**Dialysis Machine Supply**

**Terms of Reference ( Schedule of Requirements )**

**1.0 Project outline:**

The aim of this project is to secure ten (10) hemodialysis (HD/HDF-compatible) machines with chairs and reverse osmosis (RO) systems under a reagent-rental model. To avoid single-vendor dependency, awards will be made to two suppliers offering different equipment brands. Each awarded supplier will supply and install five (5) dialysis machines, five (5) dialysis chairs, and six (6) RO units (five operational + one backup), totaling twelve (12) RO units across both suppliers (ten operational + two backup).

**2.0 Supplier Responsibilities:**

The Supplier shall provide, at its own cost, the supply, delivery, installation, commissioning, and configuration of:  
• five (5) HDF-compatible dialysis machines,  
• five (5) dialysis chairs, and  
• six (6) RO systems (five operational + one backup).

The Supplier shall ensure continuous operability of the equipment and provide all preventive and corrective maintenance, spare parts, software/firmware updates, and any replacements necessary to maintain performance throughout the contract term. The Supplier shall maintain a full-time on-site/local biomedical engineer or technician and shall meet the following service response standards: initial triage within two (2) hours of fault notification; if unresolved, deployment of an appropriate engineer/application specialist on-site within six (6) hours. The Supplier shall maintain adequate buffer stocks of critical spares and consumables and shall guarantee an uninterrupted supply of reagents/consumables in line with AEH’s usage.

Supplier shall maintain ≥95% monthly uptime per machine and per RO

1. **Training & Competency:**
2. The Supplier shall conduct:  
   • On-site initial operator training at installation for fifteen (15) nurses, five (5) doctors, and three (3) biomedical engineers.  
   • Annual on-site refresher training for the same group throughout the contract.  
   • On-site technical training for three (3) AEH biomedical engineers on maintenance and troubleshooting.  
   • International training for a minimum of two (2) AEH staff per contract year on advanced applications/technical modules.
   * Training materials (user manuals, service manuals, simulation/competency checklists) shall be provided in English. Attendance lists and competency certificates shall be issued to AEH.

**3.0 AEH Responsibilities:**

1. AEH shall provide a place to install the equipment.
2. To conduct awareness among AEH staff on equipment use and functions.
3. To ensure users are operating equipment as per the manufacturer’s recommendations and advice.
4. To prepare and share with the supplier AEH consumables requirements required to provide services.
5. AEH will purchase machine-related consumables **exclusively** from the supplier.
6. AEH can decide to change the location of the machine within AEH or to any other health facility under AEH.

## Ownership

* The machines will be in the ownership of the supplier during the contract period; however, once the full term is reached, ownership will be changed to AEH without any additional charges.
* Suppliers must assess all machines and do a maintenance run to ensure machines are in a condition acceptable to AEH at the end of the contract period.
* In the event that the contract is ended due to a breach of contract or the supplier is unable to continue providing the service, ownership of the machines will be transferred to AEH.

## Submission Requirements:

* **Brochures:** Include product brochures and technical documents.
* **Previous Installations:** Provide references of previous installations in healthcare facilities.
* **Training:** Outline comprehensive training programs for end users.
* **Technical Support:** Provide details of customer support services and response times.
* **Demonstration:** Demonstration (remote) **if requested by AEH**.
* Certification documents.

## Additional Remarks or Requirements:

* Complete product details to be enclosed with the original brochure or catalogue

(Soft copy).

* Details of the standard accessories, additional accessories, optional items,

consumables and minimum supplies to be stated clearly.

**Dialysis Machine: Technical specifications**

**Quantity: 10 nos**

## General Requirements:

* **Type:** Hemodialysis and Hemodiafiltration (HDF) Machine.
* **Structure:** Modular design for easy maintenance and scalability.
* **Power Supply:** 220VAC ± 15%, 50Hz.
* **Battery Backup:** In-built battery backup of 15-20 minutes for complete extracorporeal blood system during power failure.
* **UPS:** One hour battery backup for uninterrupted operation.

