MINISTRY OF EXTERNAL AFFAIRS
(GOVT. OF INDIA)

DISTRICT GENERAL HOSPITAL,DIKOYA,
SRI LANKA

Tender

for

Supply, Installation, Testing & Commissioning of CSSD Equipment at District General Hospital, Sri Lanka

VOLUME – IV

TECHNICAL SPECIFICATION

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(Consultants & Engineers for Mega Hospitals & Laboratories)
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TECHNICAL SPECIFICATION OF CSSD EQUIPMENTS

Scope of Work : **Supply, Installation, Testing and Commissioning of CSSD including Turnkey works and handover in satisfactory condition to the District hospital premises of Dikoya, Srilanka and services of Defect liability Period as per contract.**

1.0 DOUBLE DOOR AUTOCLAVE

The sterilizer is conforming to the following standards:

- IS 3829 (Part-I)
- ISO certified 9001 : 2008
- ISO certify 13485 : 2003
- CE certified

Electrically heated

Size 450mm (W) x 450mm (H) x 900 (Depth)

The normal working pressure would be 1.2 - 2.1 Kg/cm^2 corresponding to temperature 121 - 134^{o}C.

- **Fully automatic** and Microprocessor controlled, User friendly Alpha-numerical / Graphical / Digital type display and Display of Cycle status Fault/Error Indication with visual alarms.

Material of Construction:
Chamber S.S. 316 L quality,
End-ring S.S. 316 quality,
Jacket S.S. 316 quality,
Insulation Glass wool. (50 mm. thick)
Outer cover S.S.304, 20 G. sheet – mirror polished
Pipe lines S.S.316 quality seamless.
Fittings / Connections S.S. 316 quality, B.S.P. threading.
Gasket Silicone rubber, joint-less hollow type.

The Sliding **Doors** made of AISI-316 Stainless steel should be with automatic door sealing. The door sealing system should be with Silicon gasket with a stainless steel spring fitted into a groove of the sterilizer chamber.

The **Safety features** as the Sterilizer operation cannot commence until the door is fully closed, the door cannot be opened until the sterilizing cycle is fully completed and the chamber is effectively vented to atmosphere before the opening mechanism is fully released.

Steam Generator (Boiler)
Will be of SS-316 and attached to underneath the jacket & fitted with Heater Water immersion type industrial, ISI mark Water level magnetic switch to protect heater from low water level.
Glass tube to indicate water level in boiler. Valves For water inlet & outlet.

- All S**team Piping** should be made of stainless steel with TIG welding joints.

- The sterilizer should be equipped with :
    - Chamber Drain Temperature Sensor for steam processes
    - Chamber Pressure Sensor*
    - Temperature sensors should be PT 100 type

* Pressure sensors should have software based temperature compensation. Accuracy of 1% over the range 0 to 5 bar.

- **Alarm System** for:

    - Failure of Temperature and pressure sensor
    - Phase time out
    - Not properly closing of door
    - Power failure
    - Low water level
    - checking of all safety devices continuously

- Both the chamber and the jacket should be equipped with **Safety Valves.** If the pressure exceeds the allowable limit the safety valves should discharge steam.

- The Sterilizer should be equipped with liquid-ring **Vacuum Pump** to create vacuum for total evacuation of the air from the chamber in the shortest time.

- The Sterilizer should be provided with following mountings & fittings:

    - Fully Automatic with pre-selected and variable programs
    - Self sterilizing vacuum drier.

    - Safety valve spring loaded and vacuum breaker.
    - Pressure and compound gauge
    - Screen plug for chamber discharge line.
    - Chamber discharge line with steam trap and swing check valve.
    - Dial type thermometer.
    - Compound Gauge Indicates chamber pressure/ vacuum Pressure Gauge Indicates jacket / boiler pressure.

- The **operation** of the sterilizer should be activated by means of **solenoid valve**

- The Sterilizer should be fitted with **Control Panels** of Stainless steel construction where discharged steam from the autoclave on opening of the door cannot impinge on it. The Control Panel contains the control system and associated circuitry. Each circuit should be protected by a miniature circuit breaker. All electrical components in the control panel should be labeled. All wiring should be insulated and labeled to link with the circuit wiring diagrams and should be resistant to conditions of high humidity and heat, eg. PVC and silicon insulated wires.

- The **controls** must be capable of controlling automatically the following:
    - Wrapped instruments, textiles, porous load - 134°C
    - Heat sanities material, rubber, plastic porous load - 121°C
    - Sterilization for open instruments - 134°C
    - Bowie & Dick Test cycle - 134°C
    - Automatic leak test

- The Sterilizer system is incorporated with PLC based microprocessor with the facility of Human-Machine-Interface.

