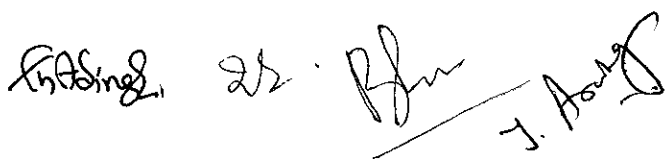


BOQ for Modular OR Turnkey Project			
S.No.	Description	Quantity	Unit
	<b>Modular Operation Room</b>		
1	Modular OR Glass Panel Walls	320	Sqmtr
2	Modular OR Ceiling Panels	160	Sqmtr
3	Modular OR Conductive Flooring	160	Sqmtr
4	Modular OR Peripheral light cum luminaries	32	Nos
5	Modular OR Automatic Hermetically Sealed Door	4	Nos
6	Modular OR X Ray Viewer	4	Nos
7	Modular OR Surgeon Control Panel	4	Nos
8	Modular OR Laminar Air Flow	4	Nos
9	Modular OR Hatch Box	4	Nos
10	Modular OR Electrical Works	4	Lot
11	Modular OR Storage Unit	4	Nos
12	Modular OR Writing Board	4	Nos
13	Modular OR View Window	4	Nos
14	Modular OR Medical Gas Pipeline System	4	Lot
15	Modular OR Ducting	4	Lot
16	Modular OR Air Handling Unit & Condensing Unit	4	Nos
17	Modular OR Pressure Relief Damper	4	Nos
18	Modular OR Surgical Pendants	4	Nos
19	Modular OR Anaesthesia Pendants	4	Nos
20	Anaesthesia Gas Scavenging System	1	Lot
21	Modular OR Distribution Box	4	Nos
22	Modular OR Three Bay Automatic Scrub Sink	2	Nos
23	Operation Theatre Complex HPL Wall Cladding	200	Sqmtr
24	Operation Theatre Complex Metal False Ceiling	150	Sqmtr
25	Operation Theatre Complex Electrical Work & Fixtures	1	Lot
26	Operation Theatre Complex & Other Areas Anti Bacterial Flooring	150	Sqmtr
27	Operation Theatre Complex Clean Room Doors	6	Nos
28	Horizontal Bed Head Panel: Pre OP & Induction Room	6	Nos
29	Medical Gas Pipeline for Pre OP & Induction Room	1	Lot
30	MOR Video Integration System	1	Lot
	Routing System		
	IP Based Two Way Audio - Video Communication System		
	4K MEDICAL GRADE DOCUMENTATION SYSTEM		
	In-Room Camera		
	32" Full HD MEDICAL GRADE MONITOR		
	Cabeling & Patch Panels for Integrtion Ready		
Switch to be provided in corridor for all inputs and outputs for integration as per client need			

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 22. *[Signature]*
  
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## Turnkey of Modular Operation Room, Corridor and Other Areas

S.No.	Description
<b>1</b>	<b>Modular OR Glass Panel Walls</b>
	Walls should be made from 10mm/12mm toughened Glass Panels of desired color as per DIN /CE/EN/ US FDA Standards
	Total distance between the inside and outside surfaces of the operating room should be variable to suit the site layout, but should be sufficient for the flush mounting of equipments.
	The cavity between the inner and outer walls should be left with minimum obstructions 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 should be flush mounted.
	Glass panels are heat strengthened in compliance with EN 1863-1
	Thermally toughened in compliance with EN 12150-1
	The wall panel design and construction should allow for the installation and support of all equipment and the provision of openings required for installations, without affecting rigidity and strength.
	There should not be any sharp edges and corners should be smoothed
	A shell type substructure should be designed as a non-load bearing wall.
	This substructure should be made of galvanized steel/aluminium 2mm thickness. This will receive the prefabricated Glass Panels.
	Vertical support of atleast 2mm thickness
	Supporting cross structure beams of 2mm thickness
	The individual wall panels should be made of single sheet without any joints.
	The individual wall panels should be attached to each other with removable clamps or screws or an equivalent fastening system which will allow fast installation as well as removal for service.
	Welding of wall panels will not be permitted.
	The joints should be covered with removable medical grade silicone gasket such that there is continuity in walls visually and seamless surface.
	Liquid silicone should not be used for sealing. Once fixed they have to provide complete hygienic sealing.
	It should be highly durable against mopping, cleaning chemicals and steam.
	Should be non-porous.
	Shade of glass should be confirmed with the user department, any RAL color should be available
	Resistance against common hospital cleaning and disinfection agents must be ensured.
	Picture on wall panel, According to choice by the user on minimum 50% of one wall where there are no cut outs or where there are minimum cut outs.
	It shall be factory printed and no pasting of vinyl will be allowed
<b>2</b>	<b>Modular OR Ceiling Panels</b>
	Ceiling system should also be made of detachable panels for easy disassembly and reassembly.
	It should be similarly prefabricated in the factory and fulfill the requirements of flexibility such that it should be possible to remove the individual panels individually,
	Clip In system, which should be secured with a locking system and perfect sealing.
	The joints should be provided with a silicone sealing for a continuous optical closure.
	The suspension height should be adjustable with tension springs
	The height should be continuously adjustable from 250mm to 110mm with a $\pm$ of 25mm.
	It should be stable and nonslip after adjustment. The material should be of galvanized steel with a thickness of minimum 0.6mm to 0.8mm.
	The ceiling panels should be Antibacterial coated and antimycotic surface.