## Performance Specifications:

* **Blood Flow Rate:** Adjustable from 30 to 600 mL/min.
* **Dialysate Flow Rate:** Adjustable from 300 to 1000 mL/min.
* **Ultrafiltration Rate:** Adjustable from 0 to 4 L/h.
* **Dialysis Treatment Time:** Programmable between 2 to 8 hours.
* **Treatment Modes:** Standard, online, nocturnal, and sequential ultrafiltration.
* **HDF Treatment Mode:** Hemodiafiltration (HDF) mode, online HDF, and pre- and post-dilution HDF capabilities.
* **Substitution Fluid Rate for HDF:** Up to 30 L of substitution fluid.
* **Single Needle Dialysis:** Available.
* **Dialysis Facility:** Supports acetate and bicarbonate dialysis.

## Hemodiafiltration (HDF) Specific Features:

* **Online HDF Mode:** Capable of performing online HDF treatments, both in pre-dilution and post-dilution modes.
* **Substitution Fluid Rate:** Adjustable substitution fluid rate up to 30 L for HDF.
* **Substitution Fluid Preparation:** In-line preparation and delivery of high-purity substitution fluid for HDF.
* **HDF Compatibility:** Machine must be compatible with high-flux HDF dialyzers and able to perform HDF for improved patient outcomes.

## Dialyzer Compatibility:

* **Types:** High-flux, low-flux, bio-compatible dialyzers, and those suitable for HDF treatments
* **Surface Area:** Minimum 1.5 m².
* **Membrane Material:** Synthetic (e.g., polysulfone, polyether sulfone, cellulose acetate).
* **Concentrate Formulation:** Compatible with multiple concentrate formulations and different dialyzers and blood tubing sets.

## Monitoring Systems:

* **Real-Time Monitoring:** Continuous monitoring of:
  + Blood pressure (arterial/venous)
  + Blood flow rate
  + Dialysate flow rate
  + Ultrafiltration volume
  + Hemoglobin, hematocrit, and vascular access pressure.
  + Fluid status indicators.
  + Transmembrane pressure monitoring.
  + Non-invasive patient blood pressure monitoring.
  + Substitution fluid volume and flow rate during HDF treatments.
  + Relative Blood Volume Monitoring (RBVM)
* **Integrated Sensors:**
  + Air bubble detector with optical sensor at venous clamp.
  + Blood leak sensor differentiating between real blood and impurities.
* **Alarms:** Comprehensive alarm system for:
  + Air in bloodline
  + Blood leak detection
  + Pressure drops/increases
  + Ultrafiltration limit breaches
  + Temperature and conductivity deviations
  + End-of-treatment alerts
  + Substitution fluid volume deviations during HDF
  + Timer settings should be available throughout the dialysis session.

## User Interface:

* **Display:** Minimum 10” high-resolution color touchscreen (TFT/LCD) with easily readable graphics.
* **Controls:** User-friendly interface with programmable settings for multiple patients.
* **Data Logging:** Capable of storing treatment data for at least 1000 sessions, with export options.
* **Custom Alerts:** User-defined alerts for patient-specific thresholds.
* **Multilingual Support:** Interface available in multiple languages.

## Connectivity:

* **Data Transfer:** Wireless capability for integration with electronic health records (EHR).
* **Remote Monitoring:** Support for telehealth services and real-time remote patient monitoring.
* **System Integration:** Compatible with hospital information systems (HIS) and laboratory information systems (LIS).
* **Cloud Storage:** Option for secure cloud storage of treatment data.

## Safety Features:

* **Emergency Shut-Off:** Automatic shut-off in case of malfunction or emergency.
* **Power Backup:** Integrated battery backup for 15-20 minutes.
* **Water Quality Monitoring:** Real-time monitoring for water quality during dialysate preparation with alerts for non-compliance.
* **Anti-Backflow Mechanism:** Prevents backflow into the patient's vascular access.
* **Thermal Protection:** Automatic control to prevent overheating of dialysate.
* **Shock Absorption:** Design minimizes vibrations during operation.
* **Safety Locks:** Physical safety locks on critical access points.
* **User Authentication:** Role-based access control for operation adjustments.