- The technician can program the cycles with his choice of different settings of time, temperature and corresponding pressure, which can be used to sterilize various types of contents / materials.

- The **Micro-Processor based control Panel** should control entire cycle of sterilization and steam pulsing automatically through water ring vacuum pump. The control panel should house the complete automatic process control arrangement including timers, relays, contactors etc.

  The digital display at front panel should show the following parameters:

  - Chamber Pressure
  - Chamber temperature
  - Cycle no.
  - Batch no.
  - Time & Date
  - Alarm indicator
  - Error code
  - Low water indicator

- **The Chamber, Jacket and Steam Generator should be hydraulically tested at the pressure twice of the working pressure**

- **ACCESSORIES WITH CARRIAGE (SS-316) AND TROLLEY (SS-304)**

2.0 ETHYLENE OXIDE STERILIZER

- **Chamber**

MOC SS 316
Thickness 4 mm thick
Working Volume **5 Cu.Ft.**

- **Jacket**

MOC SS 304
Thickness 3 mm thick

- **Door**

MOC SS 304
Thickness 8 mm thickness
Type Hinged Type Radial Locking
No. of Door One
Mechanical Door Lock 1 Nos.

Humidification System
MOC SS 304
Glass Gauge 1 Nos.
Nos. of Heater 1 kw

- **Vaporiousier System**

MOC SS 304

- **Hot Water Circulator**

MOC SS 304

- **Aerator System**

No. of Filter Cartage 1 Nos.
No. of Port 2 x ½”

- **Vacuum System**

Tank MOC Stainless Steel 304
Piping Connection ½”

- **Stand**

MOC Mild Steel Round Pipe

Insulation
MOC of insulation cover SS 304 20 Gauge
MOC of insulation R.B glass wool
Thickness 50 mm thick

- **Gasket**

MOC Neoprene
Size ¾” x ¾”

- **Interconnecting Pipe**

MOC SS 304
Type Seamless
Pipe Thickness 10 gauge

- **Inlet & Outlet Valve**

Chamber inlet ½” BSP
Jacket inlet ½” BSP
Chamber vent ½” BSP
Chamber drain ½” BSP
Jacket drain ½” BSP
Chamber vacuum ½” BSP

- **Temperature Sensor**

Type Head Type
Size ¼” x 6” length
Qty. 1 nos.

Pressure Transmitter
Type Pressure State
Range 4 kg
Qty 1 Nos.

- **Solenoid Steam Valve**

Type Pneumatic Rotary Actuator

Body CF8 SS 304
Design Three Piece Full Bore Ball Valve
No. of Valve 3 Nos.

- **Manual Steam Valve**

Size ½”

- **Vacuum Pump**

Electric Motor
Type Belt Drive
Qty 1 Nos.

Operating temp. Range : 33 to 55 C

Cartidge-100 Nos

Should be provided with Compressor if required.

Exhaust pipeline for venting out the gases should be laid upto 3m above the top of the hospital building from ETO machine.

3.0 WASHER DISINFECTOR

The Washer Disinfection will be equipped with all accessories suitable for washing, disinfecting and drying of all kinds of surgical instruments, anesthetic an respiratory tubing, suction devices, bottles and other glassware

- Single door.
- Chamber made of stainless steel S.S.304
- Microprocessor control for all services, programming and statistic functions –
- three preset programs.
- Equipped with powerful water circulation pump.
- Equipped with four spray arms for good penetration.
- Dosage of detergent can be preset with dosing pump.
- Sensor to detect level in soap tank and easy refilling system
- Sensor for water in chamber to avoid dry run.
- Double wall with insulation to run with minimum sound and heat emission.
- Air particle filter to ensure the drying air is free from particles.
- Chamber volume: **250 – 275 liters**.
- Front loading.

