

**MINISTRY OF EXTERNAL AFFAIRS
(GOVT. OF INDIA)**

**NEPAL BHARAT MAITRI EMERGENCY AND TRAUMA CENTRE (NBMETC),
KATHMANDU
NEPAL**

Tender

for

**Construction of Additional works for making Operation Theaters (OTs)
functional at 200 Bedded Nepal Bharat Maitri Emergency and Trauma Centre
(NBMETC), Kathmandu, Nepal**

VOLUME – IV

TECHNICAL SPECIFICATION

May 2014



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Tender No. HSCC/SES/MEA/Nepal/OT /2014

TECHNICAL SPECIFICATION OF ADDITIONAL WORK FOR CONSTRUCTION OF OPERATION THEATRE

SCOPE OF WORK -

Supply construction of Operating Theatre on turnkey basis in accordance with the specifications, bill of quantities and providing of free spare parts and service during 1 year Defect Liability Period.

Size in mm of

Operation Theatre (1)	6548 x 5990 x 4000
Operation Theatre (2)	8450 x 5250 x 4000
Operation Theatre (3)	7230 x 5250 x 4000
Operation Theatre (4)	8685 x 5250 x 4000
Operation Theatre (5)	7035 x 6145 x 4000

1 WALLS & CEILING CONSTRUCTION:

The prefabricated modular construction for 1.60 mm thick EGP backed by 12mm thick Gypsum board to provide seamless operating room to provide seamless operating Room.

The ceiling suspension from concrete ceiling should be as:

Suspension elements : Suspension bracket with tension spring

Suspension Height: Continuously adjustable from 250 to 1100 mm

Stability: Permanent and non-stop after adjustment.

Material High quality galvanized steel

The external wall of the room shall be constructed with solid brick and mortar by the hospital authority. Clearance between inner panel and outer wall preferably should be 45-55 cm to allow the maintenance personnel for service. This closed space should be flushed continuously to eliminate dust and bacterial accumulation. In order to create a smooth uninterrupted surface between adjacent panels, thereby preventing the risk of the accumulation of dust and bacteria in gaps, the panel should be produced in a single full height floor-to ceiling piece. The total distance between inside and outside surfaces of the operating room should be sufficient for flush mounting of the equipment. All the sharp edges and corners of the OT room should be rounded /coved to avoid bacterial contamination. Coving should be wall to wall, Ceiling to wall and floor to wall using Aluminum profile. The wall panel and Ceiling design and construction should be strong enough to allow for the installation and support of all equipment and should have provision of opening required for the installations without affecting rigidity and strength. Access Boxes should be fitted to the rear of all wall-mounted equipment to enable maintenance to be carried out from outside the operating room. Room lighting, air supply inlet, Ceiling Service

units, return air outlets etc should be integrated with EGP ceiling system. The individual panels except those at the edges should be removable individually. The Walls and suspended Ceiling should be hermetically sealed. All the four corners should have return air duct outlets and grill with powder coated Aluminium. Colour should match with colour of Wall Panel. The system should afford the maximum versatility at the planning stage and flexibility during erection, ensuring openness to future alternations and trouble-free maintenance. During the installation of first the structural parts and subsequently the finishing elements, the system should ensure perfect integration of technical networks and allow ample operational flexibility at the construction site. The clean, dry installation method should enable optimum programming of the various work phases, allowing optimization of the installation of technical systems and any necessary alterations to be made – right up to checking and final testing of the installed systems – before the modules are sealed.

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. The wall panel should be fixed to the brick wall with supports/sub-frame on which individual wall panels will be mounted. The individual wall panels should be spot welded together at equal intervals to render equal support to the panels. Spot welding should be properly grinded to make the surface leveled. All joints and cavities should be filled with Metallic Epoxy sealer and sanded flush to provide **seamless finish**. In the case of EGP panel, the internal surfaces of the walls and ceiling of Operation theatre should be sprayed with anti-bacterial paint (Factory Internal test report to be submitted) to a minimum dry film thickness of 300 microns with primer. The **anti bacterial paint** coating should overlap the floor covings, ceiling system and door frames by 25 microns to provide a continuous sealed surface. The anti bacterial paint coating should be non-reflective type, highly resistant to abrasives, water, detergents and weak acids and alkali used in cleaning area. The coatings should have no loss of performance or adhesion to the substrate in the case of regular steam cleaning. Imported Anti bacterial paint applied should not leach out in order to maintain anti- microbial system throughout the life of the product. The coating should have biocide action and prevention property against growth of mould, bacteria and yeasts. Internal colour of the wall and ceiling panel shall be as suggested by the Institute.