	The surface should offer active and long-term protection against growth of microorganisms
<b>3</b>	<b>Modular OR Conductive Flooring</b>
	Electro Static Discharge (ESD) Control Flooring
	Providing and fixing 2mm thick Conductive flooring with carbon backing total thickness 2mm, polyurethane reinforced, scratch resistant, fire resistant, chemical resistant, slip resistant, resistant to fungal and bacterial growth.
	Should be Homogenous
	Coving should be provided for better finishing
	Should be connected to earthing through copper strips
	Self-Leveling compound of 3 mm should have prolonged work ability, extra rapid hardening, compensated shrinkage,
	Suitable for high-resistant adjustment from 2 to 4mm of irregular non-planer substrates before laying homogenous tiles with very low Total Volatile Organic Component (TVOC) emission and hypo-allergenic cements.
	The cement based adhesive should come with Shock Absorbing System (SAS) Technology, reactive-epoxide and polyurethane two component products, dispersed in water solution and solvent.
	Design & Color options should be available
<b>4</b>	<b>Modular OR Peripheral light cum luminaries</b>
	36W to 44W LED Peripheral Light cum clean room (OT) luminaries
	Color temperature 4000K
	CRI>90
	Energy Class A++
	Dimension:- 600x600mm
	They should be surface-mounted and recessed lights.
	Framed light cover should be made of highly-resistant and disinfectant – consistent,
	Bottom opening, screwless system
	Protection IP 65
<b>5</b>	<b>Modular OR Hermetically Sealed Door</b>
	Hermetically sealing horizontal sliding door
	Sliding Direction: Left or Right as per site
	The Door should withstand up to 75 Pa overpressure to such a degree that any leakage loss will still not be measurable due to the hermetic seal.
	Standard sizes (W in mm x H in mm): 1800 x 2100 mm.
	Opening the door is extremely easy due to the lever principle on the inner and outer door handles. The door can also be provided with the electrical automatic SDA-04 type.
<b>5.1</b>	<b>Door blade</b>
	The Door Panel should be 60mm thick and has 4mm thick high Quality High Pressure Laminates on both sides of 52mm thick Pressure Injected,
	CFC free Rigid Polyurethane Core of 45±2 Kg/m <sup>3</sup> density.
	The door panel should be flush framed in extruded Aluminium alloy profiles, Grade 6063 T6, shaped with wide radius curves.
	The Aluminium alloy profiles should be natural anodized in 20µm thickness
	Removable EPDM sealing gasket is fitted to the vertical profiles and top profile of the door leaf.
	A special lower sealing gasket with lip facing the floor is fitted on the bottom profile of the door leaf to ensure 100% hermetic sealing.

	Being a perfect flush door, the door skin is made of joint less laminates for widths upto 1500 mm in all standard shades and up to 1800 mm in select shades. Where ever required, perfect butt the joints, without any cover strips, are done with a special adhesive used for structural joints in speed boats.
	The door blade should come with vision panel (Tempered Glass IG unit ) of size 300 x 300 mm flushed with surfaces of the door blade.
	Espagnolete Lock system with key outside and emergency release inside comes as an option. The same gets integrated with automation in automatic doors.
<b>5.2</b>	<b>Rail and Canopy</b>
	Heavy duty extruded single length Aluminium Alloy profiles (3.2 Kg / m) in 6063 T6 grade with unique indentations that allow the door to slide "down and in" (6mm down and 6mm in) simultaneously at an angle of 45° utilizing the weight of the door to give a perfect hermetic seal when closed.
	The rail comes with a joint less single length canopy with closed ends and sloping top in 1.2mm thick 200 GSM Galvanized Steel coated with 25 µm RMP paint in RAL 9006.(up to 1800mm wide doors)
<b>5.3</b>	<b>Hermetic Opener</b>
	Lever Opener for effortless opening, made from Solid AISI 304 grade stainless steel and fitted with innovative rubber spring system.
<b>5.4</b>	<b>Top Rollers</b>
	Powder Coated high quality roller system fitted with special grade (PA6G 210) self lubricating rollers with double ball bearings ensuring noiseless, frictionless and trouble free operation for years.
<b>5.5</b>	<b>Wall Frame and Planks</b>
	Extruded Aluminium Alloy, Grade 6063 T, natural anodized 20µm thickness should be installed along the outside and inside edges of the door opening.
	High density particle board planks finished with 1mm thick compact laminates of door colour are used to cover the door opening.
<b>5.6</b>	<b>Automation</b>
	Microprocessor Based SDA 04 controller. (230 Vac, 750 W (max), CE Marked).
	90W AC Servo motor, IP65 protection Class, 20 Nm, 3Øx230V. (CE Marked)
	If an obstruction is present and prevents the door from closing, the intelligent automation sense with self reversal function thus eliminating the need for safety strip.
	Additional safety is provided by means of a photo cell fitted across the door opening inside the wall frame.
	Easily adjustable variable options for
	o the opening and closing speeds,
	o time delay closing and
	o part / half opening.
	A self diagnostic coded system makes fault finding simple, reducing expensive down time.
	Easy integration with fire safety system.
	The spread of infection is controlled by automating the doors with touch less sensors from BEA Belgium allowing hands free operation.
	AISI 304 grade Stainless Steel Foot Switches with high quality inductive sensors from P+F, Germany.
	Doors can be interlocked to suit individual client requirements.
	The automation can be very easily integrated with various sensing devices depending upon the client requirement.
<b>6</b>	<b>Modular OR X Ray Viewer</b>

