STATE HEALTH SOCIETY BIHAR

REQUEST FOR PROPOSAL (RFP)

For Supply/Installation/Commissioning (turnkey basis) of Modular Operation Theatres in 6 Medical College & Hospitals and 36 District Hospitals in Bihar

Sealed bids (three envelope system) are invited from the leading firms/ consortium for Supply/Installation/Commissioning (turnkey basis) of Modular Operation Theatres in 6 Medical College & Hospitals and 36 District Hospitals in Bihar. Request for proposal (RFP) and detailed terms and condition are available on (http://www.statehealthsocietybihar.org/). The last date for submission of proposal along with all requisite documents is 20/01/2014. All the applications received by due date will be opened at 11:00 am on 21/01/2014 in presence of bidders or their representatives. The shortlisted agency are required to make technical presentation at 11:00 am on 24/01/2014 in the Conference Room of State Health Society Bihar, Sheikhpura, Patna. The State Health Society Bihar reserves the right to cancel the tender without assigning any reason.

For any further clarification, please contact Mr. Sandeep Kumar on 9308138612 during official working hours.

Secretary Health cum Executive Director
State Health Society Bihar

Supply/Installation/Commissioning (turnkey basis) of Modular Operation Theatres

REQUEST FOR PROPOSAL (RFP)

A. Introduction

Health sector in Bihar has witnessed notable developments in the last few years particularly in fields of improvement in health infrastructure, patients visiting health centres, institutional delivery & reduction in maternal mortality. The results of health initiatives in the Bihar are positive and the state needs to sustain the momentum during the coming years. Continuing with the trend, Government of Bihar intends to establish modular operation theatre in medical college & hospital and district hospitals in the state.

B. Scope of Work

The Government of Bihar intends to install Modular Operation Theatre (MOT) in 6 Medical College & Hospitals and 36 District Hospitals. The agency will provide complete technical support in terms of design and execute the modular OTs on turnkey basis, supply bio medical equipments & medical furniture as required including installation, operationalisation and maintenance of modular OTs. The number of MOT are 7 (seven) in Patna Medical College & Hospital, 3 (three) in remaining 5 Medical College & Hospitals and 1 (one) in each District Hospitals (total 36 District Hospitals), thereby, totalling **58 MOT** across the state. **The Bill of Quantity (BoQ) along with Technical specifications are in Annexure I of the RFP.**

C. General Terms and Conditions:

1. Interested Bidders may inspect the proposed hospital buildings before submission of their proposal to decide requirement at their own cost.

2. Before submitting the proposal, the bidder will be deemed to have satisfied themselves by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates quoted in the proposal are adequate and all inclusive to accord with the provisions of contract for the completion of works to the entire satisfaction of the SHSB.

3. The Bidder should have an experience for similar nature work to manage turnkey projects for a period of 3 years in India and shall submit documentary evidence of satisfactory performance of the OTs.

4. The proposal with required document shall be submitted on or before 20/01/2014 to the Office of the Executive Director. Any submission after the due date will not be accepted. The documents should be submitted in three separately sealed envelopes, one each for **eligibility, technical and financial bid**. All the three sealed envelopes should in turn be put in one big sealed envelope and

marked as follows addressed to the Secretary Health cum Executive Director, State Health Society Bihar along with address mentioned in the advertisement:

a. **Outer Envelope:** " Proposal for Supply/Installation/Commissioning (turnkey basis) of Modular Operation Theatres"
b. **Inner Envelopes:**
    - Eligibility Envelope
    - Technical Proposal
    - Financial Proposal

5. All the applications received by due date will be opened at 11:00 am on 21/01/2014 in front of bidders or their representatives. **Firm will be short-listed based on the eligibility criteria and will be invited for technical presentation at 11:00 am on 24/01/2014.**

6. The Firm will be short-listed based on technical documents furnished & presentation made for proposed services on the 24/01/2014. The date and time for opening financial bids of the technically short listed firms will be intimated later by e-mail and/or telephone.

7. The State Health Society Bihar reserves all rights to reject any or all the RFP/tender without assigning any reason. **SHSB reserves the right to distribute the work to technically short listed single or multiple vendors after negotiating to match the cost of all bidders to the 1st lowest.**

8. **Eligibility Criteria:** Interested agencies must have the following minimum credentials to qualify for the proposed task:

a. The minimum average annual turnover required for agencies taking part in this RFP shall be Rs. 15 (fifteen) crores in the last three years. Reports on the financial standing of the Bidder, such as profit and loss statements and balance sheet and auditor's reports for the past three years to be submitted
b. Minimum of 3 year of experience of working in setting up of Modular OT on turnkey basis. Attach relevant completion certificates.
c. Must not be blacklisted or fined/ adverse observation by any government department/ institution/ Competition Commission of India/ Comptroller and Auditor General of India (CAG)/ Central Vigilance Commission (CVC). The Agency should submit an affidavit for the same.
d. Earnest Money Deposit (EMD) of **Rs. 25,00,000/- (Twenty Five Lakh)** (Refundable) through a Demand Draft drawn in favour of "State Health Society Bihar". Any bid which is not accompanied by the EMD will be automatically rejected. The applicants should be prepared to make presentation on their technical proposals at State Health Society Bihar office at Pariwar Kalyan Bhawan, Sheikhpura, Patna without any cost or commitment in a pre-bid meeting. EMD will be returned to the non-qualifying bidders.
e. Contact details of the experts involved in implementation of the project

9. The selected agency will have to provide uninterrupted power supply through online UPS system and DG Set for back up at each MOT (details in Annexure-I).

10. The agency will lay down the medical gas pipeline and supply services and connections and ensure proper upkeep of this facility (details in Annexure-I).

11. The agency will provide dedicated air handling unit (AHU) for each MOT complex (details in Annexure-I).

12. JV/ Consortium will be allowed upfront during bidding as consortium partners/members with evidences thereof in the form of Letter of Association (LOA) for specific activities; no sub-letting for any or whole work will be allowed thereafter.

13. The consortium will be technically evaluated based on the credentials of the lead firm.

14. The selected agency will have to carry out civil work inside of MOT area. If required, civil work of related area will also be carried out by the selected agency to ensure proper functioning and maintenance of MOT.

D. SUBMISSION REQUIREMENTS:

Interested Agencies wishing to undertake the above task on behalf of State Health Society Bihar, may submit their application in a sealed envelope marked "RFP for Providing Modular OTs on Turnkey Basis in Government Medical College & Hospital and District Hospital across Bihar". Agency is required to clearly indicate the relevant page number against each of the submission requirements mentioned below in your cover letter/application accompanying the proposal. There should be three sealed envelopes, one each for (i) eligibility criteria, (ii) technical proposal, and (iii) financial bid. The contents of each envelope is discussed below.

I. **ELIGIBILITY ENVELOP**

a. Cover letter to participate.
b. Audited Financial Statement (turnover certificate) for the last 3 financial years.
c. Completion certificates of the activities completed in last three years
d. No-conviction certificate for the last three years submitting affidavit from Magistrate that they are not blacklisted by any Govt. Dept. /Govt. organization and/or the Competition Commission of India/ Central Vigilance Commission/ Comptroller and Auditor General of India for bid rigging & cartelization/ pending cases to this effect in the court of law.
e. EMD for Rs. Twenty Five Lakhs only
f. Contact details of the experts responsible for implementation of the project

II. TECHNICAL PROPOSAL

a. **Section 1: SELF ASSESSMENT FORM**

The participating agency should fill up the self assessment form (Section 1a and Section 1b) given as under along with documentary evidences for the same in the subsequent sections. The agency will be responsible for all the information furnished and liable to be prosecuted/ blacklisted/ penalised for misrepresentation of the information and hiding any truth that is revealed during the project period. The defaulter will have to refund the total amount of the project along with interest earned for the entire period and will be blacklisted by the Government. The maximum marks a company/ consortium can score is 70 (seventy) including all parameters in the technical bid. The mark assigned by the bidders is not binding and final. **SHSB may assign their own evaluation marking which will be final and binding to all the agencies.**

Section 1a: Self Assessment Form

Sl. No.	Particulars	No.	Value (Rs.	Self Assessment	Evidence (attachment/	Page No.