2 CEILING FILTRATION SYSTEM / LAMINAR AIR FLOW SYSTEM **(Unidirectional Low Turbulence Laminar Air Flow Plenum Ceiling for each OT)**

Plan air Ceiling System, standard size. PLENUM UNIT - The complete unit shall have factory prepared fine sealing system. It should be perfectly seamless integration of ceiling mounted equipment and OT Ceiling. It should be flexible modular range of solutions, adjustable to the local requirements .It should be made out of high quality and durable materials, filter housings and pressure chamber are made out of Aluminum. It should have a low pressure drop allows for the long-term usage of the HEPA miniplete H14 filters . It should have reliable filter efficiency and filters are guaranteed to remove particles and germs with the usual H14 filters retaining 99.99 % of the particles and germs. It should have minimal pressure drop a low pressure drop ensures the energy saving characteristic of the Laminar Flow Ceiling . Air & light diffuser made out of two layer of mono filament precision woven polyester for the plan air ceiling to give a “LAMINAR FLOW” of filtered air. It also provides a diffused shadow less lighting system with

a control on the intensity of luminance by using high frequency electronic fluorescent tubes and ballasts.

3 FLOORING (ANTISTATIC CONDUCTIVE TILES)

The Operation theatre floor finish should be laid with 2 mm antistatic seamless conductive PVC tiles on a semi-conductive adhesive base. The floor should be scratch resistant, fire resistant, chemical resistant, non-corrosive to biological fluid and detergent, slip resistant, smooth, anti fungi, antimicrobial impervious material conductive enough to dissipate static electricity but not conductive enough to endanger personnel from electric shock. The floor finish should pass over a concealed cove former and continue up the wall for 100mm.

The floor should be provided flat to within a tolerance of ± 3 mm over any 3 meter area. Copper grounding strip (0.05 thick, 50 mm width) should be laid flat on the floor in the conductive adhesive and connect to copper wire of grounding. The connection from copper grid should be brought out uniformly at places to form equi-potential grid. A self-leveling compound should be laid prior to laying of the floor finish. One earthing lead should be brought out of from every 150 Sq.ft. area and attaching it to main earthing strip/ground. Continuous roll should be used and all the joints should be welded by heat fusion process to get seamless floor. The joints in the flooring should be sealed by using a PVC welding bar of matching colour and hot air gun for fusion of welding bar with flooring to provide a continuous sealed surface. The sheets should be highly durable with resistance to shock, scratch proof and indentation. Corners should be uniformly curved. The conductive material should be uniformly impregnated as grains. The floor should be inert to body fluids, chemicals, detergents and disinfectants and it should not be affected by temperature variation within the OT. Colour should be uniform, pleasant and matching with ambience. The floor should have electrical resistance(Point to ground) within 2.5×10^5 to 2.5×10^6 Ohms. The floor should not allow build up of electrical charge beyond 100 volts due to antistatic effect. The corner should not be terminated sharply and concealed cove-former (Aluminum) should be used overlap to a height of approx.25mm and sealed perfectly and uniformly. Self-leveling compounds should be used for the process.

4 PRESSURE RELIEF DAMPERS

The Pressure Relief Dampers are to be equipped with the theatre to prevent contamination of air from clean and dirty areas. The Dampers of suitable size should have AISI-304 Stainless Steel blades of thickness 1 mm each. The body should be epoxy powder coated as per standard BS colours. The statically and dynamically balanced Pressure Relief Damper should be properly placed. The Dampers enable to maintain differential room pressure to close tolerance inside the Operation theatre. Counter-weight balancing system should be provided in the Pressure Relief Damper to maintain positive pressure inside the operation room. The PRD should remain closed at pressure below the set pressure and should open fully at a pressure only fractionally above the threshold pressure.

5 INTERNAL DUCTING

The internal ducting within the Operating theatre and connection with the nearby ductline laid from AHU should be done as per ISI-655 duly fabricated out of 22 swg Aluminum sheet complete with flanges and accessories such as GI suspenders and GI supports completely sealed with Silicon sealant duly insulated with Aluminum foil Nitrile rubber self adhesive type insulation.

