

**Tender No.65.12.8025**

**Technical Specifications for Modular OT.**

**Major Parameters.**

a) Operation Theatre Department.

- Structural Steel shell with joint less sealed sterile coating.
- Joint less prefabricated modular Operation Theatre.
- Paneled Modular Wall & Ceiling System.
- Ultra Clean Ventilation Through Ceiling (Vertical laminar flow system).

b) Integrated Air & Light Theatre Ceiling.

- Hermetically sealing hospital doors.
- Static Conductive Flooring.

c) Medical Gases pipeline system:

- Medical Gas pipeline Equipment

d) Multi-Movement Ceiling & Wall Pendant Systems.

e) Suction & Oxygen Therapy products.

- Bed Head Trunking System.

f) Ceilings – Integral Lighting System.

- Uniform diffusion of air into theatres
- Air and light diffusers.
- Should be of plenum with conditioned air through HEPA filters.

g) AGSS – Anesthesia gas scavenging system and outlets suck the waste anaesthetic gases.

h) Hermetically sealed doors.

i) Flat X-ray imaging screens step less, flicker free and dimmer.

j) To provide writing board.

k) Surgical scrubs sinks – elbow action taps or knee operated or flow sensor operated.

l) To provide cascade pressure stabilizers.

m) To provide operation theatre control panel.

n) Ceiling suspension systems for monitor, anesthesia equipment surgical equipment.

o) Versatile pendant (double arm) swiveling

p) Vertically movable

q) Good maneuverability

r) OT control panels

s) It should be closed circuit TV facility.

t) Service maintenance warranty for 3 years and good service backup.

- Floors should be smooth, non slip, impervious material conductive enough to dissipate static Electricity but not conductive enough to endanger personnel from shock. The flooring should either be inset mosaic with least possible joints and copper strips to carry away any static electricity produced or of joint less conductive tiles. Conductive copper mesh and self levelling epoxy flooring may be done.
- Ceiling should be painted with washable paint and corners of the rooms should be rounded off to prevent collection of dirt and dust.
- Power back up with provision of stand-by generating sets.
- In operating rooms anaesthetic room(s) recovery room, holding area, colour of walls and ceilings should be such that they do not alter the observers perception of skin colour this will facilitate patient monitoring and management.
- OT should have facilities for high speed autoclaves/ sterilizers for immediate / emergency requirements of sterilizing equipment.
- Essential pharmaceutical storage including refrigeration facilities should be available.

- There should be a waiting room with toilet facilities for patient attendants.
- Pass-through cabinets that circulate clean air through them while maintaining positive air room pressure allow transfer of supplies from outside the OR to inside it. They help ensure the rotation of supplies in storage or can be used only for passing supplies as Needed from a clean center inside the OT.
- There should be emergency communication system that can be activated without the use of hands.

### **Detailed Technical Specification for Modular Operation Theatre.**

#### **1. WALLS & CEILING CONSTRUCTION:**

The room wall to have two independent surfaces with a minimum opening in between.

The external walls of the room to be constructed with solid bricks with cement plastering.

The inner surfaces walls to be constructed with 1.60mm thick EGP steel 9 panels backed by 12-mm gypsum board ( India gypsum make) these panels to have flame resistance to BS1142

part 3. The inner surface walls to be fixed to the bricks wall with essential supports. There should be minimum possible cavity/gap in between the solid and steel walls. The total distance between the inside and outside surfaces of the operating room to be variable to suit the architect's layout, but should be sufficient for the flush mounting of equipments.

The individual 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 to be filled with metal filler and sanded flush on site ready to receive the plastic finish.

Wall panel's joints should be invisible after the final wall coating is applied.

The cavity between the inner and outer walls should be left with minimum obstruction for the possible addition of equipment at a later date and to enable services, pipes, conduits etc. to be run within the cavity. All wall mounted equipment to be flush mounted and sealed into theatre.

The wall panels design and construction to allow for the installation and support of all equipment and the provision of opening required for the installation, with out affecting rigidity and strength.

Access boxes will be fitted to the rear of all wall mounted equipment to enable maintenance to be carried out from outside the operating room. All the sharp edges and corners should be in radius to avoid bacteria contamination. The internal surfaces of the room walls should be sprayed with water based liquid plastic, wall glaze or equivalent, approved by the architect to a minimum dry film thickness of 300 microns. The plastic coating should overlap the floor covering, ceiling system and doorframes by 25 microns. The plastic coating should overlap the floor covering ceiling system and doorframes by 25mm to provide a continuous sealed surface. The plastic 10 coating should be non- reflective and the colour to be submitted for approval. All the four corners should have return air duct outlets, the grill of which should be made of MS steel , duly powder coated with colour will suit the hospital.