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	Three plate view screen should be with electrical safety for high & low voltage system.
	It should be designed to provide flicker free luminance for the film viewing purpose.
	It should be installed flushed with the wall for hygiene and ease of cleaning
	Dimmable option should be available
	Frame Size (L x H x T) = 1220x550x29mm
	Viewing Area (W x H) = 1112x440mm
	Light Source should be LED
	Surface Brightness >10,000LUX
	Colour Temperature = 6500k
<b>7</b>	<b>Modular OR Surgeon Control Panel</b>
	Control panel should have all the controls within the theatre
	It should be atleast 27" or more size Mirror Touch Screen Panel
	Screen panel should be flush mounted on the theatre wall
	It should be based on android or linux operating system adopting the latest international capacitive screen and system integration technology,
	Intelligent voice function, intelligent fault detection function;
	Support 10 point touch 1920*1080 resolution HD Display
	User rights management, system parameter settings
	Human body infrared sensing, automatic shutdown function
	One button start calling
	Phone number configuration
	Time elapsed digital clock
	Real time digital clock
	Medical gas alarm will indicate High and Low gas pressure for each gas service present in the operating theatre and will have an audible buzzer with mute facility.
	The medical gas alarms will be connected to local pressure switches located downstream of the last isolation valves.
	Temperature and Humidity Parameters
	Clean room luminaries control on off
	Telephone
	Differential Pressure Display
	The AC temperature control should be available either on the control panel or as a separate panel on the wall inside the operating room.
	AGSS status also should be indicated on either same panel or another inside the operating room.
	The temperature and humidity sensing should be done from as near the operating table area as possible
<b>8</b>	<b>Modular OR Laminar Air Flow</b>
	Laminar Air Flow Ceiling constructed out of extruded Aluminium/extruded SS304 sheet
	Size 2400 x 2400mm
	8 nos of HEPA Filters.
	Sufficient number of pre-filters to be provided at source that would maintain the efficiency of HEPA filters.
	The HEPA filters should have dust spot efficiency of 99.97% for 0.3 micron particles.
	Air 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.
	Number of air changes should be such that Clean room classification can be maintained at Class 100, as per relevant ISO.
	System shall have CE mark