6. EXHAUST AIR CABINET

Return air exhaust cabinets should be provided in the operation theater. The exhaust air cabinets should be openable and cleanable. These cabinets should have suction from top as well as from bottom. Designed flow rate should not be less than 1000 m³/hr. Distribution of exhaust air volume between fluff strainers top should be 400 m³/hr and bottom 600 m³/hr. The Exhaust air cabinet should be manufactured and supplied by the supplier of wall and ceiling system supplies.

7 PERIPHERAL LIGHT CUM CLEAN ROOM LUMINARIES

It should be fitted outside the air ceiling system area and flush with the ceiling in the operation theatre suitable to required illumination of OT. Peripheral lights and clean room luminaries fitted in the frame should be 4-6 (As suitable to the required illumination) in numbers depending on the size of OT and required Lux level. The fluorescent lamps 36 W 16mm Ø- 2 nos / Non-hygroscopic high glow low power LED based peripheral lights (1'x2') having high quality low wattage LED lighting system with highly spectacular anodized Aluminum reflectors and optical antiglare system for adjustable light distribution. Luminaire cover made of highly resistant, disinfectant proof laminated safety glass with fine grained surface, glass pane with white powder coated steel frame. Luminaire body made of sheet steel, white, powder coated supplied ready for connection. The reflectors should be of high quality, cleanable and non deteriorating. Dimmable ballasts of reputed companies to be used and diffuser should be constructed with opaque acrylic diffuser material in aluminum frames/ SS frames. It should have flicker less design with color. Recess frames should be gas tight. The fitting should be flush with the ceiling and should be removable from top or bottom. Lighting units should be properly sealed with the ceiling by means of fillers and beadings so that all lighting units are airtight with ceiling panels. The light fitting should be uniformly and aesthetically distributed on the ceiling to provide uniform illumination in the OR. Peripheral lighting should be done according to **IP65 protocol**. Light should not interfere when green mode of Endoscopy is performed.

8 OT CONTROL PANEL

The room Surgeon's control panel should be designed to cope with changing technology & equipment in operating environments.

The **touch screen** typed Control Panel should be 19" medical grade color TFT/LED panel stationed in the sterile field. The Control Panel should be configured to incorporate all the services required by the staff in the Operation theatre. It should be mounted flush in the theatre wall.

Control Panel will be user friendly & ease of operating & maintaining purpose. Operation Theatre Surgeon Control Panel consisting of display like Real time, Count down time, lighting control through dimmer, Telephone, Medical Gas pressure set point, Alarm, Room Temperature and Relative Humidity mounted flush in the theatre wall with Distribution Board complete with all accessories etc. Lighting Control along with Day time clock –Digital, Elapsed Time Clock – Digital.

The control panel should be user friendly and ease of operation and maintenance. All internal wires should be marked with plastic ferrule type cable markers, for ease of identification. The control panel should be able to be integrated with the commonly used OT software in future.

The control panel should meet Electrical Safety Code for High and Low voltage system, wired to the current IEE regulations.

9 X-RAY FILM VIEWER

The two (2)-plate viewing LED type/4 pieces of high frequency fluorescent lamps X-Ray Viewing Screen should be designed to provide flicker free luminance for clear film viewing. Each plate should be able to illuminate films up to 14”x17” size. ‘Dimming is controlled using dimming ballast and PCB mounted inside the box. The mounting of the Screen should be installed flushed with Operation theatre wall to avoid dust accumulation and microbial growth and ease of cleaning. The diffuser should diffuse the light evenly and to provide adequate luminance for film viewing. Body should be of extruded aluminum powder coated black with bacteria and disinfectant resistant finish. Proper spring loaded film clip with rollers should be provided to holes of the films firmly and to remove the film without scratches. The X-Ray Film viewer should comply with relevant Electrical Safety Codes for High and Low voltage system. Mounting should be flush with the wall to avoid dust accumulation and growth of organisms between wall and panel.