4.0 HEAT SEALING MACHINE

a) Rotary heat sealers should provide validated sealing of sterilization bags and clear-view pouches (paper/plastic laminate).

b) It should be microprocessor-controlled.

c) The rotary heat sealer should give documentation of process parameters via an integrated printer and could be integrated with documentation system.

d) The ergonomically design should be tilted forward for increased user convenience and space saving installation.

e) The sealer housing should be powder-coated and the control panel is of the flat-membrane type, for easy cleaning.

f) It should be operationally simple. When a bag is fed into one side of the machine, the machine should start automatically or by pushing a button, moving the bag through the machine, and applying pressure and heat to form a perfect seal.

g) The warm-up time should not exceed 30 seconds, and the feed speed should be approx. 10 m/min.

h) The temperature should be adjustable from 50–200°C with a tolerance of 1% of the set value.

i) It should be regulated by a heating element that is highly sensitive to temperature fluctuations, assuring even temperature and perfect seals.

j) It should offer a number of additional features, including:

k) Automatic start-up

l) Reverse feed function in case an instrument accidentally enters the sealing area

m) Energy-saving stand-by mode

n) Pre-set temperatures
o) Re-settable counter function

p) Rotary heat sealers come with a port and cable for connection of the sealer to a PC and printer, enabling monitoring and documentation of the entire process.

q) Should have a protection mechanism against overheating and start prevention at temperature deviations outside +/- 5° C tolerance.

5.0 DRYING CABINET

- Chamber Volume: **150 Litres** approx.
- Operation : Automatic
- Construction: The equipment consists of MS frame work supporting the outer cover and inner chamber. The inner chamber is fabricated from stainless Steel the outer chamber from epoxy painted CRCA sheets.
- Door: The drying cabinet is provided with a quick lock door of S.S. 304 from inside along with heat resistant gasket.
- Air Circulating Fan: The chamber design allows uniform air circulation. The air is circulated by a stainless steel impeller powered by a 3 phase motor.
- Exhaust: Exhaust is provided at the top of the unit. The exhaust opens to ensure complete removal of moisture.
- Heating System: S.S. Sheeted “U” Type Heaters are provided.
- Shelf: 2 No’s. Equiv.-spaced S.S. 304 shelves are provided.

• Insulation: The drying cabinet chamber will be insulated with 50mm. thick resin bonded glass wool.
• Control System: The user friendly control panel comprises of: Temperature Indicator Controller for setting the drying Temperature, Timer for setting drying time, “START” Push button & Indication bulb.

6.0 ULTRASONIC CLEANER

a) The units should be a compact free-standing bench model, with a built-in tank manufactured from high-quality (316) stainless steel and a solid-state generator that sends ultrasonic (approx 40 KHz) impulses through wash water containing detergent and electrical heating; microprocessor controlled display with memory time and temperature functions.

b) The electrical energy should be transformed into sound waves by transducers, fixed to the bottom of the tank.

c) The tank should be made of solid stainless steel (316).

d) The ultrasonic cleaner should have a display and control which could be easily seen and placed above any liquid for safety and reliability.

e) It should have digital read out timer and temperature setting (temperature adjustable from 20 to 69 °C) monitoring.

f) Capacity should be 30 L

g) Should work on 230V, 50 Hz AC Supply.

h) Ultrasonic cleaner should supplied with Wire mesh basket of suitable size & Stainless steel lid

7.0 GAUZE CUTTING MACHINE

• Useful in cutting thickest of cotton gauze material
• Cutting unit and a knife sharpening unit
• Blade size : 200 mm
• Cutting Capacity: 165 mm
• Work on 230V,50 Hz power supply.

8.0 STORAGE RACKS

• Stainless steel 304 storage Rack with five shelves (Open type)
• Floor mounted
• Frames fabricated out of stainless steel.
• Shelves – made of stainless steel.
• Legs are provided with adjustable nylon bulled feet.
• Overall dimensions: 1800mm L x 600mm W x 1800mm H.

9.0 DISTRIBUTION TROLLEY (COVERED TYPED)

- Made of good quality stainless steel-304.
- Internal size – 1100mm x 500mm x 1400mm.
- External size – 1200 x 600 x 1700mm.
- No. of shelves – 2 nos.
- Good quality 4 Nos. castor wheels for easy maneuverability, size of castor: 150mm.

10.0 WORK TABLE WITH SINK

Stainless steel work table with **double sink** unit with hot water, cold water and air

- Spray connections – for washing of instruments.
- Complete stainless steel body construction, with four leg supports made of stainless steel.
- The Unit Complete with hot water, cold water and air spray for rinse provisions.
- Drain Outlet Connection
- Sinks will be designed in a way to minimize splash.
- All smooth ground corners.
- One under shelf made of stainless steel SS304.
- Bench top dimension: 2400mm L x 650mm W x 900mm Ht.
- Size of sink: 500mm x 400mm x 200mm.

11.0 TRANSFER BASKETS

- Basket made of corrosion resistant SS wire with welded joints.
- Adaptable with disinfectors, transfer carriage sterilizing and storage equipment.
- Compactly stackable when empty.
- Dimensions -385mm length x 395mm width x 95mm height.