			Lakhs)	Marks (0/1/2)	section)	
1	Experience of Firm (years) (less than 3 years – 0; 3-7 years – 1; > 7 years – 2)					
2	Projects involving installation, operationalisation and maintenance of modular OT in last 3 years. (less than 5 projects – 0; 5-15 projects – 1; > 15 projects – 2)					
3	Projects involving installation only (less than 10 projects – 0; 10-20 projects – 1 marks; more than 20 projects – 2 marks)					
4	Projects Completed on time as per the purchase order or contract with start date and due date in last 3 years (less than 5 projects – 0; 5-15 projects – 1; more than 15 projects – 2)					
5	On-going assignments (less than 5 projects – 0; 5-10 projects – 1; more than 10 projects – 2)					
6	Projects done with the Government on turnkey basis (less than 5 projects – 0; 5-10 projects – 1; more than 10 projects – 2)					
7	Projects done with the private on turnkey basis service provider (less than 5 projects – 0; 5-10 projects – 1; more than 10 projects – 2)					
8	Projects done/ in-progress in Bihar (less than 2 projects – 0; 2-5 projects – 1; more than 5 projects – 2)					
9	Company owned service centre in Bihar (No centre – 0; 1 centre – 1; more than 1 centre – 2)					
10	Submission of Quality Assurance Manual along with design of MOT, working test and inspection plan, non-conformity and corrective actions, safety, monitoring mechanism for operationalisation and quality assurance of modular OT and its equipment (No submission – 0; Submitted for few equipment – 1; Submitted for all equipment – 2)					

11	Ability to complete number of projects within 6 months (less than 10 projects – 0; 10-15 projects-1; more than 15-2)					

Self Assessment Marks for Sl. No. 12 to 33: The firm should assign marks as per the following criteria:

Mark	Criteria
0	(i) No compliance with the technical description mentioned (ii) No work experience
1	(i) Partial compliance with the technical description mentioned (ii) Work sublet/ outsourced to other firm
2	(i) Full compliance with the technical description mentioned (ii) Work carried out by the firm/consortium themselves

Section 1b: Self Assessment Form

Sl. No.	Particulars	No.	Value (Rs. Lakhs)	Self Assessment Marks* (0/1/2)	Evidence (attachment/ section)	Page No.
12	Operation Theatre Complex					
13	Pre fabricated Walls and ceiling for speciality and super-speciality MOT					
14	Flooring					
15	Writing Board					
16	Operation Theatre Control Panel (i) Medical Gas alarm + Humidity and temperature control device					
	(ii) Electrical Safety system					
	(iii) Time elapsed digital clock + insulation monitoring device + remote cabinet + Plenum Lighting Controls + Phone					
17	Doors and Frames (Hermetically Sealed type) with Automation Unit					
18	Laminar Air Flow System with HEPA filters and pressure stabilising system					
19	Peripheral lighting					
20	Twin plate X-Ray Viewing Screens					
21	Scrub Station					
22	Equipment Storage Unit					
23	Hatch Box					
24	Electrical Installation					
25	Insulated Power Supply System to OT					
26	Electro Hydraulic OT table-CE/ FDA approved					
27	Double combination UL/CE approved OT Ceiling Light with LED Technology					
28	AHU					

29	Double arm CE marked Pendant					
30	Anaesthesia Workstation with ventilator—CE or US FDA approved					
31	Medical Manifold with Fully Automatic Gas Control System as per NFPA/ HTM std. UL listed / CE mark with four digit No.					
32	Medical gas services pipeline					
33	Miscellaneous					

Note: Attachments should have clear page numbering and may include completion certificate, order letter, salary slips, or any other validated documentary evidence.

b. **Section 2:** Background profile of the firm/organizations/LOAs for JVs and consortium (along with contact details viz. Name, Address, Phone No., E-mail Address of the party)
c. **Section 2:** Capability Statement/s (List of major completed/on-going assignments similar to present assignment) for all the firms involved
d. **Section 3:** List of organization available on hand (own) and proposed to be engaged for the work indicating description of work, contract value, and approximate value of balance work yet to be done and date of award. Certificates from private individuals for whom such works are executed / being executed will not be accepted.
e. **Section 4:** List of similar works completed in the last three financial years giving description of work, organization for whom executed, approximate value of contract at the time of award, date of award and date of scheduled of completion of work. Date of actual start, actual completion and final value of contract should also be given. The section should be supported with documents / certificates from organizations with whom they worked / are working should be enclosed.
f. **Section 5:** List of plant and machinery available on hand (own) and proposed to be inducted (own and hired to be given separately) for the current work. Firms must submit along with the offer the necessary authority letter from their principals / manufacturer and the Manufacturers certificate for all the items mentioned in the specifications list.
g. **Section 6:** Detailed Technical Proposal providing approach to the project along with offer of services and the process of rollout of the service, work plan, timelines. This section should include details on:
    i. Installation, operationalization and maintenance of Modular OT
    ii. Plan on provision of the necessary equipment, spare parts and support services {like HVAC, and provisions for Electric & medical gas services} for establishment of the above system.
    iii. Proposal must be accompanied with a Quality Assurance Manual (QAM), project organization (Flow Chart), Project Organization (Duties and Responsibilities), Project Control and Administration, Methodology of Working, Test and Inspection Plan, Non Conformity and Corrective Actions, Safety, Monitoring mechanism.
    iv. Plan on provision of training to all the health service providers.

III. FINANCIAL PROPOSAL

a. The financial proposal has to be submitted as per the detailed financials and cost breakup depicted in **Annexure-II**.

b. The cost for speciality (in district hospitals) and super-speciality (in medical colleges) MOT should be submitted separately. **Specialty OT** includes surgery, orthopaedics, gynaecology & obstetrics, etc. and **Super Specialty OT** includes transplant OTs, CTVS OT, Neurosurgery OT etc.

c. The financial will include fixed and variable cost separately. While for the decision on 1st lowest a comprehensive cost will be considered, the cost break-up of fixed and variable will allow the GoB to increase or decrease the requirements of variable components based on per unit cost within the project duly certified by the authorities.

E. Special Terms and Conditions:

1. **The SHSB will place purchase order of maximum 10 (ten) MOTs per purchase order. SHSB reserves the right to issue multiple purchase orders to the same company/ consortium based on the technical capability and experience of SHSB after the issue of first purchase order.** The bidders are free to apply for any number of MOTs.

2. Delivery & Installation: The ordered items shall be delivered & installed and commissioned within **6 (six) months** from the date of issue of contract as per the details mentioned in Annexure-I.

3. **Payment Terms: The payment to selected agency will be as per following**
   - 25% - supply of equipment after proof of delivery
   - 50% - installation
   - 15% - operations – after submission of Certification of acceptance by the Superintendent in case of MCH and Civil Surgeon in case of DH.
   - 10% - bank guarantee as security deposit in the form of Bank Guarantee valid for 3 (three) years.