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<b>9</b>	<b>Modular OR Hatch Box</b>
	Hatch box to have two doors
	With one door opening at a time mechanism
	UV light to be given inside the hatch box, which on automatically when door is closed
	UV light gets off when any one door opens
	Door opening indicators to be present on both sides of the door
	Dimension:- 600x600mm
	Made from SS 304 Grade
<b>10</b>	<b>Modular OR Electrical Works</b>
	Wiring, Conduits with fixtures inside the OT
	Wiring with Low leakage current wires of FRLS wires as per requirements including providing and fixing of conduits and boxes, etc. to complete the work in all respect.
	Inside the OR all electrical works to be done including switch and sockets on walls
	Every wall to have two sets of switch sockets of 4 each
<b>11</b>	<b>Modular OR Storage Unit</b>
	Size 2000mm x 1000mm x 230mm deep or as per the site condition
	The storage unit made from 1.6mm of Stainless steel 304 Grade.
	The doors of the storage cabinet should house vacuum insulated glass, these doors should be installed on the storage units with the help of good quality 304 grade fittings.
	The storage unit should be divided in 2 equal parts and each part should have individual doors with locking system and shelves of glass/SS Grade 304
<b>12</b>	<b>Modular OR Writing Board</b>
	Writing board should be made of glass having Magnetic properties and should be flushed to the wall of the operation room
	Dimension as per suitable wall panel
<b>13</b>	<b>Modular OR View Window</b>
	The view window should be of Double insulated fixed glazing with not less than 5mm thick toughened safe glass
	Window frame shall be Stainless steel Grade 304/ GI of approved shape flush mounted with wall paneling.
	It should be aligned with present window and made of suitable size for each theatre after consultation with concerned department.
	Motorised blinds should be provided which will be able to fully open and close such that full view from window is available or it can be closed fully. Also it should allow angulation of blinds view outside
	Dimension as per site condition
<b>14</b>	<b>Modular OR Medical Gas Pipeline System</b>
	All Copper Pipes must be duly Medical Grade, seamless, fully degreased and half hard
	It should confirm and meet with the latest BS EN standard or equivalent.
	Chemical Composition as per CU.DHP to 1190-1 and CW024A to EN 1412 or equivalent.
	Maximum total carbon content 20mg/m <sup>2</sup> .
	Copper Pipes must have BS EN standard or equivalent.
	Degreasing: All pipes, fittings and valves shall be degreased, steam cleaned internally, dried, shot blasted and blown through with medical quality air and individually capped at both ends
	Fittings shall be wrought copper, brass or bronze conforming to BS: 864 parts 2

	Suitable for a steam working pressure of 17 bar and especially made for brazed socket type of connections
	Every OR must have individual Zonal Valve Box in the corridor for easy access
	Every OR must have individual Alarm System in the corridor for easy access
	Pressure switch for each gases must be provided for the control system per OR
	Connection to each Pendants must be done inside the OR
	All Gas as requested by the client must be provided to the OR from the manifold Room
<b>15</b>	<b>Modular OR Ducting</b>
	Aluminum sheet ducting to be done for supply of air from AHU as well as return to AHU duly polysulphide sealed as required for OT and as per Bureau of Indian standards or equivalent specifications.
	The aluminum sheet shall be of at least 22G-20G
	Entire air duct insulation with 13 mm Thick Cross Linked Polyethylene insulation with factory laminated Aluminum foil
	All joints of insulation should be cover with aluminum tape.
	Joints to be sealed with silicon also
	Risers to be made of the 20G Aluminum sheet,
	Return Grills to be placed in each risers with 20 Micron Pre Filters
<b>16</b>	<b>Modular OR Air Handling Unit &amp; Condensing Unit</b>
	Unit shall be complete with compressor, condensor coil constructed of plate aluminium fins , condensor fans, miscellaneous accessories, and controls with its support.
	Copper piping, valves, gases, etc all should be part of the supply
	8.5 Ton of OD
	Factory build, cabinet type,
	Horizontal AHU, floor mounted in double skin construction of following capacity at 110mm static pressure
	Fabricated independent sections, housing the various components,
	Blower
	TEFC blower motor suitable for operation on 415+ _ 10%volts
	Three phase 50 hz AC Supply
	6 Row copper tube aluminium finned direct expansion cooling coil,
	Pre Filters with anti vibration mountings as required
	~6 row deep and 10 micron pre filters
	AHU should have
	2 stage filtration
	2 pre filters
	2 fine filters
	Mixing chamber should be there to ensure proper fresh air intake and exhaust system
	Supply of AHU kit & control box
	3500 cfm -110mm SP
	<b>Guidelines should be followed as per NAHB-Air Conditioning 2018 Guidelines</b>
	<b>Air Changes Per Hour:</b>
	Minimum total air changes should be <b>20</b> based on biological load and the location.
	The fresh air component of the air change is required to be minimum <b>4</b> air changes out of total minimum <b>20</b> air changes.



