cm
viii. High frequency X-Ray generator tube with output of 60 kW or more, Anode heat storage
capacity of 8.0 MHU or more, Tube Voltage between 80-140 kV, Tube Current of 20-400
mA, Automatic self testing system

4. Performance Specifications:
i. All specifications must comply with NEMA Standards Publication NU2-2007 or latest
performance measurements without altering instrument parameters. QC Software to measure
these parameters must be available in the system.
ii. Axial & Transverse spatial resolution at 1 cm & 10 cm from the central axis of the gantry
should be ≤ 5 mm FWHM

iii. System efficiency / sensitivity must exceed 4 cps/KBq at 350 KeV
iv. System Energy Resolution should be ≤ 12.0 %
v. 3-D scatter Fraction should be ≤ 34%
vi. Total Uniformity should be ≤ 5% variation
vii. During image reconstruction system should use Time-of-flight algorithms, when required for
better lesion detectability.
viii. System should have & capable to use HD technology during image reconstruction.
ix. Attenuation correction should be CT based. Protocol/Algorithm for attenuation correction
should be independent of metal/mA/IV contrast related artifacts

5. Patient Bed:

i. Precision bed with low attenuation carbon fiber pallet and minimum sag of the patient table
top.
ii. A separate flat table top should be provided for radiotherapy treatment planning.
iii. It should be able to bear 180 kg or more patient weight.
iv. The horizontal motion of the patient bed must be electrically motorized and computer
controlled with an independent operator control option as well. Operator controls accessible from both sides of the patient must be provided for both horizontal and vertical movements.

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v. The horizontal travel of the bed should enable the full length scanning of a patient in one scan
acquisition. Full body horizontal length should be ≥ 190 cm and vertical travel from 60 to 90

cm.

vi. A Digital readout of the horizontal and vertical position of the bed must exist and must be
located near the aperture controls for the bed to provide ease in positioning
vii. Pediatric support, headrest, armrests, knee-leg support are to be provided.

6. Workstation (Data Acquisition, Processing & Management)
i. One Acquisition station independent of main processing unit having HD, OSEM and Time-
of-flight reconstruction algorithms as a standard features. The workstation should be of latest specifications at the time of shipment.
ii. It should have both, serial and USB ports
iii. The processing workstation should be high performance Pentium i7 quad-core or equivalent
with multi tasking operating system having minimum of 8 GB RAM, 3 GHz processor speed, minimum 1 GB graphic card, 1000 GB or more SCSI hard drive (if less, another HDD may be included), Optical Mouse, Key-board and high resolution flat panel dual view LCD monitor
of ≥ 19” size with minimum resolution of 1280 x 1024. It should also have CD and DVD
combo drive preferably with writer facility
iv. Intercom with user programmable patient instruction system
v. Reconstruction filters - Shepp-Logan, Hanning, Hamming Parzen, Ramp, Butterworth and all
other latest available filters with the company for PET applications

vi. Communications - Ethernet with TCP/IP protocols and DICOM-3 or latest networking of all
possible equipments in the facility with their peripherals and PACS available in the department
vii. Processing workstations should have image fusion, quantification facility and image
comparison software for the baseline and follow-up studies.
viii. Image archiving system of ≥ 4 TB capacity capable of maintaining database of patients and
images.

7. Software:
7.1 Data Acquisition
i. Acquisition Modes: Acquisition in Full 3-D mode must include Static, Whole Body,
Dynamic and Gated acquisition provisions with prospective 3-D reconstruction algorithm.
ii. 4D CT Scanning facility: 4D CT Scan software with 4D phantom for QA shall be
provided and separately there shall be 4D CT Respiratory Gating hardware price provided if the main equipment needs such hardware.
iii. Same PET CT protocol should be used for Contrast CT in single acquisition

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iv. Acquisition Protocols: The acquisition program should support pre-programmed scan
protocols with acquisition and reconstruction parameters and patients information with simple, dynamic editing of parameters. These parameters would include all information necessary to acquire data on the PET scanner (e.g., scan duration, patient information
frame / list mode, bed motion), as well as information necessary for reconstruction.
v. Whole Body Acquisition: Multi bed acquisitions (e.g. for the purpose of whole body
oncology studies) should advance the bed from one position to the next automatically.
vi. Dynamic frame Mode Acquisition: The acquisition setup software must support multi-
frame acquisition of different (arbitrary) frame duration's with no loss of data between
frames. Alternatively, list mode acquisition may be available as standard feature.
vii. Reconstruction: Image reconstruction should simultaneously start for the acquired image
while acquisition is still in process.
viii. Time of Flight and HD must be available for image reconstruction
ix. Fully 3-D Iterative reconstruction technique should be available as standard
x. Low dose iterative reconstruction algorithm should also be provided
xi. Pixel Size: The User should have the option to specify the pixel size for reconstruction.
The reconstruction program should support reconstruction in image sizes of at least
128x128 or higher.
xii. Scatter Correction: Scatter correction must be provided based on scan of the actual
patient whose scan is being corrected and processed automatically.

7.2 Clinical Application Software:
i. Software for data collection, CT based attenuation correction, reconstruction of image for co-
registration, Full 3-D prospective reconstruction with iterative scatter correction, advance 3-D Volume rendering with 3-D fusion, virtual endoscopy, Model based 3-D scatter correction,
MIP, whole body acquisition, dynamic acquisition
ii. System management software for computerized calibration, quality control for all scanner
performance parameters, diagnostics and administration of the patients' records.
iii. Attenuation correction, quality control software and a latest version of DICOM facilities for
clinical applications
iv. Software for PET/CT/MRI fusion
v. Should be possible to evaluate different scans of same patients done over a time to give
overall assessment of malignancies progression in oncology.
vi. Provision to make DICOM/ PDF/ JPEG /AVI /MPEG digital output.
vii. PET DICOM 3.0 or higher version must be implemented. It should have the ability to import
MR /CT DICOM Data

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viii. Latest advanced CT radiation dose reduction technology and software that should offer higher
speed image reconstruction.
ix. All future software upgrades including associated hardware during warranty period and CMC
shall be free of cost
x. The CT Simulation workstation should be fully integrated and networked with the
treatment planning system for 3D CRT, IMRT/IGRT and with portal imaging
workstation at the linac console.

xi. It should have capabilities for 3D viewing of images along with tools for constructing
and display of high resolution (≥ 512X512 pixels) DRRs and MPRs.
xii. Tools for auto-contouring of normal structures along with manual contouring of normal
structures and target volumes should be included. Editing, copy and paste of structures.
xiii. 3D margin tools from GTV to CTV to PTV should be available.

• Should have capability to do online CT simulation (while patient remains on CT couch)
and also offline CT simulation at physician’s workstation.

• Tools for beam placement including MLC of any make and isocentre determination
should be included. The tracking laser system should be linked to the virtual simulation software

• The supplier will be responsible for complete networking and integration between the
CT Simulation workstation, Treatment Planning System and portal imaging
workstation for import and export of image and data.

• Should be a fully DICOM RT “plug and play” system for import and export
ofCT/MRI/PET images, RT structures and data.

8. Peripherals / Accessories
i. UPS for the whole system including CT with minimum 30 min backup at full load should be
provided.
ii. ECG gating device & necessary electronics to enable gated cardiac acquisition (Discuss)
iii. Latest dual head pressure injector compatible with CT and 100 disposable CT syringes with
tubing and connector
iv. High Resolution table top dry chemistry type DICOM laser film processor for x-ray films
with minimum 100 packets of films of required size
v. High resolution color laser printer for color hardcopy on paper with 5 sets of all cartridges
vi. Required Phantoms for CT & PET Quality Assurance and calibration sources
vii. One dose calibrator (Capintec - CRC 25 PET)
viii. One shielded L-bench for F-18 handling

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ix. One decay drum for PET radionuclides
x. Three waste bins with minimum 12 mm lead for PET Radiopharmaceutical waste
xi. 40 Lead bricks and 8 lead corners for F-18 handling
xii. One Dose drawing module for F-18 FDG
xiii. Four Tungsten syringe holders of 2 sizes (Two 2 ml and Two 5 ml)
xiv. Five digital pocket dosimeters (Rad-60R by Rados Technology)
xv. Two digital ion meter (Rotem)
xvi. Two digital µSv/hr range GM based survey-cum-contamination monitors (Rotem)
xvii. One decontamination kit
xviii. One Crash cart trolley
xix. Two Syringe Needle destroyer
xx. Two digital area zone monitors
xxi. One hand foot monitor
xxii. Two mobile lead barriers/screens
xxiii. One electronic weighing machine for 200 kg.
xxiv. One Stainless steel side trolley in the PET/CT room
xxv. One side by side refrigerator
xxvi. Two sets of Type A liquid radioisotope transport containers (external polyethylene case and
CF 18 Tungsten shielded container) by Comecer
xxvii. Two glucometer with strips, two sphygmomanometer, two stethoscope
xxviii. One latest specifications PC for patient reports with laser printer
xxix. One latest specifications Laptop for teaching purposes
xxx. One vital sign monitor (Schiller or other standard make)
xxxi. Two single syringe infusion pump (Schiller/ASCOR/AITECS)
xxxii. One Defibrillator (Schiller or other standard make)
xxxiii. One collapsible wheel chair with rubberized swivel wheels
xxxiv. Two X-ray LCD illuminators for minimum 2 films view
xxxv. Multimedia Projection system with XVGA resolution

9. Others:

i. Complete Turnkey work as per AERB standards (As per local requirements and rules).
ii. Lead Glass Window: 100 x 150 cm separating the scanner and console.
iii. The complete system should have a guarantee including the radioactive reference source,
crystals, detectors and x-ray tubes replacement for a period of FIVE years after the

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satisfactory commissioning and handing over of the equipment. Warranty will include all the

accessories and third party items.

iv. Rates for Comprehensive maintenance contract (CMC) for whole system including x-ray tube

replacement as and when required and accessories for a period of FIVE years after the expiry

of warranty period.

v. The peripherals / accessories, electronic / electrical consumables (leads, probes, batteries etc.),

calibration sources, air-conditioning units and batteries of UPS will also form part of the

warranty and CMC. Service, repair and maintenance of all third party items will be the sole

responsibility of primary vendor.

vi. At least 95% uptime should be maintained during warranty as well as CMC period. Down

time penalty-25000/-Rs

vii. Onsite training by trained engineers and application specialists to physicians and technologist

for at least 2 weeks period.

viii. After sale service to be available locally.

ix. Workstations of PET-CT machine are to be well equipped with hospital furniture.

