# HINDUSTAN PREFAB LIMITED

**(A Govt. of India Enterprise)**
**Jangpura, New Delhi-110014**

# TECHNICAL SPECIFICATIONS& MAKE LIST OF MODULAR OPERATION THEATRE

# Technical Specification

**Modular Operation Theatre**

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| 1 | **WALL SURFACE :-**<br><br>SS 304 panel min. 1.5 mm thick wall, ceiling and sloping panels:<br>.<br>The wall panels should be constructed using min. 1.5 mm thick SS 304 panels, backed by 12mm gypsum board panels. The individual wall panels should be tag/spot welded together and grounded to make surface levelled.<br>All the joints/ gaps between the panels should be filled with metal filter and sanded flush on site ready to receive the plastic finish. These panels should withstand strong impacts, such as the bombardment of trolleys.<br>These panels should be finally sprayed with water based liquid plastic, which is aseptic and self sterilizing coating does not support bacteriological or fungicidal growth and should be resistant to most chemicals used in hospital department. The liquid plastic coating should overlap the floor covering, ceiling system and doors frames by 25mm to provide a continuous sealed surface. The wall panel joints should be invisible after the final coating is applied. One should achieve a seamless finish using these panels, avoiding chances of any bacterial growth between the joints of each individual panel. |
| 2 | **VINYL FLOORING OT:-**<br>A substrate floor should be provided; having a flatness tolerance of + 3mm over a one square meter area.<br>On to this sub-floor, a self levelling compound of minimum thickness 3 mm with the requisite primer should be applied to level the floor to its true flatness.<br>Copper grounding strips should be not less than 0.05mm thick and 50mm width, and should be laid flat on the above floor and connected to copper wire of grounding/ separate earth point.<br>The floor finish should be 2mm thick Anti-static conductive vinyl flooring, laid on a semi conductive adhesive base.<br>The vinyl flooring should be homogeneous material incorporating carbon encapsulated granules throughout its full thickness and have a conductive backing.<br>It should have excellent resistance to static and rolling loads. It should have resistance to mechanical stress and dynamics loads and having ESD/ EMI (conductive) protection characteristics. It should be classified 34-43 in accordance to EN 649 standards.<br>It should have low VOC emissions.<br>It should have fungi static and bacteria static treatment throughout the total thickness of the material.<br>It should be non-absorbent, impervious and non-porous.<br>Flooring should be hot welded and installed with a covered skirting –continuing up to the wall surface for a minimum 100mm to give a seamless sealed surface.<br>The flooring should conform to standards DIN EN 1081, DIN EN 1815, EN 12466, EN 425, EN 423 & EN 433. |
| 3 | **UNIDIRECTIONAL LAMINAR AIR FLOW SYSTEM :-**<br><br>The Laminar air flow should dilute the bacteria generated by the operating team and patient in the theatre and should create an Air Flow pattern that carries contaminated air way from the operating table and prevents entering surgical wounds.<br><br>It should provide a bacteria free source of air to produce positive pressure to displace contaminated air away from the operation site and prevent entry of bacteria from contaminated areas/ zones.<br><br>It should contain three basic elements – a blower, a high efficiency air flow and a plenum with a diffuser.<br>The filtered air should pass through the mini pleat H14 HEPA filters and should come into a huge volume of space within the plenum, constructed out of aluminium. Plain air ceiling constructed out of 2mm thick aluminium sheet, with aluminium extrusion frame, neoprene gasket to seal the gap between the ceiling & plain air.<br><br>The Laminar flow system should incorporate mini pleat HEPA filter class H14 as per HTM 03-01 standards filter class which must filter 99.995% of particles.<br>The pressure drop of 110mm H14 filter should be 110Pa to air flow velocity of 0.45 m/s.<br>The size of the plenum should depend upon the size of the operation theatres and volume of air requirements as per the HVAC design.<br><br>The system should comply as per HTM 03-01 standard.<br>Classification of air cleanliness within the operation theatres should comply with ISO 14644-1 and ISO class 5 standards. |
| 4 | **HERMITICALLY SEALED DOOR :-**<br><br>Size 1500/1000mm x 2100 mm with vision panels, 300mm x 300mm. The minimum width of the door should be 1500mm to allow smooth movement of patient in the operating room.<br>To maintain sterility and the correct air pressure in the room, all doors should be sliding hermetically sealing type. Track system and door blade guide system.<br>Door leaf strength of leaf core: 40mm (33mm tubular chipboard (core) + 3mmMDF (medium density fibreboard) on both side + 0.8mm HPL (High Pressure Laminate) on both side). Circumferential profile: Anodized aluminium profile, circumferential 56mm, V-shaped in the bottom area towards door lead on ground lobes. Surface: 0.8mm HPL-laminate on |