	If Healthcare Organization (HCO) chooses to have 100% fresh air system then appropriate energy saving devices like heat recovery wheel, run around pipes etc. should be installed.
	<b>Air Velocity</b>
	The airflow needs to be unidirectional and downwards on the OT table.
	The air face velocity of <b>25-35 FPM</b> (feet per minute) from non-aspirating unidirectional laminar flow diffuser/ceiling array is recommended.
	<b>Positive Pressure</b>
	The minimum <b>positive pressure</b> recommended is <b>2.5 Pascal</b> (0.01 inches of water).
	There is a requirement to maintain positive pressure differential between OT and adjoining areas to prevent outside air entry into OT.
	Positive pressure will be maintained in OT at all times (operational & non-operational hours)
	<b>Air handling in the OT including air Quality</b>
	Air is supplied through Terminal <b>HEPA</b> (High-Efficiency Particulate Air) filters in the ceiling. The HEPA can be at AHU level if it not feasible at terminal level inside OT. The minimum size of the filtration area should extend one foot on all sides of the OT table.
	<b>Air Filtration</b>
	The AHU (i.e. air handling unit) must be an air purification unit and air filtration unit.
	There must be two sets of washable flange type filters of efficiency 90% down to <b>10 microns</b> and 99% down to <b>5 microns</b> with aluminium / SS 304 frame within the AHU.
	The necessary service panels to be provided for servicing the filters, motors & blowers. HEPA filters of efficiency 99.97% down to <b>0.3 microns</b> or higher efficiency are to be provided.
	Air quality at the supply i.e. at grille level should be Class 100/ISO Class 5 (at rest condition).
	Note : class 100 means a cubic foot of air should not have more than 0.5 microns or larger.
	<b>Temperature &amp; Relative Humidity</b>
	It should be maintained $21^{\circ}\text{C} \pm 3^{\circ}\text{C}$ (except for Joints replacement where it should be $18^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ) with corresponding relative humidity between 20 to 60%, though the ideal RH is considered to be 55%.
	Appropriate devices to monitor and display these conditions inside the OT may be installed.
<b>17</b>	<b>Modular OR Pressure Relief Damper</b>
	Pressure Release Dampers should be provided in each room to prevent contamination of air from clean and dirty areas.
	Suitably sized air pressure relief damper should be strategically place enabling differential room pressure to be maintained and ensure that when doors are opened between clean and dirty areas.
	Counter - Weight balancing system should be provided in the PRD to maintain positive pressure inside the operation room.
	Air pressure stabilizers should have a capability of controlling differential pressure to close tolerance.
	The PRD should remain closed at pressure below the set pressure and should open fully at pressure and should open fully at pressure only fractionally above the threshold pressure.
	SS 304 Grade Body and blades
	Outside grill of powder coated with shelves
<b>18</b>	<b>Modular OR Surgical Pendants</b>
	Imported Heavy duty Ceiling Pendant System should have the facility to provide convenient positioning of medical equipment, medical gas terminal units, electrical and specialty services in operation theatre.
	Pendant should be single arm type having arm length of approx. 900 mm. The pendant should be ceiling mounted.
	Should have aluminium powder coated body with 3/4 trays for keeping instruments and one drawer.

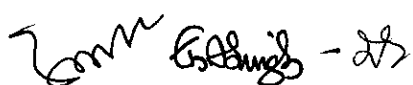


	The pendant shall be provided with 6 nos. of electrical 6/16 Amps / 230V power socket having individual switch
	The pendant shall be provided with <b>Imported 6 nos gas outlets</b> as approved by the HOD/Surgeon
	Shall be provided with 1 no. of I.V pole with mounting bracket.
	Weight carrying capacity of the arm shall not be less than 70 Kgs.
	The pendant shall provide adequate clearance above finished floor level.
	Each pivot point in the pendant including the pendant head should have 330 degree rotation.
	Segregation of services i.e. Electrical supply and Medical gases should be maintained throughout.
	Should be supplied with integrated arrangement for mounting accessories.
	The pendant shall be supplied with medical and electrical outlets pre-fitted and internally wired
	Monitor Arm to be given with the pedant from ceiling or pendant drop tube
	<b>ISO 14001:2015</b>
	<b>ISO 9001:2015</b>
	<b>ISO 13485:2016</b>
	<b>CE/FDA/BIS</b>
	<b>ISO 45001:2018</b>
	<b>GMP</b>
<b>19</b>	<b>Modular OR Anaesthesia Pendants</b>
	Imported Heavy duty Anaesthesia Pendent System should have the facility to provide convenient positioning of <u>medical gas terminal units, electrical and specialty services in operation theatre.</u>
	Pendant should be single arm type having arm length of approx. 900 mm. The pendant should be ceiling mounted and <b>shall have provision to mount at least 1 monitor.</b>
	The pendant shall be provided with 6 nos. of electrical 6/16 Amps / 230V, AC power socket having individual switch.
	The pendant shall be provided with <b>Imported 6 nos gas outlets</b> as approved by the HOD/Doctor
	Shall be provided with 1 no. of I.V pole with mounting bracket.
	Weight carrying capacity of the arm shall not be less than 90 Kgs.
	The pendant shall provide adequate clearance above finished floor level after mounting the anaesthesia machine.
	Each pivot point in the pendant should have 330 degree rotation.
	Segregation of services i.e. Electrical supply and Medical gases should be maintained throughout.
	Should be supplied with integrated arrangement for mounting accessories.
	The pendant shall be supplied with medical and electrical outlets pre-fitted and internally wired.
	<b>ISO 14001:2015</b>
	<b>ISO 9001:2015</b>
	<b>ISO 13485:2016</b>
	<b>CE/FDA/BIS</b>
	<b>ISO 45001:2018</b>
	<b>GMP</b>
<b>20</b>	<b>Anaesthesia Gas Scavenging System</b>
	The Anaesthetic Gas Scavenging (AGS) System shall comply with HTM 02-01, HTM2022 and either EN ISO 7396-2 or BS 6834.
	The AGS system shall be dedicated, specifically designed active extraction and disposal system for waste anaesthetic gas.
	It shall provide a maximum flow rate of 80 l/min (EN ISO 7396-2) or 130 l/min (BS 6834) with a 1 kPa resistance to flow, and a minimum of 50 l/min (EN ISO 7396-2) or 80 l/min (BS 6834) resistance to flow at each terminal unit, irrespective of the number of terminal units in use.
	The AGS system shall use dedicated radial blowers in <b>duplex</b> configuration.
	The AGS pump assemblies shall be skid mounted and included on the skid shall be the duplex pump(s), motor control unit(s) with starter/isolator, moisture drain flask and flexible connector(s) to connect the plant to the pipeline.