10 HATCH/PASS BOX

It should be of 610mmx610mm size for disposal of dirty linen/waste to non-sterile store with Door open/close indication. Each Hatch should be equipped with two doors and the door should be operated electronically. The Hatch should be designed in such a way that only one door will be opened at one time. The Hatch Box should be constructed of Stainless Steel AISI-304 Door and completed with interlocked UV light and electro-magnetic mechanism complete with indicators and hours meter. This UV light should be automatically turned off in case of opening of either of the doors. Indicators should be provided on both sides of the OT so that door open / close status can be monitored from both sides.

11 WRITING BOARD (OPERATING LIST BOARD)

Writing Board as operating list Board of size-1000x700x60deep should be made of ceramic having magnetic properties and should be flushed to the wall of the operating Room.

12 BUILT-IN STORAGE UNIT

Storage Unit should be made out of 1.60 mm thick EGP. The storage unit should be divided 2 or more parts and each part should have individual glass doors with high quality locking system. These doors should be installed on the storage units with the help of imported fittings allowing an opening allowance of 160degree. Each part should be provided with steel racks which should be completely detachable type. The storage unit should be fitted with 5mm thick vacuum insulated glass door and mounted flush with the theatre wall. The storage unit should be continuously ventilated by positive air in the OT through ventilation holes provided at the bottom and top of opposite sides. The dimensions of each storage unit should not be less than height 1800mm x 900mm x 350mm.

The storage units should be designed in a way that they are flush with the OT wall panels and the units should be air tight, not allowing any leakage between units and the wall panels.

13 DISTRIBUTION BOARD ELECTRICAL WIRING, CONDUITING WITH FIXTURES INSIDE THE OPERATION THEATRE

Electrical Distribution Board along with all high voltage equipment should be installed in a separate enclosure. Electric Distribution Panel, UPS, Transformers, Mains, Relays, Circuit protective equipment, for all circuits of Operation theatre shall be installed in the remote cabinet. All electrical wiring should be terminated to the connectors mounted on DIN/CE approved rail and labeled with indelible labels. Individual fuse and miniature circuit breakers should protect all internal circuits. Complete schematic diagram drawing description should be enclosed with the equipment.

Laying of PVC conduits, Modular Switch Boxes, Modular Switches-sockets, Power and Light wiring including Earthing wire for all the lighting controls, Pendant and other equipment fixtures and fittings inside the theatre Wiring with low leakage current wires of FRLS wires should be as per requirements. Wiring for 250 volts single phase and neutral 6/16 Amps switched socket outlet with 4 sq.mm and 2.5 sq.mm PVC insulated copper conductor 1100 volts stranded flexible wires should be concealed with conduit. Installation of all electrical cabling must be of IS: 1554 (As per latest amendment) standard and wiring as per IS: 732 standard and proper earthing of OT and other accessories in the OT room as per standard guidelines of BIS. Fittings should be sealed on accordance with the standard IP54. Earthed equipotent bonding of all exposed metal work should be provided.

14 OT LIGHT WITH CAMERA AND MONITOR- IMPORTED

Description: Dual Dome LED Surgical Lighting System with one dedicated Spring-Arm Suspension for Progressive Scan HD Flat Panel with an Integrated In-Light Camera System.

i) OT Light

Operating Room Surgical Lighting System should provide an ideal combination of brightness,
HSCC/SES/TRAUMA CENTRE-OT/NEPAL/2014

maneuverability, and shadow resolution without sacrificing color accuracy through a consistent LED technology with a unique faceted reflector design technology.

Such Lighting System should have the following technical specifications:

- Number of Light heads : : Two per suspension
- Number of LEDs : Number of LEDs should be adequate enough to provide minimum Illumination level 160000 Lux each.
- Color Temperature : 4000 - 5000 K
- Field Size Diameter Depth : 6 inch – 12 inch
- Depth of Field : 30 – 35 inch
- Illumination Level : minimum 160,000 Lux each
- Controls : Wall Control Touch Panel
- Rotation : 360 degrees
- Vertical Adjustment Range : + 20 inch – 25 inch
- Sterilizable Handle : Yes
- Lighthouse Diameter : 20 – 30 inch
- Mounting Type : Ceiling
- Supply Voltage : 230 VAC 50 Hz
- Bulb Type : LED
- Dimming Range : 30% - 100%
- Operating/Storage Humidity : 10 – 95%
- Life of Light Source : > 30,000 Hrs.

Camera System

Description : Integrated In-Light HD Camera System should be integrated at the centre of one of the domes of this lighting system in order to capture images & video sequences of the open cases.