## Advanced Reverse Osmosis (RO) System Requirements:

* **RO System Type:** Multi-stage RO with pre-filtration and post-filtration capabilities.
* **Filtration Performance:** Removes >99% of contaminants, including bacteria and endotoxins.
* **Flow Rate:** Minimum of 200 L/hour.
* **Monitoring:** Real-time monitoring of RO inlet/outlet pressures, flow rates, and water quality parameters.
* **System Flush:** Automated flushing cycles to maintain performance.
* **Waste Water Management:** Efficient wastewater handling features.
* **Alerts:** Notifications for RO maintenance, filter changes, and water quality deviations.

## Dialysis Chairs:

* The Chair unit specifications are provided below separately.

## Maintenance and Cleaning:

* **Self-Cleaning Cycle:** Automated cleaning cycles with user prompts.
* **Disinfection:** Hot rinsing and hot chemical disinfection (up to 80°C) with recirculation, chemo-thermal cleansing, and universal disinfectant compatibility.
* **Disinfection Log:** History and logging of disinfection events.
* **Easy Maintenance:** Quick replacement of components (filters, tubing) with maintenance alerts.
* **Service Kits:** Availability of service kits for routine maintenance.

## Dimensions and Weight:

* **Compact Design**.
* **Height**: 1400 mm – 1600 mm (55 in – 63 in)
* **Width**: 500 mm – 600 mm (19.5 in – 23.5 in)
* **Depth**: 500 mm – 650 mm (19.5 in – 25.5 in)
* **Weight:** 80 kg – 120 kg (176 lbs – 265 lbs)

## Additional Features:

* **Integrated System:** Seamless integration with reverse osmosis (RO) systems for dialysate preparation.
* **Customizable Protocols:** Ability to program individualized treatment profiles.
* **Data Analytics:** Advanced analytics for patient trends and treatment outcomes.
* **Voice Activation:** Optional voice-controlled operation.
* **Telemonitoring:** Real-time remote monitoring capability.
* **Patient Management Software:** For scheduling and managing appointments.
* **Training:** Comprehensive training modules for operators, including simulation training.
* **Auto Priming & Rinsing:** Auto priming and rinsing of dialyzer and bloodlines.

## Standards and Requirements:

* **Compliance:** Meets local health regulations and international standards.
* **Certification:** CE, USFDA, ISO, or equivalent internationally recognized standards..
* **Warranty:** Minimum 2-year warranty with options for extended coverage.
* **Online Monitoring:** Kt/V monitoring and adequacy assessment during treatment.
* **Manuals:** Detailed operation and service manuals with circuit diagrams.

## Accessories and Consumables:

* **Dialyzers:** Different sizes of high-flux and low-flux dialyzers suitable for both HD and HDF treatments.
* **AV Tubing Set (Universal):** Included
* **AV Needles:** Included
* **Disinfectant Solution:** Provided
* **Water Filter Assembly:** Minimum 10-micron filter assembly with cartridge and necessary attachments.
* **Consumables:** Any other necessary consumables required for machine operation.

**Advanced Dialysis Chair: Technical specifications**

**Quantity :10nos**

## Chair Structure and Design:

* **Ergonomic Design**: Fully adjustable, ergonomically designed to reduce pressure points and provide maximum comfort during long dialysis sessions.
* **Material**: Premium-grade antimicrobial synthetic leather or fabric upholstery for easy cleaning, stain resistance, and enhanced patient safety.
* **Frame**: High-strength, lightweight aluminum or steel alloy for durability and stability.
* **Recline Functionality**: Electrically adjustable reclining system with a 180-degree full recline option.
* **Headrest and Footrest**: Padded and adjustable, with easy-to-control electric settings to customize height and tilt.
* **Armrests**: Adjustable armrests with padded surfaces, designed to facilitate easy access for medical staff during dialysis access.
* **Dimensions**: Wide seat (600 mm to 700 mm) to accommodate a range of patient sizes with adjustable seat height.
* **Weight Capacity**: 150-200 kg (330-440 lbs) to support a variety of patient body types.