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| | 3mm MDF board as carrier material; depending on the chosen material a free passage of 1.15m or more may require a seam in the laminate. Sealing: Rubber gaskets embedded in the door leaves press against the frame and the door, providing a hermetic sealing of the door. Rail system guide rail: Anodized aluminium profile with two countersunk slots at 42° for carrying wheel position in closed condition. Carrying Wheels: Ball bearing with duroplastic rolls. Covering: Rounded covering of extruded anodized aluminium. Ground Rail: Duroplastic lead lobes on bottom running rail. Operation Handle: Bilateral (inside/ outside) stainless steel lever arm handle with integrated return spring to neutral position.<br>Frame HPL-system frame: HPL- coated embrasure board with circumferential aluminium corner protection profiles for arbitrary wall strengths. Closed frame steel: Closed steel frame with additional aluminium corner protection profiles (for sealing the operation side of the door). Closed frame stainless steel: Stainless Steel frame, steel grade 1.4301, polished 240 grains, with additional stainless steel corner profiles (for sealing the operation side of the doors). Window: Integrated 300mm x 300mm window, mounted flush with the adjacent area of the leaf. Automated drive: Process controlled automated drive for the most diverging kinds of activation. Canopy about 15 to 20Kg (depending of the door). Power requirement: 230V alternating current 50Hz. The opening distance are controlled completely step less. It can be adjusted (according to the switches). Speed of the door adjustable: The speed is adjustable in 5% steps (opening and closing speed is adjustable separately). It is adjustable from 0.1m/sec to 0.8m/sec. The time the door stays open is adjustable up to 30 sec. (standard is 8 sec). Foot switch inside and outside. Elbow Switch inside and outside.<br>**should be composed of a motor with reduction gear, powered by a single phase power supply; magnetic encoder to determine position, speed and moving direction of sliding leaves; electronic control panel with a microprocessor, self-monitoring system and inverter technology with independent adjustment of voltage and frequency with wide toothed drive belt. Mechanical sealing device to direct hermetic leaf down and against wall to seal perimeter of opening. Mechanical fail-safe device - Composed of a spring to mechanically open automatic door in the event of a power failure.**<br>**Photocell barrier - Safety device composed of an infrared transmitter and a receiver located on both sides of the door. This safety device is monitored by the electronic control board of automatic door operator. If the leaves are in open position or in motion and the infrared beam is obstructed by an object or person, the control panel will reopen the door and hold it open while the infrared beam remains obstructed.**<br>**Switch - Device should be used to manually activate and open the door. Specifically designed for use in clean rooms.**<br>**Vision panel - double glaze vision panel, flushed with the door surface to avoid the accumulation of dust and bacteria. Square window size 300 mm x 300 mm.**<br>**Security floor rail - Aluminium security floor rail with one or two channels, to ensure the correct movement of the** |
| 5 | **<u>OPERATION THEATRE CONTROL PANEL :-</u>**<br><br>Control Panel to incorporate, electrically operated equipment, ground and power bar unit with power bar connection and medical gas to be recessed with matt aluminium finish. The panel shall include the following:<br>* 1 no Day Time Digital Clock.<br><br>* 1 no Elapsed Time Digital Clock.<br><br>* 1 no Hands Free Telephone system.<br><br>* Peripheral Light Control<br><br>* Medical Gas Alarm for 4 gases.<br><br>*Temperature & Humidity Indicator<br><br>* Alarm for Vacuum. |
| 6 | **<u>X-RAY VIEWING SCREEN (DOUBLE PLATE) :-</u>**<br><br>The theatre should be equipped with a double plate X-ray viewing screen, recessed in the wall and designed to provide a high level of control luminance, without flicker, from a unit that is easy to clean and maintain.<br>The X-ray viewing screen illumination should be by LED lamps controlled by dimming ballast.<br>The front panel diffuser should be glare free type, sealed flush with the inside face of the operating theatre wall (or may as an option be integrated within the control panel fascia).<br>The LED lamps should provide a uniform level of illumination across the entire front panel.<br>Access for maintenance and lamp changing should be from the front of the panel.<br>All internal wiring should be terminated in connectors with screw and clamp spring connections.<br>All internal wiring should be of high temperature resistance and secured by propriety cable clips.<br>It should be flush mounted and sealed into theatre wall be means of a sterile jointing system. |