Sl. No.11: Equipments for Surgical Oncology

Modular OT Qty
1 Installation of Wall & Ceiling
Supply and installation of wall, Sloping & Ceiling of pre-fabricate modular Operation
Theatre with 1.2 mm S.S.304Grad as per is 277, backed by 12 mm thick gypsum board
with proper supports etc. As required complete with all accessories to provide a
seamless operating room. Filling of all joints and cavities with metallic epoxy filler and
sander flush to provide a joint less finish and then sprayed with a water based anti-
Bacterial, Self sterilizing point to a depth of 300 microns with primer.

1

2 Flooring
Conductive floor is imported & as per EN standard and made from two
component anti-static resin in three different layer consisting of primer self leveling
and top layer. Top layer is treated chemically to harden the surface for longer
durability and for ease of cleaning and disinfection

1

3 Control Panel

Tile based and membrane type control panel, mounted flush in the theatre wall, comprising of the following:
1 No. Day Time Clock
1 No. Lapse Time Clock
1 Set Dimmer for peripheral/plainer lights
1 No. Hands Free telephone
1 No medical gas status/ alarm
1 Set indicator only for temperature and humidity display

1

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4 X-Ray View Box
Twin Plate X-ray viewing screen designed to provide a high level of control luminance
without flicker. It will be equipped with eight spring-loaded clips to secure the X-ray negative when in use. The X-ray viewing screen illumination shall be high frequency
fluorescent lamps, controlled by dimming balsat.

1

5 OT Door

Sliding, Hermetically sealing Motorized door of size 1500 x 2100 mm having high
density particle board cores high pressure laminated faced on both sides, viewing
window 300 x 300 mm and for smooth effortless sliding, the doors run on nylon wheels
within an aluminum extrusion track.

1

6 Pressure Relief Damper
Fabrication, Supplying installation of pressure relief damper statically and dynamically
balanced made out of appropriate thick stainless steel of grade 304 of minimum size
300 mm x 300 mm with minimum three adjustable stainless steel blades, etc. complete
as required.

1

7 Writing Board
Supplying and fixing operating writing board size 840 x 640 mm complete with writing
pens Scrubbing Pad etc. As reqd.

1

8 Storage Unit
Providing fixing, supply and installation of storage unit of size (800 X 1900 x 300).
The storage unit will be made with 1.50 mm thick E.G.P. 120 GSM Zinc coated steel
panels (Make SAIL/Nippon/Bhushan) with sterile surface coating. The unit will be divided into 2 equal parts and each part will have individual glass doors with locking system. Each part will have glass rack to keep surgical medicines etc.

1

9 Peripheral Light
Recess mounted IP54 Protocol, non-hygroscopic peripheral lights having compact flourcent lamp and sigma-digital ballast

1

10 Gas Pipeline
All pipes shall be drawn half hard temp., solid drawn, seamless, phosphorous
deoxidised, non-arsenic and degreased copper pipe conforming to BS 2871-1971
Part 1 (Table X) and chemical compositon as per BS-6017 of 1981 table 2.
The supplies of copper pipe would be accompanied with manufacturers test certificate
for the physical properties of copper pipes and their
Chemical composition. The supply of pipes be further substantiated with
inspection certificate from the third party like SGS/Lloyds Register. The Pipeline
will be laid as per HTM-2022 or NFPA 99

1

11 Laminar Flow

Plainer Ceiling constructed out of 1.6 mm thick aluminum sheet of size 2400X 1800
mm having 6 nos. of hepa filters and a stainless perforated base. The hepa filter having
dust spot efficiency of 99.99% 0.3 micron. Air & light diffuser made out of two layer
of mono filament precision woven polyester for the plan air ceiling to give a
“LAMINAR FLOW” of filtered air. It also provides a diffused shadow less lighting
system with a control on the intensity of luminance by using high frequency electronic fluorescent tubes and ballasts.

1

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12 Double Dome OT Light
Light intensity at 1 m distance (lux): Minimum intensity 40,000 Color rendering index Ra: 95
Regulated Color Temperature (K): 5000 K or more
Temperature increase near surgeon’s head: <1°C
Lifetime of the source of light (hrs.): >30000 h
Power supply: 24 W
Range of light intensity: 50-100%
Protection provided by enclosure: IP 20
Lighthead diameter (cm) - 75-80
Lighthead diameter (cm) - 70-72
No. of LED – Main room – 65, Satellite Room 45

1

13 Double Arm Anesthesia Ceiling Pendant
Fitting with Working Platform/Tray - 1no
Working Drawer 1 no for storage effect IV & Infusion Pole - 2no.

Medical Gas Outlets (DIN)
Medical Oxygen 2 nos
Medical Air 1 no
Vacuum 2 nos
Nitrous 1 nos

Power Outlets 6 nos
Data/IT Point 1 no
Medi Rail 2 no

Level Degree Axis Rotation 0 to 340 degrees Round Angled Design made of high-strength aluminum alloy with electrostatic power coated finish with separate channeled chamber for gases and electrical. Whole-sealed design.
Ergonomic Control Console for easy positioning and man oeuvre.
Working Load 120 kg, Arm Length 1500 mm
International Quality Directives such as ISO 9001:2008
International Medical Supply Unit EN ISO 11197:2004z

1

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14 Single Arm Surgical Pendant
Fitting with Working Platform/Tray - 4 nos Working Drawer 1 no for storage effect
IV & Infusion Pole - 2no.
Medical Gas Outlets (DIN)
Medical Oxygen 2 nos
Medical Air 1 no
Vacuum 2 nos

Power Outlets 6 nos
Data/IT Point 1no
Level Degree Axis Rotation 0 to 340 degrees
Round Angled Design made of high-strength aluminum alloy with electrostatic power coated finish with separate channeled chamber for gases and electrical. Whole-sealed design.
Ergonomic Control Console for easy positioning and man oeuvre. With Pneumatic
Breaking System
Working Load 120 kg, Arm Length 1500 mm
International Quality Directives such as ISO 9001:2008
International Medical Supply Unit EN ISO 11197:2004

1

15 Imported OT table – Please Specify 1

16.a. Major OT Equipment
Equipment Quantity
1. O T Table 02
2. O T Light 02
3. Electrocautery machine 02
4. Suction machine 02
5. Anaesthesia machine 02
6. Energency drugs trolley 02
7. IV Stand 06
8. Stretcher cum trolley 02
9. Infusion pump 04
10. Laryngpscopy set 02
11. Glucometer 02
12. Pulse Oximeter 02
13. Vital Sign Monitor 02
14. Equipment for IV Induction of Anaesthesia 02
15. X-ray view box 02
16. Refrigerator (Large) 02
17. General Surgical Instrument Set 02
18. Harmonic Scalpel 02
19. Table mounted multipurpose reactor set 02
20. Gigli Wires

16.b.Minor OT Equipments
Equipment Quantity
1. O T Table 02
2. O T Light 02
3. Electrocautery machine 02
4. IV Stand 04
5. Suction machine 02
16.c. Ward (10 bedded) + ICU (2 bedded)

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Equipment Quantity
1. Bed 12
2. IV Stand 12
3. Bed side table 12
4. Infusion pump 06
5. BP Instrument (memory) 05
6. Suction machine 03
7. Nebulizers 02
8. Ambu bag 02
9. Weighing scale (Adult) 01
10. Laryngpscopy set 01
11. Vital Sign Monitor (BP, SPO2, Pulse, Ech) 03
12. Pulse Oxymeter 02
13. Glucometer 02
14. Refrigerator 01
15. Dressing Set 10
16. Cut Down Set 01

17. Tracheostomy set 01

Technical Specification of Modular OT
Major Parameters
a) Operation Theatre Department
- Structural steel shell with joint less sealed sterile coating.
- Joint less prefabricated modular Operation Theatre.
- Paneled Modular Wall &Ceiling System.
- Ultra Clean Ventilation Through Ceiling (Vertical laminar flow system).

b) Integrated Air & Light Theatre Ceiling
- Hermetically sealing hospital doors.
- Static Conductive Flooring

c) Medical gases pipeline system
- Medical gas Pipeline Equipment

d) Multi-Movement Ceiling & Wall Pendant Systems.
e) Suction & Oxygen Therapy products.
- Bed Head Trunking System.
f) Ceilings – Integral Lighting System
- Uniform disffusion of air into theatres
- Air and light diffusers.
- Should be of plenum with conditioned air through HEPA filters.
g) AGSS – Anesthesia gas scavenging system and outlets suck the waste anaesthetic gases. h) Hermetically sealed doors.
i) Flat X-ray imaging screens step less, flicker free and dimmer.
j) To provide writing board.
k) Surgical scrubs sinks – elbow action taps or knee operated or flow sensor operated.
l) To provide cascade pressure stabilizers.
m) To provide operation thertre control panel.
n) Ceiling suspension systems for monitor, anesthesia equipments, surgical equipment. o) Versatile pendent (double arm) swiveling.
p) Vertically moveable.
q) Good maneuverability
r) OT control panels
s) It should be closed circuit TV facility.
t) Service maintenance warranty for 3 years and good service backup.

