

ANNEXURE – A

Technical Specification and Scope of Work for installation and execution of Two numbers of Modular Operation Theater (MOT) Complex at Divisional Railway Hospital- Ranchi at Hatia.

1) Puff Pannel Wall (PUF Insulated panel):

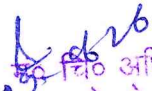
- Operation Theatre Wall: Supply & Installation of seamless Wall Panel with proper coving angle maintained, smooth finishing with proper insulation.
- 50 MM Thick Puff Panel
- Front EGP Panel 0.8 MM Thick
- Back PPGI Panel 0.6 MM Thick
- PUFF density of 40kg/m³
- Finishing with Aluminum Coving – (Anodized powder coated paint) perfectly curved flush Covings.
- Antibacterial, Scratch Resistant, Anti-Fungal, Anti- Corrosion Coating, even thickness, 100% non-porous and water - repellent wall system with male - female joint and proper insulation.
- Easy to clean with smooth and fine, very useful for any critical care facilities
- EGP & PPGI Puff panel – finishing with Metal Putty, primer and Antibacterial Paint
- Products Certification with – ISO 13485: 2016, Quantum and CE certifications.
- Food grade sealant for seamless and airtight finished.

2) Puff Pannel Ceiling System:

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- Food grade sealant for seamless and airtight finished.

3) Antibacterial Paint Coating System for Critical Healthcare Environments:

- To ensure a seamless, hygienic, and contamination-free surface in critical areas such as Operation Theatres, ICUs, clean rooms, and laboratories, a multi-layer antibacterial coating system will be applied.


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- Surface Preparation: All joints, seams, and cavities will be meticulously filled with polyester putty specially formulated for metal surfaces. Once cured, the surface will be sanded to achieve a completely smooth, jointless finish.
- Priming: A high-adhesion metal primer will be applied to create an optimal base for the final antibacterial top coat, enhancing bonding and long-term durability.
- Antibacterial Final Coating: A high-performance, water-based liquid plastic aseptic wall coating will be applied, designed specifically for sterile healthcare spaces. The coating system is self-sterilizing and offers active protection against a wide spectrum of microorganisms, including bacteria, fungi, mold, and yeast.
- Type: Antibacterial Paint coating
- Dry Film Thickness (DFT): Minimum 200+ microns
- Finish: Smooth, washable, non-porous, and chemical-resistant
- Application Areas: Modular OT walls, ceilings.
- This comprehensive coating solution ensures long-lasting surface protection, supports infection control protocols, and maintains the highest standards of hygiene required in critical healthcare environments.

4) Vinyl Flooring:

- Supply & Installation of seamless Antistatic, Antibacterial, Scratch Resistance, Anti-Fungal, Slip Resistance, even thickness, 100% non-porous and water - repellent flooring system with wear Layer - T-Group, 2MM THICK, Conductive products.
- Self-Levelling Floor Compound: Supply and application of high-performance self-levelling flooring compound to create a smooth, level substrate suitable for vinyl or other cleanroom flooring applications
- Material is homogeneous characteristics.
- Applied with Copper strip for anti-static, with perfectly curved flush covings and connected properly with earthing.
- All joints welded properly with same material.

5) Manual operated Hermetically sealed Sliding door:

- Hermetically sealing horizontal sliding door.
- Sliding Direction: Left or Right as per site
- Door size (1500mm wide 2100mm height) complete with double toughened glass vision window of 300mm x 300mm and smooth effortless.
- Manual operated Hermetically sealed Sliding door with High Pressure Laminate on both Side.
- sliding door runs on nylon wheel within an aluminum extrusion high quality rail complete with required accessories. The door track is constructed from an aluminium extrusion, fixed firmly to the wall. Nylon runner guides are fixed to the floor in such a way that they do not obstruct trolley movement through the door. The doorframes consist of reinforced plasterboard panels faced with the same laminate as the door and will be edged with an aluminium extrusion and with

concealed fixings that are adjustable during installation to ensure a 100% hermetic seal is achieved.