#### **2. CEILING FILTRATION SYSTEM (IMPORTED):**

The ceiling filtration system should be designed to ensure unidirectional distribution of sterile air with differential flow velocities decreasing from centre to perimeter of the surgical theatre to ensure the cleanliness of all the area covered by the air flow. The ceiling system should be equipped with HEPA filters with different performances according to their position in the ceiling to achieve different flow velocities. The complete filtration ceiling system should be factory assembled its holding structure, Filter frames and top plenum should be made of AISI 304 stainless steel. Filtration ceiling system should have HEPA filters, H according to EN 1822. The filtration ceiling system should have flow equalizer to achieve uniform & constant air distribution over the whole surface it should also have connection for surgical lamp to be fitted in place of any filter. The air management system should be designed to achieved the following

parameters:

F.S. 209 classification	= 100 (100 particles/ft <sup>3</sup> )
Bacteriological class	=B (5 CFU/m <sup>3</sup> )*
Particle decontamination kinetics CP	=5 min
Biological decontamination kinetics CB	= 5min
ECG-GMP Annex 1 classification	= Class A
ISO 14644/1 classification	= ISO 5 11

### 3. DOOR AND FRAMES (HERMETICALLY SEALED DOORS):

Should maintain sterically and the correct air pressure in the room, all doors into and out should be of the sliding, hermetically sealing type. The door should meet following specifications:

\*International quality & safety requirements.

- Doors should be wired to the current IEE regulations & BS7971 standard.
- Motor should be DC 24V 70 W brush less DC Motor.
- Noise level of movement should not be more then 60 decibel.
- Controller should be microprocessor based and be CE marked.
- Power efficiency should be .95 (in AC 100V full load).
- The track should be made up of single piece extruded aluminum.
- Environment temperature should be -20°C to +55°C.
- Starting time should be able to regulate from .5second to 23 second & starting speed should be 600 mm per second.
- Electrical safety codes for high & low voltage system
- Design should meet HTM 2020/2021 standards.

The doorframe should be made of high quality anodize aluminum and the door panel should be made of compact laminate that can withstand high abrasion. To ensure efficient sealing of the doors frames should be provided. They will consist of reinforced plasterboard panels faced with the same laminate as the doors.

The door should seal on all four edges in the closed position & should be surface installed type.

The track of the door should be constructed with high quality door lock with aluminum extrusion, fixed firmly to the walls.

Nylon runner guides should be fixed to the door in such a way they do not obstruct trolley movement through the door.

The doorframes should be edged with an aluminum extrusion & with concealed fixings to be adjustable during installation to ensure a 100% hermetic seal is achieved.

Vision panels, 300mm X 300 mm should be provided in the doors.

The door controller should be sensing overload condition and in overload incase the door will automatically stop & reverse the direction of travel.

The controller should be capable of either being operated by elbow switches/foot switches, radar switch (touch less sensor). All doors should be able to be operated easily manually in the event of failure of the power supply or the automation unit.

### 4. OPERATION THEATRE CONTROL PANEL:

The surgeon control panel should meet Electrical safety codes for high & low voltage system, wired to the current IEE regulations.

The room Surgeon's control panel should be modifiable with changing technology & equipment in operating environments. Control Panel will be user friendly & ease of operating & maintaining purpose.

The panel should be “Membrane” type; configured to incorporate all the services that operation room staff required. The fascia should be made with superior quality UV resistance membrane with sterilization feature.

The Panel should contain 6 or 9 service tiles as below:

1. Time Day Clock. 2. Time Elapse Day Clock. 3. General Lighting System.
4. Medical Gas Alarm Panel. 5. Hand Free Telephone set with memory.
6. Temperature & humidity indicator with controller.
7. HEPA Filter Status module. 8. Room Pressure Indicator. 9. Music control.

Time day clock should be digital type & clocks having high brightness characters.

Time Elapsed Day Clock should be digital type & clocks having high brightness characters.

Temperature indicator should indicate the room temperature which should be connected to the local pressure switches of Air-Conditioning System. Indicators should be digital type & clocks having high brightness characters, not less than 30 mm in height.

Central Lighting system should incorporate all the necessary controls of the lighting system inside the theatre.

The medical gas alarm should indicate High, Normal & Low gas Pressure for each gas service present in the operating system & should have an audible buzzer with mute facility. Pressure sensors should be connected to MGPS for monitoring the pressures.

A hand free set Telephone System should be incorporated in the panel with memory type card. The control panel should be designed for front- access only. All internal wires should be marked with plastic Ferrule type cable markers for ease of identification.