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• Floors should be smooth, non slip, impervous material conductive enough to dissipate static
electricity but not conductive enough to endanger personnel from shock. The flooring should either be inset mosaic with least possible joints and copper strips to carry away any static electricity produced or of joint less conductive tiles. Conductive copper mesh and self
leveling epoxy flooring may be done.
• Ceiling should be painted with washable paint and corners of the rooms should be rounded off
to prevent collection of dirt and dust.
• Power back up with provision of stand-by generating sets.
• In operating rooms anaesthetic room(s) recovery room, holding area, colour of walls and
ceilings should be such that they do not alter the observers perception of skin colour. This will facilitate patient monitoring and management.
• OT should have facilities for high speed autoclaves/ sterilizers for immediate / emergency
requirements of sterilizing equipment.
• Essential pharmaceutical storage including refrigeration facilities should be available.
• There should be waiting room with toilet facilities for patient attendants.
• Pass-through cabinets that circulate clean air through them while maintaining positive air
room pressure allow transfer of supplies from outside the OR to inside it.
They help ensure the rotation of supplies in storage or can be used only for passing supplies
as needed from a clean centre inside the OT.
There should be emergency communication system that can be activated without the use of
hands.
Detailed Technical Specification for modular Operation Theatre
1. WALLS & CEILING CONSTRUCTION:

The room wall to have two independent surfaces with a minimum opening in between. The external walls of the room to be constructed with solid bricks with cement plastering. The inner surfaces walls to be constructed with 1.60mm thick EGP steel 9 panels backed by 12-mm gypsum board (India gypsum make). These panels to have flame resistance to BS1142 Part 3. The inner surface walls to be fixed to the bricks wall with essential supports. There should be minimum possible cavity/gap in between the solid and steel walls. The total distance between the inside and outside surfacts of the operating room to be variable to suit the architect’s layout, but should be sufficient for the flush mounting of equipments. The individual walls panels should be spot welded together at equal intervals to render equal support to the panels. Spot welding should be properly grinded to make the surface leveled. All joints to be filled with metal filler and sanded flush on site ready to receive the plastic finish. Wall panel’s joints should be invisible after the final wall coating is applied. The cavity between the inner and outer walls should be left with minimum obstruction for the possible addition of equipment at a later date and to enable services, pipes, conduits etc. to be run within the cavity. All wall mounted equipment to be flush mounted and sealed into theatre. The wall panels design and construction to allow for the installation and support of all equipment and the provision of opening required for the installation, without affecting rigidly and strength.
Access boxed will be fitted to the rear of all wall mounted equipment to enable maintenance to be carried out from outside the operating room. All the sharp edges and corners should be in radius to avoid bacteria contamination. The internal surfaces of the room walls should be sprayed with water based liquid plastic, wall glaze or equivalent, approved by the architect to a minimum dry film thickness of 300 microns. The plastic coating should overlap the floor covering, ceiling system and doorframes by 25 microns. The plastic coating should overlap the floor covering ceiling system and doorframes by 25mm to provide a continuous sealed surface. The plastic 10 coating should be non-reflective and the colour to be submitted for approval. All the for corners should have return air duct outlets, the grill of which should be made of MS steel, duly powder coated with colour will suit the hospital.
2. CEILING FILTRATION SYSTEM (IMPORTED):
The ceiling filtration system should be designed to ensure unidirectional distribution of sterile air with differential flow velocities decreasing from centre to perimeter of the surgical theatre to ensure the cleanliness of all the area covered by the air flow. The ceiling system should be equipped with HEPA filters with different performances according to their position in the ceiling to

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achieve different flow velocities. The complete filtering ceiling system should be factory assembled its holding structure, filter frames and top plenum should be made of AISI 304 stainless steel. Filtration ceiling system should have HEPA filters, H according to EN 1822. The filtration ceiling system should have flow equalizer to achieve uniform & constant air distribution over the whole surface. It should also have connection for surgical lamp to be fitted in place of any filter. The air management system should be designed to achieve the following parameters:
F.S. 209 classification = 100 (100 particles/ft3)
Bacteriological class = B (5 CFU/m3)*
Particle decontamination kinetics CP = 5 min
Biological decontamination kinetics CB = 5 min
ECG-GMP Annex 1 classification = Class A
ISO 14644/1 classification = ISO 5 11

3. DOOR FRAMES (HERMETICALLY SEALED DOORS):
Should maintain sterically and the correct air pressure in the room, all doors into and out should be of sliding, hermetically sealing type. The door should meet following specifications:
* International quality & safety requirements.
• Door should be sired to the current IEE regulations and BS7971 standard.
• Motor should be DC 24V 70W brush less DC Motor.
• Noise level of movement should not be more than 60 decibel.
• Controller should be microprocessor based and be CE marked.
• Power efficiency should be.95 (in AC 100V full load.
• The track should be made up of single piece extruded aluminum.
• Environment temperature should be -20oC to +55oC.
• Starting time should be able to regulate from.5 second to 23 second & starting speed should be
600mm per second.
• Electrical safety codes for high & low voltage system.
• Design should meet HTM 2020/2021 standards.
The doorframe should be made of high quality anodize aluminum and the door panel should be made of compact laminate that can withstand high abrasion. To ensure efficient sealing of the door frames should be provided. They will consist of reinforced plasterboard panels faced with the same laminate as the doors.
The door should seal on all four edges in the closed position & should be surface installed type. The track of the door should be constructed with high quality door lock with aluminum extrusion, fixed firmly to the walls.
Nylon runner guides should be fixed to the door in such a way they do not obstruct trolley movement through the door.
The doorframe should be edged with an aluminum extrusion & with concealed fixings to be adjustable during installation to ensure a 100% hermetic seal is achieved.
Vision panels, 300mm x 300mm should be provided in the doors.
The door controller should be sensing overload condition and in overload incase the door with automatically stop & reverse the direction of travel.
The controller should be capable of either being operated by elbow switches/ foot switches, radar switch (touch less sensor). All doors should be able to be opened easily manually in the event of failure of the power supply or the automation unit.

4. OPERATION THEATRE CONTROL PANEL:

The surgeon control panel should meet Electrical safety codes for high & low voltage system, wired to the current IEE regulations.
The room Surgeon’s control panel should be modifiable with changing technology & equipment in operating environments. Control panel will be user friendly & ease of operating & maintaining purpose.

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The panel should be “Membrane” type; configured to incorporate all the services that operation room staff required. The fascia should be made with superior quality UV resistance membrane with sterilization feature.
The panel should contain 6 or 9 service tiles as below:
1. Time Day Clock. 2. Tile Elapse Day Clock. 3. General Lighting System. 4. Medical Gas Alarm Panel. 5. Hand free telephone set with memory. 6. Temperature & humidity indicator with controller.
7. HEPA Filter Status module. 8. Room Pressure Indicator. 9. Music control.

Time Day Clock should be digital type & clocks having high brightness characters.
Tile Elapsed Day Clock should be digital type & clocks having high brightness characters. Temperature indicator should indicate the room temperature which should be connected to the local pressure switches of Air-Conditioning System. Indicators should be digital type & clocks having high brightness characters, not less than 300mm li height.
Central Lighting system should incorporate all the necessary controls of the lighting system inside the theatre.
The medical gas alarm should indicate High, Normal & Low gas pressure for each gas service present in the operating system & should have an audible buzzer with mute facility. Pressure sensors should be connected to MGPS for monitoring the pressures. A hand free set Telephone System should be incorporated in the panel with memory type card. The control panel should be designed for front-access only. All internal wires should be marked with plastic Ferrule type cable markers for ease of identification.
5. DISTRIBUTION BOARD:
A HIGH VOLTAGE EQUIPMENT SHOULD BE INSTALLED IN A SEPARATE ENCLOSURE. The remote cabinet should house the operating lamp transformers, mains failure relays, electrical distribution equipment & circuit protection equipment of all circuits with the operating theatre. All internal wiring should terminate in connectors with screw & clamp spring connections of the clip-on
type mounted, on a DIN rail & labeled with clear proprietary labels. Individual fees or miniature
circuit breakers should protect all internal circuits.
6. X RAY VIEWING SCREENS:

Sl. No. 11: Equipments for Surgical Oncology
Anaesthesia Equipments
Sl No Name of Equipments Quantity

1 Anesthesia Workstation – Primus with Infinity Omega S
Each unit contains the following specifications & accessories
Primus
Primus product family – 8603800 Anesthesia workstation for use in the all standard
inhalation anesthesia procedures including law & minimal flow applications. Suitable for
adults, children & neonates. All components are arranged in a clear & compact manner and include the following:
An electrically powered precision ventilator with electronic control without use of drive – for constant volume ventilation (volume mode) with tidal volumes of between 20ml (10ml optional) and 1400ml and for pressure controlled ventilator (pressure mode). Synchronisaion is an option in both ventilator modes. A heated, compact breathing system with integrated absorber (disposable absorber with integrated bypass optionally available) and sensor holders. Monitoring of ventilation volume and airway pressure. Electronic gas delivery of 02, N20 and Air. Safety devices, supply failure alaons for 02, N20.
Air, N20 shut-off system, Oxygen ratio controller (electronic minimum 02 delivery for low-
flow and minimal – flow modes), O2 flush and interlock plug-in system for two Vapors
(e.g. Vapor 2000) 21% O2 application is possible when using compressed air as a carrier
gas. Fresh gas delivery, ventilator controls, and monitoring are incorporated in a user interface featuring a colour TFT display and central rotary knob.
Monitoring & display of all parameters including ventilator pressure, inspiratory and