6) Magnetic Writing Board:

- Supply and installation of a magnetic white writing board of size 940 mm x 640 mm x 75 mm, designed for wall-flush mounting in clean room and clinical environments.
- Construction:
- Writing surface made of 1.50 mm thick white high-pressure laminate
- Bonded to a 10 mm high-density fiberboard for enhanced rigidity and durability
- Magnetic surface compatible with markers and magnets
- Easy-to-clean, smooth writing finish
- Supplied with duster and whiteboard markers

7) X-ray View Screen:

- Supply and installation of a 2-plate LED dimmable X-Ray viewing screen, complete with all necessary accessories.
 - Dimming Range : 3% to 100%
 - Type: LED-based with uniform brightness.
 - Application : Suitable for modular operation theatres, diagnostic rooms, and clean room environments
- Features:**
- High-luminance for clear film visibility.
 - Smooth dimming control for optimal viewing conditions.
 - Flush wall-mounted design for hygienic and space-saving integration.

8) Anesthesia cum Surgeon Ceiling Supply Unit – Manual Single Arm Pendant:

The manual ceiling-mounted pendant system is designed to supply medical gases, electrical power, and communication interfaces directly to the anesthesia and surgical zone. It enables ergonomic positioning of essential equipment and devices, improving accessibility, safety, and workflow efficiency in Operation Theatres and critical care areas.

Technical Specifications:

- Arm Length: 1000 mm (Manual movement with 360° rotation)
- Column Length: 1000 mm
- Load Capacity: Up to 80 kg
- Electrical Outlets:
- 6 x 5/15A Sockets (with protective covers)
- Gas Outlets:
- 2 x Oxygen
- 2 x Vacuum
- 2 x Medical Air (4 bar)
- 2 x Nitrous Oxide (N₂O)
- Communication & Data Ports: Provision for LAN/communication as required
- Accessories:
- 2 x Equipment Shelves (adjustable)
- 2 x IV Poles (adjustable height)

This pendant provides a flexible and modular solution for surgical and anesthesia environments, offering optimal space utilization and ease of use.

- Certification: CE certified.

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9) AHU (Air Handling Unit) :

Supply of Ceiling-Mounted Double Skin high-performance Air Handling Unit (AHU) with the following specifications:

- Capacity : 11 TR / 3400 CFM .
- Static Pressure: 125 mm, Cooling Coil: 6-row DX type.
- Fan Type: Centrifugal, backward curved, plug-type, direct-driven.
- VFD: Integrated.

Construction Features:

- Casing: Double skin construction with thermal break profile.
- Outer Skin: 0.6 mm Pre-coated Galvanized Steel Sheet (GSS).
- Inner Skin: 0.6 mm Plain GSS.
- Insulation : 40 mm thick Polyurethane Foam (PUF) with a density of 42 kg/m³.
- Fan Section: Plug-type backward curved fans, direct-driven with IE2 motor, equipped with VFD.
- Cooling Coil: DX type with aluminum fins and copper tubes.
- Motor: TEFC, suitable for 415V $\pm 10\%$, 50 Hz, 3-phase AC supply.
- Drain Pan: Stainless steel or aluminum, with proper drain connection.
- Filter Section:
 - EU4 Pre-filter (Box Type, 50 mm).
 - EU7 Fine Filter (Bag Type, 300 mm).
 - Both mounted on a common filter frame.
- Temperature & Humidity Control:
 - Room Temperature: 22°C ($\pm 2^\circ\text{C}$).
 - Relative Humidity: 55% ($\pm 10\%$).

Mixing Box Section:

- Equipped with manually operated Aluminum Return Air Damper (AL-RAD) and Fresh Air Damper (FAD) with extended shaft.
- Thermal Transmittance: T2 Thermal Bridge Factor: TB2.

Scope of Supply:

- Floor-mounted Double Skin Air Handling Unit (AHU).
- Mixing Box Section with AL-RAD and FAD
- Filter Section with EU4 Pre-filter and EU7 Fine Filter
- Coil Section with 6-row DX Coil
- Fan Section with Plug Fan, IE2 Motor, VFD, and connecting damper.