## Comfort and Luxury Features:

* **Memory Foam Padding**: High-density memory foam padding throughout the chair to reduce fatigue and ensure comfort during long dialysis sessions.
* **Heated Seat and Backrest**: Adjustable heating elements in the seat and backrest for enhanced patient comfort.
* **Massage Function**: Built-in massaging features with multiple intensity settings, targeting lower back, upper back, and legs to enhance circulation.
* **Zero-Gravity Position**: A feature allowing the chair to tilt into a zero-gravity position, reducing pressure on the spine and improving circulation during dialysis.
* **Customizable Preset Positions**: Pre-programmed seating positions for ease of use (e.g., recline, zero-gravity, flat for treatment).

## Patient Convenience Features:

* **Integrated Entertainment System**:
  + **10–15-inch HD Touchscreen**: For access to internet browsing, video streaming (Netflix, YouTube), and digital magazines.
  + **Headphone Jack and Wireless Connectivity**: Bluetooth-enabled for wireless headphones.
* **USB Charging Ports**: Multiple USB ports to charge mobile devices.
* **Reading Light**: Adjustable LED reading light mounted on the chair’s arm or headrest for patient convenience.
* **Personal Storage Compartments**: Built-in side compartments or drawers for personal belongings (e.g., phones, books, glasses).

## Medical Features:

* **Integrated IV Pole and Accessory Rails**: Adjustable and retractable IV pole attached to the chair with accessory rails for easy attachment of medical equipment (e.g., BP monitors, infusion pumps).
* **Armrest for Easy Needle Access**: Soft, yet firm, removable armrests designed to facilitate vascular access for both AV fistulas and catheters.
* **Easy-to-Clean Surfaces**: Seamless design for quick and effective cleaning with disinfectants; waterproof and stain-resistant upholstery.
* **Vital Signs Monitoring Integration**: Docking station for non-invasive monitoring equipment (e.g., blood pressure, pulse oximeter).

## Safety and Mobility:

* **Emergency Control System**: A one-touch emergency button that automatically brings the chair to a sitting position for rapid patient egress in case of emergencies.
* **Lockable Casters**: High-quality, heavy-duty casters for easy movement, with locking mechanisms for safety.
* **Safety Straps**: Optional patient safety belts or restraints to prevent falls or movement during treatment.

## Chair Control System:

* **Remote-Controlled Adjustments**: Wireless remote control or mobile app for adjusting chair positions and settings.
* **Touchscreen Panel**: Built-in touchscreen control on the armrest to adjust seating, heating, and massage functions with intuitive UI.

## Aesthetics:

* **Color Options**: Available in a range of luxury color palettes to match the clinics or hospital’s design aesthetic.
* **Finish**: Glossy or matte finishes for a sophisticated look.

## Power and Durability:

* **Power Supply**: Dual-powered system with both AC and DC (battery backup) for continuous operation in the event of power failures.
* **Battery Backup**: Minimum 2-hour backup to ensure operation during power outages.
* **Warranty**: Minimum 3-year warranty on the frame and electronic components.

## Optional Features:

1. **Voice-Activated Controls**: To enable hands-free control of chair adjustments and entertainment systems.
2. **Air-Cooling or Ventilation**: Built-in fans or ventilated cushions to keep patients cool.
3. **Remote Patient Monitoring**: Integration with patient monitoring systems to track vitals and transmit data to healthcare professionals.
4. **Built-in Speakers**: Surround sound speakers for an immersive audio experience during entertainment.