6 Nos.

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expiratory flow, inspiratory and expiratory flow, O2 concentration, N2O concentration and monitoring of volatile anaesthetic agents such as Halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane with automatic ansesthetic agent identification and quantitative mixture measurement of two volatile anaesthetics in the by pass flow measurement system MAC value of volatile anaesthetics and N2O, age adjusted (optional) and CO2 concentration measurement (inspiratory and expiratory), ventilation value and breathing frequency (SpO2: optional). Display of 3 real time curves, trends and list displays. Automatic power-on test with automatic calibration of all sensors. Prioritised display of alarms includes flow and O2 sensors, water trap (water lock) and other sensor accessories.
NIST medical gas supply connections (DIN connections also available) including electronic monitoring of the medical gas supply pressures as well as the optional reserve gas cylinders via LEDs and on-screen display of numerical values. Integrated uninterruptible power supply for maintaining operation in the event of mains power failure: fully loaded, rechargeable battery provides power for at least 80 minutes and for as long as 90 minutes, depending on he ventilation mode. Integrated additional outlets. Optional AGS anesthetic gas ………
SW version 400
With ventilation plus – SIMV and PS
With SW Monitoring Plus - Loops Gas supply with A cone With AGS
Press red O21 small cyl PIN
Press red N2O PIN INDEX
Anaesthetic mask size 3
Anaesthetic mask size 2
Anaesthetic mast size 1 with halogen lamp 12v direct Parking holder on rail with DigFlow O2 16L/min oxygen flow meter with digital display of set flow with suction apparatus
*** Hose PS selection ***
1x O2 CS Hose 5m
1x N2O CS Hose 5m
1x AIR CS Hose 5m

Vapor 2000
Consisting of Vapor 2000
Vapor 2000 vaporiser for anaesthetic inhalation agent in the fresh gas branch of anaesthesia delivery systems, suitable for all common inhalation anaesthetic procedure, 360ml filling volume, temperature range 10 to 400C, flow range 0.25 to 15L/min with “T sitting for transport of the filled vaporizer in any position.
1x Isoflurane Vapor 2000
1x Sevoflurane Vapor 2000

Infinity Omega – S – Infinity Kappa with Infinity C700

The Infinity C700 for IT display integrated data at the point of care on a 20” touch screen color display. Infinity Explorer software enables two-way communication between the Kappa and the Infinity.
C700 for IT, bridging the gap between patient monitors and the IT infrastructure of your hospital. The synergy puts the information you need at your fingertips which can support decision making, save time spent looking for information, and help reduce the potential for medical error.
Infinity Kappa monitor: “VGA video output (800x600 pixels) compatible with medical-grade VGA or SVGA (VE) monitors – Display upto 4 channels (5,6 or 8 optional) – 24 hour” “graphical and tabular trends for all parameters”. Event recall of up to 50 (2-channel) events – “Scatability using Infinity pods and software options – “Support for the Surgical Display Controller – “Easy software upgrades via memory data card – “20 minute lithium-

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ion battery”
Patient data transfer via Infinity Network or Memory data card”
PodComm (3 port) for connecting specialized parameters includes: 2-lead ECG, 8-led ECG (with 6-wire lead set)- “Basic arrhythmia – “TruST TM 12-lead (requires 6 wire lead set) – “Multiple invasive blood pressure (based on choice of pods) – “Noninvasive blood pressure
– “Temperature (up to 2)-“ Respiration and apnea monitoring.

The infinity Kappa monitors also offer a broad range of hardware and software options Infinity C700 for IT workstation Combines CPU with 20” widescreen color display-“Surface Acoustic Wave (SAW) touchscreen technology for high image clarity – “Hygenic all-glass panel-” “The industrial design”-“ Fan-less design for noise and dust reduction”. Infinity Explorer software enables two-way communication between Infinity Kappa monitor and Infinity C700 for IT workstation – “Displays real-time physiological parameters received from the Infinity monitor and visually displays alarm data for those parameters – “Can include up to 10 tabs which provide easy access to multiple applications, including Vitai signs, DICOM images, remote bed views, up to 4 Web-based applications and up to 4 Windows-based applications – “Enables control of monitoring functions from both displays Network components, pods, modules and software options must be ordered separately

MultiMed Plus & Accessories
1xMultiMed Plus OR

… … … … … … … ….

** HemoMed Pod**
1x HemoMed Pod
Hemodynamic monitoring organizer that provides a one cable connection to the Infinity modular monitor for cardiac output and 4 invasive pressures. Includes controls for pressure zeroing, wedge pressure calculation and cardiac output start

**Hemo Pods Adapters & Plates*
2x Hemo Pod adapter

IBP Y-Cables and Adapters
1x IBP Y-Cables

Core Temperature Probesd
1x Temp Probe/Cover Kit Pedi
1x Temp Probe/Cover Kit Adult

Skin Temperature Probes
1x Temp Skin Probe 1.5m
1xTemp Skin Probe 3m

Temperature Adapter Cables
1xTemperature Y-Cable

Infinity BISx Kits
1 x BISx SmartPod Kit
**Additional BISx Accessories*
1x BISx Pod Sensors, 25pcs

1xInfinity Central Station
The Infinity Central Station gathers and displays information from Infinity patient monitors

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and Infinity Telemetry for central monitoring of up to 16 patients. Data accessible from the Infinity Central Station includes real-time waveforms and parameters, alarm events, stored waveforms, trends, ST points, caliper measurements and laborabory values, respiratory and ventilator information.

***Accessory Kit ***
ICS Accessories EN
Infinity, CentralStation Accessory Kit for English language.
*** UPS ***
ICS UPS 240V
Uninterruptible Power Supply (UPS) recommended for use with the Infinity CentralStation. The UPS filters small utility line fluctuations and isolates your equipment from large disturbances by internally disconnecting from the utility line. The UPS provides continuous power from its internal battery until the utility line returns to safe levels or the battery is fully charged.

*** Patient Licenses ***
ICS 8 patient license
Enables Central Monitoring of patients on the Main Display of the Infinity CentralStation. This license includes 2- hour Full Disclosure of 4 waveforms, and 2-hours of up to 1000 events per patient.
1x Instruction Manual agreed during negotiation:
Adult Hose Set, Reusable
Paed Hose Set, Reusable
Adult Hose Set, Disposable
Slide Tray
Spo2 Massimo Sensor, Adult

6 Nos
6 Nos.
60 Nos.
6 Nos.
12 Nos.

Sl. No.12: CSSD Specification

1 High speed High vacuum Steam sterilizer(6 STU) Double door with
Inbuilt steam generator with accessories as per technical spec 2

2 Washer Disinfector with Inbuilt Dryer, 305 litres (10 nos DIN tray
processing capacity), Double door with accessories as per technical spec 2

3 Ultrasonic Cleaner (30 Litre Chamber capacity) 1
4 RO Plant of rated capacity for Steam sterilizer 1
5 CSSD furniture and Misc. equipment

A S.S. Wash Station (Clean up Counter) with 2 Sinks and 1 Drainboard and
with nylon adjustable levelling bullets for legs
Size:- 2000 x 650 x 900 + 150 mm LxWxH + Flashback 2

Sink size:- 600 x 450 x 250 mm LxWxDepth 2

B

S.S. Instrument Control and Packing Table - Two Way working; with 2
Overhead Shelves and 2 Drawers and with nylon adjustable levelling
bullets for legs
Size:- 2000 x 1400 x 900 mm LxWxH 2

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C

S.S. Linen Inspection and Fold Table; with illuminate opaque toughened
Glass and Electronic Tubelights and with nylon adjustable levelling
bullets for legs
Size:- 2000 x 1400 x 900 mm LxWxH 1

D S.S. Closed Distribution Transport Trolley with 3 shelves (i.e. 3
Compartments), 2 Doors, 1 Handle and 4 Nos. Heavy duty castor wheels
Size:- 950 x 750 x 1150 mm LxWxH 4

E S.S. Multi purpose Table Trolley with 1 Undershelf and 3 sided Railing

and with 4 Nos. castor wheels Size:- 850 x 600 x 850 mm LxWxH 2
F S.S. Instrument washing Tray
Size:- 325 x 225 x 50 mm LxWxH (Small) 6

G S.S. Free standing Open Storage Rack with 5 Nos. Plain shelves and with
nylon adjustable levelling bullets for legs
Size:- 1200 x 500 x 1800 mm LxWxH 8

H S.S. Pass through Window - Hatch system; Double Door Hinge type with
magnetic Lock, vision Glass and mechanical interlocking system
Size:- 600 x 600 x 600 mm LxWxH 2

1 Rotary Heat Sealing machine: Make: HAWO Model: 780 DC rotary
sealer with integrated printer or equivalent 1
J Spray Gun Rinser 1

Sl.No.13: Chemotherapy Bed/Chair
1. Automatic adjustment of armrest to adjust seat with support comfortable vein puncture.
2. Wedge shaped armrest to provide better blood flow from the donor and donor comfort.
Adjustable swivel able and lift up.
3. Remote control adjustments for adjustment of height and comfortable sitting position.
4. 2 motors controlled with electric remote for lower/back and height adjustment.
5. Lifting capacity of 175 Kg. Twin belt system. Length of couch 214cm. Arm rest length 55cm,
width 14.5 cm.