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| 7 | **EQUIPMENT STORAGE UNIT :-**<br><br>Equipment Storage Unit is to be provided in operating theatre of dimension approved in the user. Approximate size of the unit should be 860(W) x1660(H) x350(D) mm and it should be flush mounted into the theatre wall with a sterile jointing system.It be should be designed and fabricated using the same material as that being used for the theatre wall system.It should have laminated / tampered glass doors with proper hinges to have operating allowances of 160 degree. It should have a locking system.Each storage unit should be divided into two equal parts with the help of a horizontal fixed shelf. |
| 8 | **OPETRATING LIST – WRITING BOARD :-**<br><br>It should be flush mounted with a sterile jointing system, 1.50mm thick, white Ceramic board, bonded to a 2 mm steel sheet for additional rigidity. Approximate size of the same should be 940 x 600 mm. |
| 9 | **CASCADE PRESSURE STABLIZER DAMPER.:-**<br><br>Each stabilizer should comprise of carbon steel case. This casing should contain up to four numbers of grades 304 stainless steel blades which pivot upon sealed for life bearing assemblies.Balancing should be carried out using a proven balance weight assembly.The stabilizer should be manufactured and delivered pre-set and locked to the required pressure differential.These stabilizers should be accurate to a range of 1 Pascal over their working range of 5-35pa. |
| 11 | **HATCH BOX :-**<br><br>The Hatch box made out of high grade of Stainless Steel sheets of SS304 for disposal of dirty linen/waste. It is equipped with two electronically controlled doors with indicators for monitoring of door operation. Designed in such a way that only one door will be opened at one time .The UV light will be so installed that it is kept on while both doors are closed. This UV light has to be automatically turned off in case of opening of either of the doors. The Size and locations will be as per site locations. |
| 12 | **CLEAN ROOM LUMINARIES/PERIPHERAL LIGHTS :-**<br><br>**Ceiling Mounted Lights**<br><br>The luminaries for surface or recess mounting in operation theatres should flush with the ceiling, for 2 or 3 T5 fluorescent lamps with highly specular, anodised aluminium reflectors and optical anti-glare system for individually adjustable light distribution. Luminaries cover made of highly resistant, disinfectant proof laminated safety glass with stylish fine grained surface, glass pane with white coated steel frame. Closing devices are integrated automatically in the electrical safety control with outlines having to be connected to the luminaries housing. Luminaries' body made of sheet steel, white powder coated, supplied ready for connection optionally for individual or series circuit, with digital electronic control gear in multi lamp technology. Recess frames for the gas tight installation of clean room luminaries in IP65 in suspended ceilings. Frames made of extruded aluminium profile, white powder coated able to be put together to form a rigid, continuous frame by means of plug and screw connections, optionally in individual, continuous-line, rectangular or U-shaped arrangements. Edge for ceiling construction material as angular edge for covering the wedge of the ceiling construction material. |
| 13 | **ELECTRICAL COMPONENT / WIRING :-**<br><br>Each modular panel should contain separate cable pathways for the routing of electrical services and a variety of openings and rear enclosures for the fixing of electrical components. Cable sizes for power sockets, earth and potential equalization wiring should be provided according to the specific requirements of the site.<br>Wiring with Low Leakage Current wires of ERLS wires of RR / Finolex/ Havels/ Kalinga make or as per requirements including providing and fixing of conduit and boxes etc. to complete the work in all respect. Wiring for 250volts single phases and neutral 6/16 Amps switched Socket outlet with 4 sq.mm PVC insulated copper conductor 1100 volts grade stranded flexible wires in concealed surface mounted25mm dia. MS conduit including providing and fixing of metal box. Within the OT area ONLY. |
| 14 | **SURGICAL SCRUB SINK :-**<br><br>2 Bay Scrub Sink: - 2 Bay scrub sink made out of 304 graded brushed finished stainless steel, 1500 to 1800 mm length, with photo electric sensors,1 No. Mixture valve, 2 nos. solenoid valves with Foot operated switch. (For OT).<br>The surgical scrub sink should be designed for providing surgeons with a convenient for Pre Op scrub up.<br>The scrub should be manufactured from heavy gauge-1.5mm thick, stainless steel grades 304 material.<br>The unit should be provided with a front excess panel, which should be easily removable for maintenance of water control valve, waste connection, stoppers etc.<br>.It should have thermostatic control with fail safe temperature control. |