12.0 WORK TABLE

- Stainless steel SS 304 quality table with drawer,
- Over all size – 1800mm x 700mm x 1400mm.
- The control and packing table with two shelves is used for separation, control and
- packing of various sets of sterilized goods for wards, clinics, operation theatre etc.,

13.0 GLOVE EXAMINER

- Stainless Steel 304 body complete with nylon gloves holder, air compressor, tank, pressure switches and accessories. Size-1200 L x 640 W x 1000 H

14.0 GLOVE WASHER CUM DRIER

- Construction of SS-304 covered with SS covers.
- Inner drum of SS-304 with a perforated periphery.

- Direct or belt driven stirrer in the chamber.
- Electrical heater, blower and ducting provided within the outer casing.
- Thermostatically controlled fast and efficient drying system
- Automatic control of wash process.
- 4 number swiveling casters are to be provided along with Drain pump and manual drain complete with SS strainer.
- level control system, hot and cold water switches for inlet, indicators for cycle status,

15.0 STORAGE CABINETS

- Suitable for sterilized article storage
- Stainless steel storage Rack with five shelves.
- Floor mounted
- Frames fabricated out of stainless steel 304.
- Shelves – made of stainless steel 304.
- Legs are provided with adjustable nylon bulled feet.
- Two Door Opening
- Overall dimensions: 1800mm L x 600mm W x 1800mm H.

16.0 RAPID STERILIZER (Table Top)

Table Top Sterilizer provides fully automatic sterilization, exhaust of water and steam drying.

- Full stainless steel construction.
- Single lever pronged closure system
- Microprocessor Controller with following parameters programmable by user: Sterilizer Time: up to 99 minutes.
- Sterilizing Temperature: up to 134°C. Drying time: up to 99 minutes.
- Pt100 Sensor for precise monitoring.
- End of cycle buzzer and auto reset.
- Valves for water filing and exhaust.
- Industrial Grade energy efficient heater.
- Drying with door open facility.
- Capacity: 16 Ltr. (230 x 400mm)

17 CONTROL & PACKING TABLE WITH TWO SHELVES FOR CLEAN AREA

- Size (LxWxH) : 2000x1500x900 mm approximately.
- This table should be specially designed for sorting, inspection, functional control and packing of various sets for wards, clinics etc. and for surgical instrument sets in trays. The work could be done comfortably, either sitting or standing.
- The worktop should be made of a robust wood-based core material, surfaced with plastic laminate in a soft beige colour that reduces reflection of light from the surface. All edges should be smooth. The extended width of the worktop should be designed to facilitate thorough inspection of instrument trays and allow the use of large wrapping material.
- The rigid frame is made of stainless steel (304).
- There should be unobstructed access to the working space, since the only supports needed along the front of the table are the corner legs. This also facilitates cleaning of floors.

- Should have double workspace. One workplace table should have 700 mm wide worktop and other workplace should have 1400 mm worktop.
- The table should include a two-shelf console, mounted on the worktop, for storage of packaging materials. The rigid supporting columns of the console include 3 electrical outlets.
- There should be a free space of 450 mm between the lower shelf and the worktop, and 150 mm between the two shelves.
- The table should have a drawer unit (both sides as double model) mounted under the worktop.
- Each drawer unit should be 400 mm wide and should include a drawer and a sliding plate.
- Fluorescent tube fittings (Inspection lamp) should be available. (Optional)

18. LINEN FOLD TABLE FOR CLEAN AREA

- Size (LxWxH) : 2000x1400x900 mm approximately.
- The table should be specially designed for sorting, inspection (each piece of linen can be moved over an illuminated inspection panel) and folding of surgical dressing sets and individually packaged towels/gowns. The extended width also facilitates work with large dressing sheets. Work can be carried out comfortably, either sitting or standing.
- The worktop should be made of a robust wood-based core material, surfaced with plastic laminate in a soft white colour that enhances the lighting for inspection of linen.
- All edges of the worktop should be smooth.
- The top should have a built-in opalescent (milky) plastic surface plate, 1000 x 600 mm, illuminated from underneath by two 25 W fluorescent tubes located beneath the top in a laminated recess.
- The table should have two electrical outlets (one on each side).
- The rigid frame should be made of stainless steel (304).
- There should be unobstructed access to the working space, since the only supports needed along the front of the table are the corner legs. This also facilitates cleaning of floors.