6. Only one button to reach shock position: head low in case of donor reaction. Remote
controlled.

7. Motor protection against water.
8. Sealed ribs for air circulation.

9. Central locking with locking lever.
10.Waterproof seat, imitation leather with rounded border easy to clean.
Sl. No.14: Endoscopes

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VIDEO GASTROSCOPE HD:
FIELD OF VIEW 1400
DIRECTION OF VIEW FORWARD VIEWING
DEPTH OF FIELD 2-100MM
DISTAL END OUTER DIAMETER 9.2MM
INSERTION TUBE OUTER DIAMETER 9.2mm
WORKING LENGTH 1030MM
INSTRUMENT CHANNEL INNER
DIAMETER

2.8 MM

INSTRUMENT MINIMUM VISISBLE
DISTANCE

3.0 MM

CAUTERIZATION TREATMENT SHOULD BE COMPATIBLE
ANGULATION RANGE UP-2100, DOWN- 900, RIGHT- 1000, LEFT-1000
TOTAL LENGTH 1350 MM

SPECIAL LIGHT Please specify
HDTV SHOULD BE AVAILABLE

VIDEO COLONOSCOPE HD:
FIELD OF VIEW 1400
DIRECTION OF VIEW FORWARD VIEWING
DEPTH OF FIELD 2-100MM
DISTAL END OUTER DIAMETER 12.8 MM
INSERTION TUBE OUTER DIAMETER 12.8 MM
WORKING LENGTH 1680 MM
INSTRUMENT CHANNEL INNER
DIAMETER

3.7 MM

INSTRUMENT MINIMUM VISISBLE
DISTANCE

5.0 MM

CAUTERIZATION TREATMENT SHOULD BE AVAILABLE

ANGULATION RANGE UP-1800, DOWN- 1800, RIGHT- 1600, LEFT-
1600
TOTAL LENGTH 2005 MM

SPECIAL LIGHT Please specify
HDTV SHOULD BE AVAILABLE
VARIABLE STIFFNESS SHOULD BE AVAILABLE
AUXILIARY WATER CHANNEL SHOULD BE AVAILABLE

VIDEO BRONCHOSCOPE:
FIELD OF VIEW 1200
DIRECTION OF VIEW FORWARD VIEWING
DEPTH OF FIELD 3-100MM
DISTAL END OUTER DIAMETER 5.9MM
INSERTION TUBE OUTER DIAMETER 6.0MM
WORKING LENGTH 600MM
INSTRUMENT CHANNEL INNER
DIAMETER

2.8 MM

INSTRUMENT MINIMUM VISISBLE
DISTANCE

3.0 MM

ANGULATION RANGE UP-1800, DOWN- 1300
SPECIAL LIGHT Please specify
SEMI RIGID PLEURAVIDEOSCOPE:
DISTAL END DIAMETER 7.0MM
INSERTION TUBE OUTER DIAMETER 7.0MM

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FIELD OF VIEW 1200
DEPTH OF FIELD 3-100MM
ANGULATION RANGE UP 1600 DOWN 1300
WORKING LENGTH 270MM
TOTAL LENGTH 520MM
CHANNEL INNER DIAMETER 2.8MM
HIGH FREQUENCY COMPATIBILITY YES
LASER COMPATIBILITY YAG, 810NM DIODE

HD VIDEO PROCESSOR:
VOLTAGE 100-240 V AC
TYPE OF PROTECTION AGAINST
ELECTRIC SHOCK

CLASS I

EXAMINATION LAMP LED/300 WATT XENON Please quote all
OUT PUT HD-SDI, SD-SDI, DVI
WHITE BALANCE ADJUSTMENT FROM THE FRONT PANEL
COLOUR TONE ADJUSTMENT RED, BLUE, CHROME + - 8 STEPS
AUTOMATIC GAIN CONTROL (AGC) SHOULD HAVE AGC
CONTRAST ADJUSTMENT SHOULD HAVE CONTRAST ADJUSTMENT
NOISE REDUCTION SHOULD HAVE NOISE REDUCTION
IRIS SHOUL HAVE PEAK AND AVERAGE MODE
IMAGE ENHENCEMENT STRUCTURE AND
EDGE

SHOULD HAVE BOTH STRUCTURE AND
EDGE ENHECEMENT.
IMAGE SIZE SELECTION SHOULD HAVE IMAGE SIZE SELECTOR
FREEZE SHOULD HAVE FREEZ MODE
PRE-FREEZE SHOULD BE AVAILABLE
NBI OBSERVATION SHOULD BE CAPABLE OF NBI
OBSERVATION
INTERNAL AND PORTABLE DATA
MEMORY

SHOULD HAVE INTERNAL AND PORTABLE DATA MEMORY
OBSERVATION MEMORY COLOR TONE, IRIS MODE, IMAGE
ENHANCEMENT, COLOUR
ENHANCEMENT, CONTRAST, AGC,
COLOUR MODE, WHITE
BALANCE,BRIGHTNESS ADJUSTMENT
METHOD, BRIGHTNESS, AIR FEEDING.

PRE-INSTALLATION REQUIREMENT
Vascular Patency Enhancement Technology
MEDICAL GRADE 2I INCH HD MONITOR
COMPUTER PRINTER MONITOR WITH IMAGE GRABBING SOFTWARE ENDOSCOPIC TROLLY
UPS 1KVA
SUCTION MACHINE
ENDOSCOPIC ACCEASSORIES SHOULD BE FROM THE SAME MANUFACTURER

Sl. No.15: Biochemistry, Haematology, Molecular Diagnostic Laboratory Equipments. SPECIFICATION OF AUTOMATIC TISSUE FIXATION MACHINE

Spin Type Carousel Fully Automatic Tissue processing machine for fixation and processing of tissues using formalin, xylene, isopropanol & paraffin

Stable, ergonomical compact design, movable on rollers.

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Bench unit with programmable microprocessor control, display and touchpad keyboard. Silent electro-mechanical motors for agitation and transport of cassette basket.
Built in Fume Hood, 10 reagent stations. Poly Propylene beakers (solvent resistant),
1.8 - 2.0 L capacity.
2 heated paraffin baths that can be controlled.
Connection for third paraffin bath.
Storage capacity of the cassette basket: 120 cassettes.
Spiral Agitation or Vacuum on all the 12 Reagent Stations for Better quality and rapid processing. Microprocessor control of immersion time (1 min. - 99 hr 59 min.) per station and selection of drop and agitation and centrifugal time.
Centrifuging for 60 secs at 210 rpm with automatic change in
Direction every 15 secs for basket and specimen to be optimally drained.
Reduced carryover due to centrifugal movement.
Programmable start delay function without time limitation.
Possible process interruption for reloading or removal of specimens
Indication of date, time, remaining time in process step, step number and reagent description. Permanent memory capacity for up to 10 programs.
Safety switch for not melted paraffin
Optical and acoustic alarm during failure and program end
Manual basket removal during power failure.
Built in Battery protect the sample during power failure
Operable on 220 - 240 V/50 – 60 Hz
Manufacturer must be ISO certified
Product must conform to European CE or American FDA
Should be supplied with suitable UPS with min. 2 hours power back up
Should be able to use local reagents like Formalin, Xylene, Isopropanol, Paraffin etc. Should be supplied with min. 100 metallic tissue processing capsules with lids

Specification Semi Automatic Rotary Microtome
Ergonomic design.
Compact dimensions.
Vertical guidance by zero-backlash and maintenance free cross roller bearings Electronic precision feed mechanism with stepping motor technology Section thickness range from 0.5 up to 500 um
Especially smooth running handwheel.
One hand quick clamp change
Fine orientation with one hand operation and zero positioning
Easy exchange of specimens.
Specimen retraction during return travel, can be turned off.
Two section thickness areas that can be pre selected easy switchable Removable operating panel with full graphic display.

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Indication of all relevant information such as section thickness, trim thickness, number of sections, section thickness sum, and remaining travel of the specimen feed as well as time and date.

Reduced number of buttons for intuitive operation.

Patented and ergonomic one knob operation of the specimen feed with variable speed adjustment.

Indication of cutting parameters can be switched over to large indication.
Large section waste tray, covering the entire working area.
Ergonomically optimized operating elements for non tiring usage.
Design with highest demands concerning operational safety and ergonomics.
Integrated removable storage plate.
Stepping motor micrometer mechanism
Specimen retraction during return travel: 40 um can be turned off
Fine section thickness feed via precision stepping.
motor from 0.5 to 100 microns:
up to 2 um in 0.5 um increments,
up to 10 um in 1 um increments,
up to 20 um in 2 um increments,
up to 30 um in 5 um increments,
up to 40 um in 10 um increments,
up to 100 um in 20 um increments.
Trimming thickness feed via precision stepping motor up to 500 um: up to 10 um in 5 um increments,
up to 100 um in 10 um increments,
up to 200 um in 20 um increments,
up to 500 um in 50 um increments.
Horizontal feed range 28 mm.
Vertical specimen stroke 72 mm to make possible cutting of larger tissue
Specimen orientation universal 8°, can be rotated 360°
230 V 50 Hz 420 x 490 x 280 mm (W/D/H) Wt: 28 Kg
Unit should be CE/FDA approved

Should be supplied with Blade Holder common for High and low profile blades and 1 pk each of High and Low Profile Blades (50/pk) and a suitable clamp for holding the Specimens

Laboratory Equipments
Electric Colorimeter
1 Filter: Seven Glass filter

2 Photometric Range: 0-100%T(Transmittance)
0- 2.0Abs(Absorbance)
3 With digital readout

4 Sample Container: Square cuvette 10x10x45(mm)
Round cuvette 10(ID),12(OD),105(L)mm
5 Works on 230V,50 Hz
6 Accessories
7 Filter case-1 pc

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8 Filter-7 Pc
9 Analog output cable-1 Pc
10 Power cord-1 Pc
11 Operation manual -1 copy
12 Bulbs-3 nos
13 Extra Cuvettes -10 nos

14 Should be CE or ISO approved product
15 Test and calibration Reports to be provided
16 Should be supplied with reagents, calibrator and controls for demonstration and installation
Shaker Water bath
Technical Specification

1 Double Wall, both outer and Inner chamber are Stainless steel with insulation between outer

and inner chambers.