Such a camera should have the following specifications:

- Signal to Noise Ratio (S/N Ratio) : <50 dB.
- Minimum Illumination : <3 lx
- Optical Zoom : 25 – 30x.
- Digital Zoom : 12-15X
- Power Supply : Through Light / max. 12W.
- Relative Humidity : <90%.
- Video Output : S-Video & Composite Video
- White Balance & Gain : Automatic/Manual

Such Surgical Light System Should be compliant with relevant European (CE) /US FDA standards

Such Light and Integrated Camera should have a control through Touch Panel of the control equipment placed inside the operating room at documentation station / nurse works station.

C. Flat Panel Monitor

Should be 23” High Definition Progressive Scan Flat-panel Monitors with ceiling mounted spring arm suspension to support high-definition/HDTV progressive Scan images and should be able to support and display DVI/HDTV, RGBHV, S-Video, Composite video signals.

The flat Panel suspension should be ready with the cables for integration of High Definition Digital (DVI/HDTV), RGBHV (High Resolution), SVHS (S-Video), Composite video signals to travel from the various sources of video like endoscopic camera, room camera, in light camera, high definition flat panel monitors, while assuring native resolution / signal.

Such Monitor should at least meet the following technical criteria:

- Resolution : 1600 dots x 1200 dots, Progressive Scan
- Display Colors : 16 Million Colors
- Inputs : DVI, RGBHV, S-Video, Composite Video
- Synchronization : 2.5 – 5.0 Vpp separated sync
- Response time : <25ms
- Travel : 330° - 340°
- Forward Tilt : 30° - 40°
- Backward Tilt : 45° - 50°
- Cable Kit for Integration : DVI, Fiber Optic, RGBHV, S-Video, Composite

In addition to the above mentioned equipment/appliances, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the Low End Modular OT then that may be provided after approval from Engineer in-charge.

The contractor should construct the Low End Modular OTs considering all stipulated requirements of Air management system etc.

The sizes are approximate. Minor variations in sizes shall be acceptable subject to prior approval of the Engineer.

15. IN ADDITION TO THE ABOVE, FOLLOWING TURNKEY WORKS FOR INSTALLATION AND COMMISSIONING OF LOW END MODULAR OT ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR :

The turnkey work includes all modifications to the built up space provided at the hospital site including demolishing, dismantling, reassembling, civil modifications, electrical works, Mechanical works. plumbing works, all cable trenches and railings wherever required, interior decoration, air conditioning duct, furniture and other related works of the Operation Theatre required for the smooth and efficient functioning of the centre. These works shall comply with all relevant safety and standards guidelines. The contractor is fully responsible for installation and commissioning of all equipment mentioned in the tender. Bidders are strongly advised to visit the site for assessment before the submission of tender offer.

- **Electrical cabling** of IS : 1554 standard(Latest) and wiring as per IS : 732 standard from MDB(Single point source) to Electric Distributional Panel and to the corresponding load points
- Providing fixing of **Electrical Gadgets** like ELCB, MCB, Light Points, Power points, in the Low End Modular OT room. • Number of fans, power point, bulbs/tube light. Apart from these supplies to the individual equipments with ELCB & MCB for Low End Modular OT • Installation of MCB, ACB, ELCB & OCB of Havell/Siemens/L&T/Schneider etc for Control Panel for Low End Modular OT.
In addition to the above mentioned equipment/appliances, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the Low End Modular OT then that may be provided and any other necessary work required for satisfactory working of the Low End Modular OT and not mentioned

The sizes are approximate. Minor variations in sizes shall be acceptable subject to prior approval of the Engineer.

TECHNICAL SPECIFICATION FOR CONSTRUCTION FOR ADDITIONAL WORK OF MINOR OT

SCOPE OF WORK -

Supply construction, and commissioning of Operating Theatre (Minor) on turnkey basis in accordance with the specifications, bill of quantities and providing of free spare parts and service during 1 year Defect Liability Period.

Size of Minor OT (mm) 6140 x 5070

1. CEILING SYSTEM

The prefabricated modular construction for 1.60 mm thick EGP backed by 12mm thick Gypsum board to provide seamless operating room to provide seamless operating Room. Factory made cutout in the ceiling panel for light fixtures and diffusers. Aluminium Ducting inside the OT with Diffusers and ducting connection with the incoming duct at the OT from AHU.