4. **Installation Penalty Clause:** The lead firm will be liable for applicable penalty clauses in the contract. The agency will be bound to establish the MOT within the stipulated period as mentioned above, failing which the following penalty will be levied on the agency (the deductions will start with deductions from the EMD/Security Deposit). For delayed setting up of MOT: A penalty of 0.5% of the total value of order per week will be imposed subject to a maximum of 10% of the total value of the order.
   a. A delay beyond 1 year per MOT will amount to blacklisting of the firm
   b. For Non-setting up of MOT:- Security Deposit of the firm shall be forfeited.

5. **Uptime guaranty and Penalty**: During the Warranty / Guaranty period, the agency shall maintain the equipment with 95% uptime.
   a. The Agency shall give a written commitment for 95% uptime of the equipment, calculated on annual basis, with penalty equivalent to double the amount of daily cost (on total loss of revenue per day/ running cost per day basis) of the unit for each day's delay in proper functioning of the unit beyond 5% down time per annum.
   b. The Agency will be bound to get the equipment repaired within 48 hours of the receiving of the complaint from the requesting hospital failing which a penalty of @ 1% of the cost may be recovered from the Bank Guarantee before releasing the same after 3 years.

6. **Special Instructions:**
   a. Prices should be firm & fixed
   b. Prices accepted are for MCH and DH as mentioned in the RFP

c. Required to furnish original manufacturers test certificate.
d. Freight & insurance, loading / unloading and incidental expenses including of all taxes, installation & commissioning will be arranged by agency at their own cost.
e. The Agency should indicate prices of MOT for Medical College & Hospitals and District Hospitals **separately** as the cost for MOT in DH is likely to be lower than that in MCH.

7. EVALUATION CRITERIA

All proposal received by due date will be analysed as per the following rules.

Bid Evaluation Process:
Weight-age for the proposals shall be:-
(a) Technical Bid = 70%
(b) Financial Bid = 30%

Each proposal would be evaluated against the 70-30 criteria. This means 70% weightage will be given to Technical proposal and 30% to financial proposal.

If scores of technical evaluation for Bidder 1, 2, 3, ...are taken as T1, T2, T3, ...wherein T3 is the highest score; The weight-age given to technical evaluation would be T1/T3, T2/T3, T3/T3, ... For Bidder 1, 2, 3, ...respectively.

Similarly, weight-age will be calculated for financial evaluation:

The Price Evaluation Score of the Bidders shall be computed on the following grounds:
If commercial bids for Bidder 1, 2, 3, ... are taken as L1, L2, L3, ...wherein L1 is the lowest bid; The weight age given to commercial bids would be L1/L1, L1/L2, L1/L3, ... for Bidder 1, 2, 3, ..respectively.

As a last step, the technical and financial scores obtained by all the bidders screened through would be summed and the bidder that scores the highest would be AWARDED THE BID.

EXAMPLE:
Bidder 1: Quoted Price=2.00 crores (L1), Technical marks received=45/70
Final Score = (T1/T3) * 0.7 + (L1/L1) * 0.3=
(45/70) * 0.7 + (2.0/2.0) * 0.3 = **0.75**

Bidder 2: Quoted Price=2.25 crores (L2), Technical marks received=50/70
Final Score = (T2/T3) * 0.7 + (L1/L2) * 0.3 =
(50/70) * 0.7 + (2.0/2.25) * 0.3 = **0.77**

Bidder 3: Quoted Price=2 crores (L3), Technical marks received=50/70
Final Score = (T3/T3) * 0.7 + (L1/L3) * 0.3 =
(50/70) * 0.7 + (2/2) * 0.3= **0.80**

Highest score is received by bidder 3 and would be awarded the bid.

7. COMPREHENSIVE WARRANTY: The following Guarantee/Warrantee Clause shall be applicable and binding on agency: The qualified party will have to provide 1 year warranty and Comprehensive Maintenance Contract (CMC) for 5 years of MOT.

The seller declares/ certify that the goods/ equipment/ articles sold/ supplied to the purchaser under this contract shall be **NEW** in all respects, are of the best quality, workmanship and shall be strictly in accordance with the specification and particulars contained/ mentioned in the contract

and **not** refurbished equipment/ articles are supplied. The contractor/ seller will further guarantees that the said goods/ equipments would continue to conform to the given description and quality aforesaid for a period of 36 months from the date of Installation / Commissioning of the said MOT in the premises of the purchaser/user facility. The above guarantee/ warranty are not-withstanding to the fact that the purchaser may have inspected the MOT/ article and/ or not within a period of 36 months of thereafter. In case said goods/ articles is discovered not to conform to the description and quality aforesaid or not giving satisfactory performance or have deteriorated at subsequent stage, the purchaser may take such action or issue such directions as deems fit to Agency to bring the machine in conformity with prescribed specification/ to make it operational and which shall be final and binding on the contractor/ seller. The purchaser is entitled to call upon the contractor to rectify the goods/ equipments/ articles or such portion of MOT as found to be defective by the purchaser within a reasonable period/ or such specified period as may be allowed to the contractor failing which the losses, compensation, damages etc, including the cost of repairing of such equipments/ goods, if the items/ machine is repaired from open market or such damages as assessed by purchaser, which indenter would suffer due to non-operation of the said article/ instrument, shall be recovered from the Agency and the firms/ tenderer shall be blacklisted for breach of warranty. **The Agency will also furnish the list of items not covered under warranty/ guarantee.**

8. **Correctness and Completeness of MOT**: The MOT shall be correct, complete fully operational, ready to move-in in every respect with all mounting fitting, fixtures, finishing, standard accessories which are normally supplied even through not specifically detailed to the specification. The Agency should calculate costs considering all these aspects.

9. **Rectification Clause**: In the event of spares is given back to the manufacturer, it should be ensure that the defect is attended immediately without loss of time so that spares can be re-inspected. However, it should be noted that the manufacturer will not entitled to dispose off that spares which is given for rectification/ rejecting without prior permission of the inspection.

10. **Installation**: The equipment shall be installed/ demonstrated by Agency free of cost at consignee premises. The Agency should provide 2 copies of the manual including electric circuit diagram, MOT design, medical gas connections and pipeline layout, ventilation channel and connections with AHU free of cost along with the equipment.

11. **Intimation of dispatch**: The documents should be in the name of consignee only. The information regarding shipment should be sent to the institution well in advance. Delay in submission of relevant information/ incorrect document, and any such information due to which the clearance of MOT is delayed, the demurrage charges shall be to Agency accounts.

12. **Liability**: Supplier's responsibility shall be up to consignee's premises/ facilities. However, agency will be responsible for any damages/ losses due to defective packing, transportation, etc.

13. Training: The Agency shall provide onsite training to medical & technical Staff.

14. **Insurance**: The Agency shall take insurance cover from originating place and shall keep it valid until entire materials reach hospital leaving sufficient time for necessary installation and commissioning. The Agency shall also ensure accidental/ fire insurance, as applicable to all equipment in the MOT.

15. Safe custody of equipment: The GoB will try to provide a space wherever possible for the vendors for safe keeping of the materials under lock and key. However, the GoB is not responsible for the safety of the material stocked within the hospital premises and the vendors will have to make their own arrangements for the same.

16. The Agency will have to procure and install the equipment/ fixtures/ articles manufactured only by the reputed companies/ manufacturers. They will have to indicate the name of manufacturers in the bid document which will be duly approved by the Technical Committee of the SHSB before executing the work.

17. The decision of the State Health Society Bihar shall be final, and no enquiries, or application for review, shall be entertained. The State Health Society Bihar reserves the right to modify the terms & conditions partially or wholly or cancel the tender without assigning any reason.