2 Special type of transparent PP/PVC/acrylic cover in the shape of inverted V to avoid
evaporation of water and draining of condensed water back into water bath.
3 Shaking speed (Approximately): 25 to 200 strokes/min.
4 Temperature Range: from Ambient to 100 o C with accuracy of ± 1 o C
5 Thermostatically controlled with Regulator.
6 Mercury thermometer must be provided
7 Digital temperature indicator cum Regulator

8 Removable stainless steel tray with the following capacities (Approximately) must be
provided.
9 1.100 ml x 10-12 flask
10 2.250 ml x 4 - 6 flask
11 3.500 ml x 2 - 4 flask
12 4. Test tube racks.
13 Should work on 230 V,50 Hz
Hot Air oven
1 Double Walled, inner wall made of aluminum and outer wall Mild Steel sheet.

2 Shelves: 3 to 5 stainless steel, perforated shelves, could be adjusted at any levels.
3 Heating Elements: placed at the bottom and sides.

4 Temperature control: Thermostatic control from 40 to 250 o C with Regulator and digital
temperature-indicator.

5 Automatic timer 0 - 60 minutes.
6 Air circulating fan.
7 Volume: 50 L
8 Standard,Safety and Training
9 The manufacturer should have ISO certification.
10 Documentation

11 User Manual in english
12 Service Manual in english
Lab Incubator

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1 Technical Specification
2 Capacity: 120 L
3 Interior chamber: SS 316 for easy cleaning and decontamination
4 Timer: 1 min. to 100 hours and hold position
5 Minimum turbulence and no cross contamination
6 Adjustable safety thermostat for temp setting at 1 deg C increment
7 Temp Accuracy: +/-1%
8 Internal glass door for the observation
9 With minimum two adjustable shelfs

10 Audiovisual Alarm to Indicate when temperature deviates more than 1°C from setpoint, and
when program or time has finished. Equipment should have provision to mute the alarm.

11 Peltier heating with continuous air circulation and Heating by natural/forced convection for
homogenous temperature distribution
12 Temperature range: +5° C to 60°C

13 There should be a Membrane Keypad with LCD/LED Display to set and display operating
parameters, current status, running time and alarm conditions for time and temperature.

14 The Equipment should have Interior lighting facility, and insulated door fitted with heavy
hinges
15 Power Supply:230V,50 Hz
16 System Configuration Accessories, spares and consumables
17 Incubator as per specification

18 All consumables required for installation and standardization of system should be provided

free of cost

19 Should be supplied with all the accessories required for the functioning of the equipment.
20 Power Cord
21 Standard,Safety and Training
22 The manufacturer should have ISO certification.
23 Documentation

24 User Manual in english
25 Service Manual in english
Hot plates
Technical Specification
1 Dimensions (mm) (approximately): 445x110x395
2 Glass ceramic area(mm): 430x280
3 Heated zone (mm): 165 and 145 x145
4 Stirrer: Inbuilt Stirring facility
5 Min/max speed (MIN): 100/1000
6 Temperature control: Right heating arc, each temp sensor between 35 and 199ºc
Rotor / Shaker

Technical Specification

1 Double Wall, both outer and Inner chamber are Stainless steel with insulation between outer

and inner chambers.

2 Special type of transparent PP/PVC/acrylic cover in the shape of inverted V to avoid
evaporation of water and draining of condensed water back into water bath.

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3 Shaking speed (Approximately): 25 to 200 strokes/min.
4 Temperature Range: from Ambient to 100 o C
5 Thermostatically controlled with Regulator.
6 Mercury thermometer must be provided
7 Digital temperature indicator cum Regulator

8 Removable stainless steel tray with the following capacities (Approximately) must be
provided.
9 1.100 ml x 10-12 flask
10 2.250 ml x 4 - 6 flask
11 3.500 ml x 2 - 4 flask
12 4. Test tube racks.
13 Should work on 230 V,50 Hz
Counting chamber

1

TCDC count will be performed by Haematology Auto analyzer. However, in the event of
failure of the machine, the same should be performed manually with a neubeaur counting chamber which should have very thin marking on the glass (visible only under microscope)

2 The small marking shall be for RBC and the big markings for WBC counting
3 Weber Bright Line Counting Chamber
Paediatric Glucometer

1 Should be digital, battery operated
2 Code strips should be easily available
3 Should operate at room temperature
4 Package should come with disposable sterile lancet
5 Should give results within 1 minute
6 Should be able to store data for at least last 3 tests
7 Should come with CE marking
Glucometer

1 Should be digital, battery operated
2 Code strips should be easily available
3 Should operate at room temperature
4 Package should come with disposable sterile lancet
5 Should give results within 1 minute
6 Should be able to store data for at least last 3 tests
7 Should come with CE marking
Haemoglobinometer
1 Should be digital, battery operated
2 Code strips should be easily available
3 Should operate at room temperature
4 Package should come with disposable sterile lancet
5 Should give results within 2-3 minutes
6 Should not be affected by haemoglobin variation
7 Cartridge should be self-contained
8 Should be able to store data for at least last 3 tests
9 Should be NGSP certified
10 Should come with CE marking

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11 Accessories free of cost:
12 1.Micro Pipette - 2.5 ml: 1 No.
13 2..Lancing device - 1 Unit
14 3 Lancettes: 25 Nos

15 4. 1-heme cuvettes with rubber cap
Electrolyte Analyser
System should measure Na, K and Ca, Li.
Facility for auto sampler tray for constant loading. Sample can be fed by capillary syringe
or sample tube directly
Sample volume should be less than 100 micro-liters.
Auto Calibration Facility and provision for economy mode.
Quality control facility
Facility of flagging of abnormal results and user programmable ranges.
Stand by mode: user controlled and automatically controlled Memory for last 100 messages.
Built in printer for printing the data.
RS.232.C (standard serial port) should be available
ISE Analyser-01
Na, K, Ca,, Li, Electrodes- 02 each (1 standard and 1 spare
Should be provided with reagents and consumables for 300 tests
Glycosylated Haemoglobinometer
a Fully automatic
b User Friendly, easy to use
c Multiple sample accommodation in primary tubes and sample vials. Whole blood primary
tube sampling
d Facility of result display with chromatogram in a printed format
e Minimum interference from other labile HbA1C, Lipemic samples, other haemoglobin
f variants
g With Bar Code Facility.
h With LCD Display.
i With Built in printer.
j With Data Storage facility.
k With Service port for connectivity
l With Suitable UPS for ½ hr capacity.
m Consumables and specific reagents worth of 300 tests to be provided as per the requisition
of the end user.

Laboratory Autoclaves
1 Technical Specification

1.1 Stand-alone bench top autoclave 20 Litres, automatic.Single door, self sealing with high-
quality silicone gasket
1.2 Dimension should match to suit the voume of autoclave

1.3 The autoclave should have double wall sheet metal with suitable insulation in between

walls.

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1.4 Pre-set automatic cycles for unwrapped instruments, wrapped instruments/packs

1.6 Two automatic programmes, approx: 2.2 bar at 134 degree C and 1.1 bar at 121degree C.

1.7 The equipment should have automatic pressure control switch /automatic water control
device to ensure that the equipment does not run dry.

1.8 System should have digital display for Temperature and Time.System should have
analogue display for Pressure.

1.9 System should have audio visual alrm for low water level,and other system errors.

1. 10 Fit with 5 L water reservoir, automatic fill, autonomy for at least 10 cycles
1.11 Should be with 3 removable shelves
1.12 Should have Double safety door locking device

1.13 Should have safety feature protection against over-pressure and over-temperature

1.14 Audible and visual alert upon cycle interruption or completion
1.15 Unwrapped cycle time: cold 30 min, hot 20 min
1.16 Control panel with alpha-numerical display and cycle indicators
1.17 Should be complete with 3 instruments trays
1.18 Power Supply:230V,50 Hz
1.19 Power consumption: 3000 W(Approx)
2 System Configuration Accessories, spares and consumables
2.1 Autoclave-20L
2.2 1 x set of 3 matching instrument baskets
2.3 1 x set of 3 matching sterilizing drums
2.4 1 x roll of sterilization indicator
3 Standard,Safety and Training
3.1 The manufacturer should have ISO certification.
3.2 Equipment should have CE/BIS certification
4 Documentation

4.1 User Manual in english
4.2 Service Manual in english
4.3 Certificate of calibration and inspection from factory.
Floatation Bath

To be used for tissue culture, fermentation of tissue and processing
should be able to process wrinkle free specimen

should have round double walled single piece inner and outer chamber made of aluminium

rim should be wide enough to dry the wet slides
should have a capillary thermostat from ambient to 70 degree centi grade with accuracy of
+- 2 degree celcius

Specification of Manual Slide Stainer
It should use the staining troughs and slide baskets suitable for low-volume procedures having the following features:
It must have min. 14 staining stations
Sturdy cover that closes over troughs to minimize evaporation
Baskets should be designed to lock slides into position even when turned upside down

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Each Slide basket to hold 20 standard microscope slides
Troughs made of acrylic plastic to hold 11 fl. oz. (320mL) of reagent
Physical Specifications
Dimensions (D x W x H): 7.1 x 39.4 x 4.7 in. (18 x 100 x 12cm)
Must Include: a steel support rack, a complete set of 14 staining troughs (320mL), and five slide baskets with carriers.