	Each pump shall include an electric motor and directly coupled impeller assembly.
	Impeller bearings in the pump(s) shall not require lubrication.
	The pump(s) shall be air cooled and rated for continuous operation
<b>20.1</b>	<b>Vacuum /Flow Regulating Valve</b>
	A vacuum/flow regulating valve shall be provided and positioned at the pump, comprised of a spring-loaded plate valve and inlet silencer.
	The valve should be changeable with the pipeline inlet in order to provide flexibility on site. The plate shall control air ingress into the pipeline system, thereby controlling the vacuum level within.
	An optional air inlet fitter shall be available should the air quality be poor/dusty offering further protection against dirt ingress into the pump.
	Additional in line vacuum /flow regulating valves may be installed if required and shall be determined by the pipeline designer.
	The vacuum/flow regulating valve shall ensure a maximum vacuum of 200mb below atmospheric pressure is not exceeded and shall be factory preset at 150mb.
<b>20.2</b>	<b>Control System</b>
	Each motor control panel shall incorporate an emergency panel isolation switch facility, which controls all electrical power to the exhauster unit, remote start switch panels and system indication lights.
	All control and status indication circuitry shall be limited to 24V a.c. A green 'POWER ON' indicator shall be fitted to the starter/isolator panel, and shall illuminate whenever power is available to the 24V control and indication circuit.
	A 'HAND/OFF/AUTO' switch shall be provided to control operation of the pump, running the pump continuously when selected to 'HAND'. When selected to 'AUTO', control of the pump shall be passed to the remote start switch panels.
	Operation of any of the remote start switches shall activate the pump. The pump shall continue to run until all remote switches are selected 'OFF'.
	The starter/isolator panel shall incorporate a thermal protection over load device.
	The thermal protection overload device shall also monitor the electrical power supply and phase input. In the event of a fault, the overload device shall break the circuit to the pump, preventing operation until the system is manually re-set.
	Operation of the overload device shall also break the circuit to the remote start switch panels, extinguishing the green running indicator.
	Duplex installations shall use remote start switches that include amber 'PLANT FAULT' indicator.
	This shall illuminate, if either pump is set to 'HAND', or if one of the overloads trip. A red 'PLANT EMERGENCY' indicator shall also be provided and shall illuminate on all remote start switch panels if the vacuum level falls below the pressure switch set point level when the pump has been called.
	The on/off rocker switch shall include a green illuminated surround to indicate 'mains on'.
	Where a duplex system is installed each pump shall be controlled by a separate motor control panel to enable servicing of either pump or control gear whilst maintaining system operation.
	Volt free relay kits for replicating alarm conditions to BMS shall be available as an optional extra. To be either installed either at factory or as a retro-lit kit for onsite installation.
<b>20.3</b>	<b>Terminal Units</b>
	Terminal unit shall be provides with an adjustable orifice to allow balancing of the terminal unit flows during commissioning. Venturi style terminal units are not acceptable. Terminal units shall not be connected to the medical vacuum system.
	A. AGSS System of 2100 LPM Duplex :- 1 nos
	B. Balancer & Receiver Unit:- 4 nos