19.0 ELECTRIC DISTRIBUTIONAL PANEL FOR CSSD EQUIPMENT

with all switchgears, wiring and controls etc of L&T/ Siemens/ ABB/GE or Schneider make) for distribution of power supply to various load points in the CSSD Room from single point power supply(Provided by the hospital).

20. IN ADDITION TO THE ABOVE, FOLLOWING <u>TURNKEY WORKS</u> FOR INSTALLATION AND COMMISSIONING OF CSSD AT DISTRICT HOSPITAL, DICKOYA, SRILANKA ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR :

- Bidder must take into consideration in its bid, costs to be incurred for any additional work pertaining to Civil, Electrical, Plumbing, Sanitary and any other protections relevant as per State/Central Govt. regulation/local authority of Srilanka, Servo stabilisers, U.P.S. etc. required for successful installation testing and commissioning of the system and the offered price should include all such costs, each Schedule is to be considered a package in itself and contractor to execute the order package on a "turn key basis". Demolishing of existing set-up and reconstruction as per the requirement shall be the sole responsibility of the contractor.

- Partition wall for constructing Sterile area, Clean area and Wash area along with Sliding doors -2 Nos and ETO Room should be made for the CSSD.

- Proper **Ventilation system** including fans and exhaust fans has to be provided for Cleaning and Disinfection area and linen folding area. **Proper degassing and ventilation facilities should be provided for ETO sterilizer room.** Proper ventilation has to be provided in the receiver area and entrance foyer. Necessary Ducting of GI sheet with grills at the Wash and Non-sterile area & Corridor area and Aluminium ducting with powder coated diffusers for the Sterile area inside the CSSD upto the nearby AHU for supply of cool at the working place inside the Sterile, Clean. Fresh air should be supplied to the Wash Area of CSSD. **Exhaustion of hot air** for creating comfortable working zone within the CSSD.

- ETO sterilizer should be provided in a separate room with ventilation, degassing and other regulatory ethylene oxide disposal protection requirements.

- **Finishing**

  Sterile area- Epoxy coated wall, Epoxy flooring(2mm thick epoxy and 3mm thick self leveling compound) with corner coving in the Sterile area.
  Wash and Non-sterile area and Corridor area - Antifungal painting on the wall. Vitrified tiles flooring and fixing of glazed tiles upto the 7 ft. height of the wall.

- Laying of **GI water pipe line for Plumbing** with necessary taps, joints, elbows, Unions, Tees and valves of GI made and IS-1239 standard (Latest version) to various supply points in the CSSD Room from single point supply(Provided by the hospital). Contractor will be responsible for supply and installation of water storage tanks and Booster pumps. Individual plumbing lines with valves are required.

- Construction/laying of **Draining system** from all the equipments/Sinks to the main drain (outside the CSSD) with SS Grating/covered with drain port, proper trap and flow system and tapping.

- Providing fixing of **Electrical Gadgets** like ELCB, MCB, Light Points, Power points, Cool air Fans, Exhaust fan etc in the CSSD room.

- Installation of MCB, ACB, ELCB & OCB of Havell/Siemens/L&T/Schneider etc for Control Panel for CSSD.

- 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 all CSSD equipments and other electrical instrument and accessories in the CSSD room **as per standard guidelines of BIS/Srilankan standard.**

- Arrangement for requisite **fire fighting** for CSSD Room

In addition to the above mentioned equipment/appliances, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the CSSD 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.

Note :

- **The contractor shall be responsible for the complete works including submission of working drawing and walk through view.**
- **The contractor should provide complete Operation manual, Equipment manual, Service manual and manuals for all systems and subsystems.**
- **The contractor should provide Final electrical safety test, system test and calibration to be done by authorized person with test instruments.**
- **All electrical accessories like cable wire, electrical outlets, switches etc supplied by the contractor 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 materials and equipments used for CSSD**
- **Training of personnel of the Institute should be 30 days by the contractor.**
- **The contractor should prepare and submit layout plan as well as As-Built drawing for Steam Pipeline, Electrical Wiring, Electrical Distributional Panel, Plumbing, Fire Fighting System, Air Washing and Ventilation and Drain line to HSCC for approval before beginning of supply and installation and As-Built drawing after installation.**
- **The contractor should provide test certificate for all materials along with manufacturer's test certificate and equipments used for CSSD.**
- **Third party quality certification of the CSSD equipment from SGS/TUV/Lloyds should be submitted by the contractor as "Certifies that the CSSD equipment to be supplied/supplied for installation meet the technical specification and BOQ of the tender document vide contract No (Mention Contract No.)."**