Specification Cytocentrifuge
Unit should provide economical thin layer preparations from any liquid matrix, especially hypo-cellular fluids such as Spinal fluids & Urines
Technical Specifications:-
centrifuge working principles should be that the cytocentrifuge deposits cells on to a clearly defined area of a glass slide & allows for the absorption of the residual fluids into the sample chamber’s filter card. Unit should also provides constructively flattens cells for excellent nuclear presentation.
The action of cytocentrifuge should be that way so that it gives all cell types equal opportunity for presentation.
In load or spinning, tilting feature should be available so that it reduces the possibility to touch the prepared slide from the residual fluids.
Unit should have 20 program memory.
Unit should have “easy-touch” program for easier key stroke & more intuitive programming. Revolution per Minute (RPM) should be from 200-2000rpm.
Unit should display programmed & remaining time.
Run time should be from at-least 1 min. to the max. Of 99mim.
Should have power saving mode. Display should be turned on/off by the stand-by key.

Unit should have the facility of safety alarm feature which reminds end-user to remove the specimens.

Should have the option of acceleration control for more flexibility & exceptional protection for fragile samples.
Unit should be able to run 12 head & 24 specimens at one time.
Opening/closing of the lid should be done with single handedly
Unit should not run until the lid is locked & should remain during the rotation.
Lid of the unit should be made of polycarbonate material so that it allows user to see the through cytocentrifugation.
Unit should come with auto locking, plastic outer lid & autoclavable sealed head.
Unit should have CE/FDA approved.
Should be supplied with disposable funnels with integrated filter cards for single hole, double hole, clips and Mega Funnels for large vol. samples. Min. 200 samples.
Physical Dimension:-
Hx W x D:-
With closed lid: 24 x 40.5 x 62cm
With open lid: 62.5 x 40.5 x 62cm
Weight: Not more than 12kg
Power req:- 100-240 VAC, 50/60Hz, 1Ph, 150VA Max. Plain Real Time PCR

RT-PCR:
Specifications:-

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o Automated, latest and bench top Real Time PCR system for IVD use. System should be certified
with CE-IVD & US-FDA.
o Kits provided should be IVD and FDA approved. Company should have kits for HIV, HBV, HCV
and other assay.
o System should have at least two platforms. One for manufacturer’s reagent system & another for
open channels for programming home made assays using TaqMan and Hybridization probe
assays. Ready to use DNA and RNA master mixes should be available for homemade assays.
o System should be 4 color & capable for multiplexing.
o Sample throughput should be at least 48 tests per run
o Laser transmitter on board barcode reader should contain Class 2 IEC 825-1 and EN 60825-1
laser products.
o System should run minimum two different assays simultaneously in a single run by using two
blocks.
o Temperature range should be from 40°C - 98°C with a ramp rate of 1.2°C / sec
o Should have four excitation filters and four emission filters to cover wide chemistries. Each
sample in each well should be monitored with dedicated fiber optic bundle to have improved sensitivity for fluorescence measurement and to avoid cross talk
o Light Source – halogen lamp with highest intensity & spectral range featuring with heat saving
guard.
o System should use close tube process to avoid any cross contamination
o It should have on board laser transmitter and barcode reader
o Systems should be supplied with latest Pentium computer with color monitor and printer. It
should have a interface to laboratory host computer
o System software should be based on Windows XP/Windows10 and validated for IVD applications
o Systems should be compatible for 220 V / 50 Hz power supply.
o Computer memory up to terabyte limit.

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Extraction system:

• Automated US FDA and CE IVD approved sample extraction, nucleic acid isolation and PCR

reaction setup

• Sealed, ready-to-use bar-coded reagents reduce instrument set-up time
• Sample processing takes place in a disposable sample processing unit (SPU)
• Closed sample input tubes to reduce cross contamination.
• Perform general DNA/RNA sample extraction with Total Nucleic Acid Isolation (TNAI)
reagents
• Convenient loading of at least 72 samples at the same time & process within 4 hours.
• Processing of multiple parameter simultaneously.
• Flexible batch sizing of patient samples
• Continuous loading of additional samples, reagents and consumables during operation
• Extraction process should be solution phase magnetic bead separation based technology
• Throughput of at least 130 specimens per day, based on testing combination & lab workflow
• Sample volume ≤1500 μL (depending on extraction protocol)
• At least 6 independently programmed incubators with at least 24 positions each, at least 3
position at 60°C & 3 maintained at 37°C
Please quote for all of them with specifications
a. Agarose Gel Electrophoresis Truft and power supply.

b. Page get Electrophoresis Truft & power supply.

I. Gel Caster
II. Western Blot
III. Blot Transfer
IV. Truft & RLV densitometric scanner.
c. - 20 ° C Refrigerator.
d. DNA & RNA should be manually extracted.
e. Flow cytometry.
f. Electronic Balance.
g. Dry hot Bath 25° C – 199° C.
h. ELISA Reader.
i. Dual Beam Spectrophotometer Range 150 nm – 1100 nm.
j. Variant / HSLC / DIO Biorad Glycosylated haemoglobinometer.
k. Plain Real time PCR.

Sl. No. 16: Equipment Specifications for Advanced Anesthesia Workstation
1. Description of Function
1.1 Anesthesia Workstation is used for delivering anesthesia agents to the patients during surgery. The complete unit also monitors the vital signs and ventilates the patients.
2. Operational Requirements
2.1 Anaesthesia machine complete and integrated with Anaesthesia gas delivery system;
Circle absorber system;
TEC Vaporisers for Halothane /, Isoflurane / Sevoflurane;
Anaesthesia ventilator.
Anaesthesia Gas monitoring with automatic Agent identification, EtCO2, Patient circuit Oxygentation status FiO2 and EtO2 (using Paramagnetic cell for no recurring cost)
2.2 Essential accessories to make the system complete and compatible with the existing system of gas outlets.
2.3 Demonstration of the equipment as per specifications is a must.

3. Technical Specifications

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3.1 Flow management
3.1.1. Should be Compact, ergonomic & easy to use.
3.1.2. Machine should provide electronic gas mixing. User should be able to set Fresh Gas
flow and FiO2 on the screen. Direct setting of FiO2 should be available to make setting of O2 plus Air flows faster across all flow ranges instantaneously.
3.1.3. Multi-color Touch Screen TFT display of at least 15” size, with display of flow of
O2, N2O or Air. The screen should be movable and angle should be tiltable for better viewin.
3.1.4. Dual flow sensing capability at inhalation and exhalation ports.
3.1.5. Should have back-up O2 control which provides an independent fresh gas source and
flow meter Control in case of electronic failure.
3.1.6. Gas regulators shall be of modular design/ graphic display
3.1.7. One no. yoke each for Oxygen & Nitrous Oxide. Separate Pipeline inlet for Oxygen,
Nitrous Oxide and Air with electronic pressure gauges to indicate inlet pressures.
3.1.8. Electronic Hypoxic Guard to ensure minimum 25% O2 across all O2-N2O mixtures
and Oxygen Failure Warning.
3.1.9. Auxiliaryflowmeter for Oxygen
3.1.10. Should have unlockable Oxygen flush to deliver oxygen flow of approximately 40 l/min.
3.1.11. Should have facility of delivering basal flow of oxygen on switching on the machine. 3.1.12. A single pneumatic/electric on/off switch should activate the gas flow and vaporization.
3.1.13. Tenderer to quote individual price of TEC vaporizer for each drug (Halothane, Isoflorane, Sevoflorane)

3.2 Breathing system
3.3.1. All parts of the breathing system that are in contact with patient gas should be latex
free and autoclavable.
3.3.2. Flow sensing capability at inhalation and exhalation ports, sensor connections shall be
internal to help prevent disconnect.
3.3.3. Should not require tools when dismantled for cleaning and sterilization.
3.3.4. Sensor should not require daily maintenance.
3.3.5. Should have bag / vent selecting valve integrated onto the absorber and should
automatically turn on the ventilator when positioned to ventilator position.
3.3.6. Adjustable pressure limiting valve shall be flow and pressure compensated.