For any clarification, please contact Sandeep Kumar on Phone +91 9308138612.

Secretary Health cum Executive Director
State Health Society Bihar

Annexure – I

TECHNICAL DETAILS AND BOQ PER MODULAR OPERATION THEATRE

Sl. No.	Particulars	Description of Works
1.	**Operation Theatre Complex**	The Operation Theatre complex should make arrangements for the following: • Modular Operation Theatre-Sterile area • Scrub area—clean area with Scrub Station • Equipment and Drug Store-- clean area • Facility for flash sterilization—clean area • Exit of material from MOT area to disposal area • Air Handling Unit outside the OT complex with laminar flow system entering the OT • Medical Gas station outside the OT complex with gas pipelines entering the OT • Electrical Gen set outside the OT complex with electrical conduits entering the OT All structural steel frames will be of Grade 43 to BS 4360 or equivalent Indian Standard and welded sections in accordance with BS 5135. The structural frames for the operating theatre are to be designed taking into account all fixed equipment to be installed currently and in future (total loading not more than twice that of all the equipment that would be currently installed) in the Modular OT, such as the operating lamp etc, and should be vibration free and rigid, rust proof, easily cleaned with disinfectants used in hospitals, non-corrosive, dent proof.
2.	**Pre fabricated Walls and ceiling for speciality and super-speciality MOT**	The walls and ceilings should be made of solid surface material, minimum thickness 3 mm backed by structural panel thick 15 mm minimum consisting of a trapezoidal aluminium corrugated core glued between two flat of aluminium sheets. The Materials should be made from aluminium hydroxide and poly-metacrylate, enriched by the coloured pigments to characterize the wide range of colours. The frame should be made up of uprights, ledgers and profiles entirely made of a galvanized steel sheet with a minimum thickness of 1.5/1.0 mm. They should be folded structural steels with suitable sections for the loads. The structure should be provided with stiffening ledgers or profiles for sliding door fixing and other accessories according to needs of the MOT. The inner surface walls (facing inside the MOT) should be easily washable, scratch free, dent free, flame resistant, stretch resistant to as per BS 3900 Part E2 Standards, should not support bacteriological or fungicidal growth and is resistant to most chemicals commonly used in hospital departments and should be curved on the corners to ensure easy washing and avoid gaps that may lead to clogging, contributing as a potential source of infection. The inner angles (which are at 90 degrees) in operating rooms should without interruption cover the angular areas. The individual wall panels should be perfectly sealed together without any gaps and free of projections. Wall panel joints should be invisible when the OT is finished. The panels should be easily removable and should be easily plantable in new location. All the electrical conduits and medical gas pipelines passing behind the

		walls and ceiling should be easily serviceable. The lower panels of the walls should be equipped with a profile prepared for the laying and coupling of the horizontal skirting. The inner lining of SMS in the walls should overlap the floor covering, ceiling system and door frames by 25mm to provide a continuous sealed surface. The plastic coating should be non-reflective and the colour should be submitted to the architect for approval. The inner wall panels should be constructed to withstand strong impacts, such as from the bombardment of trolleys without significant damage to the panels. All wall mounted equipment should be flush mounted and sealed into theatre wall by means of a sterile jointing system. The wall panel design and construction should allow for the installation and support of all equipment and the provision of openings required for the installations, without affecting rigidity and strength of the panel. Access boxes should be fitted to the rear of wall mounted equipment to enable maintenance to be carried out from outside the operating theatre. The ceiling should be thermodynamically stable, not getting heated with electrical wiring or air flow and should not sag with weight of pendants.
3.	**Flooring**	A floor screed should be provided, flat to within a tolerance of +/- 3mm over any 3 metre area. The floor finish in the operating room should be 2mm static conductive PVC tiles, laid on a semi conductive adhesive base. It conforms to CEN classification EN 685 and Resistance to Chemicals as per DIN 423/DIN 51958. It conforms to the requirement standard for healthcare facilities NFPA 99. The PVC flooring tiles should be laid on copper grid for providing antistatic electro-statically conductive flooring. The floor finish should terminate at the room perimeter passing over a concealed cove former and continuing up the wall without a gap between the wall and the floor. All joints should be sealed and finish should overlap the floor coving, to provide a continuous sealed surface so as to prevent bacterial and fungal growth and facilitate easy washing with use of all kinds of disinfectants used in hospitals.
4.	**Writing Board**	A List/Writing Board should be provided in operating theatre. It should comprise a flush mounted into the theatre wall with a sterile jointing system, 1.5 mm thick, white laminate board, bonded to a 2 mm steel sheet for additional rigidity. All wall-mounted equipment such as X-ray view box, writing board etc. should be flush mounted and sealed into theatre wall by means of a sterile jointing system.
5.	**Operation Theatre Control Panel**	All the controls within the theatre are located on membrane type control panel mounted in the theatre wall. A remote electrical distribution board is provided to allow access to the panel for maintenance without access to the theatre. Each control panel contains:- ➢ Time elapse Clock ➢ Standard Clock ➢ Medical Gas Alarms ➢ Electrical Safety Alarm system ➢ Temp and Humidity Indicators and Set Point Adjuster

		➢ Insulation monitoring device ➢ Plenum Lighting Controls ➢ Phone a. **The time elapsed digital clock** and real time digital clocks should be of high brightness characters. b. **The medical gas alarm** to indicate High and Low gas pressure for gas service present in the operating theatre and should have audible buzzer with mute facility. The medical gas alarms are connected to local pressure switches located downstream of the last isolation valves. c. **Electrical Safety system:** IEC 60364-7-710: "Electrical installation of buildings-Requirements for special installations for medical locations" and Indian NEC- SP-30- Section 4, 2011, provision P5 requires unearthed (IT) system for all critical medical locations (O.T, I.C.U, I.C.C.U, Premature Baby Room etc). Therefore, an Electrical Safety Alarm System should be installed to ensure patient and employee safety against risk of electrical shock and fire and damage of electrical insulation used in equipment and power distribution circuits. The system should provide perfect ungrounded power supply system in OT; ensure no fire, no electrical spark, no MCB tripping even in case of 1st insulation fault (BIS NEC-SP-30 , P5 location requirement); ensure 24X7 Insulation monitoring of entire electrical distribution system & an audio visual remote and local alarm even in case of 1st fault; never give any spurious alarm / false alarm, fool proof against EMI/EMC effects; should have a system to identify faulty feeder / socket / equipment online without tripping the system; a periodic self diagnostic features to identify malfunctions in the system itself. Insulation monitoring devices using a pulsed measuring voltage in compliance with IEC 61557-8:2007-02 should be used. d. **The Humidity and temperature control device** should have an audio-visual alarm indicating the temperature and pressure changes within and outside MOT, so that the surgical team can manage their movements efficiently. e. **An insulation monitoring device** to be provided to indicate the occurrence of fault from live part to exposed-conductive-parts or to earth. **f. A remote cabinet** should house the operating lamp transformers, main failure relays, electrical distribution equipment and circuit protection equipment for all circuits within the operating theatre. All internal wiring should terminate in connectors with screw and clamp spring connections of the Klippon type mounted, on a DIN rail and labeled with indelible proprietary labels. Individual fuses or miniature circuit breakers should protect all internal circuits. All internal wiring should be of the high temperature type and enclosed in propriety ducting or mini. All internal wires should be marked with plastic ferrule type cable markers, for ease of identification. All wall mounted equipment should be flush mounted and sealed into theatre wall by means of a sterile jointing system.
6.	**Doors and Frames (Hermetically Sealed type) 2100 mm Height &**	The door with its automation unit conforms to machine directive 93/87/EC, low voltage directive 73/23/EEC and 93/68/EEC and EMC directive 89/336/EEC and 92/31/EEC and 93/97/EEC. To maintain sterility and the correct air pressure in the department, all doors into and out of the operating theatre and ancillary rooms be of the sliding, hermetically sealing type. All sliding doors should be electrically operated.