2000  
 22  
 2000  
 22

22  
 22

	C. Remote:- 4 nos
	Supporting accessories per system should be given
<b>21</b>	<b>Modular OR Distribution Box</b>
	All high voltage equipment should be installed in a separate enclosure.
	The remote cabinet should house the transformers, mains failure relays, electrical distribution equipment & circuit protection equipment for all circuits within 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 miniature circuit breakers should protect all internal circuits
<b>22</b>	<b>Modular OR Scrub Sink</b>
	Three Bay Scrub Sink with Foot Pedal made from 304 Grade Stainless Steel.
	Hand sensor to be provided with timer facility
	Seamless Structure for non-corrosive nature. Foot Pedal to be corrugated and incorporated inside the structure.
	Hot & Cold Water mixer to be given inside
	Three Faucets to be provided for flow of water
	Electrical & Plumbing work to be done by supplier
<b>23</b>	<b>Operation Theatre Complex Wall Cladding</b>
	Anti-Bacterial HPL Cladding 6mm thick with standalone structure
	Solid grade compact high pressure laminate as per EN 438-4
	Made of alpha cellulose fibre impregnated with thermosetting synthetic resins
	Material should provide high resistance to abrasion, scratch, heat, chemical impact, moisture and bacterial growth resistance
	Density as per ISO 1183
	Wear resistance as per EN 4380-2 10
	Impact Resistance as per EN 438 2-21
	Direct pasting on wall not allowed
	GI/SS Structure or clamps to be used for wall panels
	Adjoining panels to be joined with silicon/gasket/SS Strip
	Floor SS 304 Grade/GI Skirting to be given
	Corner guards to be used as required on pillars and corners
	SS 304 Grade L Angles to be used in corners
<b>24</b>	<b>Operation Theatre Complex Anti-Bacterial Flooring</b>
	Imported Anti-Bacterial, anti-fungal and anti-skid 2mm homogenous medical grade flooring
	Coving to be used
	Substrate floor will be provided; having a flatness tolerance of $\pm 3$ mm over a one square meter area.
	On to this sub-floor, a self-levelling compound of minimum thickness requirement of 2mm to 3mm with the requisite primer should be applied to level the floor to true flatness
<b>25</b>	<b>Operation Theatre Complex False Ceiling</b>
	600x600mm metal power coated false ceiling to be in corridor
	Full tile installation to be done and rest area to be gypsum for uniformity
	32mm prelude main and cross tee to be used
	Class A fire resistance performance
<b>26</b>	<b>Operation Theatre Complex Electrical Work &amp; Fixtures</b>

	Wiring, Conduits with fixtures on the corridor as required
	Wiring with Low leakage current wires of FRLS wires as per requirements including providing and fixing of conduits and boxes, etc. to complete the work in all respect.
	Inside the OR Corridor all electrical works to be done including switch and sockets on walls
	Supply of Electrical will be given by hospital.
	Inside the complex work to be done by vendor
	600x600mm 36w or above to be supplied as required in the corridor
<b>27</b>	<b>Operation Theatre Complex Clean Room Doors</b>
	PPGI Sheet Puff 30 to 50mm, Panel Clean Door with 300x300mm view glass suitable for Critical Areas
	Size:- 1500/1800x2100mm (As per site)
	Door Frame should be part of door
	Door Accessories to be included;
	1. Hinges
	2. Door Lock
	3. Door Closer
	4. Door Seal
	Interlock in Passive Door
<b>28</b>	<b>OT Integration Technical Specification</b>
<b>28.1</b>	<b>Routing System</b>
	The router should have minimum 10 Digital Inputs & 8 Digital Outputs. It should support 10 base T to use Encoder & Decoder to support any kind of inputs & outputs Using simple Cat 6 Cable Infrastructure
	The Video routing system should receive the video signal from different sources like Room camera, Endoscopy Camera, Overhead Camera, Archiving System, Autillary device like C-Arm, Video Microscope, Mobile ultrasound & video conferencing.
	Control System along with 21" Full HD with 16:9 aspect ratio Medical grade Touch monitor should be Wall / Desk mounted for controlling Routing(eg. Video Signal from C arm, endoscope, OR light camera, Microscope & In-Room Camera)
	The routing system should be able to accept all kinds of singnals including FHD, 3D & 4K within in the OT
	The routing system should also be capable of taking input from high resolution PACS workstaion within in the OT to distribute PACS images of the patient to any monitor/display within the OT
	Routing Touch interface should include Source Preview, Presets including customizable name according to Super Speciality or User
	Medical Certifications: ANSI/AAMI ES60601-1, CAN/CSA C22.2 No. 60601-1, EN 60601-1, EN 60601-1-2, FCC Part 15 Class A, ICES-003, VCCI V-3, MDD Class I
<b>28.2</b>	<b>IP Based Two Way Audio - Video Communication System</b>
	One loudspeaker, One Hand Mic & One Wireless Collar Microphone with echo cancellation shall be installed within the Operating room, suitable cable material and a patch panel should be offered as per the position of the Loudspeaker.
	The system should have In-Built IP Based Unicast Video Streaming Facility with Zero Latency in order to transmit live Surgery on Hospital Network / Seminar Room / Lecture Theaters / Auditorium
	The system should have IP based two way audio facility with Zero Latency in order to have live audio communication with auditorium during workshops / conferences
	It should have min Two Microphone Input