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| | 3 Bay Surgical Scrub station should be designed for use in Operation theatre complex providing surgeons with a convenient sink for pre op scrub up. Each fixture is fabricated from Stainless Steel grade 304, It should be seamless welded construction polished to a stain finish. The scrub sink is provided with a front access panel, which is easily removed for access to the water control valve, waste connections, stoppers and strainers. Hands free operation includes infrared sensor with built in range of adjustment. Thermostatic mixing valve control for constant water temperature. User defined settings of 1, 3, 5 min are available. This timing is adjustable to meet individual application requirement, provided with infrared sensor thermostatic Controlled taps with fail temperature controls. Foot / Knee operated switch offered as an option. |
| 15 | **<u>SINGLE ARM MOVEABLE PENDANT :-</u>**<br><br>The pendant has following;<br><br>• 1000 mm moveable arms each with 330 *deg rotation.<br>• Weight carrying capacity of the arm more than 200 kgs.<br>• Procedures and tasks easily adopted.<br>• Reduction of work and personal movement is attained<br>• Good designed allow overall overview<br>• Easy moving and positioning<br>• Instrument Platform - 1no.<br>• Maximum access around the patient<br>Each pendant has provision for :<br>Max 8 gas outlet as user/department requirement<br>Data /Telephone Socket - 4 nos.<br>Electrical sockets - 6 Nos.<br>Shelf with two rails at least - 1 No. |
| 16 | Imported Dual dome LED surgical light based on Multi reflection technology. Pure white light LED.<br><br>o The latest LED Technology OT Light with Integrated Ambient Light should be having US-FDA or CE (Conformity European directive 93/42/EEC) certification and compliant to International Electro-technical Commission IEC- 60601-2-41 (applicable only for OT Lights)<br>o The each light-head should consist of several, symmetrically arranged light emitting diodes (LED's) in modules to form a single light head for a shadow free white color light and having no heat emission through IR radiation.<br>o Surgical light Ceiling Mounted Plate should be consisting of :<br>o Two horizontal rotatable extension spring arms, freely 360deg. rotatable (without stops)<br>o Should have Two horizontal arms (approx.660mm to 700mm in length) to hold two light-heads (Main & Satellite Dome)<br>o Theheatfiltrationsystemshouldbebasedonaluminumorlatesttechnologyreflectors, no Glass, forhighestenergy efficiency with the lowest heat generation.<br>o TheLight-headshouldbedesignwith min. 20 to 40 single color LED lamps.<br>o Aerodynamic shape of the light head should not obstruct effect of Modular OT laminar air flow systems.<br>o Light Intensity digital control should be on Light-head for 50% to 100% intensity adjustments with variable of color temperature. Additional single second wall control unit should also be provided for both light-heads<br>o LightLED sourceshouldberated for morethan50,000hours<br>o Shouldhaveintegrated 100Lux Ambient Light for using Scopes inside dimmed OT<br>o Shouldbeseamlesswithsealedconstructionmeetingstringenthygienerequirements and shouldbelight- weight.<br><br><u>Technicalfeatures</u>:<br><br>o Double Cardianic with Central maximum luminance at 1 mtr. With two light head.<br>o Major Light head: 160,000Luxwith patterns spot size adjustable from 25cm to 30cm |

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| | with depth of illumination 50cm at 60% intensity as per IEC and power consumption less than 70W<br>o Satellite Lighthead:110,000Lux ,with fixed pattern spot of size min. 25cm. and depth of illumination min.54cm at 60% intensity as per IEC and power consumption less than 30W<br>o Adjustable Colourvariabletemperature3500K,4000K, 4500K and 5000K<br>o Colour rendering index CRI>95 and R9 ≥ 91 to 97<br>o Illuminationdepth of field of approx. : 60 to 70 cm.<br>o Supply voltage : 110 - 240 VAC / 24V DC 50Hz, single phase and Wattage each dome less than 90W<br>o Each Light-Head should be supplied with 02 Nos. Extra Aluminum Sterilizable handles<br>All technical specifications in the compliance statement must be supported by printed literature from the firm. |