	1500 mm Width (with Automatio n Unit)	The doors should be constructed with high-density particle board cores, and high pressure laminate faced on both sides. The cores should be set firmly in an aluminium frame and with concealed fixings that are adjustable during installation, suitably sealed with a non-porous non-shedding gasket to ensure a 100% hermetic seal is achieved. The aluminium frames should contain the door seal. The door should seal on all four edges in the closed position. The door track should be constructed from an aluminium extrusion, fixed firmly to the walls. The doors should run on nylon wheels within track. The track and wheel design should be such that during the last 50 mm at travel on the closing cycle, the door moves in 3 directions to form a seal against the floor, at the bottom and against the frame on both sides and at the top. Nylon runner guides should be fixed to the floor in such a way that they do not obstruct trolley movement through the door. They should provide stability during the opening and closing cycles and assist in creating the necessary pressure at the bottom of the door to maintain the seal and maintain the temperature and pressure set in the OT. Floor guides across the door opening should be considered. Vision panels should be fitted to all doors. Automatic units should be of the single phase electronic type mounted directly to the door track. The units should consist of a computerized electronic controller and motor. The drive mechanism should be by heavy-duty steel reinforced toothed fabric belt. The controller should have the facility to individually set opening speeds, partials opening, closing speeds, time delays and a variety of locking and interlocking options, within factory pre-set limits. The door controller should also have the ability to sense additional loads on the door caused by any obstruction in its path and to automatically stop or reverse the direction of travel. The controller should be capable of being operated by foot switches, key switches. All doors should be able to be operated easily manually in the event of failure of the power supply or the automation units.
7.	**Laminar Air Flow System with HEPA filters and pressure stabilising system**	Laminar Air Flow with 8 HEPA filters (as per plenum size-2400mm X 2400mm) per OT with 99.97% efficiency to ensure high quality clean air & tight control of bacterial infection system. HEPA filters should be factory tested and certified. Test seals must be provided in the filter housing in accordance with DIN 1946 and DIN 4799. Air from the filter should be diffused into the theatre uniformly over the total area through perforated aluminium sheet. The ceiling should have been type tested and certified in accordance with the German standard DIN 4799. The Air-Supply ceiling should provide optimum air distribution over the patient area, integrated with shadow less lighting. The laminar flow installation & lighting system will be design to provide the Operation Theatre as key to preventing patients being infected during operation lies on the design of sterilized air conditioning system and the flow pattern of draught as well as the quality of engineering. The ceiling will incorporate supports to secure it to the main structural frame of the modular operating theatre. A cascading pressure stabiliser with multi bladed units should be used to control room air pressures OT and scrub area and ensure maintenance of pressure gradient between sterile and clean area. Each Stabiliser to comprise of a carbon steel case & matching slip over ring. The carbon steel housing should

		contain up to four Grade 304 stainless steel Blades, which pivot upon sealed for life bearing assemblies. Balancing should be carried out utilising a proven balance weight assembly. The air-flow in the MOT should be monitored and support low flow of anaesthetic gases to prevent pollution due to anaesthetic gases. The vendor needs to mention and clarify the system that would be installed to maintain the required flow rate to prevent the same in the MOT.
8.	**Peripheral lighting**	Eight sets of double peripheral OT lights each set having two lights should be provided with stepped finish aluminium reflector and to be for use in clean room application. The peripheral light diffusers to be constructed from opal prismatic diffuser material in aluminium frames. Light to be generated from high frequency electronic ballast's complete with colour corrected fluorescent tubes. The ceiling to incorporate supports to secure it to the main structural frame of the modular operating theatre. The laminar flow ceiling should be able to provide integrated lamp support system, ease of maintenance and long life system. Control equipment for the peripheral lighting to be provided in the theatre control panel to allow independent control of the lighting levels by the surgical team. The operation procedures should never be affected by shadows, shimmering lights and dazzling eyes.
9.	**Twin plate X-Ray Viewing Screens**	The theatre should be equipped with a twin plate X-Ray Viewing Screen, designed to provide a high level of control luminance, without flicker, from a unit that is easy to clean and maintain. Being a wall mounted equipment, it should be flush mounted and sealed into theatre wall by means of a sterile jointing system. The X-Ray viewing screen illumination should be by high frequency fluorescent lamps, controlled by demining ballast. The front panel diffuser should be of a glare free type, sealed flush with the inside face of the operating theatre wall (or may as on option be integrated within the control panel fascia). The fluorescent lamps should provide a uniform level of illumination across the entire front panel diffuser and should be controlled by electronic step-less dimming controls to provide flicker free dimming from maximum brightness to off. It should be equipped with eight spring-loaded clips to secure the X-Ray negative when in use. Access for maintenance and lamp changing should be front of the panel. All internal wiring should terminate in connectors with screw and clamp spring connections. Individual fuses or miniature circuit breakers should protect all internal circuits. All internal wiring should be of a high temperature and secured by propriety cable clips.
10.	**Scrub Station**	The Compact Surgical Scrub Sink should be fabricated from heavy gauge type 304 stainless steel & should be seamless welded construction polished to a satin finish. The scrub sink should be provided with a front access panel, which should be easily removed for access to the water control valve, waste connections, stoppers & strainers. Hands free Operation with infrared sensor with built-in range of adjustment for Thermostatic Mixing Valve control fail-safe system to maintain constant water temperature, to be made available on user defined settings of timings. All units should have anti splash fronts (irrespective of height of the surgeon). Knee or foot operated switch should be offered as an

		option as an exigency.
11	**Equipment Storage Unit**	Equipment Storage Unit is provided in the operating theatre. It is flush mounted into the theatre wall with a sterile jointing system. All wall-mounted equipment should be flush mounted and sealed into theatre wall by means of a sterile jointing system.
12	**Hatch Box**	A Hatch of 600mm x 600mm size is to be provided in the Operation Theatre as specified in the scope of the work to remove waste materials from the Operation Theatre to Dirty linen Area just adjacent to Operation Theatre. Each Hatch will be equipped with two doors and the door will be operated electronically. The Hatch should be designed in such a way that only one door will opened at one time. The UV light should also be so installed that it is kept on while both the doors are closed, this UV light has to be automatically turned off in case of opening of either of the doors. There will be indicators on both sides of the OT so that the door open/close status can be monitored from both ends.
13	**Electrical Installation**	Modern medical procedures utilise and increasingly rely on, electrical and electronic equipment. This equipment ranges from lighting to patient monitors and electrosurgical equipment. Power distribution within "the departments should be "provided' from distribution boards located local to each theatre. From the sub mains power panels all distribution services within the departments should be managed. Earthed equipotent bonding of all exposed metalwork should be provided. Power sockets within the Operating Theatres ancillary areas should be matched to the rest of the hospital. Light fittings within the clinical areas should be recessed fluorescent type, with high frequency tubes and control gear. Fittings should be sealed In accordance with the standard IP54. All equipment should be fully and permanently labelled to identify and describe the function, operation and voltage of the apparatus concerned. Throughout and upon completion of the electrical installation, tests in accordance with relevant sections of the local wiring regulations should be carried out and the results recorded.
14	**Insulated Power Supply System to OT**	An ungrounded power supply with insulation monitoring and indication should be used. In addition, a single-phase isolating transformer according to IEC standards should be used with a rated power of 0.5...10 kVA to supply power @ AC-220 to 240 V 50 Hz. A system leakage capacitance to be installed to have an un-interrupted supply of power and prevent tripping of a fuse in operation. Insulation monitoring and fault location devices using a pulsed measuring voltage in compliance with IEC standards should be used. To protect the transformer and the connecting leads between the primary and secondary terminals and the distribution against overload and temperature monitoring devices as per IEC standards to be installed with a visual and acoustic alarm.
15	**Electro Hydraulic OT table- CE/ FDA approved**	Minimum Six section Electro Hydraulic operation table preferably with divided leg section. Table top frame section should be made of high quality non rusting stainless steel and having off-set column with complete C-arm compatibility with Radio translucent top and easy unobstructed movement. System should be remote controlled with rechargeable and compatible battery backup circuit to ensure a failsafe function of the operating table with override controls in case of failure of hand control. Antistatic latex free foam mattress to be used with a freely mobile table base with immobilizer on antistatic castors. Stainless steel telescopic ram/column, eccentrically positioned for up and down movement of the table. The table should provide Hydraulic height adjustment of minimum