	It should also have Aux input for connecting External Audio devices like Laptops for Presentation Audio etc.
<b>28.3</b>	<b>4K MEDICAL GRADE DOCUMENTATION SYSTEM</b>
	The Digital Documentation system should be 4K, 3D & HD Medical Grade Recording System. The System should be a portable system, based on embedded windows7/8 or Linux designed specifically for recording, manage, and archiving surgical images and videos in Native 4K, HD upto Progressive at 60 Frames Resolution . The captured images & video can be accessed from the hard drive of the system for printing or saving onto multiple forms of external media which High Speed USB3.0 Flash Drive & Hospital network.
	The system should be integrated with the Routing System in such a way that the central control system is capable to route any running surgical video, which is being recorded in it, onto any display device in an operating room.
	The system should have In-Built Unicast Video Streaming Facility in order to transmit live Surgery on Hospital Network / Seminar Room / Lecture Theaters / Auditorium
	It should have at least 1TB or more internal Hard Disk Drive (HDD) for Data Storage
	Should have capability for Newtrok Storage for Data Archiving on larger storages like NAS/SAN
	Should have the facility to choose archiving foler format like Patient Name / Patient ID / Time & Date Stamp
	Built in Touch Screen
	Built in Actvation enabled PACS & HL7 integration for Worklist data inside OT
	Patients Recorded Video & Image data can be called up and distributed to required monitor in the operating room
	HIPAA Compliance encryption, auditing, logs, user/admin roles
	MEDICAL CERTIFICATIONS: IEC 60601-1:2012 IEC 60601-1-2:2014
<b>28.4</b>	<b>In-Room Camera</b>
	The Bidder should install an In-Room HD Camera inside OT
	Image Sensor: 1/2,8" CMOS
	In-Built min12X Optical Zoom
	White Balance, Auto Focus, Anti Iris
	Pan Tilt Zoom upto +- 170 Degree & +-90 Degree
	Full HD 1080P 60HZ Resolution
	3G-SDI / DVI / HDMI Output
	1x Control RS-422 / 1x Control + LAN (Ethernet RJ45)
	Wireless Remote Control
<b>28.5</b>	<b>32" Full HD MEDICAL GRADE MONITOR</b>
	Full High Defination 32" Medical Grade Monitor
	LED/LCD Flat Panel Monitor
	Input : DVI, VGA
	Resolution Supported : 1920x1200 & 1080P 60 Hz
	Aspect Ratio - 16:9
	Medical Certifications: ANSI/AAMI ES60601-1, CAN/CSA C22.2 No. 60601-1, CAN ICES-3(B)/NMB-3(B), FCC Class B, EN60601-1, EN60601-1-2, CE, MDD 93/42/EEC, Class I Medical Device
	Spring arm from ceiling to be supplied for hanging the monitor
<b>28.6</b>	<b>Cabeling &amp; Patch Panels for Integration Ready</b>
<b>28.7</b>	<b>Switch to be provided in corridor for all inputs and outputs for integration as per client need</b>

<b>29</b>	<b>Horizontal Bed Head Panel: Pre OP &amp; Induction Room</b>
	Minimum length 1.2 metres. Maximum length 1.8 meters.
	It should have the following features:
	Efficient, Safe & Robust design in extruded aluminium section.
	Smooth curved surfaces, and choice of base colour and fascia plates.
	Unit should have integrated rail system to mount accessories.
	The headwall system should be constructed of aluminium extrusions joined together to form a carcass to suit the particular application. Unit should be factory assembled for electrical and mechanical components.
	The panel should be designed to accommodate the following:
	a) <b>Gas Outlets</b> – Oxygen - 2 nos., Medical Air 4 Bar – 2 nos., Vacuum – 2 nos.
	b) <b>Electrical Sockets with Switches 6/16 Amps</b> - 6 nos.
	c) Should be supplied with integrated rail for mounting accessories.
	Each bed-head panel unit shall be supplied with medical and electrical outlets pre-fitted and internally wired
	<b>ISO 14001:2015</b>
	<b>ISO 9001:2015</b>
	<b>ISO 13485:2016</b>
	<b>CE/FDA/BIS</b>
	<b>ISO 45001:2018</b>
	<b>GMP</b>
<b>30</b>	<b>Medical Gas Pipeline for Pre OP &amp; Induction Room</b>
	Isolation Box outside each Room
	Valve as required
	Alarm outside each room
	<b>Terms</b>
	This includes spare parts for gas control panel, gas outlets, alarms and zone valve box. Sufficient spares to be maintained at hospital's end by the MGPS Vendor at their own cost to meet emergency situations during warranty period. Items used by MGPS Vendor to be replenished.
	All Civil expenses to be borne by the vendor for laying of Copper Pipes which includes breakage, re plastering, erection of scaffoldings etc
	Cylinders & Gas for entire job to be arranged and cost to be borne by the vendor themselves
	<b>Service call logged should be entertained within 36 hours as the area involves Operation theatre</b>
	Performance of Modular OR in the North East Region to be submitted
	All Civil expenses to be borne by the vendor for laying of Copper Pipes, Ducting, wall and ceiling panels inside OR, Corridor etc which includes breakage, re plastering, erection of scaffoldings etc