Low Side Job:

- Copper Pipe HD 7/8 x 0.80mm WT Copper Pipe HD 5/8 x 1.00mm WT Thermostat & Humidistat Subzero temperature controller 2911 PVC Pipe 32 mm Nitrile Rubber Tube 1x1/4 x 6mm PVC Elbow 32mm & PVC Coupler 32mm Nitrile Rubber Tube 7/8 x 9mm Nitrile Rubber Tube 5/8 x 9mm Copper elbow 7/8 (16SWG) Copper elbow 5/8 (16SWG) Copper Coupling socket 7/8 (16SWG) Copper Coupling socket 5/8 (16SWG) Expansion Valve sanhua 5.5 TR

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- Filter Drier danfoss/ EMR DML 305 (5/8) Copper Reducer 5/8 x 1/2 Brass Flare Nut Short Type 5/8 Variable Frequency Drive (VFD).

Air Heating Unit (Strip Type) :

Type: Electric Strip Heater.
 Heating Capacity: 3kW.
 Power Supply: 415 V, 3 Phase, 50 Hz.
 Duct Size: 800 mm x 400 mm.

This air heating unit features a strip-type heating element, designed for efficient and uniform heat distribution within the ducted HVAC system. It is suitable for high-performance applications, ensuring reliability and consistent air temperature control in controlled environments.

10) HVAC Electrical Control Panel :

- The electrical control panel is designed to manage the following equipment:
- AHU Motor: 5HP – 1 No.
- Condensing Unit: 11 TR – 1 No.
- Electric Heater: 3 kW – 1 No.
- The panel is compatible with HVAC PCB Boards (12" x 14") – 2 Nos., and is equipped for safe and efficient control of the connected HVAC components. The panel should include all necessary protection devices, indicators, and wiring as per standard electrical safety norms.
- Make: L&T or Similar.

11) Unidirectional Laminar Air Flow System (HEPA Filter):

- The Planair Ceiling System is a standard-size Plenum Unit designed with a factory- prepared fine sealing system to ensure a completely seamless integration between ceiling- mounted equipment and the OT ceiling. It offers a flexible, modular range of solutions, adaptable to local requirements.
- The unit is constructed using high-quality, durable materials. The filter housings and pressure chamber are made of aluminum. It features a low pressure drop, allowing for the long-term use of HEPA minipleat filters (H13/H14).
- The system ensures reliable filter efficiency, with H13/H14 filters capable of removing 99.997% of particles and germs. Its low pressure drop also contributes to energy-efficient operation, a key feature of the laminar flow ceiling
- The Laminar Air Flow diffuser is made of SS304-grade stainless steel. Size: 2400mm x 2400mm x 400mm
- Structure: Laminar Air Flow System Structure made of 16 Gauge Aluminium

12) DX AC Unit – R410a Refrigerant:

- The unit operates on R410a refrigerant and comes equipped with a suitable wired remote controller for system operation via integrated PCB controls.
- Nominal Cooling Capacity: 11 TR

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13) **22-Gauge Aluminium Ducting with Thermal Insulation:**

- The work includes the supply, fabrication, and installation of 22-gauge aluminium ducting, including necessary curves and bends as indicated in the design for smooth airflow. All duct joints will be sealed using silicone sealant to ensure an airtight system.
- The ducts will be properly supported using G.I. coated threaded rods and hangers, spaced at intervals not exceeding 2.5 meters, ensuring structural stability.
- The entire supply and return air ducting will be thermally insulated using 13mm thick Class '1' closed-cell nitrile rubber insulation, finished with an aluminium foil vapour barrier. All insulation joints will be lapped and sealed using nitrile insulation tape to maintain insulation integrity and minimize energy loss.

14) **Membrane Type surgeon Control Panel :**

- Membrane Type Surgeon Control Panel is designed to provide centralized control and real-time monitoring of critical Operation Theatre parameters.
- Engineered for seamless integration into modular OT environments, the panel offers a user-friendly interface with high reliability and hygiene standards.