		27.5" and maximum 41", to be able to put the patient on Trendelenburg position, Reverse/ Lateral with facility for complete physical Flexion and Extension of the human body, head section adjustments, Divided Leg section adjustment, Head and leg flap drop / detachable and interchangeable. **The Essential Accessories would be** ➢ Accessory clamps, circular socket direction at least 4 ➢ Accessory clamps, circular socket rotary end, at least 2 ➢ Arm rest - 2 with Pads ➢ Patient restraint straps – 2 ➢ U-Shaped Head Rest and Posterior Sitting head rest-one each ➢ Upper arm support with pad ➢ Anaesthetic screen ➢ Head gel ring (Adult-1) (Paediatric-1) ➢ Lateral support (pair) with clamp-1 ➢ Shoulder support-1 pair ➢ Foot controller-1
16	**Double combination UL/CE approved OT Ceiling Light with LED Technology**	Should have standard UL/CE approved light system with following Features: **Two Major Dome/light head, minimum 140,000 lux central illumination** ➢ Single Colour Pure White LED ➢ Reflector based, cool LED Technology to avoid heating of the work station ➢ Arrangement of LED in such a way that Shadow Free / Deep cavity illumination is achieved ➢ The illumination should have a system to change the light intensity range ➢ Special design to maximize the field of illumination and optimized illumination depth ➢ Should have good laminar flow properties ➢ Should be light in weight (LH </= 15kg) to reduce load on the ceiling ➢ Easy and less time consuming service access of electronics on the light head dome surface ➢ Housing for better heat management with adjustable spring arms ➢ ESG safety glass for simple and fast disinfection process ➢ 360 deg rotation of domes/lightheads / arms for unlimited positioning of light heads ➢ MIS Lightning Feature on domes
17	**AHU**	**Floor mounted One Double Skin Air handling Unit** construction with PUF Sandwich Panels at a static pressure of 120 mm WG complete with backward curved blower, TEFC blower motor suitable for operation on 415 V +/- 10%, 3 Phase, 50 Hz, A.C. Supply complete with 8 Rows copper tube, aluminium finned DX cooling coil, pre-filter, micro-vee filters, Heater Bank. Mixing Box complete with drain connections with anti-vibration mounting and with VFD compatible motor of following capacities: 4000 CFM * 120 mm WG S.P. with 6 Row Deep Cooling Coil for Operation Theatre **Two Air-cooled Condensing units** 5.5 TR Capacity incorporating Scroll compressor, Condensing coil, Condenser Fan and fan motor with interconnecting copper pipe between compressors and Condenser coil. Display sensor with remote control should be provided. Refrigerant gas [R-22] with copper refrigerant piping / control wiring, refrigerant line accessories / instruments and Suction Line and Liquid Line completed with nitrile tube insulation over suction line and Control Wiring between AHU and Condensing unit to be installed. **Supply of Air Handling Unit with a minimum of 200mt Aluminium ducting**

		with acoustic & Thermal installation (along with provisions for fresh air) and fabrication with specifications 24/22 gauge. Supply, installation and testing of multi-blade type louver dampers of aluminium for ducts coolers to be provided with suitable links, levers and quadrants for manual control of volume of air flow and for proper balancing of the air distribution system.
18	**Double arm CE marked Pendant**	Multi-movement Pendant of double arm with load carrying capacity of minimum 100 kg should be installed to support the requirements of anaesthesia and surgery. The arm should be rotatable to more than 300º with adjustable stopper. The pneumatic brake system should be attached and adaptable to various safety requirements and construction facilities. The interior cross section for supply lines should be enough to ensure free passage and maintenance of all the supply lines. Service head should be of modular design, and shape to achieve maximum supply with minimum required space to host, Base, Gas Module, Electric Module and shelves and to up to 8 Gas outlets & 10 Electrical switches. Racks & shelves are to be provided to mount the surgical equipment & monitor. The total length of the manager should be a minimum of 800-1000mm. **The** pendants should have 2 horizontal and vertical movement; weight carrying capacity > 100 Kg.); Minimum Two shelves with side rails for monitors and at least 2-drawer. There should be provision for gas outlets with interface plates for gas and electrical fittings --Oxygen 2 Nos, vacuum 2 Nos, air 4 bar-l, air 7 bar 1, N2O-1 no; Electrical 5/15 amps minimum 8 Nos Sockets, data connector.2 nos.I/V hooks with stand 2 Nos. infusion management system for surgeon; Audio visual connector at least 1 No; I/V hooks with stand at least 2 Nos Ceiling cover for interim ceiling.
19.	**Anaesthesia Workstation—CE or US FDA approved**	All the major component of anaesthesia workstation like Anaesthesia Machine, Ventilator, Vaporizer and Anaesthesia Monitor preferably from one manufacturer should be installed. **a. Anaesthesia Machine** Anaesthesia machine should be compact, mobile with integrated ventilator with pressure, volume and oxygen monitoring system. Anaesthesia machine must be suitable for low flow anaesthesia. Machine should have working surface and the storage space for keeping the accessories. • Should have facility to connect to the central supply (O2, N2O & Air), pin index cylinder one each of O2 & N2O and pressure gauges for central supply and cylinder. • Should have hypoxia guard and provides with a nominal minimum 25% • Should have dual cascaded flow meter for O2 and N2O and single flow meter for air. • Should have integrated auxiliary oxygen flow meter. • Should have oxygen flush upto 75 lpm. • Should have compact autoclavable breathing, system and soda lime chamber capacity of 1.5L. • Should have electronically controlled and electrically / pneumatically driven anaesthesia ventilator. • Anaesthesia Machine should have provision to mount two vaporizers at a time and supplied with Halothane & Iso-flurane vaporizer along with the machine. • Anaesthesia machine should have battery backup of at least 1hr. b. **Anaesthesia Ventilator** should have Manual/ Spontaneous Ventilation Mode, IPPV- Volume controlled with tidal volume (40 – 1500 ml)