The ceiling suspension from concrete ceiling should be as:

Suspension elements : Suspension bracket with tension spring

Suspension Height: Continuously adjustable from 250 to 1100 mm

Stability: Permanent and non-stop after adjustment.

Material High quality galvanized steel

Laminar Flow Tent should be made of 0.8mm thk GI/1mm thk Aluminium sheet and provision for flanges for Duct connections and two layer monofilament diffuser/6mm perforated grill Size 8ft x 8ft x 400mm ht. Tent shall be made so as Laminar Flow System to integrate with OT equipments

The **anti bacterial paint** coating should overlap the ceiling system and door frames by 25 microns to provide a continuous sealed surface. The anti bacterial paint coating should be non-reflective type, highly resistant to abrasives, water, detergents and weak acids and alkali used in cleaning area. The coatings should have no loss of performance or adhesion to the substrate in the case of regular steam cleaning. Imported Anti bacterial paint applied should not leach out in order to maintain anti- microbial system throughout the life of the product. The coating should have biocide action and prevention property against growth of mould, bacteria and yeasts. Internal colour of the ceiling panel shall be as suggested by the Institute.

2. WALL PAINTING

Anti fungal paints should be quoted smoothly and uniformly on wall (Colour should be as per the choice of client)

3. CORNER COVING

Extruded Aluminium powder coated/Anodized clip on type covings for the entire wall to wall and wall to ceiling. R-70, 3D internal/ external corner coves. Covering and coving of Return air ducting lines inside OT. Material to be used for covering ducting line should be Powder coated galvanized sheet/Powder coated Aluminium/SS-304.

4. PERIPHERAL LIGHT

It should be fitted outside the air ceiling system area and flush with the ceiling in the operation theatre suitable to required illumination of OT. Peripheral lights and clean room luminaries fitted in the frame should be 6 to 8 in numbers for OT. The fluorescent lamps 36 W 16mm Ø- 3 nos with highly spectacular anodized Aluminum reflectors and optical antiglare system for adjustable light distribution. Luminaries cover made of highly resistant, disinfectant proof laminated safety glass with fine grained surface, glass pane with white powder coated steel frame. Luminary's body made of sheet steel, white, powder coated supplied ready for connection. The reflectors should be of high quality, cleanable and non deteriorating. Dimmable ballasts of reputed companies to be used and diffuser should be constructed with opaque acrylic diffuser material in aluminum frames/ SS frames. It should have flicker less design with color. Recess frames should be gas tight. The fitting should be flush with the ceiling and should be removable from top or bottom. Lighting units should be properly sealed with the ceiling by means of fillers and beadings so that all lighting units are airtight with ceiling panels. The light fitting should be uniformly and aesthetically distributed on the ceiling to provide uniform illumination in the OR. Peripheral lighting should be done according to IP 54 protocol. Light should not interfere when green mode of Endoscopy is performed.

5. DISTRIBUTION BOARD, ELECTRICAL WIRING, CONDUITING WITH FIXTURES INSIDE THE OPERATION THEATRE

All electrical wiring should be terminated to the connectors mounted on rail and labeled with indelible labels. Individual fuse and miniature circuit breakers should protect all internal circuits. Complete schematic diagram drawing description should be enclosed with the equipment.

Laying of PVC conduits, Modular Switch Boxes, Modular Switches-sockets, Power and Light wiring including Earthing wire for all the lighting controls, Pendant and other equipment fixtures and fittings inside the theatre Wiring with low leakage current wires of FRLS wires should be as per requirements. Wiring for 250 volts single phase and neutral

6/16 Amps switched socket outlet with 4 sq.mm and 2.5 sq.mm PVC insulated copper conductor 1100 volts stranded flexible wires should be concealed with conduit. Installation of all electrical cabling must be of IS: 1554 (As per latest amendment) standard and wiring as per IS: 732 standard and proper earthing of OT and other accessories in the OT room as per standard guidelines of BIS. Fittings should be sealed on accordance with the standard IP54. Earthed equipotent bonding of all exposed metal work should be provided.