#### 5. DISTRIBUTION BOARD:

All high voltage equipment should be installed in a separate enclosure. The remote cabinet should house the operating lamp transformers, mains failure relays, electrical distribution equipment & circuit protection equipment 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 fuses or miniature circuit breakers should protect all internal circuits.

#### 6. X RAY VIEWING SCREENS :

The system should have electrical safety codes for high & low voltage system. The theatre should be equipped with a 2 plate X-ray viewing screen. It should be designed to provide flicker free luminance for the film viewing purpose. It should be installed flushed with theatre wall for hygienic and ease of cleaning purpose. The X-Ray viewing screen should be designed for the purpose of front access. The X-Ray viewing screen should be illuminated by 4 pieces of high frequency fluorescent lamps and the dimming is controlled by the usage of dimming ballast with the PCB that is mounted inside the box.

The diffuser should be able to diffuse the light evenly and to provide enough luminance for film viewing. It should be made of high quality opaque acrylic sheet. The film should be held firmly by using spring – loaded clips for ease of mounting and demounting. The body should be built by using electrolyzed steel with powder coating. It should work on PCB button control system.

#### 7. PRESSURE RELIEF DAMPERS:

Pressure relief 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

placed, 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. The body should be epoxy powder coated as per standard BS colors. First class electrolyzed steel plate should be used for body and with high grade SS304 stainless steel for blades.

#### 8. OPERATION THEATRE FLOORING (ANTISTATIC CONDUCTIVE TILES):

A floor screed should be provided, flat to within a tolerance of +/- 3mm over any 3 metre area. Onto this sub-floor, a self -leveling compound should be laid prior to laying of the floor finish. Copper grounding strips (0.05 mm thick , 50 mm width) should be laid flat on the floor in the conductive adhesive and connect to copper wire of grounding . The floor finish in the operating room should be 2mm Conductive PVC tiles, laid on a semi-conductive adhesive base. The floor finish should terminate at the room perimeter passing over a concealed cove former and continuing up the wall for 100mm. All joints should be welded with electrodes of the same compatible material to provide a continuous sealed surface. The floor should have an electrical resistance of  $2.5 * 10$  to  $10^6$  Ohms as per DIN 51953 ATM F-150 or NFPA 99, B1 class of fire resistance and should meet UL standard 779. Fulfill product requirements as per EN 649. 16.

#### 9. STORAGE UNIT:

The storage unit should be made with 1.50 mm thick EGP Zinc coated steel panels. The storage unit should be divided 2 equal parts and each part should have individual glass doors with high quality locking system. Each part will be provided with glass racks.

#### 10. OPERATING LIST BOARD:

One operating list board should be provided in each operating theater. It should be made of ceramic having Magnetic properties and should be flushed to the wall of the operating room.

#### 11. HATCH BOX:

A Hatch should be provided in each operation theater to remove waste materials from the operation theater to Dirty linen area just adjacent to Operation Theater. 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 should be opened at one time ,The UV light should 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 shall be indicators on both side of the OT so that door open / close status can be monitored from both ends.

#### 12. SCRUB STATION:

Compact surgical scrub sink should be designed for use in OT complex providing Surgeons with a convenient sink for pre – OT scrub up. Each fixture should be fabricated from heavy gauge type 304 stainless steel and should be seamless welded construction, polished to a stain finish. The scrub sink should be provided with a front access panel which should be easily removed for access to the water controlled valve, waste connections, stoppers and strainers. Hands free operation should include infra red sensors with built-in range of adjustment. Thermostatic mixing, valve control should be located behind the access panel and maintain constant water temperature. User defined setting of 1 to 3 min are available. This timing should be adjustable to meet individual application requirements. Provided with infrared sensors, thermostatic control

taps with fail safe temperature controls. All units should have reduced anti- splash fronts. Knee operated switch should be there.

13. VIEW WINDOW:

The view window of specified size to be provide: Double insulated fixed glazing with not less than 5mm thick toughened glass. Window frame shall be powdered coated Aluminium of approved shape flush mounted with wall paneling Motorized horizontal Venetian Blinds of powder coated Aluminium strips of vista level or equivalent of approved shade including necessary accessories. The motor shall be of reputed brand The Venetian blinds should be motorized for 90 degree rotational.

**Minor Parameters.**

Manufacturer should be ISO certified for quality standards.

Comprehensive warranty for 2 years and 5 years AMC after warranty.

Complete Documents to be provided.

User/Technical/Maintenance manuals to be supplied in English.

Certificate of calibration and inspection.

List of Equipments available for providing calibration and routine.

Preventive Maintenance Support. as per manufacturer documentation in service/technical manual.

List of important spare parts and accessories with their part number and costing to be given.

Log book with instructions for daily, weekly, monthly and quarterly maintenance checklist.

The job description of the hospital technician and company service engineer should be clearly mentioned.

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