		compensation Pressure Mode with setting of inspiratory time and inspiratory pause time (ratio I:E of 1:4 to 4:1), with PEEP of 4 – 30 cmH2O and Pressure Range of 5 – 60 cmH2O. The other features should be • Integrated colour display of at least 7". • Display configurable and showing any one of the waveform Paw vs time or flow vs time. • Monitor and display the measured value of minute volume, tidal volume, fiO2 concentration, Peak pressure, mean pressures, plateau and PEEP. • Adjustable high / low limits setting for FiO2, expired tidal volume, Minute volume, frequency and airway pressure. • Should have autoclavable filters. **c. Anaesthesia Monitor** Anaesthesia workstation should have advance patient monitor and capable of monitoring of all patient age group. • Should have integrated touch screen of 12" and display 6 channel waveform. All the data should be access through touch screen and rotary knob. • Monitor should have 24 hrs trends and stores 100 alarm events. Should have Audio visual alarming system. • Monitor should have monitoring facility of 3/5 lead ECG with ST segment analysis, NIBP, SPO2, Dual Temperature and Invasive Blood. • Monitor should have basic and advance arrhythmia detection. **d. Accessories to each Anaesthesia workstations should include** • Two vaporizers i.e. Halothane & Isoflurane one each. • 10 set of disposable circuits with filter. • ECG 3 and 5 lead one each • Adult & Paediatric Spo2 sensor two each • Adult & Paediatric NIPB cuff two each • Temperature probe skin & rectal one each • 10 set of water trap for adult / Paediatric, 25 pcs of sampling line. • IBP kit with 10 disposable transducer Equipment should be demonstrated and compliance statement should be supported with brochures and technical data sheet.
20.	**Medical Manifold with Fully Automatic Gas Control System as per NFPA / HTM std. UL listed / CE mark with four digit No.**	The Manifold should be a fully automatic non-interruptive medical gas service that should contain the following: • Gas Manifold reserve Bank-fully automatic with Audio-Visual indicator system • Terminal gas outlets with probes • Oxygen Flow meter & Humidifier Bottle with timer facility • Nitrous oxide manifold • Vacuum and suction facility • Medical compressed air supply facility • Medical area valve service unit • Supply of CO2 cylinders wherever required **Gas Manifold reserve** should be fully automatic, auto–shifting to reserve bank on exhaustion of the primary service bank without interruption of gas delivery to the system. When the depleted cylinders are replaced with full cylinders the system should automatically reset itself in preparation for the next bank change. The connection should ensure that the connection is gas specific, non-interchangeable, designed to eliminate gas supply error. The manifold control system will supply a flow of 1000 L/ Min at 50 psi. The dual line

		regulator/single vent Medical Gas Manifold control unit should include right and left header bars and pigtails for the appropriate medical gas. It should also have provision for emergency supply. The oxygen cylinder manifold should comprise of two cylinder Banks which can accommodate 4 cylinders in each Bank (means 4+4) complete with copper tail pipes with bull nose fittings of RH External threading suitable for cylinder valves conforming to IS 3234 (Oxygen service) and Cylinder support system. Manifold should be suitable to withstand a pressure of 140 Kg/cm2, along with high pressure copper annealed tail pipes with Brass adapter suitable for Oxygen Cylinders and manifold. Top frame comprising of high pressure copper pipes of size 1/2" I.D. x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves. The middle and bottom frame to be provided to fit both round and flat bottom cylinders safely. The manifold should be tested (hydraulically) at 250kg / cm sq. The copper tail pipes are to be fitted to the individual non return valves of the cylinder manifold for easy removal of cylinders without disturbance to system operation. Each manifold should be provided with one terminal header and a NPT connection for the Automatic control panel. The manifold should have automatic audio-visual alert system with LED indicator and buzzer to indicate a depleted bank by turning red. When the system is reset by replacing the depleted cylinders, the indicator should turn green and also silence the buzzer automatically. The manifold should also be connected to the OT complex's central alarm system that should also indicate that the bank was depleted and, in turn, was reset. The only manual activity that the Medical gas Manifold should have is the changing of the depleted cylinders. The pigtails should have on-way Valves (check valves) to allow the replacement of depleted cylinders without gas pressure back-flow into the remaining depleted cylinders on that bank. In the event of break in the system on the device on an individual cylinder the check system should also prevent loss of gas from the rest of the cylinders in the bank. Two line pressure regulators will be installed in parallel, and each will be capable of maintaining a constant dynamic delivery pressure at the maximum designed flow rate of the system. The solenoid valve should be the key to the automatic mechanism in the manifold. **The Terminal/ Gas Outlet with probes** are the Oxygen Vacuum Surface mount, non-interchangeable, self-sealing outlets. The outlets should consist of a roughing in assembly and a finishing assembly. A non-removable positive-pin keying arrangement for each assembly and a finishing assembly is a must, installed in the mounting box with a fully assembled brass secondary check valve. Design of outlet should be such that it will have 100% metal construction for corrosion resistance, fire safety & push button mechanism for quick release of adaptor. The secondary check valve automatically should form a positive seal to prevent a gas flow when the finishing assembly is removed. The secondary check valve to include 7" (17.78cm) of 1/2" Type K copper tubing with a label affixed to identify the specific gas by name and colour coded. The rotation of the inlet tube should allow gas connection from the top or bottom. The finishing assembly should consists of a die cast chrome plated cover plate, machined brass housing for the primary check valve, and a positive-pin keying device to prevent accidental installation into a roughing in assembly of a dismal gas. The

		finishing assembly should have a double seal arrangement which automatically engages when a hose adapter or patient treatment device is removed from the outlet. The design of the outlet should be such that it can be easily repaired without dismantling the outlet. The locking device should be in the probe instead of gas outlet. Matching probe for each outlet is a must, meeting the NFPA-99 standards/ HTM 02-01 UL Listed/ CE Marked. Each adapter should have suitable barb or thread to connect it the tube or flow meter/ suction regulator. **Oxygen Flow meter & Humidifier Bottle with timer facility** should be compact in design with superior performance in a single package having flow meter body & timer, with a control within a range of 0-15LPM and meet strict precision and durability standards. The flow meter body shall be made of brass chrome plated materials to prevent corrosion and the flow tube and shroud components shall be made of clear, impact resistant polycarbonate expandable to 0-15 LPM range for improved readability at low flows. The humidifier bottle should be made of unbreakable & reusable polycarbonate material and autoclavable at 121 degree centigrade. The Automatic timing of oxygen flow will be as low as 0.5 LPM & the time measurement should be extremely precise increments. **Nitrous Oxide Manifold** should be a fully automatic, self–shifting reserve bank comprising of two cylinder Banks which can accommodate 2 cylinders in each Bank (means 2+2) for cylinder valves conforming to IS 3234 (N2O service) complete with copper tail pipes with fittings specific and colour coded for the specific gas. Manifold should be suitable to withstand a pressure of 140 Kg/cm2, along with high pressure copper annealed tail pipes with Brass adapter suitable for Nitrous Cylinders and manifold. Top frame comprising of high pressure copper pipes of size 1/2" I.D. x 15swg with high pressure brass fittings made of high tensile brass and connections through non- return valves. The middle and bottom frame to be provided to fit both round and flat bottom cylinders safely. The manifold will be tested (hydraulically) at 250kg / cm sq. The copper tail pipes should be fitted to the individual non return valves of the cylinder manifold for easy removal of cylinders without disturbance to system operation. Each manifold should be provided with one terminal header and a NPT connection for the Automatic control panel. It should also have provision for emergency supply. **Medical compressed air system** should maintain international standards (standards should be clearly mentioned) and have Air pumps of capacity supply of 500 Lt/Min, TEFC model, Size of reserve of 1000 Ltr. The Air dryer fluid system should have an inlet flow 15 CFM with pressure 7 kg/cm2 at Temperature of 45 Deg.c & Moisture Contents of 100%RH; and the outlet of flow 27CFM with ambient temperature and pressure 6.8 Kg/cm2 Medical vacuum central system should have precision in the critical care range (0-200mm hg) and should provide fast adjustment with turns of the knob up to full wall vacuum thus instantly facilitate regulated and continuous suction for tracheal and pharyngeal airway management, surgical procedure and continuous nasogastric drainage which shall facilitate unrestricted full time vacuum for emergency. The unit shall be equipped with Positive Pressure Relief Valve to protect patient and unit both in case if accidentally connected to pressurized gas (O2, Air etc). The unit shall be made of 100% metal and corrosion & lubrication free having service fee back plate.