6. OPERATION THEATRE FLOORING (ANTISTATIC EPOXY)

Providing and laying of approved make Epoxy ceramic aggregate mixed abrasion resistance flooring over IPS flooring. Antistatic Epoxy flooring to be laid over Epoxy Primer coating applied on levelled IPS floor. Supply & laying of 2mm thick self leveling screed and Antistatic Epoxy Flooring. Copper grounding strips (not less than 0.05mm thick, 50mm width) should be laid flat on the floor in the conductive adhesive and connect to copper wire of grounding. Supply and laying of 150 mm wide Epoxy coving for wall to flooring.

7. OT Light Ceiling –HALOGEN

The unit should have reflector for optimum utilization of the dual reflector by means of targeted light direction technique with following specifications:

- Power supply : 230V, 50/60Hz
- Colour Temp. : 4200K
- Light intensity at 0.8m distance : 40000-45000lux
- Light field diameter : 180-200mm
- Colour rendering index Ra(1-8)-93
- Luminous efficacy in the light field : 290lm/w or more
- Power consumption : 12V/50W
- Working space : 27-173cm
- Lifetime of bulb : Atleast 2000hrs.
- Swivel radius : 960mm
- Vertical adjustment : 1250mm
- Weight : 20 kg.
- Should have CE certification for electricity safety

8. IN ADDITION TO THE ABOVE, FOLLOWING TURNKEY WORKS FOR CONSTRUCTION OF OT ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR :

The turnkey work includes all modifications to the built up space provided at the hospital site including demolishing, dismantling, reassembling, civil modifications, electrical works, plumbing works, all cable trenches and railings wherever required, interior decoration, air conditioning duct, furniture and other related works of the Operation Theatre required for the smooth and efficient functioning of the centre. These works shall comply with all relevant safety and standards guidelines. The vendor is fully responsible for installation and commissioning of all equipment mentioned in the tender. Bidders are

strongly advised to visit the site for assessment before the submission of tender offer..

- **Electrical cabling** of IS : 1554 standard and wiring as per IS : 732 standard from MDB(Single point source) to Electric Distributional Panel and to the corresponding load points
- Providing fixing of **Electrical Gadgets** like ELCB, MCB, Light Points, Power points, in the Modular OT room. • Number of fans, power point, bulbs/tube light. Apart from these supplies to the individual equipments with ELCB & MCB for OT • Installation of MCB, ACB, ELCB & OCB of Havell/Siemens/L&T/Schneider etc for Control Panel for OT.

In addition to the above mentioned equipment/appliances, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the OT then that may be provided after approval from Engineer in-charge.

The sizes are approximate. Minor variations in sizes shall be acceptable subject to prior approval of the Engineer.

APPROVED MAKES

1.	Cable	SKYSTONE/KEI/UNIVERSAL/NATIONAL/RR CABLE
2.	PVC Pipe Class III with Fitting	FINOLEX/ SUPREME/ PRINCE/ ORI-PLAST
4.	G.I. / M.S. Pipe Heavy Class	TATA/ JINDAL(HISSAR)/SAIL /SURYA PRAKASH
5.	MCCB/Contactor/Relay	L&T/ABB/SIEMENS/SCHNEIDER
6.	Pressure Gauges	H.GURU /FIEBIG
7.	Stainless Steel	TATA/SALEM/JINDAL/MUKUND/BHAYANDER/AMBICA
8.	Copper Pipe	MAXFLOW/PRECISION/RAJCO
9.	HEPA Filter	SAGICO FIM/THERMODYNE/ADVANCE/PENTAGON

Note:

- **All electrical accessories like cable wire, electrical outlets, switches etc, should be fire proof of reputed make, certified for electrical safety.**
- **Wherever makes have not been specified for certain items, the same shall be as per BIS and as per approval of HSCC.**
- **The contractor should provide test certificate for all material used for construction of pre-fabricated OT**
- **The contractor shall be responsible for the complete works including submission of working drawing and walk through view.**
- **The Contractor should provide complete parts manual/Service manuals for all**

systems and subsystems.

- **Final electrical safety test, system test and calibration should be done by authorized person with test instruments.**
- **Training for seven working days should be provided to the staff & engineers of client by the Manufacturer**
- **The contractor should prepare and submit layout plan to HSCC for approval before beginning of supply and installation.**
- **The contractor should prepare and submit layout plan for OTs including Electrical Wiring to HSCC for approval before beginning of supply and installation and As-built drawing after construction.**