3.3 Standard Circle Absorber System
- Should have adjustable pressure limiting valve.
- Should have a bag/ventilator selecting valve integrated onto the absorber.
- Should be suitable to use low flow techniques
- Should have CO2 absorbent chamber canister of 900gms capacity
- Should have CO2 bypass without any air entrainment or loss of pressure / disconnect

3.4 Vaporize
3.4.1. Vaporizer must be isolated from the gas flow in the off position and prevent the
simultaneous activation of more than one vaporizer.
3.4.2. Vaporizer shall require no tools to mount.
3.4.3. Vaporizer shall mount to a Selectatec® manifold which allows easy exchange
between agents.
3.4.4. Supplier must offer total vaporizer manufacturing capability-Desflurane, Enflurane,
Sevoflurane, Halothane and Isoflurane.
3.4.5. Back bar to accept two selectatecvaporisers

3.5 Ventilator (Integrated)

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3.5.1. The workstation should have integrated Anesthesia Ventilator system for adult and
paediatric and neonates.
3.5.2. Ventilator should be pneumatically driven, electronically controlled and should be
ascending bellows /bag in bottle type.
3.5.3. Ventilator should have Volume Control and Pressure Controlled,SIMV and PEEP,
Dual control mode(PRVC/ PRVT/ PCV-VG etc.), Pressure Support
3.5.4. Ventilator should be capable of ventilating diverse range of patient groups from
neonates to patients with restrictive airways with tidal volume range between 20 ml to
1500 ml with single bellows system. With option of delivering 5ml in PCV, neonatal
mode.
3.5.5. Assisted modes of breathing should be flow triggered.
3.5.6. Ventilator shall compensate for fresh gas flow and compliance of the entire circuit
dynamically. Ventilator should have a tidal volume compensation capability to adjust
for losses due to compression.
3.5.7. The workstation should be capable of delivery of low flow and minimal flow
anaesthesia.
3.5.8. Ventilator should be capable of at least 120-150 L/min peak flow to facilitate rapid
movement through physiologic “dead space” in the Pressure Control mode.
3.5.9. Ventilator should also display waveforms for flow and airway pressure.
3.5.10. Ventilator should display spirometery loops including Flow-Volume and Pressure-Volume curves.

3.6 Display of Ventilator:
3.6.1. Display should be 15 inches with touch screen for easy access to settings.
3.6.2. Display pressure vs time, flow vs time, scalars
3.6.3. should display flow volume, pressure volume loops.
3.6.4. should display respiratory gas monitoring, and anesthetic agent monitoring. Values
should display Automatic Agent indentification, concentration, inspired and expired,
Age corrected MAC value, Capnograph.
3.6.5.

a) Tidal volume (VT))
b) Inspiratory/expiratory ratio (I:E)
c) Inspiratory pressure
d) Pressure limit (Plimit)
e) Positive End Expiratory Pressure (PEEP)

3.7 Anesthesia Monitoring System:
3.7.1. Monitoring of vital parameters: ECG (5 leads) with ST segment analysis, NIBP,
SPO2 and 2 Invasive Blood Pressure.
3.7.2. Spirometry with display of flow volume loops on ventilator screen display or patient
monitor display.
3.7.3. Twin temperature measurement with skin and rectal probes-Two sets with each
monitor
3.7.4. 24hrs of graphical and numerical trending
3.7.5. Audio visual and graded alarming system
3.7.6. Display size will be 12 inches
3.7.7. Should be capable of display of six waveforms
3.7.8. Module for monitoring depth of Anaesthesia using EEG based algorithms system
BIS/ Entropy

4. System Configuration Accessories, spares and consumables
4.1. Anaesthesia Gas Delivery system -01
4.2. Circle absorber –01
4.3. Ventilator -01

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4.4. Patient Monitor -01
4.5. TEC Vaporizer Sevoflurane -01
4.6. TEC Vaporizer Isoflurane -01
4.7. Adult and Paediatric autoclavable silicone breathing circuit each
4.8. Accessories Anesthetic gases measurement-01 set
4.9. Standard accessories to make all parameters working- 01 set

5. Environmental factors

5.1. The unit shall be capable of operating continuously in ambient temperature of 100C -
400C and relative humidity of 15-90%
5.2. The unit shall be capable of being stored continuously in ambient
5.3. Shall meet IEC-60601-1-2: 2001(Or Equivalent BIS) General Requirements of Safety for
Electromagnetic Compatibility.
5.4. Safe disposal system/port of waste anesthetic gases (AGSS Anesthetic Gas Scavenging
System/Port) should be in place.

Supplier will be held responsible if this is not ensured at the time of installation

6. Power Supply
6.1. Power input to be 220-240VAC, 50Hz,as appropriate fitted with Indian plug.
6.2. Resettable over current breaker shall be fitted for protection.
6.3. Suitable Servo controlled Stabilizer/CVT.
6.4. The Anaesthesia Delivery system and Monitoring system will have a one hour battery
backup.

7. Standards, Safety and Training
7.1. Anaesthesia Workstations and monitors should be USFDA and CE approved product.
7.2. Electrical safety conforms to standards for electrical safety IEC-60601 / IS-13450
7.3. Manufacturer should be ISO certified for quality standards.
7.4. Certified to be compliant with IEC 60601-2-13-Medical Electrical Equipments
7.5. Should have local service facility.The service provider should have the necessary
equipments recommended by the manufacturer to carry out preventive maintenance test
as per guidelines provided in the service/maintenance manual.
7.6. All components like anaesthesia machine, vaporisers, and ventilator should be only from
one manufacturer/principal.

8. Documentation

8.1. User Manual in English.
8.2. Service manual in English.
8.3. List of important spare parts and accessories with their part number and costing
8.4. Certificate of Calibration and inspection from the factory
8.5. Log book with instructions for daily, weekly, monthly and quarterly maintenance
checklist. The job description of the hospital technician and company service engineer should be clearly spelt out.
8.6. List of Equipments available for providing calibration and routine maintenance support as
per manufacturer documentation in service / technical manual.
8.7. Compliance Report to be submitted in a tabulated and point wise manner clearly
mentioning the page/para number of original catalogue/data sheet. Any point, if not substantiated with authenticated catalogue/manual, will not be considered.

Sl. No. 17: List of Hospital furnitures
S.No. Description of items Qty Units

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1 CHAIRS

1 Reception / Enquiry / Registration Chairs - Backrest / Arm rest Height
Adjustment, Revolving Self Regulating Tilt Adjustment, Caster Wheel

25 Nos.

2 Consultant Chairs - High Back, Backrest / Arm rest Height Adjustment,
Revolving, Synchrotilt, Tilt Lock, Optional Seat Depth Adjustment, Self Regulating Tilt Adjustment, Castor wheel

19 Nos.

3 Duty /Resident's Interns Chair / Staff Chairs - Backrest / Arm rest Height
Adjustment, Revolving Self Regulating Tilt Adjustment, Caster Wheel

45 Nos.

4 Visitor's chairs - Backrest / Arm rest Height Adjustment, Revolving Self
Regulating Tilt Adjustment, Caster Wheel

64 Nos.

5 Waiting Chair - (3 seater) - MS Powder coated Perforated type 69 Nos.
6 Waiting Chair - (2 seater) - MS Powder coated Perforated type 28 Nos.
7 Chair with arms - Backrest & Arm rest (Attenders Chair) 48 Nos.
8 Lab Stool - SS Top & Height Adjustment type 180 Nos.
2 TABLES

9 Consultant Table (1350mm x 900mm x 750mm) - Commercial ply top
with Drawer Unit (2Box+1Filling)

17 Nos.

10 Table - (1200mm x 750mm x 750mm) - Commercial ply top with Drawer
Unit (2Box+1Filling)

20 Nos.

11 Wooden Credenza (900mm x 510mm x 610mm) with locking Facility 27 Nos.
12 Center Table (450mm x 450mm x 450mm) - Commercial ply top 5 Nos.
3 COUNTERS

13 Main Reception Counter - Polished Granite top with commercial ply
laminate finish with appropriate supports, provision of wooden storage and
CPU, Keyboard provision etc

11 Sqm

14 Counter - Polished Granite with commercial ply shutters and storage
(Nurses station, Cu, Du, Pantry, Blood Bank Lab counter)

83 Sqm

15 Lab Table - Polished Jet black Granite with commercial ply supports and
storage

119 Rm

16 Console / Treatment planning Counter (900mm wide, 750mm high) -
comercial ply top with laminate finish with appropriate supports, provision
of wooden storage and CPU, Keyboard provision etc

51 Rm

4 STORAGES Qty Units

17 Commercial ply Full Height Storages with laminate finish (1500mm X
600mm X 2100mm)

101 Nos.

18 Commercial ply Full Height Storages with laminate finish (1200mm X
500mm X 2100mm) - For LINAC & Brachy Room, CT Simulator room
storage

14 Nos.

19 Commercial ply Low height storage with laminate finish (1200mm x
450mm x 750mm)

20 Nos.

20 Commercial ply Over Head storage with laminate finish (600mm x 450mm
x 450mm)

45 Nos.

21 Commercial ply Over Head storage with laminate finish (600mm x 450mm
x 600mm)

45 Nos.

22 Steel Almarah (1200mm x 450mm x 1800mm) 5 Nos.
23 MS Slotted Angle Racks (1800mm x 450mm x 2100mm) 61 Nos.
24 SS Open Racks (1800mm x 450mm x 2100mm) 3 Nos.
5 MISCELLANEOUS

25 Curtain Track with curtains of height 2100mm 240 Rm
26 2 Seater Sofa 8 Nos.
27 3 Seater Sofa 5 Nos.

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28 Change room Lockers (4 doors) 8 Nos.
29 Change Room Lockers (2 doors) 12 Nos.
30 Notice Board - (1650mm x 1200mm) 9 Nos.
6 MEDICAL EQUIPMENTS

31 Examination Couch 18 Nos.
32 General Ward Beds 33 Nos.
33 Endoscopy Treatment Table 6 Nos.
34 Private Room beds 4 Nos.
35 ICU Beds 28 Nos.
36 Bed Side Locker 68 Nos.
37 Step Stool 27 Nos.
38 Physiotherapy Tables 3 Nos.
39 Attenders cot 8 Nos.
40 OT Table (high end - 2, low end - 2) 4 Nos.
41 Phlebotomy chairs 2 Nos.