		The Vacuum Pumps should be air cooled type, Copper pipe interconnection up to receivers, Vacuum Tank water capacity 1000 ltr and Silencer on discharge end projection (open to atmosphere) outside the plant room. The Ward Vacuum Unit with Suction Jar & metal regulator should be Analog and color coded display type regulator with 100% metal having large, easy to read gauge with gauge accuracy + 1% of full scale color coded range. The unit shall have 3-Mode High feature and equipped with push to set technology which shall automatically establish vacuum. The ½ gallon polycarbonate Suction Jar shall be capable to autoclave up to 121 degree C. All seals and splatter tube shall be in silicone for long life. The filter trap in the jar should be designed to ensure maximum efficiency in preventing overflow and incorporates design features to ensure the breakdown of foam. **Medical Area Valve Service Unit** as per NFPA -99 std (Imported) as per NFPA /HTM std UL listed / CE mark. Zone valve boxes should be constructed of 18 gauge sheet steel with air dried lacquer finish. The valves should be ball type, cleaned for oxygen service, supplied with capped ends, and will operate full open to closed position with 90 degree handle rotation (refer to Medical gas Valve specification) Gauge model zone valve assemblies will include 1- 1/2" pressure gauges reading 0-100 psi for oxygen, nitrous oxide, air and other 50 psi working pressure gases 0-300 psi for nitrogen and 0-30" HG for vacuum or evacuation vaccum.
21.	**Medical gas services pipeline**	The pipes used for laying down the pipelines should be solid drawn, seamless, deoxidized, non-arsenical, half hard, tempered and degreased materials conforming to BS: EN 13348 Medical Grade Kite mark Pipe. The installation of piping should be carried out as per international standards with utmost cleanliness. Only pipes, fittings and valves which have been degreased as per International standards should be used. Pipes should be non-ferrous suitable for the diameter of the pipe. Pipe fixing clamps for upto 28mm diameter to be used. For the pipes of the sized above 28mm rigid metallic hanging or cemented supports to be used. The main lines to the building to be taken overhead through metallic poles or through underground ducts with inspection removable slabs, all pipe joints should be made using inert gas fluxless brazing method. Fittings should be made of copper conforming to BS 864 and suitable for a steam of working pressure of 35 bar and especially made for brazed socket type connections. All joints should be of copper to copper and should be brazed by silver brazing filler material without flux while being brazed joints shall be continuously purged with oil free dry nitrogen to prevent the formation of copper oxide on the inside surface of the joint. All pipes should be installed without springing or forcing. All pipes should be protected against mechanical injury in a manner satisfactory to authorities having jurisdiction. After erection, all the new pipes cleaned or purged with the help of dry nitrogen gas and tested with dry nitrogen at 2 times of working pressure for 24 hours. All existing and proposed exposed pipes/shall be painted with two coats of Synthetic enamel paint & color codification as per international standards. All concealed pipes to have gas identification bands / labels at appropriate distance. Similarly all pipes which need embedding in the wall should also be tested/painted/labeled and properly insulated. The Medical Area Line Pressure Alarm should be designed to include all necessary digital displays, factory wiring, transformers and circuitry requiring only 230 VAC primary powers. Internal voltage to be stepped down to 5 VDC

		and 15 VDC for control circuit Power. Voltage to external pressure or vacuum transducers Will be 15 VDC. Each area alarm should monitor up to 6 or 12 medical gas & / or Vacuum services. Area alarm panels should be modular in design. Each gas monitored should have a light Emitting Diode (LED) display to continuously indicate actual line pressure and relative line pressure with a control module to include a silence/enter button to silence the audible alarm connected to the safety system in the OT complex as well. The alarm should then automatically reset itself with the correction of the fault condition. The power supply should be installed in the back box Power supply to include an on / off rocker switch and a fuse holder.
22.	**Miscellaneous***	Some other items that may be included along with the civil work for OT are as follows: Imported HD Camera Imported HD Monitor and arm Online UPS system (20 KVA) AGSS System DG Set of at least 35 KVA

***Note: the Bidders are required to note that the items required for Specialty and Super-specialty OT will be different. Specialty OT** includes surgery, orthopaedics, gynaecology & obstetrics, etc. and **Super Specialty OT** includes transplant OTs, CTVS OT, Neurosurgery OT etc. While the BOQ has suggested a list of requirements both kinds of OTs, the bidders may include additionalities for both categories separately in the miscellaneous section, and technically justify the same, which will form a part of the **technical scoring**.

ANNEXURE: II
FINANCIAL PROPOSAL BREAK-UP

Component wise cost break up of Modular OT in MCH
(Super specialty modular OT)
(Approx. size: 24 X 24 feet)

Sl. No.	Major Components	Bid Price in INR
Fixed costs		
1	Automatic Hermetic Doors	
2	Twin plate X-ray Viewing Screen	
3	Laminar Air Flow	
4	Air Handling unit	
5	Double arm surgical+ Anaesthesia pendant with lights	
6	Single Arm Pendant with lights	
7	Anaesthesia Work Station including ventilator	
8	Electro hydraulic OT Table	
9	OT Safety Control Panel (separately for each control system)	
10	Power back up (online UPS and 35 KVA DG Set (silent)	
11	Equipment Storage Unit	
12	Two bay scrub sink	
13	Operating list writing board	
14	Hatch box	
15	Medical gas, vacuum and compressed air station	
Variable costs		
16	Wall and Ceiling Panel (per sq. ft.)	
17	Flooring (per sq. ft.)	
18	Peripheral Lights (per light)-ceiling	
19	Surgical OT Lights (per light)-ceiling	
20	Electrical Installations	
21	Civil Work (per sq. ft.)	
22	Labour Costs per installation	
23	Medical Gas Pipe Line including vacuum and compressed air system	
24	Manifold	
25	Miscellaneous	
	Total	

Component wise cost break up of Modular OT in DH
(Specialty modular OT)
(Approx. size: 20 X 20 feet)

Sl. No.	Major Components	Bid Price in INR
Fixed costs		
1	Automatic Hermetic Doors	
2	Twin plate X-ray Viewing Screen	
3	Laminar Air Flow	
4	Air Handling unit	
5	Double arm surgical+ Anaesthesia pendant with lights	
6	Single Arm Pendant with lights	
7	Anaesthesia Work Station including ventilator	
8	Electro hydraulic OT Table	
9	OT Safety Control Panel (separately for each control system)	
10	Power back up (online UPS and 35 KVA DG Set (silent)	
11	Equipment Storage Unit	
12	Two bay scrub sink	
13	Operating list writing board	
14	Hatch box	
15	Medical gas, vacuum and compressed air station	
Variable costs		
16	Wall and Ceiling Panel (per sq. ft.)	
17	Flooring (per sq. ft.)	
18	Peripheral Lights (per light)-ceiling	
19	Surgical OT Lights (per light)-ceiling	
20	Electrical Installations	
21	Civil Work (per sqft)	
22	Labour Costs per Installation	
23	Medical Gas Pipe Line including vacuum and compressed air system	
24	Manifold	
25	Miscellaneous	
	Total	