Integrated Functions:

- (a) Digital Time Day Clock
 - (b) Time Elapse Day Clock
 - (c) General Lighting Control
 - (d) Medical Gas Alarm Display Panel
 - (e) Hands-Free Telephone Communication
 - (f) Temperature & Humidity Display
- Gas Monitoring Sensors : Oxygen (O₂), Nitrous Oxide (N₂O), Carbon Dioxide (CO₂), Medical Air 4 bar (Air-4), Medical Air 7 Bar (Air-7), Vacuum.
 - This panel ensures accurate control, real-time status updates, and enhanced safety for critical operational status of operation Theatre.
 - Make: Biomed or Similar.

15) **Dimmable Clean Room LED Light :**

- Dimmable Clean Room LED Light is designed for ceiling or surface mounting in controlled environments.
- It features non-hygroscopic, high-efficiency LEDs with a CRI ≥ 80 , ensuring bright, uniform illumination.
- Built with an anodized aluminum body and shatter-resistant lens, the fixture meets IP65 protection standards, is ISO 14644 compliant, and CE & RoHS certified.
- Compatible with 110–240V AC, the unit is fully dimmable, supports efficient thermal management, and offers a 50,000+ hour lifespan—making it an ideal, energy-efficient lighting solution for clean room application (Size: 2 X 1).

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16) Clean Room UVC Light:

- The Clean Room UVC Light is designed for ceiling or surface mounting, ensuring seamless integration into clean room environments.
- It operates at 253.4 nm wavelength using non-hygroscopic UVC tubes for effective disinfection, neutralizing bacteria, viruses, and fungi.
- Built with durable, non-corrosive materials, it is engineered to withstand the demanding conditions of clean room applications.
- The unit complies with stringent safety and performance standards, offering reliable sterilization in controlled environments (Size: 2 X 1).

17) OT Light :

- Double Dome LED OT Light.
- Intensity 160,000 + 1,60,000 ($\pm 10\%$)
- Size of Light Field 12-30 cm
- Colour Temperature 4000-5000 K
- Colour Rendering Index 93 RA
- LED Life >50000 Hrs.
- Number of LED 126 x 2
- Diameter of Light 500mm x 2
- Brightness Control Capacitive Touch Panel
- Power Supply 220V/50Hz AC
- Colour of LED White & Yellow (Double Colour)
- Focusing Adjustable

18) Magnehelic Differential Pressure Gauge:

- Range : 0–30 PSI.
- Application: For monitoring differential pressure across HEPA filters or between cleanroom zones. Suitable for modular operation theatres, cleanrooms, and HVAC systems.
- Display: Analog dial type with clear PSI markings.
- Accuracy: $\pm 2\%$ of full scale.
- Mounting: Surface or panel mount.
- Housing: Die-cast aluminum case for durability.
- Port Connections: 1/8" NPT high and low pressure ports.

19) SS Pressure Relief Dampers:

- Pressure Relief Dampers made out of 1.5 mm thick SS 304 having multi SS304 PRD- SS 304 graded stainless steel blades with Balancing weight made out of Stainless steel & brass for maintaining the positive pressure inside the operation theatre complete with aluminium powder coated grill outside the OT. (size: 300mm x300mm).

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20) MGPS (Medical Gas Pipe Line System) Works:

- Existing gas pipeline removing and reinstallation with proper checking.

21) Misc Works:

- Welding Rod, Rubber Coving, Copper Strip, Adhesive SR 998 And Fevicol VT .
- Transportation & Installation works.

22) Additional Clauses:

1. Bidder should provide preventive maintenance quarterly basis for one year.
2. In the event of breakdown, the agency shall attend to the issue within 24 hours of intimation.
3. Bidder should submit the declaration for availability of spare part for 10 years.
4. Bidder should provide the performance details for similar type of work.
5. It should be one year warranty on whole project.
6. Bidder should submit valid authorization for equipment.
7. NABH and Fire Safety Norms should be followed in execution and installation of modular OT.
8. Bidder should provide point wise compliances against this specification/scope of works.
9. Bidder should provide item wise make and model offering in the above said works.

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